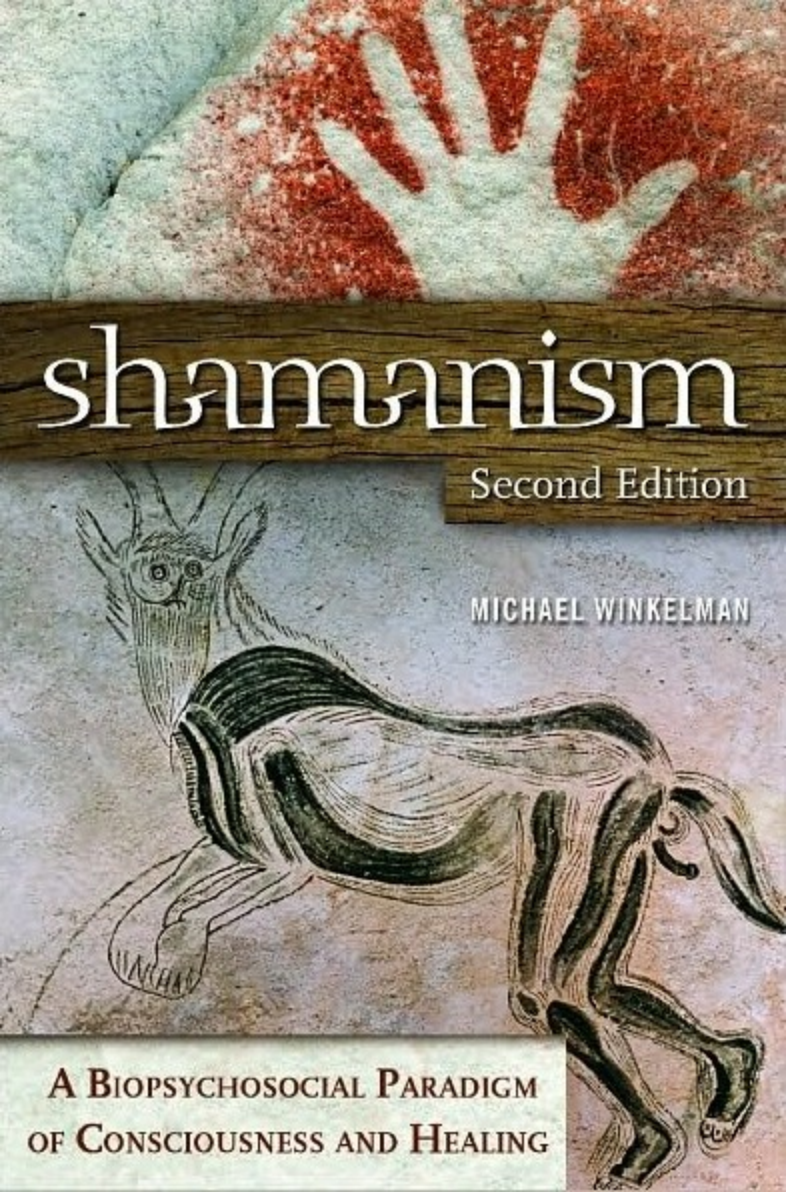
shamanism
Second Edition
MICHAEL WINKELMAN
A Biopsychosocial Paradigm
of Consciousness and Healing

SHAMANISM

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A Biopsychosocial Paradigm of Consciousness and Healing

SECOND EDITION

Michael Winkelman

PRAEGER

AN IMPRINT OF ABC-CLIO, LLC
Santa Barbara, California • Denver, Colorado • Oxford, England

Library of Congress Cataloging-in-Publication Data

Winkelman, Michael.
Shamanism : a biopsychosocial paradigm of consciousness and healing / Michael Winkelman. — 2nd ed.
p. cm.
Includes bibliographical references and index.
ISBN 978–0–313–38181–2 (hard copy : alk. paper) — ISBN 978–0–313–38182–9 (ebook)
1. Mental healing. 2. Shamanism. 3. Shamanism—Physiological aspects. 4. Altered states of consciousness. I. Title.
RZ401.W56 2010
615.8′51—dc22 2010011191

ISBN: 978–0–313–38181–2
EISBN: 978–0–313–38182–9

14 13 12 11 10 1 2 3 4 5

This book is also available on the World Wide Web as an eBook.
Visit www.abc-clio.com for details.

Praeger
An Imprint of ABC-CLIO, LLC

ABC-CLIO, LLC
130 Cremona Drive, P.O. Box 1911
Santa Barbara, California 93116-1911

This book is printed on acid-free paper ♾

Manufactured in the United States of America

To shamans past and future, and to all who wish to better understand our evolved spiritual nature.

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Preface

Shamanism has been traditionally conceptualized in terms of supernatural relations with the spirit world. The relationship of the cross-cultural featuress of shamanism and its ritual practices to human biology has been generally ignored. Skeptics favor a view that such practices are basically concerned with nonempirical and ephemeral features, while believers see such spiritual concerns as falling outside of the physical world and the purview of science.

I reject both of these perspectives in favor of a biopsychosocial approach to shamanism that addresses spirituality as an intrinsic part of human nature. The world-wide manifestations of shamanistic practices and their relationships to innate aspects of our brain functions indicate that they should be understood in evolutionary terms. This book seeks a reconciliation between scientific and spiritual views, taking a neurotheology perspective that addresses the relationships of shamanism and universal spiritual impulses to human nature.

The bold thesis of *Shamanism* is that we should examine the roles of the spiritual in human evolution. Whatever the ultimate source of our intuitions of spiritual and transcendent realities, such concepts have played a significant role in human cognitive and social evolution. Without embracing the content of spirit concepts with an certainty, we can nonetheless accept that such conceptions have played important roles in the systems of thought and action that have guided adaptive human responses. Evolution acts on behaviors and their effects on fitness, and assumptions about a spiritual world can have a variety of direct effects in producing fitness-enhancing behaviors.

This approach may offend those who view human biology as irrelevant to the transcendental spiritual impulses, ignoring the roles of biology in producing the profound experiences of altered consciousness that are so compellingly interpreted in spiritual terms. The idealist view of the power of the spiritual need not be abandoned in a scientific understanding of the nature of shamanism. As Deacon (1997) presented in *The Symbolic Species*, the spiritual is an intrinsic part of symbolism and the evolution of human cognitive capacities. The human experience of our soul

in a sense of a self that is independent of our body is produced through symbols. These symbols can create an independent "virtual" identity of the disembodied self. This self reflects the power of the symbolic capacity to free one's perceptions from the constraints of the immediate present, to allow imagination to take precedence in guiding adaptive behaviors, and to travel back and forward in mental time to review information and possibilities. These evolved capacities of the mind such as the shamanic soul journey allow the imagined to take precedence over the immediate material.

The symbolic representations of spirits reflect these recently evolved processes of mind that provide an ability to use internalized abstract models to engage in learning by extrapolating different possible scenarios and behaviors. The spiritual epitomizes the symbolic features considered to be a defining characteristic of our species. Spirits exemplify the properties of the symbolic, providing a system of representation that transcends the physical; indeed, spirits may be the ultimate symbols, without any referent in the physical world, and with meaning only in a community of like-minded individuals. It is in the search for those hidden systems of meaning that humans encountered the adaptive potentials of the spiritual to guide our perceptions and behaviors.

Acknowledgments

I thank a generation of scholars who have engaged my biological perspectives on shamanism, making possible this second edition of *Shamanism* and its updates. I also thank John Baker, my coauthor of *Supernatural as Natural* (Winkelman and Baker 2008), who contributed to the sharpening of my biological and evolutionary approaches to shamanism, ritual, and healing practices. I have benefitted from the suggestions of Stanley Krippner, Etzel Cardeña, and Alan Combs; unfortunately I was not able to incorporate all of their suggestions. Thanks also to Sue Winkelman for assistance in proof-reading.

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Introduction

Since the first edition of this book a decade ago, the phenomena of shamanism have continued to spread both socially and intellectually. In 2009, the term shaman had more than 12 million hits on Google and 50,000 listings in Google Scholar and nearly a thousand subject listings in *Books in Print*. The concept has become so diffused and accepted that even indigenous groups are now adopting the term *shaman* to communicate about their own spiritual healing practices.

This expansion of the use of the concept of shamanism has made the term even more problematic. Many are overwhelmed by the multitude of manifestations of shamanistic phenomena and cannot seem to find a definable or empirical shamanism. This book presents research that helps us understand both the original manifestations of shamanism and the diversity of manifestations of shamanistic phenomena produced by social influences on our innate potentials for ritual, alterations of consciousness, and endogenous healing responses.

The primary purpose of this revision is not to update the diversity of contemporary shamanistic manifestations, but rather to better elucidate shamanism's roles in our past. During this last decade my focus has extended back in time to explaining the origins of shamanism and its roles in the emergence of modern humans, and beyond that into its evolution from our ancient primate ritual heritage. These developments have also helped sharpen my original purpose—presenting a biopsychosocial paradigm for understanding shamanism. This explicit paradigmatic approach is reflected in the altered subtitle: *A Biopsychosocial Paradigm of Consciousness and Healing*. This biologically based evolutionary framework for understanding humanity's most ancient spiritual and healing tradition explains the cross-cultural distribution of remarkably similar spiritual and healing practices and consciousness traditions. The shamanic paradigm also provides a framework for understanding the biological bases and evolution of religion, as John Baker and I have demonstrated in *Supernatural as Natural* (Winkelman and Baker 2008).

The paradigmatic approach provides a framework for a thorough revision of the first edition, including the reorganization of the material within and

among chapters. The chapters are also updated with new material on the biological bases of shamanistic healing practices and alterations of consciousness. A new chapter on the origins of shamanism expands our understanding of the biological origins of shamanic practices by linking them to the collective rituals of our closest relatives, the chimpanzees. Homologies between shamanism and chimpanzee rituals provide a framework for inferences regarding the ancient ritual capacities of the hominids, the common ancestors of humans and the great apes. These hominid commonalities in ritual displays also provide a baseline from which we can infer and assess the evolutionary changes in hominins (our uniquely human lineage) that led to the distinctive features of shamanism. Shamanic adaptations were significant features of hominin evolution. Furthermore, shamanic features in cave paintings from the Upper/Middle Paleolithic transition indicate that these practices are central to humanity's evolution from archaic *Homo sapiens sapiens* into our culturally modern—but ancient—human ancestors.

This revised edition extends multidisciplinary perspectives in emphasizing the usefulness of evolutionary theory in addressing issues that have largely been the domain of religious studies. Biological perspectives on shamanism should be at the basis of our understandings of the evolutionary origins of religion and their relationship to our evolved psychology. Shamanism reflects exaptations of our primate heritage: the use of an ancient adaptation—ritual—as a mechanism for new social and psychological adaptations. Ritual's original functions of social coordination served as the basis for new adaptations to enhance psychological and social integration in increasingly multilevel and fragmented human societies. These processes were key aspects of the evolution of human social and cognitive complexity and provide psychosocial functions that still have important implications for humans today. These potentials provided the basis for the evolution of more complex social groups, bonding unrelated individuals into an altruistic dynamic through modifications of consciousness that facilitated attachment with an expanded group of others. Altered states of consciousness enhanced access to dream functions, manifested in a presentational (imagestic) symbolic consciousness that provided cognitive tools and workspace for the development of mythological systems representing self, mind, and others. Ritually induced shamanic experiences produced synthetic symbolic representations that are exemplified in the shamanic soul journey and in guardian spirits. Basic features of these experiences indicate that they constitute forms of self-objectification and role-taking that expanded human intrapsychic and social dynamics. Similar processes are found in the classic shamanic experience of death and rebirth, a symbolic death of the old self that permits the emergence and integration of a higher order self.

The cross-cultural similarities in shamanic practices and experiences reflect biological bases. These recurrent features of shamanism reflect neurognostic structures, biologically based aspects of the human capacities for knowing. This book presents a neurophenomenological approach for understanding shamanistic experiences, examining how their phenomenological qualities are related to neurological functions. This approach helps explain how ritual practices exert effects on consciousness and provide healing processes. This approach deliberately articulates

the relationships between two complementary realms of information: (1) phenomenal experiences found cross-culturally in shamanism; and (2) knowledge of the brain structures and functions. This interdisciplinary synthesis expands our understanding of spirituality by establishing homologies between what have been traditionally considered separate fields of endeavor, knowledge of the religious, spiritual, or mystical experiences on one hand; and on the other, the knowledge of the brain operations provided by the neurosciences.

This approach to understanding the nature of shamanistic phenomena reveals that it involves a natural symbolic system that represents basic aspects of consciousness, self, mental processes, and social and emotional dynamics. Shamanism evolved by exaptation of ritual practices and potentials, extending the use of these ancient communication adaptations to serve new functions involving psychophysiological and symbolical manipulation of biological substrates to enhance well-being. The meditative traditions are the descendants of shamanism, extending these potentials in examining and controlling the attentional, perceptual, and conceptual processes underlying consciousness. Explicitly relating neurophysiology to experiences provides a basis for illustrating the biological bases of shamanistic healing practices and their adaptive potentials. These biopsychosocial approaches also help explain the modern appeal of shamanism and the continued relevance of shamanistic practices and perspectives to modern humans. The central role of ritual and shamanic practices in the evolution of human consciousness implies that it still provides a variety of adaptive potentials derived from an enhanced and integrative operation of consciousness, with important applications in contemporary problems such as in treatment of addictions (Winkelman 2001a, 2009b; Winkelman and Roberts 2007).

ORGANIZATION OF THE BOOK

The new edition is reorganized in several ways but still addresses three major concerns: (1) a cross-cultural perspective on the nature and the basis of shamanism and its relationship to other spiritual healing practices; (2) a neurophenomenological perspective on the nature of shamanistic experiences and the characteristics of the integrative mode of consciousness; and (3) the mechanisms of shamanistic healing. These original concerns are extended in a new chapter addressing the evolutionary origins of shamanism.

Chapter 1 provides a new introduction that integrates the previous preface with an overview of the biological and evolutionary perspectives central to this book. This helps to clarify the shamanic paradigm, a biopsychosocial framework for understanding shamanism. A key feature of this shamanic paradigm is a biologically based integrative mode of consciousness that is as fundamental to human nature as the deep sleep, dream, and waking modes of consciousness. Other bases of shamanic universals are rooted in what have been called innate modules, operators and functional systems in the context of evolutionary psychology. Central features of shamanism reflect the integration of the outputs of innate modules to produce new forms of analogical cognition, providing a framework for explaining shamanism's relevance to broader questions regarding the nature and causes of

humanity's religious impulses. Shamanism provides a grounding for evolutionary approaches by its foundations in the phylogenetically ancient communication systems of ritual, the adaptive benefits of costly displays, and the biologically based alterations of consciousness that induce healing responses.

Chapter 2 presents the empirical characteristics of shamanism demonstrated by cross-cultural research, which reveals similar magico-religious practices worldwide in hunter-gatherer societies. This worldwide distribution of spiritual healing practices sharing the same fundamental characteristics and functions demonstrates the empirical reality of shamanism and reflects a biological basis. This chapter includes new material addressing the debate regarding whether or not shamanism is truly an empirically valid cross-cultural concept by distinguishing an empirically similar cross-cultural manifestation of shamans in foraging societies from the diversity of shamanistic healers that reflect modern manifestations of shamanic potentials. The prehistoric presence of shamanism is found in linguistic survivals in English, Sanskrit, and other Indo-European languages, as well as in the Paleolithic cave art of Europe. The shamanic paradigm provides a powerful framework for interpreting the human past and showing how the effects of shamanic group rituals and ideologies provided cognitive bases for enhanced group functioning.

Chapter 3 presents a systems perspective on the nature of consciousness as a framework for evaluating the key elements of altered consciousness involved in shamanism. The fundamental aspects of human consciousness manifested in bodily knowing and their presentation in images are central aspects of shamanism. Shamanism is also concerned with the socioemotional and self-functions of the paleomammalian brain and with cognitive capacities based in metaphor, analogy, and mimesis. The universals of shamanic thought reflect innate psycho- and sociobiological bases of knowing. The integration and dissociation of these representational capacities provides the structures and distinctive features of soul journeys, guardian spirit allies, death-and-rebirth experiences, and other forms of shamanic cognition. These cognitive potentials are examined as manifestations of a presentational symbolic modality that preceded language and which also gave rise to new cognitive potentials.

Chapter 4 examines the principal shamanistic alterations of consciousness, relating their characteristics to biological effects of different ritual induction practices and selection procedures involved. The shamanic soul journey has phenomenological aspects that reflect physiological effects of induction procedures that alter the connections between the experienced and physical selves. Significant features of the shamanic induction practices involve thwarting basic human drives (food, water, sex, rest, sleep), as well as altering neurotransmitter levels by provoking elevated dopamine and opioid levels through the effects of ritual and accessing exogenous sources of neurotransmitters in psychedelic plants. Meditative forms of consciousness are considered from neuroepistemological perspectives that examine the neurological bases of our knowledge of the world. These perspectives illustrate meditative perceptions as natural, or innate, forms of cognition. The basic aspects of meditation involving control of perception, attention, cognition, and emotion illustrate how shamanistic states of consciousness constitute special forms of

knowing. Possession exhibits features similar to a variety of neuropsychiatric phenomena, including temporal lobe syndromes, ictal personality, and multiple personality disorder. Comparing them with phenomenological manifestations of possession illustrates that similar biological processes may be shaped in different ways and result in distinctly different personal and social adaptations. What these forms of knowing share is an enhanced access to what is conventionally understood as aspects of the subconscious and unconscious mind, structures primarily managed by the dynamics of the paleomammalian brain and its emotional and self-functions.

Chapter 5 analyses the bases for shamanistic healing in terms of effects derived from altering consciousness to produce an experience of the spiritual world in community rituals. The psychobiology of the integrative mode of consciousness involves a number of therapeutic mechanisms that activate and integrate unconscious processes. A significant aspect of shamanic healing involves the use of innate capacities such as music. Others include the sacred medicines, which I have reconceptualized as "psychointegrators" in recognition of their therapeutic effects derived from their interaction with the serotonergic nervous system. The functions of the spirit world in shamanic healing include their roles as symbolic representations that facilitate regulation of the stress mechanisms; modification of self-concepts; and integration of the concepts of the "other." Community rituals provide a number of mechanisms of shamanistic healing, particularly as procedures for altering physiological, psychological, and emotional responses by eliciting opioid mechanisms.

Chapter 6 is a new chapter, addressing the evolutionary origins of shamanism (see Winkelman [2002a, 2009], Winkelman and Baker [2008]). The universal features of shamanism provide a paradigmatic framework for identifying the homologies with features of chimpanzee rituals. These homologies identify the ritual dynamics characteristic of our ancient hominid ancestors and the phylogenetic origins of shamanic ritual. Differences between chimpanzee and shamanic rituals suggest an evolutionary zone of development and reveal those uniquely human features selected across hominin evolution to produce shamanism. A central feature of shamanic ritual is healing, reflecting a coevolution of religiosity and spiritual healing. Healing is based in the tendencies toward altruism and expanded in the hypnotic capacity and associated placebo responses. These tendencies contribute to the alteration of consciousness, a capacity that was selected for across hominin evolution.

This capacity for alterations of consciousness resulted from several factors: adaptive endogenous responses to trauma; the selective influences of psychedelic mushrooms; enhanced dopamine and opioid systems and their effects on cognition and sociality; long-distance running and its production of mystical experiences; and the mimesis-based expressive capacities of music and dance. These features illustrate how evolutionary adaptations and exaptations produced experiences and tendencies that were subsequently subjected to selection for their capacities to enhance the social, psychological, and cognitive functions of ritual.

Shamanism has foundations in adaptive aspects of our brain systems; these aspects reflect neurognostic structures, the innate structural features of human

consciousness and knowing. The practices of shamanism tapped into and integrated these capacities, producing a human cultural evolution by using ritual activities to exploit innate potentials in new adaptive ways involving symbolism. Shamanic practices also contributed to human adaptation in their ability to manipulate psychobiological processes through ritual and symbols in order to enhance health and well-being. These processes include stimulating endogenous healing responses and our ability to function more effectively in social groups. This linkage of shamanic practices to human evolution, psychobiology, and psychocognitive potentials indicates that shamanism is part of the neural ecology of human consciousness, with continued relevance and applications to humans today. Shamanism's ancient foundations in our hominid ritual roots and hominin evolution indicate that these concerns must be central to any comprehensive explanation of humanity's religious and spiritual impulses.

This second edition goes beyond perfunctory revisions to offer a significant extension of the vision of shamanism in the first edition. The more explicit biopsychosocial paradigmatic framework and its integration with evolutionary theory provides a more complete understanding of shamanism. The focus on the biological bases of shamanism helps illustrate why shamanism is core to explaining the evolutionary origins of religion. It also illustrates why shamanism is an indispensible aspect of any comprehensive understanding of human's relations with the supernatural. This second edition of *Shamanism* offers a broader and deeper vision of the relevance of shamanism to understanding not only religion but also humanity's origins and cognitive evolution and our human nature.

1 Introduction to Shamanism and Consciousness

CHAPTER OVERVIEW

Shamanic practices reflect a virtual universal of human culture, institutionalized ritual procedures that engage a basic human drive for altering consciousness. In most times and places these practices have produced experiences interpreted in supernatural terms and considered among the most important of the culture. Shamanistic experiences provide an important contrastive perspective to waking consciousness and its rational discourse. Understanding these human universals of central importance to religion, philosophy, spirituality, healing, and creativity requires contextualizing the alteration of consciousness in relation to the structures and functions of the brain. What is the nature of shamanic consciousness, and how is it different from ordinary consciousness?

Consciousness varies in a multitude of ways, reflective of individual, group, developmental, and species differences. It is commonalities and recurrent patterns of consciousness, however, rather than unique differences,that are most important to understanding consciousness. These patterns that are shared by humans and some other animals help to reveal the general nature of consciousness and the special features of altered consciousness in particular. Characterizing the nature and foundations of altered consciousness requires a neurophenomenological framework linking biological functions and structures to phenomenological experience. A neurophenomenological approach identifies the four major modes of consciousness: deep sleep, dreaming, waking, and integrative. These different modes of consciousness reflect cyclic systemic operations of brain structures in adaptation to external and internal environments and provide a context for understanding the special properties of altered consciousness.

Cross-cultural perspectives show important similarities in the experiences of altered consciousness. These similarities reflect underlying biological factors universal to the human species, and which are the basis for commonalities in the significance of altered consciousness across cultures and human history. The different ritual modifications of consciousness found cross-culturally produce

similar brain state characteristics: the production of synchronized and coherent slow brain wave patterns across the levels of the brain. Shamanistic practices produce a parasympathetic-dominant state with entrainment of the frontal cortex by highly coherent and synchronized slow-wave discharges (especially theta waves, 36 cycles per second) originating in the paleomammalian brain structures (limbic brain). These brain wave conditions produce an integration of information processing between the limbic system and lower brain structures, between these areas and the frontal cortex, and between the hemispheres of the cortex; hence the labeling of these conditions as involving the *integrative* mode of consciousness. These innate integrative capacities of the brain are one root of shamanism's adaptive potentials. This chapter introduces frameworks for an evolutionary understanding of the biological bases of humans' ritual and religious impulses and their relations to human consciousness.

INTRODUCTION: SHAMANISM AND THE ALTERATION OF CONSCIOUSNESS

Shamanism, humanity's most ancient spiritual and healing tradition, has reemerged in contemporary societies' religious, spiritual, and healing practices and consciousness traditions. Although the precise basis and the nature of shamanism have often been ambiguous, it has been broadly recognized as a primordial, natural form of healing and modification of consciousness, a human heritage with continued relevance for today's world. Shamanic phenomena and the associated alterations of consciousness have traditionally been attributed to the supernatural and spiritual domains. With the rise of modern science, materialism, and biomedicine, shamanic practices were denounced as fraud, trickery, and delusion. Psychiatric explanations portrayed such phenomena as forms of dissociation, hysteria, psychopathology, and mistaken magical cognition. It was presumed that shamanistic practices, like other aspects of religious thought and behavior, would disappear with the spread of modern rationality.

Just as it seemed shamanism might slip into its final demise within modern rational consciousness, its practices reemerged in modern societies. The general notion that religious behavior declined in the twentieth century is a misperception. While traditional religious denominations and churches have declined, religious participation has grown through sects, cults, and individual spiritual practices. These range from groups such as Pentecostalists to a variety of Eastern-import religions—Unification Church, Transcendental Meditation, Hare Krishna, Buddhism, Hinduism, and others. Scholarly investigators have often characterized people's attraction to religion as a source of refuge and comfort to the downtrodden. In contrast to this viewpoint, the adherents to these new spiritual healing groups and the shamanistic practices in fact tend to be educated people from economically privileged sectors and the health professions.

The attraction of those in the healing professions to shamanism is supported by new evidence and perspectives provided by the fields of medical anthropology, consciousness studies, transpersonal psychology, the anthropology of consciousness,

and studies of psychedelic medicines. These perspectives reveal a multidimensionality to shamanism, a biopsychosocial practice involving techniques for the alteration of consciousness, healing, and personal development. Shamanic activities are reconceptualized as sophisticated ethnomedical practices that provide important cultural healing resources and an alternative epistemology of cause and remediation of health maladies. Shamanistic practices also manipulate physiological processes, psychophysiological reactions, and social psychology and relations. The emerging understanding of shamanistic practices locates their foundations in biological potentials, with deeply embedded roots in the functional bases of ritual, a foundational communicative and relational capacity of vertebrate species. Shamanism was the context in which hominins and early modern humans expanded these relational capacities into concerns with personal and social identity, emotional modulation, attachments, sense of self, and personal transformations associated with alterations of consciousness.

The alterations of consciousness central to shamanism have their bases in our ancient brain structures, whose functions are the foundation for our emotional, personal, social, and cognitive processes. Shamanic practices integrated these processes, producing experiences that are manifested in various forms of analogical thought such as animism, anthropomorphism, totemism, and mimetic enactment. These integrative processes use symbolic capacities of the presentational modality, an imagetic system reflecting deep structures of knowledge that operates independently of language. These integrative processes are epitomized in the visionary experiences that are a signature feature of shamanism.

Shamanic experiences were characterized by earlier anthropologists as awe, trance, or ecstasy, and later as nonordinary and altered states of consciousness (ASC). Today we may question the appropriateness of characterizations as "nonordinary" or "altered" as overvaluing the implicit reference to normal consciousness. Nonetheless, these powerful transformations of consciousness and their profound emotional and experiential effects were recognized by earlier anthropologists as fundamental to magico-religious practices. "Falling into a trance often constitutes the call to a religious vocation and . . . the ability to enter this state is a requirement for the specialist" (Norbeck 1961, 86). Possession is "one of the magician's professional qualifications . . . [and] requires and produces an alteration, a modification in one's state of mind" (Mauss 1972, 39, 128). The primordial role involving the manipulation of consciousness was that of the shaman. Cross-cultural research (Winkelman 1986a, 1990, 1992) illustrated the universality of shamans worldwide in hunter-gatherer societies, constituting an ecologically specific adaptation of human psychobiological potentials. Although many of the specific characteristics of shamanism are not found in the practices of more complex societies (i.e., death-and-rebirth experiences, animal transformation, soul flight), there remains a worldwide persistence of shamanistic healers, spiritual healing practitioners who modify consciousness to interact with spirits on behalf of the community (Winkelman 1990).

We need a scientific explanation of the ubiquity of shamanism in hunter-gatherer societies and universal manifestations of shamanistic healers using alterations of consciousness as the basis for their training and practice. Why is the

alteration of consciousness found universally and in association with spiritual and healing experiences? The answer explored here examines how ritually induced alterations of consciousness provide an integration of behavioral, emotional, and cognitive capacities that enhanced personal and social functioning. Shamanistic practices reflect adaptations to a biological potential I call the integrative mode of consciousness (IMC), a functional-structural feature of humans as fundamental to our nature as the modes of sleep, dreams and waking consciousness.

Culture and the Alteration of Consciousness

The existence of a universal drive among humans for altering consciousness is strongly supported by cross-cultural research. Institutionalized procedures for ritually altering consciousness have been documented in virtually all societies of the world, reflecting a commonality of culture and religion. Bourguignon (1968) reported evidence that approximately 90 percent of the societies in a worldwide sample had institutionalized rituals for altering consciousness, suggesting it was likely a cultural universal. In another cross-cultural study, Winkelman (1986b, 1992) found that communal ritual involving ASC were a cultural universal; all societies have magico-religious practitioners who have their professional roles based in powers derived from the modification of consciousness.

Cultures differ considerably in the attention that they give to learning about the potentials of the IMC, but all cultures have practices that engage these abilities because they involve adaptive potentials derived from the structures of the brain and consciousness. Even when there is cultural repression of the IMC, experiences of this realm of consciousness nonetheless manifest spontaneously and idiosyncratically because they reflect a biological basis. Eliciting the IMC may be achieved in numerous ways, including pushing psychological functions beyond their limits, disrupting subsystems by sensory overload or deprivation, manipulating the autonomic nervous system balance, or focusing or withdrawing attention. Even dissociative and pathological states can destabilize waking consciousness in ways that permit the manifestation of integrative potentials and experiences. This occurs because an attenuation of the waking mode of consciousness and its primary functions permits the emergence of IMC and the integrative symbolic and cognitive processes that are normally repressed.

Cultures relate to the IMC in different ways, either enhancing access and extolling it, or or blocking access and vilifying these experiences. Most ancient cultures have traditions designed to enhance the availability of a range of IMC states, manifested in conditions labeled soul flight, possession, vision quests, enlightenment, and others. In contrast, the dominant cultural ethos of modern Indo-European societies generally ignored the IMC or subjected those who sought it to pathologization, social marginalization, or persecution. There are widespread biases against some forms of altered consciousness in Western society and cultures. Historically, such manifestations were persecuted through witchcraft accusations (Harner 1973b). Western psychology has tended to consider

shamanic-type experiences to be pathological (Noll 1983) or "primitive," manifested in the perspectives that meditative states are regressions to infantile levels (see Wilber [1980] for discussion and critique). Substances that support the Western cultural ethos such as alcohol, nicotine, and caffeine are often denied the status of drugs and normalized, while there are strongly hostile attitudes toward most other drug-induced alterations of consciousness. This is reflected in severe restrictions (medical prescription) or legal prohibition of the use of major psychoactive substances.

A contrastive approach is found in the many cultures that have viewed hallucinogens as *entheogens*, sacred plants that produce a contact with the divine (e.g., see Rätsch [2005]; Schultes and Hofmann [1979]; Winkelman and Andritzky [1996]). Meditative traditions indicate that altering consciousness provides a variety of adaptive advantages through development of a more objective perception of the external world. Rather than being bound up in a habitualized subjectivity, altering consciousness is viewed as a means of developing awareness of the illusory and constructed nature of ordinary perception.Cultural differences in relating to the IMC involve degrees of knowledge of "dream culture," ranging from "monophasic" cultures, which institutionally value only waking consciousness, through "polyphasic void" cultures, which encourage exploration of phases of consciousness beyond phenomenal reality (Laughlin et al. 1992).

The desire to alter consciousness is an innate, biologically based human drive with adaptive significance (Siegel 1990; Sullivan, Hagen, and Hammerstein 2008; Winkelman 2002a&b), a manifestation of a fundamental homeostatic dynamic of the nervous system. These manifestations of consciousness involve a biologically based drive with conditions that contrast with and balance the tendencies of normal waking consciousness—sympathetic dominance and desynchronized fast-wave activity of the frontal cortex. The IMC engages a parasympathetic-dominant condition characterized by synchronized and coherent high-voltage theta wave activity originating in the circuits linking the brain stem and the hippocampal-septal area of the paleomammalian brain with the frontal cortex. These synchronized brain waves ascend from the lower brain areas to the frontal lobes, producing an integration of brain wave patterns across the major levels of the brain and interhemispheric synchronization of the frontal cortex (Mandell 1980). This intensification of the linkages of the lower brain structures, paleomammalian brain, and frontal brain structures produces a synthesis of behavior, emotion, and thought.

The wide range of procedures used cross-culturally to induce these conditions reflects the ability of diverse agents and conditions to evoke this natural potential of the human brain-mind. The IMC is a physiologically based mode of organismic functioning and integration that produces a condition of homeostatic balance. The conditions of systemic brain-mind integration provide information-processing capacities associated with the visual system and dreams, a special form of symbolic communication. Shamans are the first who learned to operate within and to utilize this IMC, providing social and psychodynamic integration and transformation of emotions and identity. Symbols such as those referenced in the flights of descent and ascent found in shamanic experiences

represent these transformations, as do the death and rebirth experiences that reflect the development of a new identity and sense of self.

Shamanistic and other mystical experiences are manifestations of a presentational symbolic system involving fundamental structures of human information processing and consciousness. Shamanism was the context within which humans utilized these imagetic structures of consciousness to extend their informational capacities in new ways. The shaman is a technician of consciousness who uses these potentials for acquiring information, healing and personal and social transformations. Shamans' fundamental roles in the evolution of human society and individual and collective consciousness are illustrated in many key features: their preeminent roles in hunter-gatherer societies as the principal political and religious functionaries, the leaders of hunting and group movement from place to place, and the bearers of cultural mythology. This present work extends the understanding of shamanism and related shamanistic healing activities by addressing the biological and psychophysiological bases of these practices. These bases help explain shamanism's fundamental role in healing, self-transformation, and cognitive integration.

Shamanism and the Study of Consciousness

Shamanistic practices illustrate fundamental aspects of consciousness and the relationships between physical and mental levels of the brain. The cross-cultural similarities in features of visions, possession, and other forms of altered consciousness and spirit world experiences indicate that they reflect biological structures and functions. Shamanistic forms of consciousness constitute important contrastive perspectives to ordinary waking consciousness and, consequently, for understanding consciousness in general. The psychophysiological and experiential changes induced by shamanic activities help elucidate the diverse subsystems that underlie ordinary consciousness. Shamanic rituals also produce a broader range of phenomenal experiences that must be addressed in a comprehensive theory of consciousness. Studies of the contemplative traditions provide data about forms of experience and aspects of self and identity beyond that conventionally recognized in Western psychology. Shamanistic practices produce one pole in the various dualisms of consciousness that contrast the experiences of ordinary egoic waking consciousness of the world and its intellectual, verbal, rational, externally oriented functioning in adaptation to the external environment. In contrast, shamanism transforms consciousness to an internal orientation interpreted as a spiritual world that is known through a subjective intuition and holistic, tacit, and nonverbal sources of perceptions and knowledge. These shamanic forms of consciousness oblige a broader model of consciousness than that emphasized by the specialized activities of the left brain hemisphere.

The traditions of European peoples and their New World descendants have tended to depreciate the shamanic forms of consciousness, manifested in many aspects of historical and current culture: witch hunts; pathological classifications in psychiatry of mystical states; mycophobia (exaggerated fear of mushrooms);

the domination of secularly oriented religious organizations rather than ecstatic sects or cults; the dominance of behaviorist and materialist ideologies in science; and a drug-war mentality in government. This "monophasic consciousness" (Laughlin, McManus, and d'Aquili 1992) obsessively focused on rationalism has resulted in a failure to investigate these types of experiences within science in general. Consequently, the well-developed traditions for understanding the nature of consciousness are largely what have been called the mystical,meditative, contemplative, and philosophical traditions of Asia. The findings of these traditions have generally been ignored by science and biomedicine, dismissed as ego regression to infantile states and as a befuddled way of thinking.

These systems developed in Buddhist and other Asian philosophies have provided extensive knowledge of the nature of the alteration of consciousness (see Walsh [1980, 1988]; Wilber [1977, 1979, 1980]). The importance of incorporating these Asian perspectives into Western consciousness studies was indicated by Laughlin, McManus, and d'Aquili's (1992) observations that Eastern descriptions of consciousness have congruencies with Western neuropsychology's views of how the brain and the nervous system work. Both note that the brain and mind work as a complex of hierarchically functioning levels that progressively model and test models of reality. Mystical systems characterize consciousness in ways similar to the neurological perspectives on consciousness as involving entrainment of circuits and networks, regulation of sensory input, information processing, and determination of adaptive action.

Shamanic and mystical traditions foster development of a different mode of perception involving deliberate cultivation of an internal visionary or imagetic world, a neurologically based symbolic system traditionally represented in spirits, energies, and other powers. The neurophenomenological perspective illustrates universal shamanic beliefs to reflect inherent structures, biologically based modes of knowing. These capacities are manipulated in ritual to promote cognitive evolution and psychological integration. The mystical traditions are "state-specific sciences" (Tart 1975) that examine the attentional, perceptual, and cognitive processes underlying consciousness, providing for further development of the human intellectual capacity within presentational (Hunt 1995a) and epistemological frameworks (Winkelman 1997a).

Although the spiritual vocabulary, concepts, goals, and worldviews used by mystical traditions have contributed to the perception that they are accepted on faith rather than as the result of critical analysis, these traditions are appropriately characterized as sciences of consciousness (Laughlin et al. 1992; Tart 1975). Procedures have been developed for the replicable observation of consciousness, based on systematic and rigorous examination, reporting, and verification of experiences (e.g., see Wilber [1990]). The findings of these mystical traditions have provided data and conceptualizations about a range of manifestations of consciousness that must be central to any comprehensive theory of consciousness. Mystical traditions see the altered forms of consciousness as involving developmental phases subsequent to the rational forms of consciousness that constitute the foci of Western psychology. These developments involve the ability of mind, intention, and consciousness to control the physiological basis from

which they arise. Mind over matter allows for more effective programming of the human biocultural computer.

Mental Effects on the Organism

Another central aspect of shamanistic healing involves what has been called "medicine's symbolic reality" (Kleinman 1980). A universal aspect of the healer-patient relationship involves the positive transformation of the patient's well-being through symbols used by the healer and the expectations for improvement that they represent. This relationship symbolically manipulates physiological levels, a fundamental mechanism of shamanistic action derived from linkages among the mental and biological systems through associations, attachments, and affects. These processes, manifested in placebo, psychosomatic, and psychoneuroimmunological phenomena, are central to shamanistic healing and are increasingly being recognized in medicine as an empirically effective "religious healing." These healing processes involve humans' capacities for hypnotic susceptibility that are extended through our symbolic capacities to enable mythic and cultural processes to evoke physiological changes that produce healing responses.

A new paradigm is necessary to explain the ways in which rituals and symbolic actions cause physiological responses, the mechanisms through which the sociocultural domains of life have effects on individual psychophysiological responses. Although poorly understood from the perspectives of the materialist paradigms that have dominated Western science, the causal effects of mental and ideological levels on the physical levels underlie the mechanisms of shamanistic procedures. Placebo effects, total drug effects, spontaneous remissions, and other healing effects show that thoughts, expectations, and social and interpersonal dynamics have effects on biological responses. Mental processes produce "downward causation," eliciting biological and physical processes (e.g., the use of symbols or intentionality causing variation in biological functioning).

The concept that subjective mental processes have direct effects on biological processes is central to the cognitive revolution of psychology that replaced the bottom-up determinism of positivist materialist science. This emergent interactionist perspective illustrates how higher mental levels have effects on the physical foundations from which they emerge (Sperry 1993). This approach is fundamental to shamanism, which evolved to facilitate an engagement of the effects of beliefs and meaning on physiological responses, using rituals to affect well-being. The influence on physiology by the use of symbols reflects some of the most far-reaching implications of shamanic consciousness for the materialist paradigms of Western science and biomedicine. These causal effects of the mental and cultural levels on the biological levels of human existence are manifested in the general stress-and-adaptation syndrome, hex death, psychoneuroimmunology, placebo effects, and total drug responses. Explicating the psycho-socio-physiological linkages underlying these phenomena requires examining the linkages of meaning to psychobiological functioning.

The effects of meaning—the interpretation of events—on physiological processes have long been understood from studies of stress. The stress-induced

general adaptation syndrome and its psychophysiological effects provide a basis for explaining shamanistic healing. Psychocultural and social effects on physiological processes are illustrated in both ordinary and unusual physiological and behavioral responses (e.g., hex death, spontaneous remission of disease, symbolically timed deaths, mourning deaths, extraordinary healing, and conscious control of the autonomic nervous system and other physiological processes [see Winkelman 2008a]). These phenomena require a major reconceptualization of traditional views of causation.

These reconceptualizations have already been recognized in the neurosciences in how the understanding of perception has shifted to a cognitive perspective (Freeman 1995, 2000). For example, in bottom-up paradigms of physical science, sensory information determines perception. But the studies of perception show otherwise: that a predisposition to see organizes the diffuse visual stimuli into sensations and perceptions. It is our intentional dynamics, what Freeman discusses as "macroscopic feedback messages," that determine the data we seek as well as our interpretations. The macroscopic-level functions are driven by the emotional dynamic of the limbic brain, which produces "parameters that bias the attractor landscapes of the sensory cortices in preafference" (Freeman 2000b, 102)—or more simply, our emotional expectations and desires select what we focus on, where we seek the input from the environment, and consequently what we process and perceive. This shift in attention to the causal effects of consciousness reflects a revolution in science in which meaning has emerged with a central causal role in which symbols produce physiological changes. This book uses these top-down views of consciousness to develop a neurophenomenological approach that integrates the perspectives of the mystical traditions with the science of the brain.

A NEUROPHENOMENOLOGICAL APPROACH TO CONSCIOUSNESS

The nature of consciousness is central to long-standing questions regarding the relationships between mind and body. The neurophenomenological perspective used here provides a unifying approach to consciousness, deliberately integrating knowledge of the physiofunctional organization of the brain with phenomenal experiences, providing a basis for understanding the interaction of biological and mental mechanisms in shamanic practices.

Piaget (1969, 1971) suggested that an understanding of consciousness requires consideration of both: comparative (between species) mental anatomy and structures to determine the commonality in and diversity of mental structures; and mental physiology, the study of mental functions. Laughlin, McManus, and d'Aquili (1992) similarly proposed that a neurophenomenological epistemology needs to address three epistemic processes or aspects: (1) phylogenetic encephalization, how the brain changes over evolution; (2) invariant patterns of ontogenetic neuropsychological development, the universal principles of growth of members of a species; and (3) the sociogenetic, the societal conditioning of views of the operational environment. A neurophenomenological foundation for consciousness requires investigation of: (1) cross-species commonalities and

differences in the development of the information-processing functions of the brain; and (2) the role of activity—praxis—especially the participation in various socially constructed states of consciousness (Winkelman 1997a). The properties of consciousness are derived from interrelations of brain structures with symbolic information and meanings. These interrelations in the production of consciousness necessitate a neurophenomenological approach that directly relates phenomenal experiences to the activities that elicit neurological structures and processes.

The neurophenomenological approach (e.g., Laughlin, McManus, and d'Aquili 1992) provides perspectives for explaining shamanic manifestations of consciousness. Recognizing that our knowledge of both the physical world and internal experience has a common basis in constructed precepts enables consideration of the relationship between the classic dichotomies of objectivity and subjectivity, brain and mind, without creating an inseparable gap between the two. The neurophenomenological approach is not reductionistic to either materialism or mentalism; it recognizes that the physical world is a transcendent reality and that our knowledge and experience of it is through mediating constructs that include the physical properties of our bodies and the mental and symbolic systems in our brains. The physical levels have their own inherent properties, but knowledge of them reflects the structuring principles of the mental (epistemic) levels. These include the features derived from mental filtering, the mental imposition of schemas (i.e., epistemic assumptions) for understanding the physical world.

Human consciousness and the alterations of consciousness are obviously affected by both biological and symbolic systems. Biological manipulations of the body, including drugs, sensory stimulation, and extreme physical activities, can dramatically alter consciousness and the individual's experience of self and world. Similarly, voluntary control of mental process and attention through symbols, rituals, and meditation can provoke dramatic alterations in consciousness and biological responses. Both physiological conditions and ritual activities contribute to the production of shamanic consciousness. Consequently, understanding shamanic phenomena requires that we address both the biological basis that produces a substrate for ordinary consciousness as well as the effects of behaviors and agents that similarly alter the phenomenological structures of consciousness and lead to spiritual experiences.

The neurophenomenological approach examines biology and experience within a common framework of the symbolic basis of both subjective experience and knowledge of the physical world. Observations, whether of the physical world or of subjective experience, are based in symbolic models. By recognizing the subjective and symbolic foundation of what we know of material reality, we obtain a common foundation for integrating what we experience as the division between the objective and the subjective worlds, using a hypothetical materialism and an idealist epistemology (Winkelman 1997a).

Operational and Cognized Environments

To distinguish transcendent reality from our experience of the world, Laughlin et al. (1992) employed Rappaport's (1984) terms *operational environment* and

cognized environment, respectively. The operational environment is the world independent of human knowledge or representation of it (Kantian *noumena*). We do not perceive this external or operational world, reality as it is. Rather we experience symbols in the patterns of neural activity, which depend on the interaction of physiological systems with the cultural programs and epistemic assumptions acquired for processing the external world. What we know of the operational world is a cognized environment or model, a consequence of enculturated processing of information from the operational world. We ordinarily experience our models, not the environment itself; our perceptions are generally limited to our culturally cognized environments, which are necessarily incomplete and contain systematic biases and errors. This structural monist perspective accepts both mind and brain as manifestations of the structures of the human organism, comprising two different views of the same reality: "[M]ind is how brain experiences its own functioning, and brain provides the structure of the mind. . . . " " '[S]piritual' awareness is one way of knowing the being; 'physical' awareness is another way of knowing the being" (Laughlin et al. 1992, 13, 11). Neither the biological sciences nor the spiritual disciplines alone provide a complete explanation or representation of reality. A neurophenomenological approach integrates these perspectives, a recognition of the roles of biology in structuring experience, as well as of consciousness in organizing biological activities.

Understanding this constructed nature of perception of reality requires learning about the operations of the human brain—a part of the operational environment and a physical structure of the organism responsible for producing the behaviors and experiences that constitute evidence of consciousness. Consciousness is what is represented to the organism, its models of the cognized environments, both external and internal. These cognized models are biologically structured, which provides the underlying features of the universals of shamanism and other aspects of religious belief. These fundamental aspects of consciousness include the perception of the universe as populated by active causal agents that are known as spirits.

Spirits as Neurocognitive Structures

The concept of cognized models provides a characterization of the spiritual world as a normal way of knowing the universe. This universal aspect of religion is manifested in the concept of animism—the postulation of intentional causal abilities to nonphysical spiritual entities. Laughlin, McManus, and d'Aquili (1992) characterized the shaman's spirit world as involving a cognized environment in the same sense as we produce an organized construct of our perceptions and beliefs about the operational (external) environment. The visionary level of shamanic experience engages inherent structures that are fundamental to the construction of consciousness. Their manipulation enables the shaman to transform both individual and social states of consciousness and experiences.

Spirits engage some of the most fundamental structures of consciousness—perceptions of self and others (Winkelman 2004a); these similarities found across cultures reflect aspects that represent inherent neurocognitive structures.

The cognized environments of the spirit worlds represent aspects of the person that are conceptualized in psychology and psychiatry as personality, self, id, ego, complexes, motivation, obsession, and other psychodynamic processes, as well as other anomalous experiential phenomena not well understood within the frameworks of Western science. Whatever they are ultimately and ontologically, spirits are experientially real; the neurophenomenological perspective address how they involve direct representations of the fundamental cognitive structures reflecting knowledge of self, others, and nature (Winkelman 2004a).

Spirit concepts play a fundamental role in representing the social world, the individual's social relations, and conceptions of self. Spirits and their characteristics provide an externalization of meanings produced by nonverbal and unconscious levels of the organism in symbolically representing fundamental aspects of the individual and social group. At this level, the difference between self and other, between ego and body, are not dissociated. The spiritual world provides mechanisms that enable both the shaman and the patient to engage in this primordial level of experience and communication that affects physiology, identity, and social relations.

This view of the spirit world as symbolically representing aspects of the social world, individual psychodynamics, and their interrelationships reveals some of the psychotherapeutic mechanisms of shamanistic systems. The relations of the spirit world to the self and the ego are symbolic, with both the supernatural domain and the domain of the self entrained with common neural networks via symbolic systems (Laughlin, McManus, and d'Aquili 1992). In addition to the ego structures that mediate consciousness, the organism also produces a variety of other neural networks that are outside of the ego's experiences. These structures from earlier development have been automatized and repressed, not ordinarily entrained with the conscious ego. These structures represented in the concept of the spirit world can affect biological processes outside of the direct control of egoic consciousness. The ego tends to deny its relationship to these structures, which predominantly function outside of consciousness as dissociated complexes. The spirit world provides a phenomenological symbol system for representing these internal complexes and their relationships. Their ritual manipulation permits the shaman to emotionally transform the individual, reducing egoic structures to permit unconscious material to emerge, guided by cultural expectations in combination with integrative physiological processes.

Constructs of the spirit world play many important roles in representing and evoking these experiences; in mediating between body, psyche, and society; and in managing intrapsychic and psychosocial dynamics. Siikala (1978) analyzed shamanic ritual as involving a form of role-taking in interaction with the spirit world, producing self-transformation for the patient. The shaman's manipulation of roles includes adopting various personalities of the spirits, as well as providing new roles for the patient to enact. This role enactment in communication with the spirit world reflects and affects the psychodynamics of the patient, exerting effects onemotions and emotional processes, attachments, repressed complexes, and other split-off aspects of the patient's own identity. Shamanistic healing integrates the physical, psychological, emotional, and social, using symbols that crosscut

these levels and affect physiological conditions. Ritual communication with the spirit world involves symbolic and pre-symbolic processes that alter the relationship between the self and world to produce a psychological balance, catharsis, and integration.

These beliefs regarding the spirit world are not the product of our rational logical mind but something perceived intuitively and naturally. The naturalness of spirit beliefs reflects their foundation in our natural cognitive processes, features of our ancient brain that provide information for consciousness. This includes an assumption of causal mechanisms underlying the events that we experience.

Brain Structures and Consciousness: The Triune Brain

Bases for shamanic forms of consciousness are derived from the major architectural and functional strata of the brain and their different information-processing functions. While all of the major systems of the brain are involved in complex human behavior, specific systemic patterns of brain functioning are associated with distinct experiential states and modes of consciousness. The relationship of brain physiology to consciousness is illustrated through an examination of how the principal physical structures of the brain and their associated functions are related to patterns of consciousness. MacLean (1973, 1990, 1993) proposed that the brain be viewed as involving three anatomically distinct systems that provide distinct behavioral, emotional, and informational functions; the reptilian (R-complex), paleomammalian, and neomammalian brains, respectively. MacLean's model has its limitations, but it is widely recognized that humans' motor patterns, emotional states, and advanced cognitive and linguistic capabilities are primarily managed by brain systems that emerged sequentially in evolution.

MacLean's model has shortcomings in that it slights the capacities of reptiles and their prototypic limbic system, and it also fails to recognize the intentional properties mediated by the limbic structures (Freeman 2000b). The limbic system is central to vertebrate behavior, constituting the primary organ structure that mediates intentionality, expectancy, achieving our purposes, fulfilling our goals, and making predictions (Freeman). MacLean's triune brain model requires expansions to include a prior amphibian brain; a separate evolutionary development of an avian brain system from the reptilian basis; and evidence of emotionality at the reptilian level (Rial et al. 2008). Rial et al. note that, nonetheless, the triune brain model remains as a useful framework, particularly in terms of understanding the evolution of emotional systems, as well as "a continuity between the brains of current fish, amphibians, reptiles, mammals and birds" (Rial et al., 56).

This triune brain model helps explicate the bases for different forms of consciousness, and how shamanic experiences are related to the ancient brain systems we share with other animals. While all models (cognized environments) have limitations in describing the nature of reality (operational environment), MacLean's triune brain models (see Figure 1.1) provide a foundational model for understanding the nature of shamanism and the effects of the associated alterations of consciousness.

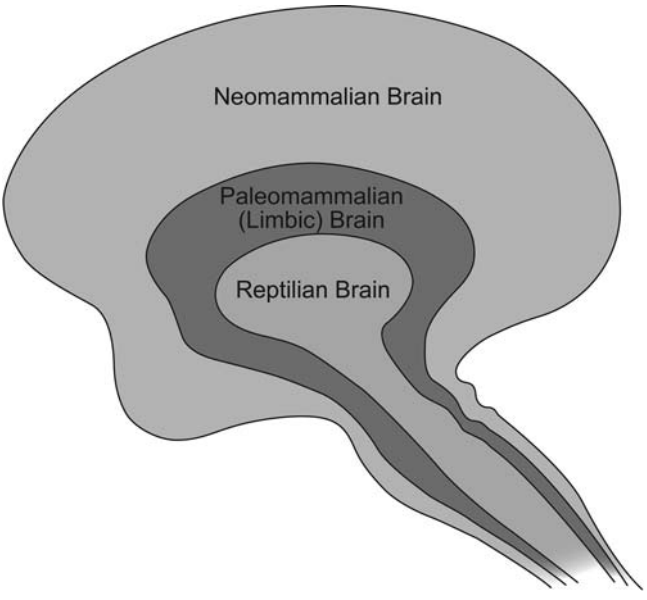

FIGURE 1.1 The Triune Brain

MacLean proposed a hierarchical triune brain based on neuroanatomical, structural, and functional divisions into three strata: (1) reptilian (organic/behavioral) brain (R-complex); (2) paleomammalian (limbic/emotional) brain; and (3) neomammalian brain (frontal cortex). The three formations have different anatomical structures that mediate different psychological and behavioral functions, with their own forms of subjectivity, intelligence, time and space sense, memory capabilities, and motor functions (MacLean 1990). Although the three levels are integrated, they provide the bases for a functional hierarchy of information-processing capabilities and distinct forms of consciousness.

The *reptilian brain*, or R-complex, is composed of the upper spinal cord and other lower brain structures extending upward to the thalamus and hypothalamus beneath the temporal lobe (see Figure 1.2). The reptilian brain regulates organic functions such as metabolism, digestion, and respiration; and it is also responsible for wakefulness, attentional mechanisms, and the regulation and coordination of behavior. It is the foundation for the complex ritual behaviors found in reptiles; other principal functions include acquisition of food, reproduction, and defense.

The *paleomammalian brain* is based on evolutionary developments in the limbic system, which MacLean suggested was the most important distinction between reptiles and the mammals. MacLean apparently erred in failing to recognize protolimbic structures and emotions even in reptiles. But it is also clear that he was correct in seeing the limbic structures as providing the basis for social behavior and nonverbal, emotional, and analogical information processing. The limbic structures function as an "emotional brain," mediating: affect; sex;

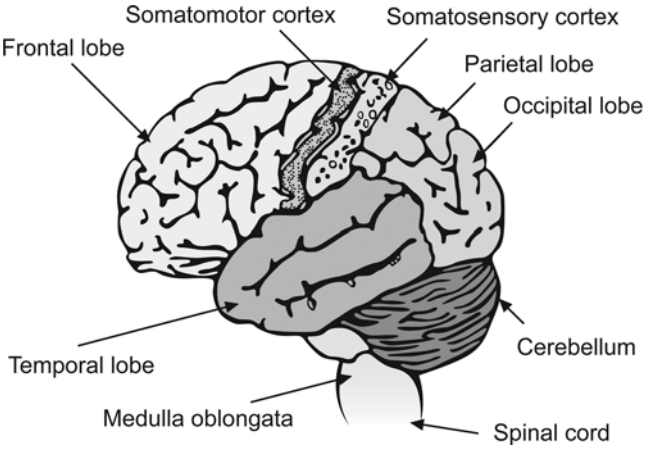

FIGURE 1.2 Lobes of the Cerebrum

fighting/self-defense; social relations, bonding, and attachment; and the sense of self that provides the basis for beliefs, certainty, and convictions. Panksepp (1998) notes that it is in the mammals that we find the great expansion in emotions, or what he refers to as "affective cognition."

The *neomammalian brain* (frontal lobes or neocortical structures) resulted from hominid encephalization. The neomammalian brain provides the basis for advanced symbolic processes, culture, language, logic, rational thought, analytical processes, and complex problem solving. While this level of the brain epitomizes uniquely human capabilities, the modern human brain depends heavily on processes that are primarily subcortical. "The limbic system, by virtue of its multimodal convergence and divergence, its control of brainstem nuclei, and its privileged access to the space-time field of the brain, appears to have evolved as the main conduit and locus of integration of neural activities into awareness" (Freeman 2000, 139–140).

MacLean's proposal of the reptilian, paleomammalian, and neomammalian brains emphasized these capacities of the limbic brain, while also pointing to the different behavioral, psychological, and mental functions of each level, which he labeled protomentation, emotiomentation, and ratiomentation, respectively (MacLean 1993, 39). The protomentation processes of the reptilian brain provide the basic plots and actions of the body. The emotiomentation processes of the paleomammalian brain provide the emotional influences on thoughts and behavior. The neomammalian brain uses enhanced symbolic capacities in elaborating on the behavioral plots and emotiomentation of the lower brain structures, integrating them with higher-level information processing. But rather than the top-down control implied by this view of the neomammalian brain, Freeman (2000b) insists that the evidence indicates it is the limbic brain that is primarily responsible for the higher-level integration. The meaning of a stimulus that leads to sensation recognition and perceptions is based in processes of the bodily senses, emotions, and

affect that are under limbic control. It is this level of the brain that remains vital to human intentions and experiences at the focus of shamanic activities.

The Brain and Levels of Consciousness

The brain levels described by MacLean have homologies with major forms of consciousness described by Oakley (1983) and Hunt (1995a). Hunt suggested that the properties of consciousness are related to neural structures involving "zones of convergence" and capacities for information integration of the different evolutionary levels of the brain. He specifically pointed to the thalamic structures of the brain stem; the limbic system; and the tertiary neocortical area, particularly the right hemisphere. These mirror the three brain strata of MacLean's model.

"Simple awareness" involves adaptation to the environment through reflexes, conditioned responses, and habituation, as well as through instrumental learning based in the confluence of peripheral sensory information in the reticular formation of the upper brain stem. This aspect of consciousness is mediated by the thalamic structures, which project to the cortical areas and trigger cortical arousal characteristic of waking consciousness (Baars 1997, 28). Baars suggested that the reticular formation and the thalamus are the only parts of the brain indispensable for waking consciousness. These brain stem centers central to the sleep and wakefulness cycles are very similar to those found in reptiles and other animals, reflecting the basis for common aspects of consciousness across vertebrate species (sleeping and waking modes of consciousness). Cory (2000) discusses the functions of this level of the brain in terms of self-preservation programming. Damasio (1999) conceptualized a preconscious proto-self which has qualities and an anatomical basis that reflect MacLean's conceptualization of protomentation, which is discussed in Chapter 3.

More complex forms of consciousness are produced by information managed through cognitive integration of modeling of the external environment, including qualities of consciousness enriched by self, other (society), and emotions. This consciousness is produced within a second zone of convergence, based in the limbic system within the paleomammalian brain. This provides the basis for more developed memory, derived from the coordination of different modalities involved in associational learning and based on the mammalian hippocampal and amygdala areas within the limbic system and on extended consciousness through imagery of anticipation and recall. Such mammalian specialization provided the basis for affectional programming (Cory). This level of brain development led to the evolution of capacities for successful cooperation and competition with members of one's own species. The survival value of sociality, relations with members of one's own species, led to the evolution of a variety of social and cognitive capacities that enabled better prediction of the behavior of other members of the group. This expanded the importance of dominance and submission, particularly dominance hierarchies and alliances as a leading force in successful reproduction. This focus on the intentions and future behaviors of others made cognitive capacities such as "mind reading" a key focus in evolution

of humans. The roles of the desires of others in modulating one's own behavior made cognition preeminently emotional.

The highest forms of consciousness are based in a third zone of convergence, the tertiary neocortical area and, in particular, the right hemisphere. These are basic to symbolic cognition and self-awareness (Hunt 1995a, 74–75), providing the basis for "self-awareness"—self-referential capacities and subjective experiences in which the knower focuses attention on representations of the self as an object in the world. Such neocortical capabilities are illustrated in the self-referential capabilities and cross-modal matching manifested in preverbal humans and chimpanzees. The neomammalian brain (neocortex and connecting thalamic structures), the most dramatic evolution of the brain, expanded consciousness through extensive interconnections among the visual, auditory, and somatic systems. The neocortex also provides the bases for other forms of consciousness through neural networks for the portrayal of language and other symbolic activities, such as writing and arithmetic. Although these mental representations are salient aspects of consciousness and self-awareness, the cognitive processes based in lower-brain structures persist because they are essential for human behavior.

The modern brain operates through the integration of the instinctual responses of the reptilian brain, the autonomic emotional states of the paleomammalian brain, and the cognitive processes of the neomammalian brain. These relationships are mediated physiologically and symbolically, but not primarily through verbal language. Rather this mediation is through nonverbal forms of mentation and representation that utilize social, behavioral, and affective information to mediate, evoke, and channel physiological processes.

Cory notes a fundamental tension between our self-preservation drives and our affectional dynamics, where our self-interest conflicts with our commitment to others. This tension produces a struggle between meeting our personal needs and responding to the needs of others. Shamanism addresses this conflict through processes that balance our self-interested and other-interested drives, our innate egocentric and empathetic tendencies.

The functions of these brain structures that humans share with other animals typically operate outside the grasp and awareness of the left-hemisphere-based linguistic modes of representation. These levels of the brain and their functions nonetheless provide the basis for a complex information and intrapsychic communication system. These reptilian and the paleomammalian brain functions are fundamental aspects of mentation and representation that underlie human behavior routines, basic personality, and the sense of self that permits social interaction and meaning (MacLean 1990).

Protomentation and emotiomentation are primarily based in the reptilian and the paleomammalian brains, respectively (MacLean 1993, 35). These forms of communication utilize a variety of mediums (vocal, bodily, behavioral, chemical), which may be active and intentional or passive and unintentional. These nonverbal communication processes have syntax (orderly sequences) and semantics (meaning) and are found in both animal behavioral patterns and humans' primary processing.

The R-complex controls protomentation, the rudimentary cerebration involved in an animal's master routines, the patterns of daily activities, and the expression of the major behavioral displays used in social communication (MacLean 1990, 12). Protomentation controls the displays (ritualizations) and the rudimentary mental processes, as well as "propensions"—"drives, impulses, compulsions, and obsessions" (MacLean 1993, 35). The R-complex manages species-typical communicative behavior, particularly isopraxis (innate dispositions to engage in the same behavior as another member of your species) and other forms of imitation. The R-complex is key to integrating the movements and the total reactions of the organism to communicate personal and social meanings. MacLean characterized the primary functions of the R-complex as social communication through the evocation of displays—animal "rituals." This level of the brain represents patterns of meaning isomorphically in their interrelated physiological, behavioral, and social dynamics.

The Paleomammalian Brain and Emotiomentation

Emotiomentation (or emotional mentation) involves brain and mental processes underlying affects, subjective information derived from associations with feelings. Emotiomentation influences behavior, particularly that pertinent to self-preservation, procreation, and other socioemotional dynamics. The primary brain system underlying emotiomentation is the paleomammalian brain (limbic system), which includes the hippocampus, which is the source of convergence of exteroceptive and interoceptive neurotransmission, synthesizing internal and external sensory information and influencing the hypothalamus and other brain structures responsible for memory, emotions, self-representation, and social behavior. The paleomammalian brain provides the basis for the three principal behavioral developments in the evolution from reptiles to mammals: (1) nursing and maternal care; (2) audiovocal contact developed from maintaining maternal-offspring contact; and (3) play (MacLean 1990, 16). These set the basis for the family, social attachments, enactments, and symbolic meaning. The limbic system expanded considerably in higher mammals, meeting the primary functions of the modulation of affect to guide behavior; it also has an important role in dreaming. Limbic functions are "essential for a sense of personal identity and reality that have far-reaching implications for ontology and epistemology" (248). MacLean (1990) suggested that the paleomammalian brain plays a vital role in higher cognitive functions, including manifestations of the basic social personality. The limbic system plays a vital role in subjective apperception, using feelings to guide self- and species-preservation behavior. Limbic system control of the autonomic nervous system plays an important role in eliciting emotional mentation and in transforming it into physiological effects. This affective and symbolic manipulation of these physiological processes can have profound effects on the organism, for example, provoking physiological changes when the organism is confronted with situations that threaten survival and interpersonal attachments. "Short of inducing physical exercise, emotional mentation represents the only form of psychological information that may provoke marked, and often

prolonged, physiological changes *within* the organism" (MacLean 1990, 23). Both physical exercise (e.g., dancing, clapping) and the ritual manipulation of emotions are fundamental to shaman healing, ritually engaging the opioid system and its powerful motivating and reinforcing effects.

Emotions also affect others' behaviors through the interpretations they model. The fundamental roles of emotions in human learning and development are revealed in the dynamics of child-mother/caretaker interactions. Empathic caring is an evolutionary adaptation, a manifestation of the co-evolution of the paleomammalian brain and of family and social relations. The long-term dependence of infants on adults for survival required adaptations, such as the development of attachment behaviors, as well as smiles, kissing, caressing, and other intimate social behaviors. Feelings of attachment, emotional security, and identity with family provided the basis for the eventual extension of such relations to nonkin, strangers, and the broader social and religious realms. These relations and sense of self also provide the basis for a variety of health problems derived from emotions elicited in social interaction.

Shamanistic healing practices are centrally concerned with the management of these emotions, sense of self, and social relations, utilizing ritual for therapeutic interventions in the processes of the paleomammalian brain. These processes that integrate different sources of information to assess their significance for the organism's well-being provide the physiological basis for shamanistic healing. The relationship of innate drives and needs and social influences constitutes the matrix for many different kinds of health problems—chronic anxiety and fears, behavioral disorders, conflicts, excessive emotionality or desires, obsessions and compulsions, dissociations, repression, and so forth. Processes that are subneocortical, based in prelinguistic symbolic modalities and affective associations, construe these problems and self-constructs through processes primarily involving the right hemisphere and the paleomammalian brain. These aspects of consciousness play a crucial role in providing the sense of unity of assurance and conviction vital for self and species survival (Ashbrook 1993). This sense of self and personal well-being is deeply intertwined with a sense of "communitas," a sense of social identity in which empathy with other humans provides the basis for self and security. Shamanic rituals engage innate social signaling mechanisms that promote a sense of community and enhance cooperation—physically, socially, and mentally—in ways that enhance human adaptation and survival. The paleomammalian brain produces and uses expressions of the face, vocalizations, actions, and gestures that provide information about others' minds and their motives and internal states, creating a common or collective awareness, which is the basis of consciousness.

These nonverbal communicative behaviors and processes have not become obsolete in humans, but rather have been elaborated along with the development of verbal language (Bateson 1972). These earlier communication systems are still manifested in art, music, theater dance, facial expressions, and poetry, reflecting their continued importance in human communication. The discourse of this nonverbal communication is primarily about the self and its emotional states in relationships to others. Bateson (1972) suggested that dreams are a context in which these earlier forms of representation persist, depicting the relationship of the

dreamer to his or her world. But although dreams operate in metaphor, Bateson suggested that they lack the capacity for metacommunication, a consequence of the lack of the reference to self and social context in dreams. But the utilization of dreams for representation in shamanic practices supersedes these limitations. This is achieved through analogical and metaphoric representations based in a visual and corporeal capacity, an imagestic form of presentational symbolism that combines images with memories and bodily sensations to produce a new form of self-awareness.

Human consciousness is experienced through a number of different modalities, which are all fundamentally symbolic in nature (Laughlin, McManus, and d'Aquili 1992). Hunt (1995a&b&c) distinguished two fundamental modalities of symbolic cognition involving a self-referential capacity, which he referred to as representational symbolism and presentational symbolism. In contrast to linguistically based forms of representational symbolism, Hunt characterized presentational symbolism as derived from cross-modal translation, a fusion of the senses of vision, hearing, and touch-movement (Hunt 1995c, 410, 416). This presentational symbolism also constitutes the basic form for awareness within nonsymbolic organisms, including human children; the presentational is prior to the representational. With presentational symbolism, the visual medium is focal, and a polysemic meaning emerges out of the unconscious. The meaning of presentational symbolism appears to emerge directly and spontaneously in images. Images can also provide knowledge beyond that embedded in propositional knowledge, particularly as illustrated in dream imagery, which has meaning beyond that found within waking symbolic consciousness. Dreams are coded communications to be interpreted in a process of exploring the images in relationship to our feelings and social relations.

CONSCIOUSNESS AND ALTERED STATES OF CONSCIOUSNESS: A RECONCEPTUALIZATION

The concept of altered states of consciousness (ASC) as a topic for legitimate scientific inquiry emerged in the 1960s, albeit not without a lot of controversy. Among the many figures who contributed to this emerging field was Charles Tart (e.g., 1975, 1977). His influential books and edited volumes contributed to the formation of an implicit paradigm of ASC that has remained for decades. This paradigmatic framework for altered consciousness is explicitly linked to the concepts of ordinary consciousness, conceptualized as follows (Tart 1977):

states of consciousness (SoC);
discrete states of consciousness (d-SoC);
baseline state of consciousness (b-SoC); and
altered states of consciousness (a-SoC, or ASC).

Tart defined *states of consciousness* as conditions that differ qualitatively from others by the presence of conditions or characteristics that are absent in other states.

States of consciousness represent how people judge usual alterations in experience and are identified by the individual's assessment of patterns of experience. *Discrete states of consciousness* are unique dynamic patterns, configurations, or systems of psychological structures or subsystems. These patterns, in interaction, stabilize each other's functioning and actively maintain a constant overall pattern of functioning and identity across varying environments. Different states may involve different biological responses, but the characteristics are determined by personal significance.

The personal significance of an individual's SoC is of less importance to science than are the underlying biological dynamics that give both similarity to SoC across people and regular differences in SoC across people and cultures. What is most significant about the so-called ASC is not simply that they have personal significance, but that they have special forms of significance that transcend both personal and cultural factors—they are reflective of realms that are transpersonal and transcultural. These factors point to their biological foundations. This notion of an underlying cross-culturally valid biological basis for the general dynamics of altered consciousness did not figure significantly in this paradigm of ASC. But Tart's pioneering work also pointed to the reality of altered consciousness that involves something transcendental, a set of significant human conditions that must be understood with respect to their own intrinsic properties. Tart's (1972) groundbreaking article on the concept of state-specific sciences foreshadowed the perspective suggested below that characterizes altered consciousness in epistemological terms, as specific forms of knowing.

To understand these transcendental dimensions of consciousness we need a framework that goes beyond Tart's (1977, 192) conceptualization of ASC in terms of differences from the baseline state of consciousness (b-SoC), "an active stable overall patterning of psychological functions that, via multiple (feedback) stabilization relationships among the parts making it up, maintains its identity in spite of environmental changes." The ASC paradigm takes the ordinary aspects of consciousness as the framework for conceptualizing the significant aspects of ASC. But what are these major differences with respect to baseline consciousness? And if we take an approach based on the intrinsic properties of these forms of altered consciousness, what would our conceptualization of these conditions reveal? I propose that the answer lies in understanding altered consciousness within the broader frameworks of the biological and epistemological foundations of consciousness in general. This neurophenomenological approach proposes that we conceptualize consciousness first in relationship to several biological functional modes of operation that we share with other organisms such as waking, deep sleep, and dreams. And, secondly, that we understand waking and altered or integrative consciousness in terms of neuroepistemic systems, biocultural processes for knowing.

Modes of Consciousness

Similarities in manifestations of consciousness across species and cultures reflect common underlying biological structures, a manifestation of the systemic

organization of the brain. These biologically structured foundations are discussed as *modes* of consciousness. A *mode of consciousness* is a biologically based functional system of organismic operation that reflects conditions of homeostatic balance among brain subsystems to meet global organismic needs. Different modes of consciousness are revealed in the congruencies in the primary daily patterns of variation in behavior and experiences of humans and other animals. We share with other animals the daily cycles of sleep and waking, with homologous brain structures responsible for these patterns. And with most other mammals, we share the mode of consciousness of dreaming. The biological bases of the modes of consciousness are revealed in the recurrent patterns of systemic neurophysiological functioning and their homologies with the major differences in experience. The transcendent nature of these modes is indicated by their presence in other animals and in the congruence of the biophysiological and mystical approaches in recognition of four fundamental conditions or modes of consciousness:

1. waking consciousness,
2. deep sleep,
3. REM (rapid eye movement) sleep (dreaming), and
4. a spiritual, transpersonal, or transcendental consciousness, an integrative consciousness.

These four modes of human consciousness reflect fundamental aspects of systemic organismic function and balance. The different modes of consciousness are based on the differential activation and integration of different functional systems and information-processing capabilities of the organism. These modes are so basic to the operation of brains that they are functionally wired in multiple ways into the brain's structures. This multiply managed organization of modes of consciousness is illustrated in the brain's control of dreaming. No single region of the brain is entirely responsible for the initiation of REM sleep; apparently there does not exist a "REM sleep center" (Graham 1990), but independently acting groups of cells are responsible for different specific aspects of REM sleep (also see Alkire and J. Miller [2005]; Hobson [2005]; and Sutton, Mamelak, and Hobson [1992] for general neural correlates of sleep and unconsciousness). REM sleep periods may begin as a consequence of a "committee" decision made by interconnected neural groups simultaneously reaching critical levels of activity, with a number of interlinked areas involved in REM production. Studies also showed that the excision of most sites involved with sleep and dream function resulted in only partial or transient sleep disturbances and the persistence of sleep and waking cycles in the absence of what were considered required anatomical structures (McGinty 1985).

Different modes of consciousness involve a differential entrainment of biological, personal, social, and cultural information-processing functions. Although learning and cultural factors produce some variance in the manifestation of the modes of consciousness, their patterns reflect underlying biological functions and organismic needs. Individuals are bound to certain cycles of biologically

based alteration in the modes of consciousness (e.g., deep sleep, dreams, and waking), but cultures produce variability in terms of the specific states and contents of consciousness within modes.

The four different modes of consciousness—waking, deep sleep, dream, and integrative consciousness—reflect fundamental aspects of systemic functioning of the human organism that meet the following system functions and needs, respectively:

- learning, adaptation, and food and other survival needs (waking);
- recuperative functions, regeneration, and growth (deep sleep);
- memory integration and consolidation and psychosocial adaptation (dreaming); and
- psychodynamic growth and social and psychological integration (integrative).

It is noteworthy that not just the waking mode but also the dream and integrative mode of consciousness are recognized as having the potential for some forms of awareness that constitute consciousness. Furthermore, while deep sleep is generally considered unconscious, or not-conscious, meditative traditions have emphasized the ability to develop consciousness during dreams and deep sleep as well.

Reconceptualizing States of Consciousness within Modes

Tart's baseline and altered states of consciousness are reconceptualized here as the waking and integrative modes of consciousness, respectively. The waking mode of consciousness is the biological frame of reference for relating to the world and the system within which organisms function behaviorally. Tart's other states of consciousness reflect variable conditions that occur within all modes of consciousness. Because SoC differ in terms of personal significance or psychological subsystems, they are a subsidiary level of analysis to that of modes, which are derived from physiological processes. Modes of consciousness are biologically based, and their functions are related to organismic needs and homeostatic balance. The differences in states of consciousness reflect sociocultural learning and psychosocial needs. States operate within modes, with the specific characteristics of states determined by the social, cultural, and psychological effects rather than by the strictly biological needs. Modes, states, and phases of consciousness are nested levels of analysis for the bioorganismic structural, phenomenological, and cognized aspects of consciousness. Modes include several states of consciousness, which are characterized by cyclic phases. Different states of consciousness are found within each of the modes of consciousness—sleep, dreaming, waking, and integrative. Different cultures produce different types of stable states of consciousness within the integrative mode of consciousness, but these often reflect specific dynamics found cross-culturally (e.g., soul flight, possession).

The differences in the level of organization implied by modes versus states of consciousness are illustrated by the number of discrete states of consciousness

within the waking mode of consciousness. For example, during the waking mode of consciousness, a person may experience qualitatively different states of consciousness: driving a car, reading a book, eating, having sex, and daydreaming. The sleep and dream modes of consciousness also include different SoC within them. These have been referred to as "stages" in the context of recursive variations in the activities occurring during sleep (Dement and Mitler 1974). During the modes of deep sleep and dreams, a variety of SoC may emerge, known as pathological states such as somnambulism, nocturnal automatisms, sleep drunkenness, sleep terrors, and hypnagogic states. The integrative mode of consciousness also has a number of states of consciousness (e.g., soul flight, possession, *samadhi*) that are referred to collectively as ASC. Subsidiary to the level of states of consciousness are other conditions, characterized by Laughlin, McManus, and d'Aquili (1992) as phases and warps of consciousness, which represent, respectively, distinct cognized episodes of experience and the transition between them (Laughlin, McManus, and d'Aquili 1992). *Phases* reflect a more detailed differentiation of the patterns of internal variation within a specific state of consciousness, a discrete and repetitive pattern of experiences. The attentional structures of waking consciousness are programmed by culture, socializing members to a selective range of potential experiences. Personal consciousness reflects cultural programming of the development, automatization, and inhibition of awareness/attention. This produces phases reflecting the cyclic reentrainment and sequential coordination of neural network activity, producing distinct cognized episodes of experience. This involves the repetitive engagement of specific neural systems into the conscious network, reproducing a previous experience that contributes to producing a series of overall stable organizations of the psyche—discrete states and phases within the waking mode of consciousness.

Warps are experiential and neural transformations (Laughlin et al. 1992, 141) that produce the transition between two different modes or states of consciousness. The hypnagogic warp occurs between the waking phase and the sleep phase. The hypnopompic warp occurs between the dream phase and the waking phase. Warps normally pass so quickly that they are normally unconscious to the subject (e.g., one is seldom aware of the point of falling asleep). One may control or enhance consciousness by directing attention to the previous warp, but the shift through the sleep-dream-waking cycle or modes involves a series of warps that operate largely outside of consciousness. Warps of consciousness are most widely recognized in the ritualized procedures for altering consciousness and entering some state within the integrative mode of consciousness.

Control of phases, states, and modes of consciousness can be achieved by exercising control over warps and by entraining structural aspects of neural functioning normally outside of awareness. Ritual is one way used to exercise control over the operating structures of consciousness (Laughlin et al. 1992). Shamanism uses technologies to induce warps in consciousness to access different modes and states. Shamanistic practices utilize nighttime ritual activities and dream incubation to reduce the barriers to awareness of these experiences on return to the waking mode of consciousness. Production of warps in consciousness is central to shamanic practices and access to the IMC.

BIOLOGICAL BASES OF THE INTEGRATIVE MODE OF CONSCIOUSNESS

The conditions of altered consciousness are not merely some variant of ordinary waking consciousness, but reflect the operation of a different aspect of human nature. A number of investigators have proposed that many different ritual alterations of consciousness involve similar brain responses. Davidson (1976) proposed that common physiological mechanisms involved a manipulation of the divisions of the autonomic nervous system, an extensive ergotropic (sympathetic) activation leading to a collapse into a trophotropic (parasympathetic) dominant state. Consequently, a general feature of altered consciousness involves relaxation and a slowing of the brain wave patterns. These more synchronized and coherent slow brain wave discharges accompany the parasympathetic-dominant state. These altered consciousness episodes are also characterized by an integration of the various levels of the brain. This integration is manifested in entrainment of the frontal cortex by highly coherent and synchronized slow-wave discharges emanating from the limbic system and related lower-brain structures. These entrainments may occur at a variety of frequencies, but a predominant pattern is primarily in the slow-wave theta bands (3–6 cycles per second).

These processes provide the basis for the conceptualization of altered consciousness as an *integrative* mode of consciousness, reflecting principles found in both biological and phenomenological bases. Neurological perspectives show physiological integration as manifested in brain wave synchronization and coherence and reflected in the experiences of various forms of integrative cognition and experience. The biological foundation for these experiences is reflected in their production by a wide variety of natural agents (i.e., psychedelic drugs) and ritual procedures (i.e., trauma, extreme fasting, and exertion) that elicit systematic brain discharge patterns that propagate across the neuraxis of the brain, producing brain wave synchronization.

This paradigm of integrative consciousness originates in the work of Mandell (1980), who suggested that physiological mechanisms underlying "transcendent states" are based in a common underlying neurobiochemical pathway involving the temporal lobe. Mandell suggested that the neurobiological basis underlying ecstatic and transcendent feelings, including their ineffable and religious components, involves a "biogenic amine-temporal-lobe limbic neurology . . . based in the mesolimbic serotonergic pathway that extends from the median raphe nucleus in the mesencephalon, coexistent with part of the mesencephalic reticular formation regulating arousal . . . to the septum and hippocampus" (381, 390). Many agents and procedures produce a loss of serotonin inhibition of the hippocampal CA3 cells, which results in an increase in the cells' activity and the manifestation of hippocampal-septal slow-wave frequency discharges. This slow-wave EEG activity (alpha, theta, and delta, especially 3–6 cps theta) imposes a synchronous slow-wave pattern on the frontal lobes. This produces slow-wave hypersynchronous discharges across the hippocampal-septal-reticular-raphe circuit that link the R(reptilian)-complex and paleomammalian brain. Agents and procedures that

invoke this pattern include hallucinogens, amphetamines, cocaine, marijuana, polypeptide opiates, long-distance running, hunger, thirst, sleep loss, auditory stimuli such as drumming and chanting, sensory deprivation, dream states, meditation, and a variety of psychophysiological imbalances or sensitivities resulting from injury, trauma, disease, or hereditarily transmitted nervous system conditions.

Mandell proposed that the hippocampus is the focal point of the mechanisms that reduce the inhibitory serotonin regulation of temporal lobe limbic function. The loss of inhibitory regulation by serotonin results in hyperexcitability of the CA3 cells and reduction or loss of the cells' role in the "gating" of emotional response. This loss of gating, combined with the hippocampal-septal synchronous discharges, result in an emotional flooding—ecstasy (paraphrase, Mandell 1980, 400). The loss of hippocampal CA3 modulation removes regulatory input from the environment, leaving the "inside world" dominant.

The hippocampal-septal system is an association area involved in the formation and the mediation of memory and emotions. The hippocampal formation influences the hypothalamus and other brain structures responsible for self-preservation, family-related behavior (MacLean 1990), and the management of novel sensory information. The synchronous patterns originating in the hippocampal-septal-reticular raphe circuits reflect linkages of the attentional mechanisms in the behavioral brain regions (reticular formation) and the emotional brain (limbic brain, particularly the hippocampal-septal area). These repetitive responses produce synchronous electrical discharges that propagate up the major axon bundles from the base of the brain into the frontal cortex, imposing these discharges from our ancient levels of the brain into the frontal lobes.

Drugs and the Integrative Mode of Consciousness

The worldwide association of plant drugs that profoundly alter consciousness with religious and spiritual activities (see de Rios [1984], Schultes and Hofmann [1979]; Rätsch [2005]) points to intrinsic relationships among the innate properties of our neurotransmission systems and the origins of religious experience. Spiritual traditions worldwide consider substances that are exogenous sources of neurotransmitters to be the origin of their most important deities and the reason for their spiritual and consciousness-transforming practices. An explanation of the origins of religious practices, and shamanism in particular, must address the roles of these external sources of altered consciousness that are at the core of many spiritual traditions, showing the relationships of these agents to the functions of the brain systems that are activated.

The differences between drug and nondrug alterations of consciousness are generally presumed to be so obvious that their common substrate is not considered. But the phenomenological similarities of drug-induced and natural mystical experiences was illustrated in the double-blind study by Griffiths et al. (2006), which showed that psilocybin produced the characteristic features found in naturally induced mystical experiences. The relationships among natural and

drug-induced alterations of consciousness must be understood from an evolutionary perspective. This reveals altered consciousness to be related to endogenous mechanisms that are triggered by both ancient evolutionary adaptations and more recently acquired propensities to use exogenous sources of substances to alter consciousness. Reconceptualizing plant "toxins" as "rewards" in terms of effects on behavior, emotions, and cognition reframes this human attraction as an adaptation involving an enhanced ability to use exogenous sources of important endogenous neurotransmitter substances that have a profound effect on human consciousness.

Sullivan and Hagen (2002) review evidence of a long-term evolutionary relationship between psychotropic plant substances and humans' cognitive capacities that indicate there were selective benefits of their use. Sullivan, Hagen, and Hammerstein (2008) point to a variety of forms of evidence that drug plants were part of ancient environmental exposures that resulted in human's evolution of counter-measures to plant defenses, processes that enabled us to benefit from their neurotransmitter sources without suffering from their toxic defenses. They characterize these benefits as derived from the ability of plants to provide neurotransmitter analogues that served as substitutes for endogenous neurotransmitters that are rare or otherwise limited by dietary constraints. These are primarily in the monoamine neurotransmitters such as dopamine and serotonin, as well as acetylcholine and norepinephrine, which are crucial for normal brain function and require dietary precursors. These neurotransmitters are central to managing stress, exerting a selective pressure for a metabolic system that can use these exogenous sources of precursors of valuable neurotransmitters, particularly the opioids, dopamine and serotonin (see Figure 1.3).

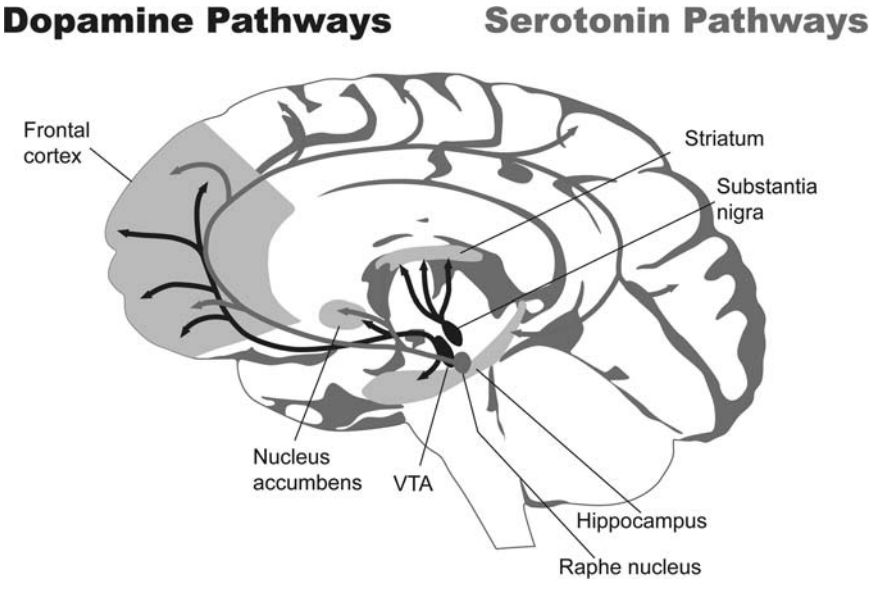

FIGURE 1.3 Major Neural Pathways in the Brain

Both dopamine and serotonin are key to understanding the alterations of consciousness found worldwide in shamanistic traditions. Dopamine and serotonin are the two most important neurotransmitter amines and play complementary roles in balancing the functions of the brain and body (Previc 2009). "[T]he serotonergic inhibition of dopamine release is arguably the clinically most important neurochemical interaction in the brain . . . particularly in the ventromedial and limbic subcortical and cortical areas" (Previc 2009, 21). The right hemisphere and its serotonergic and noradrenergic systems inhibit the left hemisphere and dopamine. Psychedelic plants have the capacity to interfere with these regulatory functions of serotonin, releasing functions of the dopamine system.

Dopamine and Altered Consciousness

A central feature of the neural transmitter systems involved in altered consciousness is the dopamine system, which is stimulated by an enormous variety of both endogenous and environmental chemicals (Previc 2009). Previc proposes that the human drive to seek ASCs directly involves the dopamine system, which is inhibited by serotonin, and indirectly disinhibited by the psychedelics. While the diverse neurochemistry underlying psychedelics might appear to contradict the model of a common neural substrate for ASC, Previc argues for a common neurochemical profile across the numerous different neurotransmitters involved. He proposes that the diverse drugs that alter consciousness ultimately lead to elevated levels of dopamine in the brain. Common to ASCs is a disinhibition of dopaminergic extrapersonal brain systems, particularly those involving ventral cortex and the limbic circuit that runs from the medial temporal lobe to the ventral striatum (Previc 2009; Vollenweider and Geyer 2001).

Evolutionary approaches to abusive use of drugs have generally focused on the reward and reinforcement effects they have on the dopamine system; virtually all classes of drugs (including alcohol, nicotine, stimulants, and tetrahydrocannabinol [THC]) have effects on dopamine transmission in the limbic system, as well as on serotonergic transmission (Mandel 1980; Smith and Tasnadi 2007). The effects of endogenous opioids on dopaminergic transmission closely resembles those of alcohol, amphetamines, cocaine, nicotine, opiates, and THC (Smith and Tasnadi 2007). Although they act through a variety of intermediary systems (serotonin, enkephalins, GABA), acute exposure to the major categories of drugs of abuse results in increases in dopaminergic activity, specifically in the hippocampus and nucleus accumbens (Smith 1999).

Endogenous opioids is a general term referring to a class of natural substances in the body that include endorphins, enkephalins, dynorphins, and other opiate-like substances (Smith and Tasnadi 2007) that interact with the dopamine system. These substances, particularly β-endorphin, are functionally identical (analogues) to the opiates found in plants, which have the capacity to interact with the same neurotransmitter sites in our brains. The endorphins are also adaptations for reducing pain and stress and enhancing learning and memory. The uniquely human activity of long-distance running produces enhanced release of endorphins, extending the capacities of such extreme physical activity that was

adaptive in flight from predators with the pain-numbing effects, facilitating the ability to continue to flee rather than succumb to pain, muscle cramps, shortness of breath, and so on (Jones 2005).

The effects on dopamine receptors are typically characterized as producing a pleasurable response that reinforces behaviors that favor successful adaptation, such as food and sex. In addition to the naturally pleasurable effects, opioids reduce pain avoidance and sexual behavior, and increase eating. The mesolimbic dopamine system and its rewarding properties and mediation of pleasures from natural rewards (food, sex) decline when the dopaminergic system is suppressed or impaired (Barbano and Cader 2007). Salamone and Correa (2002) refined this view in proposing that it is the dopamine system that attributes incentive qualities to a reward, potentiating the organism's associated responses. Humans' potential for addiction belongs to the same reward system that produces the powerful experiences of altered consciousness in spiritual traditions found worldwide, and reflects the importance of such experiences to the human condition.

Although dopamine is associated with sex and other pleasurable states, it does not appear to have a central role in emotional arousal in general or social warmth and empathy, which instead depend on serotonin, norepinephrine (NE), opioids, and oxytocin (Previc 2009). In fact, high levels of dopamine lead to emotional detachment. The human dopamine system must be contextualized in broad evolutionary terms as part of our mammalian heritage, with similar effects across mammalian species in social bonding, from mother-infant bonds to broader social groups. The endogenous opioids that stimulate our reward and learning systems also have core functions in the mammalian brain and its emotional, social, and self-systems, especially breastfeeding and bonding. Sullivan, Hagen, and Hammerstein suggest that the central role of these substances in the mesolimbic dopamine system indicates that we should also understand the broader functions of the opioids in regulation of attention, the integration of sensorimotor behavior, and modification of behavioral programs. Previc (2009) reviews evidence that dopamine is also vital for all of the key functions of advanced intelligence and cognition, including programming and executing motor planning, working memory and the capacity for parallel processing, spatial and temporal abstraction, and mental set shifting. These dopamine effects involve a number of cognitive processes fundamental to the emergence of the modern human psyche and our orientations to extrapersonal space, times and places distant from our immediate presence. Previc implicates the role of dopamine in a variety of cognitive abilities crucial to these forms of advanced human cognition, including stimulus associations, exploratory behavior, motivation, goal-directedness, reward prediction, cognitive shifting, abstract representation, and processes linked to generativity and creativity (Previc 1999, 2009).

Previc notes that all of these higher cognitive functions *are concerned with processing of information regarding events in distal space and time*. Dopamine appears central to understanding causal and temporal relationships and to placing our awareness and focus of attention outside of the immediate space and present time. Dopaminergic circuits are active during exploration of novelty and reward learning and motivate prolonged effort for delayed gratification and pursuit of

goal-directed responses. The abilities for context-independent cognition are exemplified in the capacities for "off-line thinking" and "mental time travel," the ability to experience and think about things other than those in the here and now. "In essence, ventromedial dopaminergic activation results in the 'triumph' of extrapersonal brain activity over the body systems that anchor our self-concept and our body orientation as well as a triumph over the more 'rational' executive intelligence maintained in the lateral dopaminergic systems" (Previc 2009, 53). "The predominance of dopamine in association with cortical areas, in which higher order sensory processing or cross-modal sensory interactions occur indicates that dopamine is especially well-suited to making connection among stimuli and events and organizing them into mental plans. This is beneficial in stimulating creativity and in 'off-line' thinking and strategizing, important components of abstract reasoning" (Previc 2009, 30).

Dopamine's central role in the integrative functions of the prefrontal cortex (PFC) is extended throughout the brain as the nervous system that allows the PFC to connect to other cortical regions. The major dopaminergic systems originate in the midbrain area within the mesolimbic system and its numerous connections to other limbic structures and the frontal cortex. These midbrain and brainstem areas are the most important motivational system and contain cell bodies that produce a wide range of neurotransmitters and extend to all of the regions of the cortex. Dopaminergic activation produces the integrative dynamics characteristic of the IMC.

Disinhibition and Deregulation

This paradigm of integrative brain states as a generic feature underlying altered consciousness is illustrated in the research of Vollenweider (1998) on the mechanisms of action of psychedelics on the major cortical loops. The frontal-subcortical circuits provide one of the principal organizational networks of the brain (Cummings 1993). They involve five parallel segregated loops and feedback loops of neuronal circuits that link the cortical areas of the frontal brain with the thalamus of the brain stem region. These loops linking the frontal cortex with lower brain regions (basal ganglia, substantia nigra, and thalamus) are central to brain-behavior relationships, mediating motor activity, social actions, motivations, and executive functions. These frontal-striatal-cortico circuits underlie motivated actions and emotions by monitoring information which pass through the thalamus (the primary filter). Deficits in these frontal-subcortical circuits are keys to a wide range of psychological disorders (Cummings).

Vollenweider's findings implicate the consciousness-altering properties of psychedelics as involving selective deficit effects on the brain's CSTC (cortico-striato-thalamo-cortical) feedback loops. These loops are the principal organizational networks of the brain, linking the information-gating systems of lower levels of the brain (basal ganglia, substantia nigra, and thalamus) with the frontal cortex. These loops are regulated at lower levels of the brain in the thalamus, which limits the ascending information. Psychedelics produce disturbances or deficits in the CSTC loops. The disinhibition of the lower brain systems by the

psychedelics floods the frontal cortex with information, leading to breakdown of the integrative capacity of the ego. This increased information from the lower brain systems can overwhelm the frontal cortex and lead to an alteration of experience of self and the internal world of psychological structures and projections. The emergence of these unconscious dynamics increases because of the disabling or deafferentation of the brain structures supporting egoic consciousness.

Altered Consciousness as Deregulation of the Prefrontal Cortex

The hypothesis of alterations of consciousness as disruption of processes of the frontal cortex is also proposed by Dietrich (2003), who noted that a variety of ASC involve a temporary deregulation of the prefrontal cortex (PFC). Psychological and neurological studies illustrate that endurance running, dreaming, hypnosis, drug-induced states, and meditation share commonalities in their disruption of the higher order functions associated of the PFC. This disruption is manifested in the loss of highly integrated aspects of neural information processing and higher cognitive functions. The various agents and activities that lead to this deregulation (extensive exercise, food-deprivation, induced dreaming, drugs, meditation) do so in distinct ways that contribute to different kinds of ASC experiences and their unique phenomenological characteristics. Underlying these differences, however, are significant commonalities that constitute the physiological dynamics of the integrative mode of consciousness that derive not just from a deregulation of the frontal cortex but also the manifestation of other brain structures usually repressed by frontal activities. Dietrich's transient hypofrontality theory postulates that ASCs result when higher level brain functions of the cortical regions and the prefrontal cortex are down-regulated. This inhibition happens in part through the serotonin disinhibition of the dopamine system. The action in down-regulating the PFC allows a number of unusual self-experiences because the normal sense of self is deactivated, allowing for the emergence of aspects of identity related to our more ancient brain functions.

Dietrich (2003) proposed that the lack of engagement of the PFC results in the lack of certain frontal lobe qualities—willful action, self-awareness, the deliberate direction of attention, abstract and creative thought, and planning. However, shamanic soul journeys and many meditative states retain those properties, requiring an explanation of how these capacities persist in the absence of prefrontal functions. D'Aquili and Newberg (1999) also note enhanced PFC activity in meditation.

Hypnosis as Integration and Dissociation

Selection for a biological disposition to these highly focused internal states of awareness is illustrated by the genetic basis for hypnotic susceptibility, which also reflects limbic-frontal integration characterized by theta wave discharge patterns (Crawford 1994). In noting the substantial similarities between shamanic and hypnotic experiences in spite of the very different contexts, Cardeña (1996) proposes that the alterations in consciousness found in shamanism and deep

hypnosis are likely the product of the same innate biological and cognitive dispositions. Crawford reviewed research illustrating the neurophysiological basis for hypnosis. Highly hypnotizable people have attentional filtering mechanisms that function more strongly, enabling them to sustain attention with better focus and to ignore irrelevant environmental stimuli. Their renowned ability to focus on an internally generated environment reflects a fundamental characteristic of the shaman's visionary experience.

The features of hypnosis also reveal the reciprocal side of integration, that of dissociation. In order to have a highly focused attention, there must be a reduction of attention to distracters. The highly integrated internal visionary states of the shaman involve a reduction of other inputs, in essence a reduction of external sensory information and bodily input. This reduced sensory and bodily input response can be produced in part by just the opposite, high levels of sensory (drumming) and bodily (dancing) stimulation. This excessive stimulation leads to exhaustion and habituation of the nervous system response, resulting in the cessation of attention to external and physical stimuli that facilitates an internal focus of attention. This interactive dynamic of integration and dissociation is also addressed in the context of possession and related conditions in Chapter 5.

Crawford proposed that hypnosis and its enhanced attention reflect an interaction between subcortical and cortical brain mechanisms that enable highly hypnotizable people to sustain attention as well as disattention. Crawford suggested that concentration and suppression are two aspects of the same cognitive processes involving the willful direction of attention. The attentional mechanisms involved in extreme focus of attention and hypnotizability are those related to the far frontal cortex's regulation of limbic system activity and gating for incoming sensory stimuli. A consequence of the highly hypnotizable individual's more efficient far frontal limbic attentional systems is the ability to disattend to extraneous stimuli, known as cognitive inhibition. Hypnotizability and inhibition are associated with theta-wave production, which produces more efficient attention and performance. This enhanced theta is associated with right-hemisphere activity among the highly hypnotizable.

Enhanced limbic frontal interaction characteristic of highly hypnotizable individuals is a pattern of brain functioning that typifies the model of the IMC presented here. Hypnosis typifies the natural response of the brain in which there is an enhanced interaction between the limbic and the frontal brain, enhancing connections across the neuraxis. The flexibility of outcomes at both experiential and physiological levels that is associated with highly hypnotizable persons and their cognitive flexibility reflects their ability to shift awareness and cognitive strategies. Highly hypnotizable individuals also show other specific information-processing abilities: to become deeply engrossed in imaginative activities; to produce vivid imagery; and to engage holistic information-processing styles (paraphrase of Crawford 1994, 223).

Functional connectivity is the theme for understanding conscious states and hypnosis, and a number of researchers have identified networks of functional connectivity associated with hypnosis (Jamieson 2007, 6, 7). The effects of top-down mechanisms on bottom-up processes, in essence the abilities of intentions

to override the manifestations of lower level autonomic and involuntary processes, illustrates how the dynamics of one level are integrated into another. A basic principle of phylogenetic brain evolution is increasing hierarchical integration, a top-down inhibitory control of the brain stem and limbic regions by the neocortex. Ray (2007) proposes that hypnosis be understood from an evolutionary perspective in terms of the interaction between the limbic and cortical structures, where we find interplay between the executive control functions of the frontal cortex and the preconscious social mechanisms of the limbic levels. The hypnotic state influences (reduces) the higher level emotional processing of basic reflexes by the directions provided through the social and cognitive (informational) influences of the hypnotist. Foundational to hypnosis are information-processing dynamics in which feelings take precedence over the sensory world in dictating behavior.

This reflects the basic features of the model of the integrative mode of consciousness (IMC), where lower level structures impose their dynamics on the overall functional outcomes in the brain. The model of the IMC supports the state approaches to hypnosis, which see it as engaging something other than our ordinary cognitive capacities, some structures of consciousness and brain networks distinct from those characteristic of ordinary waking consciousness. This reflects Jamieson and Hasegawa's (2007, 141) proposal that we conceptualize hypnosis as a discrete ASC, a "discrete altered state of brain networks . . . [when] the dominant network of functional connectivity between local brain regions and its oscillatory dynamics have changed from a defined baseline state." In contrast to the orientation of the external sensory world, hypnosis and the IMC engage this imagined alternative, which controls the body, including physiological responses, perceptions, emotions, behaviors, and thoughts.

In hypnosis the higher order cognitive control functions that are based in the linkages among frontal, subcortical, and posterior regions are disrupted, with "a fundamental shift in the organization of executive functions within the brain" (Jamieson and Woody 2007, 119). Hypnosis disrupts the anterior system of flexible and rapid cognitive control, resulting in a breakdown in the integrative processing of the anterior cingulate cortex (ACC) and left prefrontal cortex (PFC) (Jamieson and Woody, 123). Conflict-monitoring processes of the ACC may continue but they are not integrated into the PFC; there are nonetheless increases in the activation of the ACC under hypnosis, reflecting its role in spontaneous hallucinatory imagery.

The connections of the ACC linking the PFC with motor and visual fields give it roles in shaping both top-down and bottom-up processing, playing a central role in differentially allocating control to various regions of the brain. Connections with the amygdala, hypothalamus, and other limbic regions give it central roles in providing motivational and emotional input to perceptions and behaviors. Jamieson notes that the dominant theories of hypnosis emphasize the interruption of a hierarchy of cognitive systems under hypnotic conditions, a dissociation of the executive supervisory attentional system from the conflict-monitoring regions of the brain found in the anterior cingulate cortex (ACC) brain regions responsible for controlling autonomic, emotional, and cognitive

processes. Hypnotic analgesia is also associated with enhanced functional modulation between the ACC and the brain regions associated with the integration of sensory, motor, affective, and cognitive networks.

The control of the emotional level of the brain through interactions with higher cortical structures involves connections between the orbitofrontal cortex and the anterior cingulate cortex (ACC) (Ray 2007). The orbitofrontal cortex is a key structure lying just below the PFC, where it modulates emotional and motivation information; originally thought to be a crucial part of the limbic system, Allman et al. (2001) propose that it be seen as an evolved part of the neocortex. The orbitofrontal cortex also has key connections with the ACC, a limbic lobe loop that reflects a neocortex specialization for managing and integrating emotional and cognitive information. This ACC area has been repeatedly implicated as key to the modulations of hypnotic experiences, particularly the hallucinatory components. It also has a variety of crucial roles in cognitive processes.

The dorsal areas of the cingulate cortex form a "collar" (corpus callosum) that links the nerves connecting the two frontal hemispheres of the brain and receives direct input from the hypothalamic emotional processing centers (Allman et al. 2001). Stimulation of the anterior part of the ACC produces the animal's full range of vocalization behaviors. The ACC has a very large number of dopamine receptors, one of the highest of any area of the cortex, as well as strong amygdala projections. The ACC has a wide range of outputs back into subcortical structures. Because of its intense interconnectedness with limbic structures, the ACC was traditionally seen as part of the limbic brain. More recently, however, it has been recognized as a specialization within the neocortex that has central roles in control of emotions, problem solving, recognition of errors, and the ability to make adaptive responses under conditions of change (Allman et al. 2001). The significance of the ACC for the evolution of consciousness is underscored by the presence there of spindle-shaped neurons found only in hominids (reported in original sources as hominoids, also meaning humans, their ancestor species, and the great apes). These neurons are a recent evolutionary development, "a hominoid specialization of the neural circuitry of the [ACC]," with distal projections for coordination of diverse parts of the brain to solve problems (Allman et al. 2001, 112).

The ACC is a central neocortical area for the regulation of emotional responses and the focus of cognitive behaviors related to problem solving. The ACC is the source of the theta waves (4–7 cps) that are produced when people engage in tasks that require focus and concentration (Allman et al. 2001). Increased functioning of the ACC is associated with greater social insight. The evolution of the ACC contributed to greater emotional self-control and the ability to solve problems through the spindle neurons that connect and coordinate distant and diverse parts of the brain. These functions of the ACC have helped to clarify the fundamental role of emotions in consciousness, bioregulation, and cognition (Damasio 2001). The integration of emotional experience is crucial to memory formation, reasoning, and decision making. The ACC and spindle cells are a central part of the integration of emotions into focused problem solving,

recognition of errors, and making adaptive responses. Emotions play a key role in mediating between the responses of the hardwired bioregulatory systems ("instincts") and personal memories, providing the value systems that select short-term memory for permanent encoding. The ACC is specialized, with a ventral function with respect to emotions and a dorsal function for cognition, internally mediating between the two. These mediating and connective functions of the ACC epitomize the basic properties of the IMC.

Meditation and Integrative Brain Dynamics

The integrative and dissociative brain dynamics of the IMC are also exemplified in studies of meditation. Although there is a range of different effects reflecting the intents of practitioners, since the earliest studies there have been consistent reports of meditation resulting in increases in alpha and theta amplitude and regularity in the frontal and central regions of the brain. This initial evidence of meditation producing increases in slow-wave brain patterns continues to be confirmed and extended (see Chapter 4). Recent research implicates an additional level of meditation-induced changes in brain waves, reflected in biphasic hypersynchronous high-frequency gamma waves (Lehmann et al. 2001; Lutz et al. 2004; Vialatte et al. 2009). The presence of gamma in meditation is direct confirmation of the IMC model because gamma is associated with binding of diverse signals within the brain. The findings of this gamma binding of activities from diverse areas of the brain support the theta-wave psychointegration model of the IMC, because gamma synchronization is modulated by the theta and alpha rhythms (Fries 2009, 217).

Meditative experiences also involve selective segregation or deafferentation of input from brain systems. D'Aquili and Newberg (1999) examined a form of mystical experience, the Absolute Unitary Being (AUB), in terms of systemic effects on the brain's processing loops. The AUB involves an experience of awareness of unlimited senses of self, being, other, time, and environment, accompanied by blissful emotions. They propose that these AUB experiences involve interference with the normal functions of four of the tertiary association areas. The relevant cortical regions are the inferior temporal lobe (ITL); the parietal lobe, specifically the inferior parietal lobe (IPL) and the posterior superior parietal lobe (PSPL); and the prefrontal cortex (PFC). A primary function of the PSPL is the analysis and integration of information, in particular higher order (previously processed) somaesthetic (body) visual and auditory information to create a three-dimensional body image in space. In defining the spatial location of the body, the PSLP also plays a vital role in defining self-other differentiations. The IPL is an association area at the junction of the temporal, parietal, and occipital lobes, providing an integration of information from the other association areas. The hippocampus is also an association area, specifically with information from the other association areas, but it is the PFC that is the most central of all association areas. The PFC regulates by determining the degree of saliency related signal-to-noise enhancement, as well as a wide range of higher executive functions.

D'Aquili and Newberg propose that deafferentation, a functional cutting off of input into a structure, such as caused by inhibitory fibers, explains some aspects of mystical experiences. Deafferentation results in the structure firing according to an internal logic or pattern, independent of normal input from other parts of the brain. As an example, d'Aquili and Newberg note the ability of the PFC to direct attention to inhibit input from the IPL (a language-processing area), resulting in the inhibition of those areas producing and transmitting words and concepts to other areas of the brain. Such inhibition explains the ineffable aspects of mystical experiences, a result of being cut off from language production centers.

Other aspects of AUB can be explained by similar activation and inhibition of specific circuits. D'Aquili and Newberg propose that the neuropsychological foundations of mystical states involve a "differential stimulation and deafferentation of various patterns of limbic stimulation" (1993, 177). Specific effects include relaxation and profound quiescence from hypothalamic stimulation of the peripheral parasympathetic system; ecstatic and blissful feelings from reverberating PSLP-PFC circuits that result in stimulation of both divisions of the ANS; and a sense of pure space and obliteration of the self-other distinction from the total deafferentation of the PSPL. But contrary to the notion of a loss of vital integrative functions of the PFC, d'Aquili and Newberg (1999) found that there was an increase in blood flow to that region, as well as the thalamic areas; in contrast, the PSLP showed decreased activity. Thus in enhancing the attentional processes characteristic of meditation, there is a necessary deafferentation of input from other systems, such as the environment, that would be distracting to the highly focused attention.

Common Denominators in Modifying Consciousness

Frecska and Luna (2006) suggested that the common denominator in techniques that alter consciousness involve two opposite processes: overstressing the high-level (frontal-prefrontal) circuits of the coping mechanisms or deregulating them, pushing them below the lower limit of functional range. They propose that the resulting effect is the emergence of a direct-intuitive information processing as replacement to the ordinary perceptual-cognitive processing, which is fundamentally a prefrontally mediated coping strategy. Frecska and Luna point to support for this model of integrative consciousness and expand its principles and neurointegrative mechanisms with insights into (1) the final common pathway of psychedelic drugs' action in the thalamus; (2) the role of thalamic gamma synchronization in binding; (3) the vertical organization of fronto-subcortico-thalamic feedback loops; and (4) their relations to the horizontal layering of McLean's triune brain model.

Previc (2006) proposes that there is a common neuroanatomy and neurochemistry underlying phenomena such as dreaming, hallucinations, and extreme religious beliefs. The common neural substrate involves dopamine, particularly elevated levels in the ventromedial cortical areas. This corresponds to the anatomical basis of these phenomena, which he postulates to "be mediated by

ventromedial (cortico-limbic) pathways extending from the medial temporal lobe to the anterior cingulate and prefrontal cortex" (Previc, 518). Previc notes that there are a number of psychological disorders (i.e., bipolar disorder, obsessive-compulsive disorder, and schizophrenia) that are both (1) associated with increased religious activity, experiences, or religious practices; and (2) involve an overactivation of dopamine, particularly in the left hemisphere. Furthermore, the brain activity typical of disorders associated with hyper-religiosity, as well as dreams, hallucinations, paranormal experiences, and paranormal behaviors involve action in the ventromedial system of extrapersonal functions, which is freed from the inhibition by the prefrontal (focal-extrapersonal or executive) dopaminergic system and/or posterior serotonergic (peripersonal) inputs. Previc proposes that religious behavior and spiritual experiences in particular are primarily produced via dopaminergic transmission within the brain's extrapersonal systems in the ventromedial cortex. These extrapersonal phenomena, such as out-of-body experiences, as well as personality manifestations in delusions of grandiosity and obsessiveness, also reflect a relative deactivation of the dorsal frontal-parietal linkages.

Diverse forms of altered consciousness all involve this enhanced capability to access the output of the unconscious mind and our innate cognitive modules. These capacities are elicited by many mechanisms, and particularly manifested in the visual system, where the effects of vision-inducing plants are among the most prominent mechanisms. They enabled an extended exploitation of the visual associational cortex and its ability to managing visual and other information. This expanded associational area improved the brain's capacity to interface with a variety of other neural mechanisms, including those involved in learning, problem-solving, and memory formation.

Psychedelics, the Brain, and Consciousness

The worldwide association of psychedelics with spiritual traditions reflects their intrinsic ability to produce profound alterations of consciousness. These alterations provide a basic neurophenomenological paradigm for understanding the nature of shamanism. The recurrent features of the mystical experiences induced by these substances indicate that they reflect biological bases and neurognostic forms, biologically based aspects of knowing. The role of drugs in the evolution of human consciousness must be understood in relationship to their effects on the serotonergic system, indirectly on dopamine, and the overall roles of both neurotransmitter system in brain functioning. These alterations of consciousness enhance paleomammalian brain functions and their coordination and their integration with the entire brain. This integration enhances integration of unconscious processes and potentials into consciousness and the frontal brain processes. Human evolution was stimulated by interactions among exogenous neurotransmitter substances, the adaptive potentials of the states of consciousness they produced, and the shamanic ritual practices that supported the engagement with altered states.

These activities engaged an integration of some aspects of consciousness and dissociation or deafferentation of others. In these complementary and codependent processes, the alteration of consciousness involves an enhanced integration of lower brain processes that may simultaneously involve a disengagement with other habitual processes of knowing. This illustrates how altered consciousness constitutes a special biologically based form of knowing that engages brain structures that preceded language and continue to function without it, albeit normally dissociated, and hence unconsciously.

Examination of these brain patterns of altered consciousness from the perspectives of MacLean's (1990) model of the triune brain illustrates the elicitation of the paleomentation and the emotiomentation processes of lower brain structures (R-complex and limbic brain) and their management of emotions, attachment, social relations and bonding, sense of self, and convictions about beliefs. These procedures and conditions that alter consciousness have an intrinsic potential to produce an integration of information processing between the R-complex and the limbic system, between the limbic system and the frontal cortex, and between the hemispheres of the cortex; hence the labeling as the *integrative* mode of consciousness.

A primary characteristic of integrative consciousness involves hierarchical integration of brain mechanisms, a limbic-system driving of the frontal cortex that integrates the preconscious or unconscious functions and material into self-conscious awareness. Key physiological mechanisms underlying integrative forms of consciousness are found in activation of the the hippocampal-septal circuits, the hypothalamus, and related areas of the paleomammalisn brain that regulate emotions and drives for self-preservation (MacLean 1990). These effects contribute to a second characteristic of integrative forms of consciousness, the ability to act on the structures of earlier levels of consciousness. This action on these brain structures engages operational structures of the unconscious and dissociated aspects of the self produced by emotional trauma. This engagement allows elicitation of aspects of the psyche and their manipulation from a higher level of awareness and self-organization, a human capacity exemplified in the healing rituals of shamanism.

AN EVOLUTIONARY BIOLOGICAL APPROACH TO SHAMANISM

The cross-cultural manifestations of basic experiences related to shamanism (e.g., soul flight, death-and-rebirth, animal identities) illustrates that these practices are not strictly cultural but are structured by underlying, biologically inherent structures. These are neurobiological structures of knowing that provide the universal aspects of the human brain/mind (Laughlin, McManus, and d'Aquili 1992). Neurognostic structures are the inherent knowledge structures of the organism that predispose and mediate the organization of experience. Universal shamanic characteristics reflect these neurognostic structures, such as those of archetypes, the primordial organization of the collective unconscious.

A number of contemporary theorists have similarly argued that the underlying basis for religious universals is found in unconscious processing systems of the brain. This approach is based in the broader idea of inborn or innate modules for organizing knowledge, which several researchers use to explain the evolution of the human mind in terms of specific specialized programs (e.g., Fodor's [1983] *The Modularity of the Mind*, where he proposes that there are hardwired input systems that provide for automatic information-processing systems). This modular model of human cognition was expanded in Gardener's *Frames of Mind: The Theory of Multiple Intelligences*, where Gardener (1983) postulated that human capabilities are based on seven different types of relatively autonomous intelligences: bodily-kinesthetic, spatial, and modules for looking in at one's own mind and for understanding others' minds and for language, music, and logical-mathematical reasoning. The innate quality of these capacities is clearly reflected in the various savants who are geniuses in one of the capacities while lacking normal human skills in the other areas.

These innate capacities are not, however, based on discrete anatomical units, but rather reflect functional systems that link together the specialized input capacities. For instance, in his discussion of the elements of intersubjectivity, Gardenfors (2008) notes that the capacity of "mind reading" is based not only on a "theory of mind" but also on capacities for detection of intentions, eye direction, and shared attention. These diverse components illustrate the multiple systems underlying any modular capacity. Nonetheless, they are specialized and largely unconscious functional systems of information processing and output that reflect the influences of natural selection in setting a genetic basis for an adaptation that provides a specialized functional capacity. These specialized unconscious functions are exemplified in the grammatical competence of language speakers, most of who are without conscious awareness of their own grammatical rules.

Evidence for the existence of these kinds of innate modules also comes from findings in developmental psychology that indicate that children are born with content-rich intuitive knowledge modules that explain humans' rapid learning of specific kinds of information. The inevitability of language acquisition in normal cultural contexts and the normal attribution of beliefs and desires to others reflect the operation of these innate capacities of the human brain. Some of the areas of innately disposed cognitive development that are key to understanding human uniqueness include deliberate imitation (mimesis), physical behavior (tool use), natural history (animal behavior), social psychology (social relations and mind), and communication (music and language). These areas of specialized learning reflect evolutionary adaptations providing specialized automatized skills that enhance awareness of important natural and social relations and their benefits.

Religious Thought and Innate Modules

Recent cognitive theories regarding the origin of religious thought have emphasized the roles of these kinds of innate modules, neurognostic structures, and functional systems (e.g., Boyer 1992, 2001; Mithen 1996; Laughlin et al. 1992; Laughlin 1997;

Winkelman 2002a; Boyer and Liénard 2006). Boyer and Bergstrom (2008) note that a prominent feature of efforts to explain the universal features of religion in evolutionary terms is the emphasis on the output of ordinary cognitive systems, such as animacy detection and precautionary systems. These approaches generally characterize religious thought as a by-product of or parasite on our normal thought processes acquired for a variety of other physical social adaptations.

Spirits and the Hyperactive Agency (Animacy) Detection Device

Barrett (2000) posits that a fundamental mental module underlying our spiritual dispositions involves a "hyperactive agency detection device" (HADD) that provides us with a highly susceptible disposition to perceive an active agent, in essence animism, the spiritual world. Agency detection is a widely noted tendency of humans and other animals to respond to situations as if there is an intelligent purposeful agent as the underlying cause of the events we perceive. This HADD has conferred survival benefits because it allowed our ancestors to avoid predators, and an oversensitivity to an imaginary predator had little or no cost compared to that of not identifying a real predator. Guthrie (1993) argued that the basic assumptions of animism provided selective advantages even though this assumption may frequently be false. The benefits of assuming that something is intention and potentially active is adaptive for all animals.

This tendency to view the world as having unseen agents contributed to the human tendency to believe in unseen spirits. Atran (2006) proposed that this evolved mental hardware for animacy detection was extended from its functions of detection of predators to an automatic perception of the dynamics of other phenomena. Animism is the result of our normal cognitive processes, producing a tendency to presume that the actions of some unseen agent are responsible for events of unknown origin, especially phenomena with complex designs and unusual features.

When we look at spirits, however, we see that they are much more than just agents; they are special kinds of agents. These differentiating principles of spirits are a basis from which an exaptation of the HADD provides a basis for new adaptive functions. Chapter 6 examines these adaptive functions of spirit assumptions, proposing that there are a number of distinctive advantages of these assumptions that go beyond animacy detection (also see Winkelman and Baker 2008).

Boyer (1992, 2001) proposed that religious notions are based in counterintuitive contradictions to the dispositions of these innate modules and characterized the supernatural as involving concepts that violate intuitive knowledge provided by the different specialized intelligences. In contrast, Mithen pointed out that ethnographic evidence indicates that intuitive religious ideas are the norm rather than counterintuitive exceptions. Mithen proposed that the integration of innate modules, rather than their counterintuitive violations, provides the basis for religious ideas. Features of supernatural beings involve a "mixing up of knowledge about different types of entities in the real world" (Mithen 1996, 177), an integration of the multiple specialized intelligences of the early human mind. Concepts of supernatural beings mix properties of the social and the natural worlds (totemic groups), the personal and natural worlds (animal identities),

and the personal and physical worlds (animacy). These key concepts of shamanism reflect cognitive fluidity between these distinct intelligences that are derived from the integration of operations from different cognitive modules.

The dominant cognitive theories of religious universals treat religious thought and spiritual experiences as epiphenomena or distortions of capacities that serve other purposes. Consequently they overlook the significant psychological and social functions they fulfill. Deacon and Cashman (2009) offer a different view followed here, namely that spiritual and mystical experiences engage novel meanings that expand humans' perspectives beyond those produced by biology. The spiritual is an emergent feature of our species, one that was co-emergent with our symbolic capacities, and which radically reorganized cognitive processes, emotional experiences and social behaviors.

This book further proposes that shamanism contributed to human cognitive evolution through the ritual elicitation and integration of innate modules that produced analogical symbolic thought. It also incorporates a generally neglected perspective in religious studies, the focus on ritual, or behavior, as opposed to cognition. This provides a deep phylogenetic perspective for understanding the adaptive aspects of religion in general, and shamanism in particular.

Ritual as Costly Signals

Boyer and Bergstrom note that behavioral ecologists and anthropologists have taken a distinctly different approach to explaining universals of religion as forms of adaptation, placing them in the context of "costly signals" (see Irons [2001]; Sosis [2004]; Wilson [2002]) and other practices that foster cooperation (e.g., Weingarten and Chisholm [2009]; Bulbulia [2009]). The apparent lack of fitness advantages of many religious and ritual behaviors is countered with the perspective that such behaviors are displays of "excessive fitness," a form of honest signaling of an individual's exceptional capacities. Animal displays that apparently attract attention from predators have been interpreted as indicators of strength and swiftness, signals that convey to predators that they are more likely to be successful if they seek less aware and fit prey. Costly signaling approaches extend altruism perspectives regarding potential adaptive benefits conferred by ritual behaviors, signaling a willingness to cooperate and assist others. In the context of animals' excessive fitness displays, there is also an embedded signaling to conspecifics of a danger that they should heed. Shamanic ritual practices involving prolonged periods of dancing and drumming have direct homologies with the excessive displays seen in other species, and provide another avenue for investigating the adaptive aspects of shamanic practice (see Chapter 6).

The costly signaling approaches are expanded by the perspectives of biogenetic structuralism, which help to illustrate the ancient biological bases of shamanic rituals and their adaptive functions in their homologies with animal displays. The biogenetic structuralist approach to ritual establishes human-animal continuities that illustrate the evolutionary foundations of shamanism and other forms of religious thought. Ritual is integral to vertebrate social life, providing mechanisms for communication that are basic to social coordination

(d'Aquili, Laughlin, and McManus 1979). Such animal rituals use behaviors, manifested in actions, that signal a disposition for specific behaviors. Animals' rituals have communication and social signaling functions, using genetically based behaviors to provide information that facilitates interactions among members of a species, coordinating their behaviors in ways that contribute to cooperation. By making internal dispositions publicly available, animal rituals contribute to cooperative behaviors by providing information that helps produce socially coordinated responses.

In *Supernatural as Natural*, Winkelman and Baker (2008) use this biogenetic structuralist approach to establish the continuity of animal displays and human rituals. This evolutionary psychology approach to ritual illustrates that shamanic rituals have ancient roots built out of prior adaptations revealed in the homologous behaviors humans share with closely related species. This approach is foundational to the perspectives developed here on how shamanic ritual activities provide important social functions in enhancing social cooperation and integration.

Altered Consciousness as an Adaptation

This book expands our perspectives on the adaptive nature of shamanic practices by examining the effects of the extraordinary altered states of conscious produced by ritual. Experiences, too, can contribute to adaptations if they lead to behaviors that enhance survival and reproductive potential for self and offspring. The IMC elicited by ritual activities creates special aspects of consciousness, providing a basis for the production of analogical and metaphorical thought by integrating the outputs of the modules for social perceptions of others and their intentionalities (mind reading) with innate specialized abilities to understand the qualities of animal species and their differences.

A fundamental aspect of shamanic thought involves the integration of this natural history capacity for recognition of animal species with other forms of self and social representation to produce supernatural concepts represented by animal spirits and familiars and totemism. A consequence of the integrative brain wave states induced in shamanic states of consciousness is a synesthesia, or mixing of different sensory experiences that underlie the symbolic function (see Hunt 1995a). Alterations of consciousness also produce a synchronization of different brain areas, an integration of modular brain functions that enhances this integrative thinking and symbolic thought. The ritually induced cross-modular integration of innate capacities produce the cognitive foundations for universal features of shamanistic thought. These are manifested in concepts of animism and the spirit world and their relations to human communities, and in the role of animal spirits in shamanic practice, identification, and thought.

Shamanistic practices induce extraordinary experiences and healing by ritually eliciting normal but unusual aspects of organismic functioning. A primary focus of the psychophysiological effects of the IMC is in the limbic system, or more broadly the paleomammalian brain, and its connections with both lower and higher brain structures. Shamanistic practices stimulate processes of the paleomammalian brain and induce a systemic integration of information-processing capacities across the

functional layers of the brain, producing healing through psychointegration—limbic-cortical integration and interhemispheric synchronization.

These experiences also reflect the elicitation of information-processing capacities fundamental to human nature, the IMC, which in interaction with ritually-induced social, cultural, and personal effects, produces a range of experiences associated with shamanism and mystical traditions. These altered consciousness experiences also enhance our ability to think about and plan activities that are distal in time and space.These experiences, the interpretations made of them, and their effects on behavior provide a basis for functional adaptations associated with shamanic ritual practices.

There are a number of different kinds or levels of meaning that mediate our knowledge of the material world, including ancient aspects of the brain and their information-processing capacities that mediate relationships of self and consciousness. Shamanistic healing practices achieve this psychointegration by physical stimulation of systematic brain wave discharge patterns that activate processes of the paleomammalian brain. This activation forces normally unconscious or preconscious primary information-processing functions and outputs to be integrated into the operations of the frontal cortex. This integrates implicit understandings of socioemotional dynamics, repressed memories, unresolved conflicts, and intuitive and nonverbal knowledge—visual, mimetic, and presentational—into self-conscious awareness. It is this elevation of the subconscious and unconscious processes that is at the basis of a variety of shamanistic experiences and spiritual phenomena.

CONCLUSIONS: VISIONARY EXPERIENCE AS A NEUROEPISTEMOLOGICAL SYSTEM

Alterations of consciousness involve adaptations, special forms of knowing, that prominently engage the imagetic capacity for presentational symbolism. This ancient system of visual symbolism predates language, yet it can also provide knowledge—even wisdom—beyond that normally associated with rational waking language-based consciousness. The visionary experiences of shamans in their soul flights exemplify this intuitive and visual iconic presentational symbolism. Altered consciousness plays a special role in managing adaptation to both internal and external environments through information manifested primarily as visual symbolism spontaneously produced by our symbolizing brains in re-representing the environmental and internal stimuli it receives.

The qualities of this altered consciousness reflect an early level of symbolism through which we know the universe in ways much like those of other animals through the processes dominated by our ancient reptilian and paleomammalian brains. These processes of consciousness make available a variety of pre-language structures and processes of knowing, a rich information system lying behind the language-based rational consciousness of modern humans. What characterizes the special nature of these forms of knowing involves the integration of these ancient levels of understanding into the processes of the frontal brain and our more advanced cognitive capacities and senses of self. This is a psychointegration of

behavioral and emotional processes into our preeminently symbolic brain processes. This process is the basis for a new conceptualization and paradigm of altered consciousness proposed here, one that characterizes these conditions as special forms of the integration of consciousness, characterized by an elevation of the preconscious protosymbolic processes of the ancient reptilian and paleomammalian brains. These preformal levels of consciousness are found in several special aspects of shamanism; specifically, the nature of the experiences of altered consciousness that provide a holistic intuitive grasp of situations, special forms of preself-identification in spirits and animals, and forms of intense emotional engagement and detachment that underlie the therapeutic potentials of shamanism.

2 The Nature and Basis of Shamanism: Cross-Cultural, Linguistic, and Prehistorical Perspectives

CHAPTER OVERVIEW

Eliade's (1964) synthesis of the cross-cultural data illustrated universals of shamanism and its social functions. The shaman was the primordial human specialist, a skilled manager of consciousness, emotions, social relations, health, and interaction with the natural and supernatural. Anthropological studies of shamanistic phenomena stimulated debates as to the status of the concept of the *shaman.* Empirical answers to questions regarding the characteristics of shamans were provided by studies using formal analysis of cross-cultural data (Winkelman 1984, 1986a&b, 1990, 1992). These studies illustrated that shamanism was a worldwide phenomenon of hunter-gatherer societies. This ecologically specific adaptation suggested the term *shaman* be restricted to practitioners found primarily in nomadic hunter-gatherer societies and sharing specific empirically derived characteristics. The term *shamanistic healer* can be applied to an expanded group of healing professionals who use the altered states of consciousness (ASC). The evolution of these shamanistic healers from shamanic roots is illustrated in diverse linguistic referents. Shamanism's ancient presence in human societies is evidenced in its central role in the art characteristic of the cultural explosion of the Middle/Upper Paleolithic and in the social and cognitive adaptations provided by shamanism. I propose shamanism as the mechanism by which the distinct modules for human thought were integrated, producing synthetic symbolic representations that are exemplified in totemism as a system of social representation.

THE PHENOMENA OF SHAMANISM

The central role of the shaman as a primordial spiritual and religious leader is indicated in the prominent role of shamanic representations found worldwide in art, cosmology, and religious artifacts, particularly in the cave paintings found

in the caves of Europe (Clottes and Lewis-Williams 1998; Whitley 2009). The preeminence of shamanistic practices in contemporary small-scale societies is also widely attested to in numerous ethnographic sources (see Walker and Freidman 2005).

Although evidence of shamanic practices is found across history and prehistory, shamanism was not recognized in the cultural practices of post-Renaissance European societies. The modern introduction of shamanism to Western science and society was through exposure to it in other cultures only a few centuries ago. The conventional explanation (Flaherty 1992) of the origin of the term *shaman* in the English language is that it was borrowed from German. German scientific explorations brought the term and the concept (*saman*) from the Tungus of Siberia via Russian. Etymologically similar terms are widely dispersed in the Siberian region, Asia, and Europe. Shamanistic phenomena are recounted in literature as early as the fifth century B.C. In 1253, a Franciscan monk, Vilhelm av Ruysbroeck of France, returned from an expedition to outer Mongolia and reported his observations of what he labeled "devil worship" (Siikala 1978). With the Siberian migrations and scientific expeditions of Russians into Siberia in the seventeenth and eighteenth centuries, there were increasing encounters with shamanistic activities. As a consequence, knowledge of shamanistic practices was increasingly brought to the attention of the intelligentsia of Russia and, through them, to the rest of Europe. Shamanism impacted Western scientific, academic, and social spheres in the seventeenth century as reports from the non-Western world became an increasing part of the literary and cultural life of Europe (Flaherty). The reports of explorers, traders, missionaries, colonists, military, and other representatives of Western culture in contact with these foreign practices provided a body of knowledge about what came to be known as the shaman. The reports wove together loosely connected ideas and observations that were typically poor, unsystematic, and unreliable, characterized by cribbing and sensationalism (Flaherty).

In the context of the Enlightenment and the revolutionary changes wrought in thought and society, shamanistic practices came to represent an irrational side of human nature, where charismatic performances dominated social life. This contrasted with the bureaucratization and rationalism dominating the emerging ethos of Europe. The sensationalistic, disbelieving perspectives of European investigators contributed to a pattern of reporting on shamanistic phenomena that focused on incredulous and outlandish claims. Shamanistic phenomena were viewed as representative of the irrationality of the non-Western "other." The shaman was viewed as a clever fraud, a "mad" theatrical performer, who, by deceit and guile, held sway over the simpleminded community.

Whereas most early descriptions were fragmentary and distorted, eventually a somewhat more complete description of shamanic practices emerged on the Yakut, Evenks, Buryats, and other Siberian groups in the late nineteenth and early twentieth centuries. However, these observations from trained ethnographers largely followed the political and societal reforms that had crushed or radically transformed Siberian shamanistic practices (Siikala). Much ethnography that appeared in that period was by political prisoners who described transformed

practices of people integrated to varying degrees into more complex societies. It was not until Czaplicka's (1914) publication of *Aboriginal Siberia*, which compiled and analyzed many of these earlier sources, that appreciable amounts of this material were available in English. Studies on shamanistic practices in Finnish, Hungarian, and Turkish peoples soon followed, although many of these were not available in English until the past several decades. Although the Siberian, Russian, and other Eurasian materials provided the primary focus for what was recognized as shamanism, reports from around the world contributed to a growing body of knowledge on shamanistic practices (e.g., Benedict 1923). The role of trance or ecstasy was widely recognized as a central tool of the shaman; it was used in self-healing, training, healing patients, divination, and the multitude of other tasks that shamans were called on to perform. More systematic and informed perspectives on the shaman emerged and contributed to efforts to relate shamanism to a variety of ancient literary and mythological phenomena of classic antiquity (Flaherty). Knowledge about shamanism impacted theology, medicine, mythology, literature, and, finally, anthropology and the social sciences.

The Classic Shaman

A synthesis of a wide range of cross-cultural material on shamanistic practices was provided by the seminal and classic work of Mircea Eliade (1964, originally 1951), *Shamanism: Archaic Techniques of Ecstasy*. Eliade expanded the fundamental implications of the concept of shamanism by pointing out that the phenomena were not just Siberian and Eurasian practices, but could be found in cultures around the world. Eliade summarized the core of shamanism as involving the use of "techniques of ecstasy" in interaction with the spirit world on behalf of the community. The shaman's principal activities involved healing, divination, protection, and finding game animals.

The shamanic ritual was a social activity of unparalleled importance in society, a "spectacle unequaled in the world of daily experience" (Eliade 1964, 511). It was the context for construction and performance of the basic cosmological, spiritual, religious, social, ecological, intercommunity, and healing activities in those societies. The shaman's curing ceremony was the most important group event and the basic means of structuring the relationship of the individual to the collectivity and cosmos. The shaman's community healing rituals played an essential role in the defense of the psychic integrity of the community. Shamans were antidemonic champions who fought spirits and disease and who defended "life, health, fertility, the world of light, against death, diseases, sterility, disaster, and the world of darkness" (Eliade, 509). The shaman brought the local community into interaction with the spirit world in a ritual charged with fear, awe, and other powerful emotional experiences. In a nighttime ceremony attended by the entire local group, the shaman enacted struggles and battles of animals and spirits, summoning spirit allies while beating drums, singing, chanting, and dancing violently and excitedly. Finally the shaman collapsed exhausted and through magical flight, entered into the spirit world to communicate with the spirits and to obtain their cooperation.

The shaman's ecstatic state was characterized as a soul flight, "a trance during which his soul is believed to leave his body and ascend to the sky or descend to the underworld" (Eliade 1964, 5). The shaman's classic flight may take a variety of forms involving some aspect of the practitioner—called the soul, spirit, or animal familiar—that separates from the physical body, entering into an experiential world and interacting with spirit entities. The shaman's flight may be in corporeal form or in the transformed guise of animals or spirit allies. The shaman was not *possessed* by spirits, but rather was in control of spirits and demons. The shaman may enter into any of three classic worlds (lower, middle, and upper) during soul flight, through which many tasks were accomplished: healing, dream interpretation, divination, clairvoyance (clear seeing), acquiring needed information, determining distant conditions or the fate of separated group members, finding lost objects, acquiring information for hunting, handling of fire, communication with spirits of the dead, recovery of lost souls, mediation between gods and people, escorting souls of the dead, and protection against spirits and malevolent magical practitioners.

At the basis of shamanistic practice and its assumptions is an animistic system, a belief in a cosmos populated by spiritual entities that have effects on all aspects of human life and nature. The spiritual entities have roles in the essence of nature and natural forces, including humans and other animals. Spirits are central to shamanistic healing, and communication with them is used to determine the causes of illness, which are generally attributed to the influences and actions of spiritual entities. Learning the language of the animals is central to this shamanic practice. The shaman develops relationships with animal spirit helpers, especially birds, which symbolize the magical flight. The animal spirits are controlled by the shaman and are the vehicle through which the shaman carries out a variety of activities. Animal transformation, like soul flight, can take the shaman into an ascent into the sky, movement through the earth, and a descent to the lower world, frequently through tree- or pole-climbing rites. The shamanic movement through these worlds involves the *axis mundi*, the "center," "opening," or "hole" through which the shamans, spirits, and gods descend and ascend. The birch tree, post, or pillar symbolizes the Cosmic Tree, Sacred Tree, or World Tree, the vehicle of ascension, which interpenetrates and connects the shaman's three worlds—sky, earth, and lower world. Another mythical image of this movement across worlds is the Cosmic Mountain or a ladder, which the shaman ascends.

Shamanic activities were typically concerned with health. The theories of illness typically considered people to have lost their souls or to be afflicted by the actions of witches, ghosts, spirits, or the malevolent action of other shamans. The interactions in the spirit world typically involved psychodramatic struggles to recover the patient's soul. This soul loss could be caused by spirits' aggression or by theft by other shamans. These beliefs represented basic psychocultural dynamics with the spirit world interaction via the shaman's activities evoking powerful emotional experiences and healing. In addition to socio- and psychotherapeutic functions, healing ceremonies also incorporated physical medicine such as cleansing of wounds, extraction of objects, herbal medicine and massage.

Selection for the role of the shaman was often derived from a prolonged period of illness or insanity that was caused by the spirits who chose the individual for the shamanic role. The worsening of the individual's circumstances often then led to experiences interpreted as death, often experienced as dismemberment, and followed by a rebirth. During this period of death, the spirits healed the initiates by giving new rules for life that made the person a "wounded healer." This encounter with death was also a spontaneous phenomenon of the vision quest, when an initiate sought spiritual power in a solitary vigil. These powers might appear in the form of savage beasts that attacked and killed the initiate, but then reassembled the person with new capacities and powers, a death-and-rebirth experience that empowered the shaman.

The Shaman as a Cross-Cultural Phenomenon

Eliade's summary suggested that the shaman was a worldwide phenomenon, with practitioners in diverse cultures sharing common characteristics and functions. This led a generation of researchers (e.g., Halifax 1979; Harner 1982; Hultkrantz 1966, 1973, 1978; Siikala 1978) to postulate a variety of universals of shamanism, including not only an ecstatic state of communication with the spirit world on behalf of the community, but a variety of other features as well, including being found in hunter-gatherer societies, selection for the position through an illness or a calling of the spirits, a vision quest, a death/rebirth experience, the capacity to fly, the ability to transform oneself into an animal, the use of animal spirits as assistants, and the potential to be a witch or a sorcerer with negative use of power.

Most have also considered an essential aspect of the shaman's ecstatic states to involve, at least on some occasions, an experience labeled as soul flight. Soul flight is an experience in which the shaman's soul or spirit, along with some sense of self, is thought to depart the body and travel to a spirit world. Some investigators have disagreed regarding the nature of the shamanic ecstatic state. Findeisen (1957) argued that possession, when a spirit is believed to take over and control the individual, is also a characteristic of shamans; others such as Peters and Price-Williams (1989) have also attributed possession to shamanism.

Many types of individuals and practices have been referred to as shaman and shamanism, respectively, including those also called witch doctor, medicine man, healer, medium, soothsayer, diviner, warlock, wizard, and others. There are numerous characteristics, activities, and roles ascribed to a shaman—an ecstatic practitioner, a healer, a psychopomp, a political ruler, a prophesier, and one involved in the death transition, hunting magic, depossession, physical and spiritual protection, sacrifice, art, and mythology. Of these many characteristics and descriptions, investigators wonder what can validly be attributed to a universally distributed phenomenon appropriately labeled "shamanism." One reason for this uncertainty and the inconclusive characterization of the shaman is the relative recency of systematic cross-cultural studies of these phenomena that can provide empirical answers to these long-standing questions.

Although shamans, mediums, and other magico-religious healers have been of long-standing concern to anthropologists, until recently there have been few empirical cross-cultural assessments of the nature of magico-religious healing practices. Many accept that practices related to shamanism are cross-cultural, but do not clearly explicate the commonalities or the empirical basis for claims to universality. Others reject a universal shamanism, arguing that the term shaman should be restricted to Siberian and sub-Arctic practitioners (Siikala 1978; Kehoe 2000). Some use the term shaman more broadly to refer to anyone who voluntarily uses ASC (Peters and Price-Williams 1981). Heinze (1991) exemplifies a definitional approach, considering shamans to be those individuals who fulfill community needs by mediating between the profane and the sacred through accessing ASC. But she arbitrarily rejected other characteristics mentioned by Eliade and others (e.g., power over animals, fire immunity, and dismemberment experiences) because those characteristics were not associated with some practitioners she called shamans. While including Asian trance mediums within the denotation of shaman, she rejected the extension of the term shaman to similar practitioners in the United States. Arbitrary definitional approaches cannot establish what to call a shaman, nor can they elucidate cross-cultural similarities and differences among religious healers. Establishing shamanism as an etic phenomenon (or transcendental noumena) requires cross-cultural research.

A Cross-Cultural Study of Magico-Religious Practitioners

Determining the cross-cultural validity of the concept of the shaman has been addressed by empirical research on magico-religious practitioners that used formal analysis of data (Winkelman 1984, 1986a, 1990, 1992). This analysis permitted an empirical determination of a cross-cultural phenomenon associated with the classical concepts of the shaman, the characteristics associated with them, as well as the differences with respect to other types of magico-religious practitioners and healers. This study utilized a 47-society stratified subsample of the Standard Cross-Cultural Sample (SCCS) (Murdock and White 1969; see Winkelman [1984, 1992] and Winkelman and White [1987] for data and methods). These societies cover a time span ranging from 1750 B.C. (Babylonians) to the twentieth century and cover the major geographic regions of the world.

Determination of the etic status and cross-cultural characteristics of the shaman was based on coding of data from ethnographies and quantitative analysis of the data. Each unit of analysis was a culturally recognized magico-religious practitioner status, a social position based on interaction with supernatural entities or power. While some societies had a single status, others had multiple types of practitioners. Practitioners were individually assessed using the ethnographic literature. The variables used to characterize the practitioners were developed from an extensive survey of theories and descriptions of magico-religious activities. Each culturally recognized status (practitioner type) was individually assessed with respect to more than two hundred variables, evaluating a wide range of characteristics, including selection criteria; training conditions and

procedures; ritual induction techniques, characteristics and labeling of altered states of consciousness; sources of power and relationships to spirit entities; magico-religious activities; types of healing and divination techniques employed; context and motives for professional activities; and sociopolitical powers and activities. Determination of the types of practitioners was based on mathematical assessment of the quantity of shared characteristics. Cluster analysis assessment of shared characteristics provided the basis for determination of different types of magico-religious practitioners (see Winkelman [1984, 1986a, 1992] for methods and analysis. The original variables are available in Winkelman [1984]; an updated/revised variable and data set is available on CD-ROM in Winkelman and White [1987]).

Types of Magico-Religious Practitioners

The different types of empirically determined magico-religious practitioners have been labeled with terms frequently employed by anthropologists: shaman, shaman/healer, healer, medium, priest, and sorcerer/witch. These practitioner types differ in terms of central characteristics, as well as in the social complexity of their respective societies. The primary contrasts among these different shamanistic healers and other magico-religious practitioners are provided in Table 2.1 (adapted from Winkelman 1992). The practitioners found in different regions (e.g., Africa, Asia, and the Americas) include practitioners who share more characteristics in common amongst themselves than they do with other magico-religious practitioners in their own society. The empirical similarity in practitioners is more relevant than *a priori* definitions or geographical location. This suggests that the term shaman should be restricted to those magico-religious practitioners sharing similar characteristics, including their principal presence in hunter-gatherer societies, where their activities first arose in sociocultural evolution. Shamans persisted in horticultural societies, but their practices undergo transformation as a function of the effects of changing subsistence patterns and increased societal complexity (see Winkelman [1986a&b, 1990, 1992]).

Shamanistic Healers

Practitioners labeled shaman, shamanic healer, medium, and many other types of healers share the core characteristics of shamanism suggested by Eliade (1964): altering consciousness in community rituals to engage in interaction with spiritual entities. However, not all shamanistic healers share other characteristics attributed to shamans: soul flight, animal transformation, animal spirits, death and rebirth, and hunting magic. But every society has religious healing practitioners who have a central concern with ritual procedures for altering consciousness. Because the transformation of consciousness is central to the classic description and activities of shamans, and since the alteration of consciousness is an ancient biological adaptation (see Chapter 6), all magico-religious practitioners engaging in the alteration of consciousness as a central feature of training and healing are referred to here as *shamanistic healers*.

TABLE 2.1 Principal Characteristics of Magico-Religious Practitioner Types

Characteristics	Shaman
Societal Conditions	Hunting and gathering, nomadic. No local political integration. No social classes.
Magico-Religious Activity	Healing and divination. Protection from spirits and malevolent magic. Hunting magic. Malevolent acts.
Sociopolitical Power	Charismatic leader, communal and war leader.
Social Characteristics	Predominantly male, female secondary. High social status. Ambiguous moral status.
Professional Characteristics	Part time. No group—individual practice.
Selection and Training	Vision quests, dreams, illness, and spirit's request. ASC and spirit training or individual practitioner. Status recognized by clients.
Motive and Context	Acts at client request for client, local community.
Supernatural Power	Animal spirits, spirit allies. Spirit power usually controlled.
Special Abilities	Weather control, flying, fire immunity, death and rebirth, transformation into animal.
Techniques	Spirit control. Physical and empirical medicine. Massaging and plants.
ASC Conditions and Spirit Relations	ASC training and practice. Shamanic soul flight/journey. Isolation, austerities, fasting, hallucinogens, chanting and singing, extensive drumming and percussion, and, frequently, collapse and unconsciousness.

Shaman/Healer	Healer
Agricultural subsistence. Sedentary.	Agricultural subsistence. Sedentary. Political integration.
Healing and divination. Protection against spirits and malevolent magic. Hunting magic and agricultural rites. Minor malevolent acts.	Healing and divination. Agricultural and socioeconomic rites. Propitiation.
Informal political power. Moderate judiciary decisions.	Judicial, legislative, and economic power. Life-cycle rituals.
Predominantly male. Moderate socioeconomic status. Predominantly moral status.	Predominantly male, female rare. High socioeconomic status. Predominantly moral status.
Part-time. Collective/group practice. Specialized role.	Full-time. Collective/group practice. Highly specialized role.
Vision quest, drams, illness and spirit requests. ASC and ritual training by group. Ceremony recognizes status.	Voluntary selection, payment to trainer. Learn rituals and techniques. Ceremony recognizes status.
Acts at client request in client group.	Acts at client request in client group. Performs at public collective rituals.
Spirits' allies and impersonal power (mana). Power controlled.	Superior gods and impersonal power (mana). Ritual techniques and formulas. Power under control.
Occasional flight, animal transformation.	Prevent future illness.
Physical and empirical medicine. Massaging, herbal, cleanse wounds. Charms, spells exorcisms, and rituals. Spirit control and propitiation.	Charms. Spells, exorcisms, rituals, and sacrifice. Propitiation and command of spirits.
ASC training and practice. Shamanic/mystical ASC. Isolation, austerities, fasting, hallucinogens, chanting and singing, extensive percussion, and, frequently, collapse/unconsciousness.	ASC limited or absent. Social isolation; fasting; minor austerities; limited singing, chanting, or percussion.

(*continued*)

TABLE 2.1 Continued

Characteristics	Medium
Societal Conditions	Agricultural subsistence. Sedentary. Political integration.
Magico-Religious Activity	Healing and divination. Protection from spirits and malevolent magic. Agricultural magic. Propitiation.
Sociopolitical Power	Informal political power. Moderate judiciary decisions.
Social Characteristics	Predominantly female male secondary/rare. Low socioeconomic status. Exclusively moral.
Professional Characteristics	Part-time. Collective/group practice. Temporal lobe syndrome.
Selection and Training	Spontaneous possession by spirit. Training in practitioner group. Ceremony recognizes status.
Motive and Context	Acts primarily for clients. Performs public ceremonies.
Supernatural Power	Possessing spirits dominate. Power out of control, unconscious.
Special Abilities	None.
Techniques	Propitiation and spirit control. Exorcisms and sacrifices.
ASC Conditions and Spirit Relations	ASC—Possession. Spontaneous onset, tremors, convulsions, seizures, compulsive motor behavior, amnesia, temporal lobe discharge.

Priest	Sorcerer/Witch
Agriculture. Semisedentary or permanent residency. Political integration.	Agriculture and sedentary. Political integration. Social stratification.
Protection and purification. Agricultural and socioeconomic rites. Propitiation and worship.	Malevolent acts. Kill kin, cause death, economic destruction.
Political, legislative, judicial, economic, and military power.	None.
Exclusively male. High social and economic status. Exclusively moral.	Male and female. Low social and economic status. Exclusively immoral.
Full-time. Organized practitioner group. Hierarchically ranked roles.	Part-time. Little or no professional organization. Killed.
Social inheritance or succession. Political action.	Social labeling, biological inheritance. Innate abilities, self-taught or learned.
Acts to fulfill public social functions. Calendrical rites.	Acts at client request or for personal reasons. Practices in secrecy.
Power from superior spirits or gods. Has no control over spirit power.	Power from spirits and ritual knowledge. Has control or spirit power. Power may operate unconsciously or out of control.
Affect weather.	Animal transformation, flight.
Propitiation and collective rites. Sacrifice and consumption.	Spirit control, ritual techniques.
Generally no ASC or very limited. Occasionally alcohol consumption, sexual abstinence, social isolation, sleep deprivation.	Indirect evidence of ASC. Flight and animal transformation.

Shamanistic healers represent diverse cultural developments of the psychobiological potentials at the basis of shamanism that emerged over the process of the evolution of human social organization from the local communities of hunter-gatherer societies into agricultural societies with hierarchical political organization and social stratification with classes. Shamanistic healers share other characteristics: spiritual interpretations of therapy; utilization of spirit entities as projective mechanisms; psycholinguistic programming through spells;

symbolic ritual manipulations; restoration of social relations; and removal of illness attributed to spirits or other humans (Winkelman and Winkelman 1990). Shamanistic practices have important therapeutic functions through affecting psychosocial processes and as culturally relevant therapies that provide physical treatments, community, and intrapsychic integration. The different types of shamanistic healers differ with respect to socioeconomic characteristics of their societies, their socioeconomic and political status, their selection and training procedures, the specific characteristics of their altered consciousness, the sources of their power, and additional magico-religious activities, as indicated in Table 2.1. These differences among magico-religious healers illustrate the unique characteristics of the shamans as opposed to the other shamanistic healers and other types of magico-religious practitioners; and they reflect changes in the manifestation of psychobiological potentials occurring as a consequence of sociocultural evolution.

Shaman In the cross-cultural studies mentioned above, practitioners classified as shamans were found in the sample societies in all regions of the world except in the Circum-Mediterranean and Insular Pacific, where their absence reflects the lack of hunter-gatherer societies in these regions in the sample studied. Most shamans were found in societies with hunting, gathering, or fishing as the primary mode of subsistence; however, several were also found in pastoral societies of Eurasia and in four Amerindian societies with some reliance on horticulture. The shamans were found in societies without formal classes and mostly in societies lacking an administrative political organization beyond the local community; none of the shamans were found in sedentary societies. Independently significant contributions to the explanation of societal variance in the incidence of the shamans were found in the negative correlations of both political integration and fixity of residence with the presence of shamans (Winkelman 1992). Increases in sedentary lifestyles and the development of more complex forms of political integration that followed the adoption of agriculture led to the transformation of their shamanic potentials.

Shaman/Healers The shaman/healers occurred primarily in sedentary societies with a major reliance on agriculture as a food source. This suggests that adoption of agriculture is a fundamental cause of the transformations of shamans into shaman/healers. The fundamental role of agriculture in this transformation of shamanism is further attested to by the significant association of agriculture with priests, and the general presence of priests in societies with shaman/healers.

Healers The presence of healers is significantly predicted by the presence of political integration beyond the level of the local community. Almost all healers also were found in societies with a reliance on agriculture as a primary food source.

Mediums Although mediums are found in societies with subsistence based on agriculture (or occasionally pastoralism), agriculture does not predict the

incidence of the mediums; many agricultural societies are without a medium present. The presence of mediums is significantly correlated with both the presence of political integration beyond the level of the local community and by social stratification (permanent classes), but only political integration is an independently significant predictor.

Priests and Witches

There were other types of magico-religious practitioners found in societies *except those where there were shamans present*. These other types of religious practitioners—priests and witches—are prominent in studies of religion.

Priests The priests were generally found in sedentary agricultural societies or pastoral societies with political integration beyond the local community. Independently significant predictions of priests were found with agriculture and political integration. This illustrates the development of priests under conditions of agriculture and their emergence as central sociopolitical leaders as societies increased in political integration.

Sorcerer/Witch The sorcerer/witch is always found in societies with agriculture or pastoral subsistence patterns, but is not found in all of them; the social conditions that significantly and independently predict the presence of a sorcerer/witch are the presence of political integration and social stratification. Significantly, the sorcerer/witches and shamans do not occur in the same societies. This and other forms of evidence suggest that these conditions produce the sorcerer/witch by the persecution of shamanistic healers (see Harner 1973b for European witchcraft; Winkelman 1992 for cross-cultural analyses).

The Cross-Cultural Characteristics of Shamans

The practitioners empirically clustered in the group labeled "shaman" conform to many of the general characterizations found in the classic descriptions of shamanism. Cross-cultural research indicates that shamans are the charismatic leaders in hunter-gatherer societies (and slightly more complex societies with horticulture or pastoral subsistence practices) and where political integration is limited to the local community. The shaman's political power is generally informal, indicated by high social status, by position of leadership in raiding parties, and by organizing communal hunts and group movement. Shamans organize communal ritual activities on behalf of the entire local community, most frequently for healing and divination; however, they also are thought to engage in malevolent magical acts designed to harm others, normally, enemies of the group. They may also be accused of sorcery by their own group.

Shamans engage in activities that alter consciousness as the basis for their training and professional service. The shamans are often thought to be selected through a variety of signs that may include: having had involuntary visions; receiving signs from spirits; and experiencing serious illness. They also deliberately

undertake vision quests or the alteration of consciousness through a variety of procedures, including the use of psychoactive plants, fasting and water deprivation, exposure to temperature extremes, extensive exercise (such as prolonged dancing), various austerities, sleep deprivation, auditory stimuli (such as drumming, rattling, and chanting), and social and sensory deprivation. Their spirit world experiences are generally labeled with terms implying soul flight or journeys to the spirit worlds. Possession, in which the spirits are believed to take over the person, might be characteristic of some experiences of neophyte, but possession is not normally associated with the experiences of shamans. The shaman's ecstatic visionary states, soul journey or flight, is validated as a universal of shamanism by this cross-cultural research. However, not all professional activities of shamans involve soul flight; and when soul flight does occur, it is only one phase of the shaman's experiences. Shaman experiences may take other forms, including vision quests and death and rebirth. Other characteristics found with shamans include the capacity to fly; relationships with and control of spirits, particularly animal spirits; and provision of hunting magic.

The !Kung Num Master: Contemporary Shaman

Included in the formal sample used in this cross-cultural study were the !Kung Bushmen of southwest Africa. Their shamanistic healer (the Num master) was empirically classified as a shaman, with selection, training, and healing activities corresponding to the classic phenomena of shamanism. The medicine dance of the Num master and the !Kung Bushmen (the topic of articles [L. Marshall 1962, 1969] and a book [Katz 1982]) occurs in the context of their communal healing activities, which involve all-night sessions in which the men as healers dance to the incessant singing and clapping accompaniment provided by women. The extensive dancing is thought to activate an energy source that is then transferred to patients. Spirits are pleaded with or commanded in an effort to obtain their assistance in the cure of illness. These ceremonies occur on an irregular basis. Although the more recent reports of the healing ceremony (Katz 1982) suggested that it does not involve drug ingestion, earlier observations (Marshall 1962, 1969; cf. film N/um Tchai: The Ceremonial Dance of the !Kung Bushmen [J. Marshall 1969]) showed the use of psychoactive substances, particularly for healers in training. Assessment of published data on pharmacological properties of the !Kung Bushmen medicine plants showed that the vast majority have evidence of being psychoactive (Winkelman and Dobkin de Rios 1989). The characteristics of the !Kung Bushman Num master in twentieth-century Africa are strikingly similar to the characteristics of the classic descriptions of the shaman found around the world. This similarity is not explained by diffusion (Winkelman 1986a, 1992). The fundamental similarity across time and cultures indicates that shamanism develops from a common psychobiological basis and its adaptive consequences. These universal and cross-cultural characteristics of shamans reflect biosocial and neurognostic structures that constitute the primordial basis for religion.

The "Shamanism Controversy"

The concept of the shaman as an etic explanatory framework has been part of the intellectual climate of the Western world since it entered into mainstream literary discourses in the 1700s (Flaherty 1992). When Eliade published his famous *Shamanism Archaic Techniques of Ecstasy* (1964, originally 1951 in French) it was a concept already familiar to the educated Westerner. Soon, descriptions of foreign religious practices around the world were communicated through the concept of the shaman.

The effort to convey the concept of the shaman was derived in part from an effort to explain the behavior of the "other" to the Westerner; it fell into disrepute as a wave of cultural anthropologists began to question and criticize the use of the term. The complaints as variously expressed made several points:

1. There is no similarity in spiritual or healing practices around the world;
2. The concept of the shaman is a fabrication of the Western imagination, a New Age phenomenon and construction; and
3. The spiritual healing practices found cross-culturally vary and reflect local cultural concepts, negating any claims to a universal shamanism.

Kehoe legitimately criticizes Eliade's failure to use systematic cross-cultural research to arrive at his conclusions regarding shamanism, accusing him of a racist treatment of the primitive other. Although Eliade's impressionistic and selective methods deserve criticism from the perspectives of modern ethnological research, his conclusions were, nonetheless, on target, as illustrated in Winkelman's (1986a, 1990, 1992) cross-cultural research. This research is in general ignored, however, by those who reject the concept of shamanism as a cross-cultural concept (e.g., Francfort, Hamayon, and Bahn [2001]; Helvenston and Bahn [2003]). This idea that shamanism might explain the structure of phenomena of the past has been considered controversial to the point of ridicule. Bahn denounces "shamaniacs" in arguments against those who examine the relationship of Paleolithic art to shamanism and altered states of consciousness. Helvenston and Bahn's arguments have been influential, but have little substance. Many of their claims are faulty and erroneous and are rejected in detail by Lewis-Williams and Whitley (Lewis-Williams 2004; Lewis-Williams and Pearce 2005; Whitley 2009; also see Clottes [2004]; Pearce [2004]; Lewis-Williams [2006]; Whitley [2006]).

In various publications, Bahn rejects what he calls "a spurious neuropsychological model" of shamanism. His arguments and data, however, are focused on the inadequacy of shamanic theory for explaining all of rock art. Such claims were never made by those he criticizes. What Bahn and his colleagues (e.g., Francfort, Hamayon, and Bahn [2001]; Helvenston and Bahn [2003]) do is criticize their own misconceptions, misunderstandings, and misrepresentations rather than the actual ideas presented (for details see Clottes [2004]; Pearce [2004]; Lewis-Williams [2006]; Whitley [2006]). Furthermore, their arguments are misleading

and their presentation of the facts is often grossly distorted to defend their points of view and discount the evidence for these hypotheses.

Whitely (2006, 2009) has pointed out abundant evidence to confront Bahn's claims about the supposed inadequacies of the neuropsychology models of shamanism. Bahn's considerations did not touch directly on the biological nature of altered states or the cross-cultural similarities in shamanistic practices. And where he does address the altered states issues, he is wrong. For instance, he repeatedly contends that the phosphenes and entoptic phenomena found in mescaline-induced altered states have no relevance to other altered states induced without drugs. But as Whitley's (2006) review illustrates, the experiences induced by the psychedelics can also be produced by the natural phenomena of sensory deprivation produced by isolation in caves.

This practice of ignoring relevant research and misrepresenting their own data is front and center in the articles in Francfort, Hamayon, and Bahn's (2001) edited collection *The Concept of Shamanism: Uses and Abuses*. In Hamayon's introduction, he despaired that "the question of what shamanism really is in the final analysis has hindered all attempts to define it," but he ignores the literature and the more relevant research that describes the empirical characteristics associated with shamanism cross-culturally. Most crucially, Hamayon obviously had access to material establishing the etic status of shamanism, because included in his references is Winkelman's (1992) *Shamans, Priests, and Witches. A Cross-cultural Study of Magico-Religious Practices*. Hamayon, however, did not actually refer to the monograph or its ideas in his article. In his introduction to a later section, Francfort sagely noted, "Archaeologists and art historians look to ethnologists for an operational definition [of shamanism]" (43). But he made no consideration of the ethnological research characterizing cross-cultural similarities and differences in shamanistic practices or the empirical cross-culturally valid characterizations of shamanism.

Similarly, Hamayon (6) claimed that "all papers in this section refute this 'theory' "—referring to the idea that shamanism involves an inner disposition to altered states of consciousness. But what is actually covered in those chapters? Nothing in this introduction nor in Francfort's introduction to the "Prehistoric Section" indicated why we should not find the bases of shamanism in altered states of consciousness. Arguments against such claims that Francfort presented are focused on the variability of shamanism in practice and definition; such variability has no bearing on the arguments regarding the brain and neuropsychological systems, their relationships to altered states of consciousness, and the origination of the shamanism in such experiences.

Part of Bahn's and others' arguments are based in an arbitrary approach to conceptualizing shamanism. For instance, Bahn characterizes Siberia as "the heartland of true shamanism" (59), resorting to the idea that the word must be restricted to the cultural region of its origin. Restricting use of the term shaman to the cultures from which it derived makes as much sense as refusing to extend such terms as *taboo*, *mana*, *kula ring*, *latah*, or many other anthropological concepts outside of their cultures of origin. When similar concepts are found cross-culturally, terminology must be appropriated to convey the similarity found in diverse places.

While arguing that "non-shamanic 'primitive' societies' [such as] Australia, New Guinea and the Andaman Islands . . . contradict (once more) the idea of a similar general shamanism for early societies" (37), Francfort follows with a direct contradiction in arguing that "if we look at these societies with a loose definition in mind [unspecified] . . . we can take them to be shamanic too. . . . This shows the inadequacy of the 'general shamanic theory' approach" (37). This contradiction and lack of reasoning do not show any general shamanic theories to be inadequate. Furthermore, Quelle's (2001, 148) article in that section, rather than refuting a cross-cultural shamanism, claimed that "true shamanism is only conceivable there [Africa] in the case of the Thonga and the San." The universality of shamanism reported in Winkelman's cross-cultural research included the San (Kung Bushman) practices, which were empirically classified as involving shamanism.

How can the reality of a valid concept of the shamanism continue to be denied in light of the empirical evidence? In the above-cited cases, it is most simply by grossly distorting the claims and arguments and ignoring the relevant data, failing to even consider this cross-cultural research. When I asked Alice Kehoe why she did not consider my cross-cultural research on shamanism in her critique of the cross-cultural validity of the concept of the shaman, she retorted, "Consider yourself lucky!" I suppose she is the one to be lucky enough to have the kind of critical thinking skills that allow her to completely ignore the evidence against her argument.

The Weakness of the "Shaman in the Cave" Arguments

There also are several problems in the evidence previously presented for understanding shamanism as a cross-cultural and biological phenomenon. One derives from conceptual problems regarding the specific characteristics of shamans of ancient hunter-gatherer societies and how they are related to spiritual healers in more complex societies. This can be resolved by the sociocultural evolution model (see below) and the distinguishing characteristics of different types of shamanistic healers (see Table 2.1). A second source of problems regarding arguments of shamanic roles in the Middle/Upper Paleolithic is in the weakness of the evidence presented justifying shamanic interpretations of Paleolithic art. Lewis-Williams (2002, 2006; Clottes and Lewis-Williams 1998; Lewis-Williams and Pearce 2005) exemplified the tendency to defend the thesis of shamanism in the Paleolithic with reference to *ethnographic* examples. This notion that we can establish the patterns of the past with ethnographic analogy is unfortunately still a dominant theoretical approach in the archaeology of ritual (Fogelin 2007). A specific ethnographic case in the present or historical past of something called shamanism has little power in establishing its presence in other time or place. What can establish the prehistory and antiquity of shamanism?

Winkelman (2002a; also see 2008b, 2009a) proposed that there should be three major pillars for this argument:

1. Cross-cultural ethnological patterns of shamanic practitioners in premodern societies that establish a base for an ethnological analogy;

2. Direct homologies between shamanic practices and the ritual patterns of other animals, particularly our primate cousins; and
3. A neuropsychological explanation for the correspondences of shamanic practices with aspects of the brain involved in altered states of consciousness.

Unfortunately, to-date most archaeologists engaged in the argument for the presence of shamanism in the past have not relied on this kind of evidence and documentation for their arguments. Establishing that rock art of specific regions is linked to shamanic practice and production does benefit from ethnographic research establishing such connections. And such connections, by ethnographic analogy, might be used to infer the shamanic context of Paleolithic art. But this ethnographic analogy is not sufficient. What we need is evidence of cross-cultural patterns of shamanism, a series of universal principles of hunter-gatherer religiosity and spirituality that allow us to infer with certainty its presence in the human past.

In Lewis-Williams's work (e.g., 2002; Lewis-Williams and Pearce 2005) for instance, there is to-date a general failure to use any systematic cross-cultural data to support his argument. Instead he engages in a subjective practice of picking societies that have interesting shamanistic practices as an example of how to interpret the past. Lewis-Williams assumes that we know what shamanism is, that it is unproblematic, that it can be compiled haphazardly from ethnographic cases, and that it corresponds to whatever lists of features he presents (and occasionally modifies). Lewis-Williams does us a disservice in obfuscating efforts to understand shamanism by ignoring relevant cross-cultural research, for instance Bourguignon's (1976) research on the importance of differences between possession and other trance states, and Winkelman's (1986b, 1990, 1992) research establishing that shamans are not possessed. This is most unfortunate, since he has been aware of this cross-cultural research since the 1980s (Lewis-Williams and Dowson 1988).

The use of the term "shaman" without an empirical grounding and for a wide range of diverse religious practitioners makes its use problematic. The underlying issues include whether the concept of the shaman is strictly emic, related only to a particular culture or region (e.g., Paleosiberia); whether shamanism constitutes an etic or universal phenomenon found cross-culturally; or whether shamanism is a modern invention, a New Age concept without parallel in the premodern world. Cross-cultural research methods are indispensable tools for empirically addressing these questions and establishing the nature of shamanism. These kind of necessary cross-cultural studies of magico-religious practitioners were published more than two decades ago (Winkelman 1984, 1986a&b, 1990, 1992). The empirical cross-cultural research summarized above establishes the basis for a *shamanic paradigm* and validates the nature of an aboriginal hunter-gatherer shamanism worldwide. It also provides a basis for distinguishing an aboriginal shamanism from other forms of shamanistic healing that emerged from that basis as a consequence of the processes of sociocultural evolution.

This is a major part of the conceptual problem regarding the question of what is shamanism, the relationship of an ancient hunter-gatherer phenomenon

to the diversity of related phenomena in more complex societies. Although manifestations of shamanic potentials differ, they nonetheless reflect a transcendent reality based in human biological potentials. These potentials take different manifestations in the different types of shamanistic healers, which reflect the effects of different subsistence and political conditions that accompanied sociocultural evolution.

The Sociocultural Evolution of Shamanic Potentials

A broader group of practitioners—shamanistic healers—manifests shamanic potentials but also reflects their adaptation to different ecological, subsistence, and social conditions. Cross-cultural analyses (Winkelman 1986a, 1990, 1992) illustrate this evolution in the systematic relationships of shamanistic healers and other magico-religious practitioners to subsistence conditions and social complexity. The relevant socioeconomic conditions underlying the evolution of shamanic healers involve: (1) the absence/presence of hunting and gathering versus agriculture as the major source of subsistence; (2) fixity of residence (nomadic versus sedentary lifestyle); (3) political integration beyond the level of the local community; and (4) social stratification (classes and castes/hereditary slavery). These relationships of socioeconomic conditions to forms of magico-religious practice were established as being independent of diffusion through use of autocorrelation multiple-regression procedures (Dow, Burton, White, and Reitz 1984; see Winkelman [1992]).

These associations of magico-religious practitioners with social complexity conditions indicate that macro- or general evolutionary processes are responsible for the disappearance of the shaman and the emergence of other types of shamanistic healers. Based on an integration of this information with data on practitioner selection procedures and professional functions, Winkelman (1992) proposed a model of the evolution of magico-religious functions, which involves these principal bases: (1) a psychobiological dynamic of shamanistic healers derived from the alteration of consciousness; (2) the role of social leadership, manifested in priests; and (3) the conflict between these two dimensions, reflected in the concepts of sorcery and witchcraft. These relationships of socioeconomic conditions to magico-religious practitioners are illustrated in Figure 2.1.

Explaining Universals of Shamanism

The role of the shaman, with a similar complex of characteristics, activities, and beliefs, is found in widely separated societies. The universality of the basic practices and experiences related to shamanism is substantiated by the convergence of the findings of Winkelman's 1992 study with other research on shamanistic practices. Specific universals include those emphasized by Eliade (1964): alterations of consciousness (ecstatic experiences); an interaction with the spiritual world; and community rituals, as well as other universal features of shamanism such as visionary and dream experiences, the soul journey, animal identities, and death-rebirth experience.

MAGICO-RELIGIOUS PRACTITIONER TYPES					BIOSOCIAL FUNCTIONS
		Priest	Priest	Priest	Social Control
			Sorcerer/ Witch *or* Medium	Sorcerer/ Witch	Social Conflict
				Medium	Integrative Mode of Consciousness
	Shaman	Shaman/ Healer	Healer	Healer	
SOCIOECONOMIC CONDITIONS	Hunter/ Gatherer	Agriculture	Political Integration	Social Classes	

FIGURE 2.1 Practitioner Types, Biosocial Bases, and Socioeconomic Conditions

Cross-cultural similarities in shamanism could have resulted from diffusion of a single tradition, as La Barre (1970) and Furst (1976) suggested with respect to the Eurasian origins of North American shamanism. The worldwide presence of shamans in this formal cross-cultural sample in such widely varying linguistic groups as the Click (!Kung), Paleosiberian (Samoyed), Mon-Khmer (Semang), and North American Indian languages indicates that the diffusion hypothesis would have to postulate a very ancient origin group. This hypothesis regarding the worldwide distribution of shamanism as a consequence of the processes of diffusion is rejected by autocorrelation analysis (Winkelman 1986a); the absence of shamans in some regions of the worldwide sample is related to the absence there of nomadic hunter-gatherer societies.

Independent invention must be considered in the origin and the worldwide distribution of shamanism, derived from psychobiological potentials that provided adaptive responses. Psychobiological perspectives can explain interrelated findings about shamans, specifically: (1) the worldwide distribution of a specific constellation of characteristics found in the role of shamans in hunter-gatherer societies; (2) the alteration of consciousness as the focus of shamanistic practices; and (3) the universal roles of shamanistic healers in divination and healing.

Shamans' ancient world-wide presence in hunter-gatherer societies illustrates that it involves an ecologically and socially determined "type of religion" (Hultkrantz 1966). Hultkrantz modeled this "type of religion" on Steward's (1955) notion of "types of culture" reflecting the basic stages of sociocultural evolution (bands, tribes, chiefdoms, states). A type of religion "contains those religious patterns and features which belong to or are intimately associated with the cultural core and therefore arise out of environmental adaptations" (Hultkrantz 1966, 146). The worldwide similarity in shamans derives from the psychobiological bases of human consciousness and its adaptation to social and ecological conditions of hunter-gatherer societies. This is possible because the alterations of consciousness basic to selection, training, and professional activities occur spontaneously under a wide variety of circumstances—injury, extreme fatigue, near starvation, and as a consequence of a wide variety of deliberate

procedures (see Chapter 4). Consequently, shamanism was reinvented or rediscovered in diverse cultures because these experiences provided important adaptive capabilities. These are derived from their usefulness in meeting challenges to survival, including healing through stress reduction and other physiological changes that enhance systemic integration of the information-processing strata of the brain (see Chapter 5).

Summary Shamanism is a part of our evolved psychology involving potentials associated with the alteration of consciousness and its effects on human emotions and cognition. Evidence for the biological basis is already provided in (1) the universal distribution of similarly characterized shamans in hunter-gatherer societies; and (2) the lack of evidence of diffusion. The following sections of this chapter provide further evidence of our shamanic past by showing the roots of shamanism in ancient religious concepts of many languages; evidence of the presence of shamanism at the origins of modern human cultures; and the adaptive features of shamanism that promoted the evolution of human consciousness and society. The subsequent chapters will show how shamanic experiences contributed to cognitive evolution through the effects of shamanic activities on the basic structures of consciousness (Chapter 3); the adaptive functions of the integrative mode of consciousness (Chapter 4); the therapeutic effects of shamanistic activities (Chapter 5); and the derivation of the evolutionary origins of shamanic healing from primate ritual structures by extending their integrative and communicative capacities (Chapter 6).

LINGUISTIC ROOTS AND SURVIVALS OF SHAMANISM IN INDO-EUROPEAN LANGUAGES

Shamanic practices were so fundamental to diverse aspects of hunter-gatherer societies that multiple referents remained embedded in language after shamanism disappeared as a consequence of sociocultural evolution to other forms of shamanistic and magico-religious practitioners. To date, etymological inquiry into the Indo-European (I-E) term for shaman is inconclusive. The term *shaman* was not part of historical English but was borrowed from the Tungus of Siberia via Russian and German (Flaherty 1992). In the Tungus language the term for shaman has been recorded as *çsaman*, *sama*, *saman*, *shaman*, *śaman*, *samman*, and *khamman* (Laufer 1917; Hultkrantz 1977); it is also recorded in the Tungus-Manchu and Turko-Tartar languages as *śam*, *csam*, *kam*, *xam*, *xamna-*, and *xamsa-*. Németh (1913) argued that these are the phonetic equivalent of the Turkish *kam* (*xam*) and the Yakut terms (*xamna-*, *xamsa-*), which mean "to move, to be agitated, to step, to stride." Campbell (1983) suggested the Tungusic root of the term may be derived from the Tunguso-Manchurian verb *ŝa*, "to know."

Such derivations suggest that there would be no cognates with shaman in English or other I-E languages, but I propose that the evidence indicates otherwise, that shamanic concepts are widespread in the ancient religious roots of I-E languages. This is not a conventional position; the I-E languages appear to

lack common linguistic roots related to religion and spirituality, much less shamanism. "[D]esignation of the 'sacred' confronts us with a strange linguistic situation: the absence of any specific term in common Indo-European . . . no common term to designate religion itself, or cult, or the priest, not even one of the personal gods" (Benveniste 1973, 445–46). In I-E languages, "[t]he only thing which could be credited to the original community would be the idea of 'god' . . . attested in the form **deiwos*, the sense of which is 'luminous' and 'celestial' " (Benveniste, 446).

Ancient (and historical) I-E repressions of shamanic practices may be responsible for obscuring a common I-E root for the sacred. Mythological sources attest to the presence of ancient I-E shamanic activities (Eliade 1964). Eliade pointed to evidence of the existence of ancient shamanism and its vestiges in I-E myths. "[T]he shamanic traditions were principally grouped about the mythical figure of the terrifying Sovereign, whose archetype seems to be Varuna, the Master of Magic, the great 'Binder' " (Eliade 1974, 379). There are extensive referents to shamanistic activities in the later developments in Buddhism, as well as the remnants of earlier shamanistic practices referred to in the Buddhist doctrines as *yaksha* (Sanskrit *yaksa* and Pali *yakka*). These are "beings mentioned in the Buddhist canon who are divine in nature and possess and supernatural powers" (Fischer-Schreiber, Ehrhard, and Diener 1991). This shamanistic root is also found in Buddhism: the *samyak-sambuddha* is a "fully awakened one" and the *yasha* are Buddhist councils.

Lack of evidence for I-E roots for religious concepts also reflects the lack of a paradigm for interpreting the evidence about religious language in the past; the shamanic paradigm can help make sense of what have been disconnected concepts. Winkelman's (1992) cross-cultural model of magico-religious practices shows systematic relationships of socioeconomic and political conditions to the nature and forms of magico-religious practice. This etic model can interpret and organize data about earlier forms of religious practice found among I-E.

Indo-European Magico-Religious Linguistic Roots

The lack of a recognized referent to shamanism in I-E is reflective of the problematic nature of the concept of the sacred in I-E. Benveniste pointed out that in addition to absence of any specific term for religious concerns, there was a common twofold designation in many I-E languages. This was attested to in the Latin *sacer* and *sanctus*, the Gothic *hails* and *weihs*, and the Greek *hieréos* and *héagios*. Benveniste posited a double prehistoric meaning for the sacred: "positive 'what is charged with divine presence,' and negative 'what is forbidden for men to contact' " (445). Latin manifests this ambiguous meaning of sacred: "consecrated to god and affected with an ineradicable pollution, august and accursed, worthy of veneration and evoking horror" (452). "A man who is called sacer is stained with a real pollution which puts him outside human society" (453). The combined negative and positive aspects of the sacred may trouble those who view the sacred as only good; however, the ambiguous meaning may reflect the positive and negative aspects of shamans, their ability to both heal and kill.

The Sacred (sak-) and the Holy (kailo)

Morris (1981) pointed out that *sak-*, with meanings of "sanctify" and "sacred," is a widespread and ancient I-E root pertaining to religion. Reference to shamanic practices are found in meanings of the I-E roots with the prefix *sa-*, virtually all of which have magico-religious implications, suggesting it reflects a Pre-proto Indo-European (PPIE) root for *shaman*. Ten of the twelve Indo-European roots that begin with *sa-* listed by Morris (1981) have meanings related to shamanism, in particular:

sā- to satisfy; sad, sufficient (wholeness, completeness).
sag- to seek out; to know; keen perception; taking possession of (divination, spirit relations, knowledge).
sai- suffering; sore, suffering mentally (needing healing).
sak- to sanctify; holy, sacred; performer of sacred rites; sacerdotal, saint.
salam (slm)- to be whole; safe, peace, completeness (healing).
salicin- (tree as axis mundi, salicin as medicine).
sānos- healthy; sane.
sap- to taste, perceive; to be wise, sage, savant.
saus- dry; withered, harsh, austere (see Sanskrit *sram*, to practice *austerities*).
sāwel- the sun (symbol of ascent, magical flight, enlightenment).

These referents based on *sa-* are complemented by numerous terms in the ancient religious languages of India that point to shamanic activities and concepts.

Shamanic Roots in Hinduism and Buddhism

Evidence regarding ancient I-E shamanism is found in the Hindu and Buddhist traditions of India. The religion of ancient India was generally subsumed by the frequently compounded words *samana-brāhmana* (Pali) or *śramana-brāhmana* (Sanskrit) (Wayman 1969–71). The *brāhmana* represented the institutionalized bureaucratic and political aspects of religious practice, and the *śaman or śramana* reflected the shamanic basis. "A *brâhmana* was a person leading a religious life while adhering to the orthodox life of social stages, which became standardized as the four stages in Hinduism; and a *śramana* was a person guarding his sanctity while not committed to the orthodox social stages of Brahamanic society" (395). The Buddha was referred to as the "great *śramana*," or "great ascetic."

An earlier root for the Sanskrit term is the Pali word for a religious specialist—*samana* (Wayman 1969–71), also represented as *śramana*, *ŝramana*, *ŝrámana*, *cramana*, and *ŝramanâ* (Hultkrantz 1977; Mironov and Shirokogoroff 1924). Another possible cognate is illustrated in the term for a hermit and divine being with supernatural power, referred to as *yaksha* (Fischer-Schreiber, Ehrhard, and Diener 1991). The centrality of this root is seen in the reference of *ŝramana* to a Buddhist monk, literally meaning an ascetic, self-tormenter, or religious person. One proposed derivation of *ŝramana* is from the root *śram*, "to be (become) weary, to exert one's self (especially in performing acts of austerity)" (Mironov

and Shirokogoroff 1924, 107). The Pali and Sanskrit cognates *śramana* and *samana* establish an I-E cognate for shaman that is pre-Buddhistic. These reflect a common PPIE root manifested in Tokharian *samâne*, the Sogdian *śmn* or *çsaman*, and the Nordic *seidhmenn* and *seidhkonur* (male and female magicians) and *seidhr* seances conducted by the *seidhkona* and *spákona* (clairvoyant, prophetess) (Eliade 1953). Shamanic lexemic representations also appear in the archaic English word *saga*, meaning a witch, hag, and enchantress and the Latin *saga* (Barlough 1974); and in the Old High German *wissago*, a seer and prophet (AHD).

Buddhist Terms with Shamanic Reference

Diverse terms associated with yogic and Buddhist practices provide evidence of these earlier roots associated with shamanistic activities in suffixed forms of *sa*. Etymological elements and mystical referents suggest an earlier referent in Sanskrit is found in *sa* and *samanna* because of the many meanings associated with suffixed forms of *sa* that refer to shamanic activity. The findings presented below are derived from *A Sanskrit-English Dictionary Etymologically and Philologically Arranged with Special Reference to Cognate Indo-European Languages* (Monier-Williams 1872, 1899; republished 1974).

Ṡa is closely related to *sha* and *sa* (sh), forming a class of three sibilants (Monier-Williams 1974, 1107) with core meanings that have shamanic associations. *Ṡa* has meanings of prosody, meter, and music; a snake or bird; air, wind, and the gods Vishnu and Siva; knowledge and meditation; procuring and bestowing; the intellect; and as a term to refer to *purusha*, the universal soul (Monier-Williams, 1111). *Sha* means best, excellent, learned; loss, destruction; loss of knowledge; end; rest, remainder; eternal happiness, final emancipation; heaven, paradise; sleep; a learned man, and teacher. *Sha* also refers to the six duties of Brahmans, the six acts allowed to a Brahmin householder as a means of subsistence, and the six acts of the practice of the yogi.

Buddhist meditative practices have a number of additional meanings associated with the prefix root *sa*. (The following are largely derived from Fischer-Schreiber, Ehrhard, and Diener.) *Sramana* (Buddhist *shramana* and Pali *samanna*) originally was applied to those who led an ascetic life, and later became applied to a Buddhist monk. *Sramanera* (Sanskrit) refers to the novices committed to following the obligations, precepts and ethical guidelines for Buddhist monks and nuns. *Samgha* refers to the community of Buddhists. *Shakya* refers to the noble clan of Buddha (Siddhartha Gautama), and *samyak-sambuddha* (Pali *samma-buddha*) means a fully awakened or enlightened individual. *Samskaras* refers to mental formations and mental impulses, while *samskrita* refers to "all interdependent and mutually conditioning phenomena" (Fischer-Schreiber et al., 184). The forms of consciousness that are the focus of the contemplative traditions are known in Buddhism as *samadhis*, involving the process of entering into deeper layers of one's own consciousness. *Samadhi* involves the focused concentration of the mind, meditative absorption, unity, totality, and total concentration of spirit.

The material in Monier-Williams also revealed shamanistic activities referenced by words with the prefix *Śa*, including those meaning hymns, songs, invocations, curses, and prayer; vows, oaths, predictions, and prognostications; blessings and curses, wishing well or ill; to supplicate, conjure, or exorcise demons; omens and auguries, especially related to knowledge of birds; ritual acts and power; hymn of song or praise, chanting sacred text or verse; worship together; and offer sacrifice. The multiple uses of *sa* roots in aspects central to the meditative traditions and their associated meanings tie them to a common conceptual framework related to the shamanic complex. This includes divination in many forms, sacrifice and worship, and a range of attributes directly related to shamanism, including chanting, singing, music, and psychodramatic enactments with the spirit world, particularly vows, conjuring spirits, and supplications used for healing.

Benveniste (1973, 448) offered a reconstruction of the I-E prototype of sacred in the root **k'wen* (**k 'eu*), which is expressed in the adjectival form as **kailos* in the Slavic, Germanic, and Celtic. The concept of "holy" expressed in the I-E root *kailo-* means "whole, uninjured, or good omen" (Morris 1981, 1520). The I-E root of *kailo-* is *ka-*, meaning "to like, desire." It is attested to in Old English derivative forms, including holy, hallowed, and whole. Kailo is the root of the English terms such as heal and health. Its suffixed forms (e.g., *kan*) have shamanic and magico-religious meanings, including "to sing," "to cast a spell, to enchant, to charm," and "incantation" (Shipley 1984).

The many ancient and contemporary meanings associated with the root *sa* point to shamanic origins. Understanding these as well as a diversity of other referents to shamanistic phenomena requires a framework. The sociocultural evolutionary model of magico-religious practitioners presented above has direct correspondences to religious structures of I-E societies, and the ancient Hindu social-religious structures in particular. This helps to identify a wide range of referents and their ancient linguistic roots.

Magico-Religious Structures in Indo-European Societies

There were remnants of the shamanic practices, but shamanism was not found among the early Indo-Europeans (Eliade 1953). This is because the I-E tripartite organization of religious life and society postulated by Dumézil (see Littleton [1982]) was "already basically accomplished at a period when the Indo-Europeans had not yet separated" (Eliade 1974, 378). Even at the proto-I-E stage, the societal and religious structures already replaced shamanism. The agricultural subsistence and political complexity of early I-E society indicate that the original shamanic practices would have already been replaced by priests and other shamanistic healers, as reflected in the classic tripartite division of proto-I-E society (as represented within India):

1. priest (brahman)
2. warrior (ksattriyas)
3. farmer, villager or clansman (*vaisya*)

The tripartite I-E structure emphasizes the influences of the priest, but nonetheless recognizes shamanic roots. While the *brâhmana* represented the priest and the bureaucratic and political aspects of the religious practice, the *śramana* or *samana* reflected the shamanic basis. The tripartite structure Dumézil identified was considered a uniquely I-E phenomenon, but the wider distributions of this tripartite model (see Figure 2.1) suggest that it be explained in terms of the causal effects that social structural features have upon religious ideologies and practices. The tripartite model of I-E society posited by Dumézil does not account for a shamanic basis nor its social representations and transformations and has been recognized as needing expansion (Allen 1996) to explicate shamanic origins, interrelationships among divisions, and developmental changes. Problems in the origins and development of the tripartite division of I-E society can be clarified by relating them to the cross-cultural structures of stages of development of religious practitioners and their sociocultural transformation. The recognition of the primordial role of the shaman as a universally distributed religious specialist, and the transformation of shamans as a consequence of socioeconomic and political evolution, provides a basis for interpreting the relationships among I-E deities, entities, and ideological forces.

Roots of Indo-European Medicine

Zysk (1992) reviewed Indo-Germanic and I-E medicine to identify their roots and relationships to the tripartite division of I-E society. Benveniste's (1945) analysis of I-E medicine concluded that there were both specialized relationships to the tripartite division and an ambivalent social attitude towards those practices that could be used to both heal and harm. Puhvel (1970) also proposed that the healing system was related to the tripartite ideology. Medicine of the priestly class was represented by Varuna's prayer healings for ritual cures. The healing or medicine associated with the warrior functions involved procedures for dealing with wounds and epidemics. The third division (*vaisya*) was clearly the most significant of the three in terms of healing. *Vaisya* was represented by the Ashvins, who used a folk medicine based in herbs and spells and were general healing practitioners (Puhvel, 371). The minor sovereign Indo-Iranian gods of the Hindus—Daksha, Amsha, Asha, Sraosha, and Ashi—whose names include "sh"—apparently reflect this basis. Zysk points out that the popular traditions associated with the *vaisya* division incorporated influences from non-I-E cultures, leading the Hindu class system to keep the shamanic practices outside of proper society, such as the god Pûshan, associated with the non-Aryan *shûdras*. The remnants of the shamanic practices associated with the *vaisyas* are repressed. In Hindu mythology, the *brahmans* and the *kshatriyas* join against the *vaisyas* because they do not want to admit the latter's gods, the Ashvins, to the sacrifices and allow them to partake of *soma*. Zysk affirms Puhvel's identification of this folk medicine with the *vaisya*, reflecting the ties of herbal medicine to agriculture. The identification of the *vaisya* division with the shamanic roots also has etymological grounds, as *vaisya*'s I-E root *weik-* has prominent meanings associated with magico-religious practice.

Weik- *as a Shamanic Root*

Weik- is an I-E root with widespread use as a referent to magico-religious practice, but it is not generally considered in the context of the sacred and religious. This reflects its representation of the negative and devalued aspects of the supernatural. The I-E root *weik-* is the source of witchcraft, wizard, sacrificial victim, and other magico-religious terms. The etymology and uses of the term "witch" in I-E languages illustrate direct relations to shamanism. The I-E root *weik-* has five general meanings (Morris 1981, 1548):

1. "clan (social unit above the household). The zero-grade form **wik-* in Sanskrit is vis, dwelling, house, with derivative *vaisya*, settler"; this represents the third dimension of Dumézil's tripartite social scheme;
2. "words connected with magic and religious notions" such as divination, wizard, bewitch, and animals used as sacrificial victims;
3. "To be like . . . likeness, image, icon," are meanings connected with the shamanistic and magical use of enactment and the fundamental role of imagery in shamans' visionary experiences;
4. "To bend, wind . . . turn" are meanings associated by Eliade (1953) with roots of I-E shamanism in Varuna, the master of magic, who was known as the "Great Binder"; and
5. "To conquer," a meaning related to both the shamans' battle with spirits and their hunter/warrior role, as well as reflecting the second dimension of the I-E tripartite division—the warriors (*kshatriyas*).

These roots of *witch* have little association with the contemporary or historical meanings of the word. They do, however, have substantial relations to shamanistic activities. The shaman is the group (clan) leader, reflecting the shaman's preeminent role in the collective functions of hunter-gatherer societies. Concepts of divination and images are directly related to shamanistic activities, with meanings of "likeness" and "image" reflecting enactment and imitation (e.g., Frazer's [1890] Law of Similarity or Imitation). The meanings "bend" and "wind" reflect direct connections with the roots of I-E shamanism, as identified by Eliade (1964) in Varuna, the master of magic, who was known as the "Great Binder." The meaning "conquer" appears more distant to the hunter/warrior role of the shaman, reflecting a meaning also found in the root *ka*.

Shamanic Elements in Origins of Mystical Traditions

The terms for the ecstatic aspects of Hindu monks and priests (the Pali *samana* and Sanskrit *srámana*) point to the shamanic roots of Hindu religious practices. Eliade pointed to an "*identity in expression* between such superhuman experiences and the archaic symbolism of ascent and flight" (Eliade 1953, 409). Other shamanic characteristics are found in the yoga power techniques, or *siddhis*, the miracles and feats of the yogis, and terminology associated with Buddhas and

saints. The origin of Hindu and Buddhist practices in shamanic tradition are also attested to by a range of functional and linguistic similarities.

Similarities between the shamanic and yogic traditions are found in the powers or capabilities of the *siddhis*, which are acquired by the yogi as a by-product of ascetic practices. These abilities also attributed to shamans include clairvoyance and psychic knowledge of past, present, and future; communication with distant places and persons; visions of distant scenes and of activities on other planes of existence; immunity to heat and fire; the ability to read and control the minds of others; control of animals; traveling in mental or etheric form; materialization and dematerialization; abnormal or unusual control of bodily functions; healing by touch or at a distance; and the separation or unification of soul and body (Evans-Wentz 1978; Gupta 1961; Wood 1948). Another shamanic technique which parallels that of the yogis is the mastery of heat and fire and production of inner heat. The production of this inner heat is associated with the experience of light or illumination, which Eliade pointed out is a core metaphor for both shamanic and yogic experience and development.

In *Yoga: Freedom and Immortality*, Eliade (1969) explored the relationships between shamans and yogis to establish the extent to which the shaman is the progenitor of the yogic and meditative traditions. Eliade pointed out that shamanic characteristics are found in the mythology, folklore, and religious traditions associated with yoga. In Eliade's assessment of the shamanistic influences upon yoga, the following shamanic characteristics are of primary importance: (1) initiation involving symbolic dismemberment, death, and resurrection; (2) ecstatic journeys; (3) mastery of heat and fire; and (4) assumption of animal forms.

Eliade characterized the frequent fakiric *siddhi* referred to as the "rope trick" as evidence of shamanic influences on the yogic traditions. The rope trick typically involves the yogi rising into the air, undergoing dismemberment, followed by a rejoining of the limbs of the body. This embodies shamanic elements of the initiatory rite of death and rebirth and the ascent into the heavens. Yogis and other ascetics acquire the power of flight represented in symbols of ascent to heaven.

Eliade concluded that shamanic activities were homologized with yoga and that this magico-religious stratum, which preceded yoga, continued to exist conterminously with the yogic practices both within and outside of India. Although yoga incorporated and preserved the contributions of these ancient traditions, Eliade's summary comments suggested the shamanic contributions were at the degraded margins of yoga and the meditative traditions, rather than their primary progenitors.

Cross-cultural research and linguistic evidence, however, suggest shamanism was the basis from which the yogic and meditative traditions developed. The relationship of the mystical traditions to shamanic roots is illustrated by the abundant connections between the two in language roots and mythology. The relationships of terms for shamanic practitioners in Sanskrit and Pali (*saman*) to words used to refer to Buddhist practices illustrate that shamanic referents and practices were the direct progenitors of the mystical, meditative, and yogic

traditions. The meanings of *śramana*—tired, fatigued, and weary—are inconsistent with Buddhistic practice and the quiet contemplative states of the Buddhist monks, but they do accurately portray activities and conditions typical of shamanistic practices (e.g., dancing, drumming, chanting, and singing to the point of exhaustion and collapse). There are major differences between the actual activities of yogis and the activities and conditions implied in the roots of the terms used to refer to them; this indicates yogic origins in activities quite different from their later characteristics. While the yogi does not engage in physical exertion as a part of meditative practices, the shaman does. This apparent inconsistency of referent and meaning in words used to refer to the yogi is resolved by recognizing the shamanic origins of their traditions.

Reasons for the shamanic developments into meditative practices were suggested by Harner (1982; cf. Doore 1988), who hypothesized that the rise of city-states prompted the development of yogic practices because the drumming associated with shamanism attracted repression from the official religions (priesthoods). The repression carried out by state religions of Asia against the meditative and mystical traditions, including Buddhism, has been widely documented (Fischer-Schreiber, Ehrhard, and Diener 1991). The silent yogic practices allowed for a secretive persistence of ASC activities in contexts where they were not officially permitted.

Linguistic Origins of "Shaman"

Ancient I-E terms used to refer to shamanistic activities coalesce around three primary sets of consonants and their alternate forms: *w* (*v*), *k* (*c*), and *s* (*sh*). These different forms reflect linguistic sound shifts and the evolutionary of terminology across time; I will leave the formal arguments for the linguists. The similarities suggest that the radical root referring to the shaman provided a basis for diverse developments as societies evolved from hunting and gathering to more complex subsistence and social patterns. Expressions of these shamanic referents in the *w*, *k*, and *s* sounds are also found in the basic tripartite division of proto-I-E society (i.e., India) into the farmer or clansman (*vaisya*), warrior (*ksatriya*), and priest/hermit (*bhraman* /*samana*).

The shamanic terms associated with the sounds of *w* (or *v*) are found in examples such as witch, wizard, wisdom, wise, vision, aware, awake, will, and the Teutonic god Woden (Odin). These are the earliest representations. The shamanic survivals associated with the *ka* sound are found in cant, cantor, chant, knowledge, consciousness, gnosis, and kannabis and include combinations of the *s* and *k* sounds (e.g., scalpumancy). A later stratum of shamanic roots is associated with the *s* sound and manifested in English terms such as sage, saint, satan, sacred, sacerdotal, sacrifice, and savant. Other possible shaman-related *sh* words include sham and shame; shade (as in ghost, spirit); shammatize (excommunication, to destroy and curse); and shamade (drum beat for a parley). *Shamble* has old meanings of "a table or counter for sale of goods or meat," "a place where animals are killed," and "to cut up or slaughter and dispose of a corpse." Most of these meanings have to do with animals, a core concern of the shaman, who

provides "hunting magic" and is considered to be a master of the animals. The implications of dismemberment also have direct relationship to the shamanic archetypal processes of death and rebirth. *Shamble* also means "an ungainly awkward or unsteady walk, an irregular gait or motion," an analogy to the shaman's dance.

The prototype of *sak-* is in the root *k'wen* (Benveniste 1973). This term should have direct relations to *weik-*, which provides evidence of the earlier presence of the shaman in PPIE cultures that later survived in words such as witch, wizard, and sacrificial victim. I propose that we may ultimately deconstruct this root *weik* into two lexemes, *wei* and *ka*, revealing root meanings of "vital force" and "to like and desire," respectively. An examination of the meanings associated with *weik* in relationship to the tripartite division of I-E society illustrates that shamanism constitutes a fundamental source of I-E religious and social representations. The direct relations of I-E witchcraft to shamanism (Harner 1973b; Winkelman 1992) illustrated the evidence for the social transformation of the shamanic roots into what became conceptualized as witchcraft.

THE ANCIENT PRESENCE OF SHAMANISM IN PRE-PROTO INDO-EUROPEAN SOCIETIES

Even more ancient PPIE origins of shamanism are manifested in the cave art associated with the ancient origins of modern human culture in Europe. Human culture manifested a revolutionary explosion some 40,000 years ago in the Middle/Upper Paleolithic transition. Significant evidence of this explosion includes dramatic art preserved in the recesses of caves. An increasing number of scholars agree that at least some aspects of the Upper Paleolithic cave art and artifacts reflect shamanistic rituals and experiences (see Aldhouse-Green and Aldhouse-Green 2005; Clottes and Lewis-Williams 1998; Dowson and Porr 1999; Hayden 2003; Lewis-Williams 2002; Lewis-Williams and Pearce 2005; Ryan 1999; Whitley 2009; Winkelman 2002a; Winkelman and Baker 2008).

The Shamanic Paradigm in Cave Art

The shamanic context of the cave art associated with this transition is attested to in a number of key features. The shamanic paradigm provides a parsimonious explanation of what are the central features of Upper Paleolithic parietal art. Among the prominent nonsymbolic representations are those resembling entoptic phenomena associated with autogenous images occurring during altered states of consciousness (ASC). Although there certainly are depictions other than those related to ASC, there are numerous features that do reflect the encounter with ASC.

These caves with paintings sites had numerous shamanic aspects in their features (e.g, see Clottes and Lewis-Williams for pictures). Winkelman (2002a) discusses prominent shamanic features of these images as representing different aspects of shamanic practice, including soul flight, visionary experiences, death/dream states, human-animal identities, and animal powers. Significant human

depictions include "bird-men," symbolizing the features of the shaman's soul flight. The "wounded man" themes may represent the shamanic death and rebirth. Cave sites themselves have a variety of shamanic functions in altering consciousness in their darkness and isolation, as well as in physically representing the lower world. The harrowing and difficult experiences of entering the caves and passageways, combined with the remote location of representations in some of the most inaccessible areas of the caves, suggest their relationships to shamanic experiences. Some sites have evidence of percussion instruments and bird bone flutes, and areas with primarily heel marks (as opposed to full foot imprints), suggesting ritual dances.

Humans are rarely depicted, but are prominently represented as combining human and animal features (see cover art), often the human torso with an animal head. These composite creatures have been called "anthropozoomorphs, therianthropes, or sorcerers" (Clottes and Lewis-Williams, 46). The most impressive human representations include the famed Sorcerer of Les Trois-Fréres and similar figures combining human and animal elements, and often placed in a significant position. This combination of human and animal features has no convincing explanation apart from shamanism, where it reflects the shaman's role as master of the animals, with both animal spirit allies and the belief in the shamans' ability to transform into an animal. While many animal representations are naturalistic and food-related, few animals (less than 10%) appear to have been wounded or killed, and the animals represented were generally not "economic" or frequently eaten (Clottes and Lewis-Williams). Among the numerous representations of animals are "rare and dangerous animals" (Clottes and Lewis-Williams, 43), which were typically relegated to the depths of the caves. These were not the victim of a "hunting magic ritual," but more likely the animal spirit ally or guardian spirit typical of shamanism.

The shamanic interpretation of rock art remains controversial for some. These diverse depictions certainly had roles and meanings other than those directly related to shamanism. The shamanic paradigm, however, provides the most effective paradigm for explaining these central aspects of some of these representations. The certainty that shamanic practices were central to the evolved characteristics of the Middle/Upper Paleolithic representations is supported by three lines of evidence (Winkelman 2002a, 2009; also see Chapter 6 here):

1. the biologically based alterations of consciousness that produce shamanic experiences;
2. the continuity of shamanic ritual with the group ritual dynamics of hominids; and
3. the evidence of group rituals occurring earlier than the Upper/Middle Paleolithic transition.

The centrality of shamanic depictions to Middle/Upper Paleolithic representations implies that they were already well-established aspects of human social life.

The shamanic paradigm helps link together and explain disparate aspects of the cave art representations. For example, the "wounded man" motif with a

penile erection is one aspect that is difficult to explain without reference to the classic shamanic "death and rebirth" and penile erections associated with dreaming. The cave journeys, depictions, and artifacts exemplify shamanic practices, images, powers, and concepts. These symbolize the mythological levels of consciousness, the transformation of consciousness, and the expansion of identity associated with shamanism. The central role of shamanic practice in Early Upper Paleolithic cave art and activities indicates that it was a well-established and central part of these cultures and a central feature in producing this cultural emergence. The activities of shamanism were central to cave art because they were central to the cultural activities that led to the production of art—representations in images. The shaman's visionary journey involved a special and intense kind of imaging (cf., Noll 1985); that imaging manifested in cave art production was central to the cognitive advances associated with the Middle/Upper Paleolithic transition.

So why did shamanism and these dramatic new cognitive capacities for representation co-occur at this crucial juncture of the evolution of modern human cognition? This conjuncture can be understood in causal terms and in relation to how shamanic activities and experiences enabled the operation of new forms of social organization and cognition. Shamanism was uniquely situated to address the needs of the Upper Paleolithic transition and is more parsimonious than competing hypotheses regarding modern cultural evolution.

The Origins of Modern Human Cognition

Mithen (1996) suggested that the phenomena of the Middle/Upper Paleolithic transition involve the capabilities for combining these specialized intelligences, a key feature of the modern mind and its cognitive fluidity. Between 30,000 and 60,000 years before the present (YBP) a new mentality that was manifested in cave art was also used to produce many kinds of figures, jewelry, and the dramatic evolution of material culture. The causes of this enhanced cognitive functioning are problematic because this modern cultural evolution of the Middle/Upper Paleolithic is not associated with changes in brain size. This cross-modular integration of different specialized modules to produce complex behaviors is relatively recent (40,000 to 50,000 YBP), long after the emergence of anatomically modern humans. The cultural explosion circa 40,000 YBP involved integrated functioning of different mental modules, cognitive fluidity for integrating technical intelligence and social intelligence in the production of artifacts that were designed to send social messages regarding status, group affiliation, and relationships through personal decoration and adornment.

Archaic *Homo sapiens sapiens* and Neanderthals had similar specialized skills for tool use, animal exploitation, and social behavior, but these modules were not capable of integrated functioning to produce more complex behaviors such as art (Mithen 1996). A key feature of the modern mind such as production of art integrates a high degree of technical expertise with a highly developed and intricate knowledge of the natural world, specifically animal anatomies. Mithen pointed

out that visual symbols have specific properties (e.g., execution of preconceived mental template, intentional communication, and meaning attribution) that were present in even earlier humans; however, the earlier humans did not produce art with these capabilities because these distinctive cognitive domains were not integrated. Early humans manifested cognitive abilities to create preconceived mental images in their working of stone artifacts; they had a social intelligence that depended on use and interpretation of intentional communication; and they had a capacity for attributing meaning to "inanimate objects or marks displaced from their reference" (Mithen, 161), as manifested in their use of natural history intelligence to find animals. The interpretation of animal marks as a basis for inference about behavior indicated the presence of cognitive processes similar to those by which modern humans interpret meaning from other humans' signals or marks. However, early humans did not use this capability for the same kinds of symbolic processes involved in the art of modern humans.

Mithen proposed that these integrative processes of the modern human mind derived from the impacts of language on consciousness. This involved a transformation of the *social* language of early humans as nonsocial language use began to infiltrate social discourse. This transference of the original social function of language reflects processes of metaphorical extension of the social world to discourse about physical objects. Integration of nonsocial information into social intelligence provided selective advantages (e.g., in enhanced tool making, hunting, mate competition) and led to a rapid evolution from a specialized social language to a general-purpose language capable of integrating different cognitive modules.

Mithen proposed that these language-based multiple representations of knowledge from distinct areas of the brain produced the cognitive fluidity such as expressed in art. But the artistic depictions at the core of this cultural emergence are not dependent spoken language (see Humphrey 1998). Rather, art involves an imagetic, presentational, analogical modality that necessarily predated spoken language. Thus, language, spoken or otherwise, cannot explain the evolution of artistic representations. Mithen also pointed out that in the period from 60,000 to 100,000 years ago, *Homo sapiens sapiens* showed significant departures from the early traditions of ancient *Homo sapiens* and Neanderthals in practices such as burying the dead; making grave offerings, which included animal parts; and utilizing tools made from materials besides wood and stone. Mithen's proposed extension of the social language module to other domains of intelligence is inadequate to explain the emergence of art and religious behavior tens of thousands of years prior to the hypothesized language-induced cultural explosion around 40,000 YBP. These capacities, which began around 100,000 YBP, involved a cognitive fluidity in which knowledge produced by the different modules was integrated in forms of metarepresentation, which depend on imagery and mimesis. The production of early art images combining animal and human references reflected a capability to integrate the social intelligence and the natural history intelligence with personal and social identity. These cross-modular integrations produced basic aspects of religious thought, referred to as animistic thinking. Anthropomorphism—applying human mental and social characteristics to the natural world—is pervasive in hunter-gatherer thought, with the natural and social

world constituting a single integrated environment in which spirits imbue not only human actors, but also the animal and plant actors. The reversal of this attribution is found in the "guardian spirit" complex, in which the natural history domain is applied to the interpretation of self, others, and the mental domains. The metaphoric relationship between the social and the natural biology domains is also found in totemism. A prominent form of totemism is where human members and their groups are attributed characteristics derived from the natural world, where animal species represent social groups such as clans (see Levi-Strauss 1962, 1967). Totemic thinking involves conceptualizing human intergroup differences and relations in terms of the models provided by the natural world—as species differ, so do humans.

Mithen pointed out that the capacity to cross domains, to develop concepts about concepts, is the normal condition of human thought. Normal human thought involves various forms of synthesis, in which natural and social domains, the physical environment and social acts, and virtually every aspect of behavior involve the integrated use of modules across diverse domains of reasoning. Hunter-gatherers think of the world in a highly integrated fashion, an interpenetration of natural and social world modules in a metaphysic of a single environment that encompasses humans, animals, plants, and material in a living nature. Typical of hunter-gatherers is the application of modules across domains, exemplified in the interactions of mental and social modules with those for animal behavior.

These integrations of personal identity, social mind-reading, and natural species models produce forms of analogical thinking, metarepresentational processes of integrating knowledge between and across different domains. The analogical ability to map across domains is a fundamental feature of human symbolic capacities (see Hunt 1995a). It does so either by introducing new knowledge into domains or by providing new ways of processing existing knowledge of a specific domain, integrating it in different cognitive domains. These processes of the modules working together involves a representational redescription, which provides multiple representations of knowledge that make it applicable beyond the module-specific goals for which it is normally used and capable of forming representations of concepts and beliefs that the modules cannot form on their own (Mithen, 58, 188).

The earlier presence of these capabilities in art and other cross-modular integrations characteristic of the Middle/Upper Paleolithic transition indicates the influences of shamanism. Shamanism emerged from the integrative capacities produced by ritual practices in which the IMC integrated the functions of different modules. The shaman is also reputed to have excellent skills in several innate module domains: in language, being the holder of the first or ancient sacred languages; in natural history, being the master of the animals and often guiding hunting; and in social intelligence, being the leader of the group. Chapters 3 and 4 demonstrate that shamanism contributed to this integrative cognition through the physiological, psychophysiological, psychosocial, and symbolic effects on consciousness that produce integrative brain states. Shamanic practices enhanced integration of the different cognitive modules because shamanism stimulated

activation of the intrinsic properties of the biologically based integrative mode of consciousness. These responses produced interhemispheric integration; frontal-limbic integration; brain stem-limbic-frontal integration; and integration across the neuraxis. Shamanic alterations of consciousness provided numerous adaptive consequences, including enhancement of representation, information integration, stress reduction, and healing (see Chapter 5). Shamanic practices were the outcomes of developments based on a capacity for enactment—mimesis—that emerged about a million years ago. Integrative brain conditions produced by the hominin "mimetic controller" (Donald 1991) contributed to shamanic alterations of consciousness and provided mechanisms for cognitive expression and social integration.

Mimesis and the Expansion of the Ritual Capacity

Donald (1991) argued that the basic similarities in the Acheulean tool tradition indicated that more than a million years ago *Homo erectus* had achieved a new level of cognitive development that he termed "mimetic consciousness." "Mimetic skill or mimesis rests on the ability to produce conscious, self-initiated, representational acts that are intentional but not linguistic" (Donald, 168). Mimesis represents the structure of events through their intentional reenactment and imitation, allowing for a sharing of knowledge and experience. Mimesis is an exaptation, an extension of the capacity to intentionally communicate through deliberate use of the information provided by behavior.

Donald suggested that mimesis led to the emergence of a new level of culture that provided the basis for a communal ritual capacity in *Homo erectus* that superseded the ritual capacities of other animals. This new level of religiosity involving symbolic communication through ritual behavior must be seen as a necessary precursor to the shamanic aspects that emerged in the Middle/Upper Paleolithic cultural explosion. This development of a ritual expressive capacity provides an earlier mechanism for cultural and religious evolution than Mithen's proposal of language-driven development of symbolic culture.

This mimetic ability is at the center of the emergence of a symbolic capacity that represents with actions, using the body and its behaviors to represent perceptions of events. Mimesis operates on the principle of metaphorical similarity based on perceptual resemblance, providing a representation of the relationship between the self and the external world through movement. It is epitomized in dance. Mimesis and its expansion in dancing and other expressive modalities (i.e., song) became important ways of communicating ideas and emotions before the emergence of spoken language. Donald proposed that the first human mimetic activities were ritual dances performed with vocalizations to imitate the sounds of animals. Donald suggested that a new capacity to focus our attention on our own body movements produced a form of body-based awareness, a physical self-consciousness that enhanced our awareness of self-in-environment. This made possible expressions based on imitation, and provided the foundation for culture, customs, rituals, gestures, and skilled behaviors. These mimetic traditions provided a collective expressive system that produced a shared group consciousness and culture.

Mimesis is fundamental to shamanic thought and practice. Universal emotional mimetic expressions include "stroking, embracing, cuddling, and hand touching" (Donald, 188), actions which have their origins in grooming behaviors that were incorporated into shamanism (i.e., massage). The shamanic core of drumming and dancing involves mimesis, supramodal capabilities representing the integration of vocal, visual, and motor components. Mimetic expressions of emotions are key aspects of shamanic rituals and central tools in the shaman's healing processes, often elaborated through chanting and singing. These collective social activities created culture in the common cognitive models enacted in the public rituals that were shared by the actors and the audience alike. These constitute a basic form of symbolic expression that provided cognitive impulses for human cognitive evolution.

Mimesis expanded the capacities for culture, consciousness, and ritual. Mimesis made it possible to symbolize through the use of the body, producing metaphors through behaviors such as mime, imitation, and gesture. Mimesis made it possible to increase group coordination because it built upon one of the most basic types of animal ritual behavior—isopraxis—in which animals automatically imitate each other's behavior as a means of identifying other members of one's own species. Mimesis led to more elaborate ways for individuals to recognize the other members of their group through the cultural overlays on these basic body movement patterns. Mimesis allowed for use of the body as a general expressive medium for communicating to others information about our inner states, past experiences, and future plans. These bodily movements, gestures, and facial expressions involve symbolic communication in the vocal expressive modalities of rhythmic sound and melody, both of which enhance social bonding and the communication of fundamental emotions (Molino 2000). Emotional expression is a part of mimetic social adaptation that combines vocal and facial expression. The use of controlled expression of emotions was a part of early human evolution of social and communication skills that enabled shamanic ritual practices to provide a number of adaptive advantages in addressing the needs of psychologically and socially more complex humans. Some of the most fundamental features of this activity involved imitation of animals and extending animal concepts into the social domain in a practice known as totemism. This engagement with animals reflects adaptations that were precursors for shamanic activities.

Hunting in Human Evolution and Shamanism

The power related to animals is a central feature of the roots of shamanism; the shaman was the master of the animals, believed to be capable of controlling them as assistants and transforming into them in order to use their powers. A significant feature of human evolution involves enhanced skills for hunting, for using culture to change from being prey into being a hunter of other animals. A key element of hunting involves the adoption of the behaviors of animals, which eventually involved imitation and disguise as animals to facilitate hunting. These activities of imitating animals in order to facilitate disguise during hunting

activities engages the basic faculties related to mimesis. These mimetic engagements with animal behaviors must have been prior to their incorporation in group ritual mimetic activities because of the ancient prehominin roots of hunting found in other hominids. Hunting activities provided a basis for representation through mimicry and new forms of self-identification.

Hunting likely engaged and selected for the mimetic capacity in the ability to imitate animals, which would have directly enhanced hunting success through the ability to engage in deception through imitation. Imitation also played a role in teaching about hunting and animal behaviors. The imitation used by early humans to facilitate hunting must have produced through association a greater sense of identification with the animal. This enactment of the "other as animal" was an inevitable outcome of mimetic hunting skills, and must have been a precursor for the evolution of human ritual. It would have also established a basis for identification with the animal other as exemplified in totemism and guardian spirits.

Hunting activities are also conceptualized in terms of the ability to acquire power over animals, based in knowledge of their habits and behaviors. This power is manifested through deception and imitation, mimicking of the vocal calls of animals to attract them. The emergence of this capacity for disguise and imitation in practices of hunters must be subsequent to a more basic capacity for mimesis, but constitute an extension of the same skills. It also set the stage for a key element of shamanism, the identification with animal powers. The extensive focus on the animal "other" in stealthy hunting must have also produced a degree of inevitable internalization and identification with the "other." And anyone who has killed an animal with his or her own hands has experienced the emotionally charged identification with the demise of the other in its final struggles for life.

Hunting consequently also elicited and engaged the fundamental emotions regarding fear of death. Not only did hunting produce death to prey, but many animals—not just predators but also game animals such as deer, caribou, boar, and buffalo—posed a serious risk of death to hunters. Hodgson and Helvenston (2006) suggested that the common practice of people imitating predatory animals during rituals reflects "a compensatory strategy for gaining some 'control' over their most feared predator by means of ritual dancing and singing that deliberately induces a trance. . . . This example provides clear empirical evidence for the link between an emotional reaction to a predator and trance phenomena, both spontaneous and ritually induced" (Hodgson and Helvenston 2006, 8). They proposed that behavioral freezing and nonresponsive conditions typified by the human entry into trance had analogues in the freezing response exhibited by most mammals and primates when they are in the presence of dangerous predators. Such freezing is adaptive, as predators respond to movement.

Hunting in Limbic and Emotional Evolution Hodgson and Helvenston (2006) propose that hunting directly stimulated the evolution of the limbic system, which is central to primate emotions, learning and memory, and the anatomical basis of the reward system related to hunting behavior in carnivores. This is elicited by a direct neural pathway linking the limbic system with the retinal-thalamic pathways, providing input for dealing with potentially

threatening environmental features. The evolution of the primate limbic system involved an enhancement of the connections among the principal cortices of the brain (limbic, frontal, and motor). These enhanced connections provided a basis for greater emotional and behavioral responses, guided by an enhanced cognitive capacity. The absolute and relative sizes of the limbic system and some of its crucial components (hippocampus, amygdala) are much larger in humans than great apes, having increased substantially across human evolution. The temporal lobes are similarly larger in humans. Hodgson and Helvenston suggested that hunting played a key role in enhancing the importance of these emotional centers of the brain and experiences. Hunting evokes a variety of emotional effects, not only fear, dread, and horror but also wonder, veneration, and anticipatory rewards of a good meal. Hunting must be seen as a central feature enhancing consciousness and awareness of death, as hunting produced death in animals and exposed the hunter to risk of the same. Ritual encounters were used to prepare hunters for these life-threatening activities, giving them a sense of control over these terrifying encounters.

Ritual as a Selective Environmental Feature

Rosano (2007) proposed that ritualized gatherings around a fire were significant forces that exercised selective influences on human evolution. "Consciousness-altering rituals, often taking the form of shamanistic healing rituals, constituted an important and unique aspect of the human selective environment. This environment targeted those areas of the brain involved in focused attention and working memory, and, in time, facilitated the genetic mutation or mutations that ultimately fixed enhanced working memory and symbolic function in the human population" (Rosano 2007, 47). Social rituals were part of the environment acting on the human genome, exerting a "Baldwin effect" in which a genetic adaptation becomes subject to selection in order to follow a somatic or behavioral adaptation (Rosano 2007, 47). The Baldwin effect involves mechanisms through which an organism acquires somatic modifications that are initially induced by environmental conditions through learning or physiological adaptation. Although these acquired traits do not have direct effects on the genes, they contribute to the creation of selective conditions that across time genetically establish the features in the population. For instance, an ability to sing might have emerged without selective pressures for it, but once it existed in the genotype, there would be selective advantages that would lead to it being established as a species trait. In the cases of shamanic precursors, the presence of collective rituals acted on individual variation in the ability to participate in ritual, exerting selective influences on our hominin ancestors because of the survival-enhancement value of ritual and associated abilities.

Following the work of Coolidge and Wynn (2005), Rosano proposed that an enhanced working memory capacity was essential for the evolution of cognitive innovation and symbolism, which required an ability to simultaneously hold various forms of information and goals in mind. Rosano (2009) contended that ritual group behaviors constituted a critical selective force that shaped the evolution of these aspects of modern human cognition. Campfire rituals were

potentially fitness-enhancing, engaging processes that depended on enhanced use of brain areas that facilitated working memory and symbolism. Generations of human ancestors sat together chanting around a fire, creating an environment that exerted a selective influence for more human-like brains. Ritual exerted selective influences because those human ancestors who were most capable of ritual behavior accrued fitness advantages that derived from an enhanced access to resources, social status, and the beneficial psychophysical effects on health. Rosano proposed that ritual behavior exerted significant selective influences in enhancing hominins' capacity for working memory capacity because "[R]itualized behaviour activates areas of the brain associated with working memory and inhibitory control, especially the dorsolateral prefrontal cortex . . . [and] may have created a Baldwinian selection environment where the ontogenetic pathway of modern humans was altered raising the probability of a genetic mutation affecting working-memory capacity" (2009, 244).

The role of ritual as a selective environmental feature derived from the unprecedented increases in levels of social complexity that Upper Paleolithic Cro-Magnons experienced. This complexity demanded the creation of larger, more complex, social integrations that cross-cut traditional group boundaries. These social integrations were enhanced by social rituals, particularly ritual behaviors that reduced innate aggression. Ritual activities have effects on brain areas responsible for controlling aggressive responses. The widespread use of ritual to reduce within-group conflict found across primate species indicates that our hominin ancestors necessarily had preadaptations involving ritual to enhance social bonding. When social and environmental conditions produced demands for effectively managing larger social groups, ritual was an already-established mechanism for facilitating social bonding and would have been the foundation for further selective effects. One of the significant features that made ritual effective in building social relationships derives from its ability to inhibit pre-potent defensive responses and aggressive behaviors in order to allow for social-bonding mechanisms to take effect (see Rosano 2009).

Social and Psychodynamic Functions of Shamanic Ritual

The role of shamanic ritual in the evolution of human consciousness also derives from adaptive effects associated with the effects of collective social rituals. The following section addresses these adaptive potentials involving totemic relations, where animal species as used as representations of social groups. These capacities incorporated influences of mimesis and natural history modules in producing new levels of social adaptation by providing tools for personal and social integration. Chapter 3 discusses other adaptive potentials in shamanic experiences involving the integrative states of consciousness manifested in a variety of spiritual experiences. These reflect shamanic ritual engagement of innate brain structures that are manipulated to provide enhanced psychosocial integration in new systems of representation and knowing. These are used in restructuring the ego

such as in the visionary soul journey and death and rebirth experiences that produce a transformation of self and identity and psychodynamic growth.

Shamanic Ritual as a Social Adaptation

Shamanism was an important resource for addressing demographic and social changes of the Upper Paleolithic, which required enhanced capacities for conceptualization and communication (Whallon 1989, 433). These selective factors for shamanism operated much earlier as well. Hayden (2003) proposed that shamanism evolved because ritual played a key role in adaptations to inhospitable environments over several million years. Early hominin adaptations to these hostile environments involved selective pressures for the ability to forge close emotional bonds with members of other groups who could provide them with essential resources like food and physical protection when needed. There are significant roles of community and intercommunity alliances in addressing resource shortages; this enabled shamanistic rituals to contribute to human survival through intensification and enhancement of interpersonal bonding, within-group cohesion, and interband alliances. Rituals producing altered states of consciousness strengthened emotional bonds between individuals. The sense of unity and pan-human identity widely associated with shared ritual ASC contributed to the development of strong emotional bonds between bands and formation of alliances that were vital to survival in times of resource scarcity. These ecstatic states brought about an expanded sense of community, enabling early humans to overcome the "natural" tendency of distinguishing their own social group from that of outsiders, and instead experiencing deep bonds of connection with others.

Adaptations to severe environments required future planning and group communication for decision making and logistical organization. Whallon (1989) indicated that declines in resources produced reductions in regional human populations, and smaller groups increased the need for out-group contact to maintain mating viability and to assure access to resources. This increased the need for information regarding potential mates and resources, particularly from beyond the local group, "from beyond the limits of direct perception" (Whallon, 437). Whallon suggested that this was achieved through intergroup exchange of information based upon ceremonies involving ritual, myth, and religion—cultural mechanisms for storage of information about adaptive responses. Shamanic practices also utilized intuitive forms of information acquisition and processing that would have enhanced this process of obtaining knowledge indirectly (see Winkelman and Peek 2005). Furthermore, shamanic totemic practices involving individual and group identities based on animal analogies would have facilitated the process of inter- and intragroup integration, and, consequently, individual survival and adaptation.

An impediment to the inclusion of an increasing number of people in a group is the ability to participate in serial or vertical hierarchicalization of status differences. Caporael (1996) proposed that the interaction between levels of identity, in essence, coordination, was an essential aspect of the evolutionary forces acting upon the human gene pool and part of the "mind's natural environment." The increased

importance of alliances increased social groups' need for hierarchical and multiple levels of nested organization. Membership in different groups creates different social identities and a person characterized by multiple selves. Shamanism was the central mechanism by which these multiple personal and group identities were mediated and integrated, particularly through animistic and totemic practices.

Shamanism was particularly important in the context of increased aggregation and interdependence during the Middle/Upper Paleolithic transition. Shamanic practices involving the participation of all band members provided the context for the expression and integration of multiple identities and were the preeminent social activity that produced this social and personal integration. Caporael provided perspectives on the factors involved in social interdependence that contribute to reproduction and survival that help illustrate the social functions of shamanism. The evolution of sociability was central to human survival, maintaining an interdependence in which individual reproduction is enhanced. Caporael proposed an expanded evolutionary theory based on hierarchical and multiple levels of nested organization in which the interaction between levels is an essential aspect of the evolutionary forces acting on the human gene pool. For humans, the relevant environmental forces are not merely physical but primarily social. The evolution of coordination is a central problem addressed across species through the processes of ritual, and humans are no different. Since group living was crucial in human evolution, it led to the selection for emotional and cognitive processes that enhance ritual participation and group support and maintenance.

The group ritual is part of the dynamic processes that relate humans to their social environment and through which coordination is achieved. This coordination requires a face-to-face interdependency that is reproduced across generations through collective rituals. Ethnographic research indicates that shamanic practices are central to the coordination that occurs within band-level societies. Eliade's (1964) characterization of the shaman emphasized that the ecstatic interaction with the spirit world was on behalf of the *community*. Shamanic activities are the most central and most important of public events, and, typically, they demanded the participation of all members of the local community.

The selective pressures creating these prominent social characteristics were derived from intense competition with conspecifics, combined with the need to cooperate. Alexander (1989, 469) suggested that the dominance of humans and "runaway social competition" emphasized collective group identity. Aspects of these changes are manifested in artifacts, which reveal an emblematic group membership and an assertive expression of individual personality, individuality, or within-group differentiation of roles, status, and identity. Ethnographic analogy suggests that shamanic practices were central to the coordination that occurs within bands and macro-band levels, producing integration through totemistic beliefs and practices that constituted procedures for developing shared social identities.

Totemism as a Shamanic Adaptation

Totemism is the result of the attribution of animal characteristics to humans and their groups. This capacity to use animals as symbol systems reflects the use of our

"intuitive biology" module, a specialized capacity for organizing knowledge about animals and animal behavior. This innate capacity is manifested in young children, who illustrate an inborn capability to understand the fundamental differences between animate and inanimate objects and to recognize types or "species essence" that cannot be accounted for on the basis of their experiences. Mithen (1996, 53) proposed that this ability is manifested cross-culturally in classification schemata for the natural world and derived from a content-rich mental module for "intuitive biology" acquired through selective pressures on prehistoric hunter-gatherers. This intuitive biology, or natural history module, provided the basis for a compulsive tendency to learn about animals and their behavior, an important adaptive capability in marginal environments. This ability to organize information about animals reflects an adaptation that provided the basis for a universal analogical system for creation and extension of meaning through metaphor.

One of the most prevalent aspects of totemic thought is found in shamanistic activities, in which the shaman incorporates animal spirits and their abilities. Typically, the totem is an animal that has a personal spiritual relationship to an individual or a collective relationship to the group. Levi-Strauss (1962) illustrated that totemism constituted a system for differentiating societies by means of analogy. Totemic thought involves processes by which a homology is postulated between the differential features existing among species and the differences among human groups; as animal species differ, so do human groups. Differences among human groups are represented through the innately recognized differences among species of animals, facilitating individual and group recognition of corporate membership. This use of the animal world, which constitutes one of the most fundamental aspects of analogical thought in shamanism, provides a natural tool for organizing relations within and between societies. This "cognitive invention" of shamanism was a natural product of the integration of the different innate human capacities and provided significant adaptive advantages.

The Sociophysiology of Group Ritual

The functions of shamanic practices in enhancing social cohesion are mediated by psychosociophysiological mechanisms; several of these have effects on individual and social consciousness. Shamanistic ritual alterations of consciousness are manifestations of a "structural drive toward differentiation and reorganization of neural systems mediating consciousness" (Laughlin et al. 1986, 120). Shamanistic practices use ritual to elicit and shape this drive, evoking cognitive and emotional responses that cause physiological changes. The relationship of the dramatic social activities of ritual to the neuropsychology of the participants involves what Laughlin, McManus, and d'Aquili (1992) characterized as a "theater of the mind," procedures in which the experience of the participants is manipulated by cultural and natural symbols.

These ritual interactions also provide social relations that induce the release of endogenous opiates (see Frecska and Kulcsar [1989]). Frecska and Kulcsar suggested that shamanism socially and ritually manipulated opioid mechanisms as a means of influencing core biological functions and producing psychobiological

synchrony among group members. The brain areas (orbital frontal cortex, the temporal lobe, and the amygdala) involved in affiliative interactions, social bonding, multimodal sensory information processing, and selective attention and top-down physiological regulation are also the areas with the highest density of opioid receptors. Frecska and Kulcsar reviewed research that illustrated that brain opioid systems provide neurochemical mediation of social bonding. They suggested that these socially and ritually manipulated opioid mechanisms constitute a means of coordinating core biological functions. The cultural symbols cross-conditioned with these ritual activities and their physiological, emotional, and cognitive responses also acquire the ability to elicit the endocrine and immunological system (see Chapter 5).

A variety of shamanic activities elicit endogenous opioid mechanisms (see Chapter 4), including social bonding, prolonged rhythmic and high-intensity exhaustive exercise, nighttime activities, the stressful procedures used to induce visions, and the elicitation of hope and positive expectations. The central role of community relations in shamanistic healing reflects their role in evocation of endogenous opioid mechanisms and, consequently, psychoneuroimmunological responses and synchronization of individuals within a group. Shamanistic healing rituals enhance social attachments through symbolically elicited physiological responses. The psychosocial manipulations of these personal and social relations in small close-knit societies induce a synchrony among individuals at psychobiological levels, enhancing group commitment and bonding among members. A significant feature of opioid elicitation is enhanced attachment to others and the consequent internalization of those others as significant relations for modeling self.

Ritual and Self Management

Caporael pointed out that the *self* is an identity defined in relationship to shared group membership. The self is constructed—and split—in a nested hierarchical organization and overlapping and contextually defined in-group/out-group relations. The shifting membership in different groups creates different social identities. The evolutionary context of human relations selects for cognitive orientations towards the social matrix, which, because of its flexible boundaries and variations in composition, produces shifts in personal and social identity. This creates a person characterized by multiple social selves. Caporael, however, did not explicate the mechanisms by which these multiple personal identities and multiple group identities are mediated and integrated.

Clearly, the practices of shamanism, which provide the context for the expression of multiple identities, were the preeminent social activities that provided the basis for this personal and social integration. These integrative processes were described by Van Gennep (1909, 1960) as the ritual passages of separation, transformation, and incorporation. Ritually induced states of consciousness contrast with the normally static and stable social life by providing a period of fluidity for transformation of social status and self-experience through liminal or transitional states. The ritual then resolves status ambiguity by marking the social transition and by producing feelings of unity and community. The shaman's ritual drama

includes dramatization of social roles, depiction of processes of social life, and expression of social relations and cosmology. Dramatic enactments of these relations in shamanic rituals produces a conditioning of physiological responses with cultural symbols, and associate the participant's identity and social self with the ritual elements representing cosmology and society. Participation in ritual drama evokes and programs experiences, activating developmental sequences for the individual (see Laughlin et al. 1992 and Chapter 5 in this volume).

A natural result of the evolution of the human brain is the fragmentation of consciousness (Laughlin et al. 1992), reflecting both the increasing modularity of consciousness and the diversification of self into more statuses. Shamanistic traditions institutionalized procedures to overcome this fragmentation of consciousness by synchronizing this divergent human cognition through traditions using ritual to elicit the operations of innate modules and induce integrative brain processes. The cross-modal integration of innate modules for knowledge about mind, social relations, and the animal world constituted a basis for metaphoric predications about the nature of self and others, manifested in animism, animal spirits, totemism, the guardian spirit complex, and the soul journey.

Shamanic ritual engaged these transformative processes through entraining neurocognitive structures, provoking a restructuring of the self at levels below conceptual and operational thought. Laughlin et al. (1992) suggested that shamanic healing practices involve two basic principles: (1) a holistic imperative, a drive toward more integrated levels of consciousness; and (2) shamanic projection, a positive projection of a more advanced state of development into another person, based on the unconscious transference of control of the individual's intentional processes to a powerful individual or "master." This shamanic projection underlies the patient's transference during therapeutic processes. The neurophenomenological perspective of Laughlin et al. (1992) showed that the shaman's practices represented an evolution through the "holistic imperative," a drive toward wholeness, or more integrated levels of self, society and consciousness.

CONCLUSIONS: SHAMANISM AND NEUROGNOSTIC POTENTIALS

Shamanism was manifested in remarkably similar ways in hunter-gatherer societies worldwide. These cross-cultural regularities reveal the shamanic paradigm, an ethnological analogy for reconstruction and interpretation of prehistorical cultural processes and a universal primordial religion. Shamanism reflects the product of ancient social adaptations that preceded culturally modern humans and contributed to key aspects of that evolution by providing a variety of forms of social, psychological, psychophysiological, and cognitive integration, based on the utilization of diverse physiological and metaphoric processes. These ancient biological foundations are manifested in the shamanic religious roots of cultures around the world and in the ancient evidence of shamanism at the origins of modern human culture. These shamanic practices provided integrative metaphoric processes that gave rise to concepts of animal-like societies and humans. These concepts of

supernatural social beings that mix properties of the self, natural world, and social worlds, represent cognitive fluidity between distinct intelligences and mechanisms for managing social relations and intrapsychic dynamics. These representations in the spirit world of shamanism provided models for conceptualizing self and others and their interrelationships, playing a fundamental role in social integration, as well as self and cognitive development processes. The following chapter examines aspects of shamanism such as the soul flight, guardian spirits, animal powers, animism, and death-and-rebirth experiences within the broader context of the operations of consciousness. These central shamanic concepts are the product of analogic and mimetic integration of specialized brain modules for social perceptions of self and "others" and their intentionalities ("mind reading"). Shamanic ideologies reflect cognitive integration of different cognitive modules to produce new systems of personal and social representations through metaphors. This is a major evolutionary development in human cognition that produces an integration of innate modular functions, providing symbolic information in metaphoric representations.

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3 Consciousness in System Perspectives

CHAPTER OVERVIEW

Shamanic consciousness involves specific aspects of the general functions of consciousness. Linguistic and cross-disciplinary perspectives illustrate that consciousness is fundamentally concerned with "knowing systems." Consciousness emerges from interactions among the biological and cultural systems that enable our construction of experience, providing a variety of structural elements from which diverse forms of consciousness are produced. The fundamental elements of consciousness involve images as representations of the body, internal states, intentions, self and others. Body-based representations are directly related to the shamanistic out-of-body experiences. Also foundational to consciousness are concepts of self and others, concerns central to guardian spirit relations and possession experiences. Perceptions of others and their views are keys to self-awareness and personal identity and the roles of the spirit world in shamanism. Shamanic thought involves the production of analogical and metaphoric systems in representations derived from innate structures. The visionary experiences involve presentational symbols of the self, others, and psychological and cognitive structures based on innate representational structures derived from the body. These personal properties provide the basis of animism and anthropomorphism, a projection of human qualities onto the unknown. These systems of meaning provide a presentational symbolism manifested in visionary experiences and soul flight, the guardian spirit complex, and death-and-rebirth experiences. These forms of knowing reflect the intrinsic properties of the integrative mode of consciousness (IMC), psychointegrative processes that operate at the emotional levels of basic properties of the self. Shamanic experiences can be further understood from clinical and laboratory research on out-of-body experiences. The findings suggest that shamanic rituals interfere with the self-integrative capacities, provoking dissolution of normal body and self-relations. This provokes imagetic experiences of componential aspects of self awareness and provides a basis for enhanced cognitive functioning through freeing the human capacity for

"mental time travel," locating consciousness at a time and place different from the physical body.

THE NATURE OF CONSCIOUSNESS

A general framework characterizing the nature of consciousness is necessary for addressing the special forms of consciousness associated with shamanism. The word consciousness is used to refer to a wide range of conditions: of being awake and having awareness; feelings and thoughts; self-awareness; internal knowledge and conviction; communal knowledge and social awareness; conscience; the ability to know and learn; skills and capacities; and the ability to teach and share knowledge and understanding (Winkelman 1994). The characterization of consciousness is often considered problematic because of its diverse referents. The commonality underlying this diversity in denotations of consciousness is revealed by etymological and epistemological approaches.

Etymological Roots of Consciousness

Linguistic perspectives illustrate both the range of phenomena of consciousness and the underlying commonalities. The *American Heritage Dictionary (Morris 1981)* definitions of *conscious* are "not asleep; awake; awareness of one's own existence, sensations, thoughts and environment; subjectively known; capable of complex response to the environment; intentionally conceived or done; and deliberate." The meanings of *consciousness* are prominently based on *conscious*, which has a Latin origin (*conscius*) meaning "knowing with others, participating in knowledge, aware of" (Morris 1981, 283; cf. Barnhart 1988). A communality underlying diverse usages of "consciousness" involves it constituting a "knowing system." This is explicit in the etymology of consciousness found in *com* (with) and *scire* (to know, the root of the word "science"). The communal dimension of consciousness is also illustrated in the alternate form *conscience*, which refers not only to the essence or totality of attitudes, opinions, and sensitivities held by an individual or a group but also to the social context that creates and evaluates knowledge. The communal dimension of consciousness as socially shared knowledge is also reflected in the primary definition of *conscious* in the *Oxford English Dictionary*: "knowing something with others . . . knowing, or sharing the knowledge of anything, together with another" (*Oxford English Dictionary* 1989, 756). This communal dimension frames the meanings of consciousness in the relationships between individual and community. The role of social factors in consciousness is reflective of the intensive social behavior involved in human evolution, including the ability to attribute meaning and intentionality to others, to be able to predict their mental states and future behaviors, and to role play in order to coordinate group behaviors, using others to model self.

The meanings associated with the linguistic roots of consciousness represent a range of denotations from biologically based organismic capabilities to culturally derived reference, learning and experience that provide for various forms of

awareness and complex intentional responses. Human consciousness involves a broad spectrum of capabilities derived from the interaction of biological capacities with cultural symbolic systems. Although some conceptualize consciousness as involving an exclusively human reflexive self-awareness, consciousness is also used to refer to common capabilities of humans and other animals. Uses of the term "consciousness" in the cognitive, artificial intelligence, philosophical, and other scientific traditions indicate that consciousness refers to a number of interrelated behaviors characteristic of complex systems that respond to their environment. There are many kinds of consciousness. Consciousness also includes a range of functions that esoteric traditions claim supersede rational and egoic forms of consciousness, representing what is conceptualized as forms of spirit, soul, mind, self, and transcendental human capabilities.

This range of forms of consciousness is often characterized as involving an explicit hierarchy, as illustrated in Gennaro's (1995, 31) model. It begins with primitive bodily and phenomenal states (bodily sensations and perceptual states) and intentional states (desires and thoughts); ascends through various forms of self-consciousness, beginning with nonreflective self-consciousness, metapsychological thought and awareness; and continues through forms of introspection (momentary-focused and deliberate). A hierarchy of forms of consciousness is also a central feature of meditative traditions' views of consciousness; Wilber (1977, 1980) suggested a hierarchy of different forms of the self that produce different levels of consciousness (see Chapter 4, this volume).

Genetic Epistemology and Consciousness

Piaget's (1969, 1971) epistemological approach to consciousness[1] illustrated that it is produced by the structures that mediate interaction between knower and known. This focus on knowing makes it necessary to take an epistemological approach (concerned with the nature of knowing) to understanding consciousness. The epistemological approach illustrates how consciousness necessarily involves the relations within a system. Genetic epistemology is concerned with the nature, origin, evolution, and validation of knowing, cognition, and consciousness. Piaget proposed that cognitive development and consciousness are epistemic,[2] based in the relationships constructed by the knower with the known. Knowledge, cognition, and consciousness are possible because of the necessary epistemic structures that the subject constructs. Piaget's epistemic stages or mental constructs underlying knowledge and consciousness proceed through fixed stages of development that represent different degrees of equilibration—adaptation of the organism to the environment. Piaget characterized consciousness as being constructed in the interaction between subject and object, a relationship between the knowing subject and what is known through the intervening cognitive (epistemic) structures that contribute to the nature of what is known. Consciousness requires a conceptualization or representation and is always mediated by a structure of interrelated concepts operating on a higher level than the experience.

Consciousness and its development are based in a number of processes that mediate the organism's relationship to the environment. These include biological

structures, whose development depends on learning opportunities necessary to handle forms and combinations of information. The social dimension and action on the environment provide essential input into the developmental process, constituting the context within which a frustration of desires motivates the construction of more encompassing models. Piaget characterized cognitive development as involving a shift from judgments based on appearances, naive perception, and empiricism to a critical rationalism: from the external objects to the internal mental mechanisms and the cognitive unconscious, a shift from the level of action to the level of thought. This development enables the thinker to transcend strictly biological processes through the structures and the norms of the psychological and social levels.

Central to Piaget's perspective is the role of reflective abstraction,[3] involving processes of operation on and differentiation from the preceding level, providing for the emergence of a higher order stage that is more complex and unified than the previous. The emergence of the higher level is mediated by symbolic structures that transform the mode or level of consciousness into a higher level. The sense of self plays a central role in this process, identifying with that new emergent form of consciousness, along with a disidentification with the previous structure. This disidentification permits transcendence of the structure and the ability to operate on it with the newly emergent self-structure.

Genetic epistemology can be extended to an analysis of meditative consciousness. Hunt (1995a) provided perspectives for assessing these conditions of consciousness as involving complex visual-kinesthetic synesthesias—multimodal integration of information—and development in an affective line of reasoning. Contemplative consciousness can be interpreted as superseding the naive, habitual, epistemic assumptions made about the nature of knowing and the relationship between knower and known, modifying epistemic constructs utilized at earlier levels through recognition of the role of habitualized symbols mediating all of consciousness—perception, cognition, affect, behavior, and sense of self.

Consciousness as a System

The production of forms of consciousness and experience through the interaction of the brain with the environment and socially constructed interpretations requires a systems approach to articulate their interrelations. Consciousness operates as the organism's *cognized environment* in adaptation to the operational environment and to changing situations. Consequently, it involves many different internal processes that provide environmental input and interpretations to a system that uses them to prioritize goal-directed behavior in relation to varying environmental conditions and internal needs.

A systems perspective is inherent to diverse models of consciousness. In the "Three Worlds" view of Popper and Eccles (1977), consciousness functions to connect the individual organism, its social group, and the environment. They propose that understanding consciousness requires linking the "worlds" of physical things, subjective experiences, and culture and products of the mind. Ellis (1986, 1995) characterized consciousness in terms of interacting components of

a system and interactions among many factors, internal and external (context); and their interrelations with lower order processes, including imagination, memory, representation, emotions, and desires. Ellis (1995, 3) suggested that conscious processes are characterized by emotional intensity and imaginative acts in which memory and desire play a fundamental role in eliciting arousal and attentional mechanisms. Motivational processes based on judgments about what is important for the organism are crucial to the selection of perceptual elements for conscious attention. Conscious information processing uses a concept or an image of what might be, with imaginative production preceding perceptual consciousness. What determines the direction of attention—and consequently, consciousness—is meaning, rather than sensory input; a predisposition to see occurs prior to perception.

The cornerstone of consciousness is the ability to represent, conceptualize, and manipulate subjunctives—to imagine physical and conceptual objects. Self-consciousness derives from the representational processes that provide information to the organism about desires through sensations, images, memories, and their associations (Ellis 1995). The generalized or generic image and the formulation of mental images involve somatic images of what it is like to move one's own body to meet a desire. Representation involves looking for what is important to the organism and depends on the motivation to be aware of something, a general desire to know (Ellis 1995, 28, 128, 138).

Body and Emotions in Consciousness

The body and emotions are central to Damasio's (1999) perspectives on the origins of consciousness. Damasio views consciousness as deriving from an image—not necessarily a visual image, but a mental pattern and representation provided in any sensory modality; consciousness derives from the sense of being the owner of that image, someone who experiences it. This consciousness derives from changes in the relationship of the organism to the object of perception. The adjustment of the body to signals from an object produces some change in the organism that is necessary for perception; awareness of that change is consciousness.

Damasio contends that while consciousness, wakefulness, and attention can be separated, consciousness and emotions cannot. The foundations of consciousness are in emotions, feelings of emotions, and knowing that we have feelings of an emotion, which constitute an information hierarchy mediated by different forms of the self. Feelings are the experiences of emotions: "the process of feeling begins to alert the organism to the problem that emotion has begun to solve. The simple process of feeling begins to give the organism incentive to heed the results of emoting. . . . '[F]eeling' feelings extends the reach of emotions by facilitating the planning of novel and customized forms of adaptive response" (284, 285).

Consciousness is the function of an organism that results from the ability of the organism to represent it own experiences. The brain's ability to plot the organism's relationship with an object provides a "feeling of a feeling." Some sense of a self is necessary for having a feeling of emotions; something must have those feelings. It is feelings that are the primitives of consciousness, an emotion that is

perceived and represented as an object and is represented in a mental image as a change in the self.

These second-order representations that provide the basis for consciousness are associated with the ancient brain structures designed to regulate basic life processes. Consciousness derives from these same structures, extending the functions of homeostasis. Consciousness permits organisms to know their own emotions, extending their capacity to maintain homeostasis and adapt to the environment. Emotions, the feelings they engender, and consciousness are all based in body relatedness, on representations of the organism. Emotions are a crucial input to reasoning related to survival, innate brain devices that play a homeostatic regulatory role through nonconscious processes. Emotions have the role of producing specific reactions to situations that require specific types of responses that promote action from aspects of our evolved biology that help to regulate survival behaviors. Life-regulation processes provide the biological machinery that produce stereotyped response patterns—emotions—that are manifested in images experienced as feelings. The brain structures most directly related to consciousness and the ancient protoself are those that process nonverbal imagetic body signals, especially the musculoskeletal structure.

The Elements of Consciousness

Baars's (1997) global workspace theory of consciousness illustrated elements of systems of consciousness in addressing the widely distributed capabilities of the brain that are used for interpretation of, learning about, and action in the world. There are many kinds of contents of consciousness, including both of the external world and internal imagery, a sense of presence, bodily sensations, personal memories, intentions, expectations, and beliefs about one's self and the world. These are made available through the functions of memory systems, behavioral automatisms, motivational systems, and the interpretation or meaning systems. Baars proposed that attention engages the key elements of consciousness, which include (1) working memory, which provides the workspace for conscious selection among (2) competing sources of information (perceptions, images, and representations) based on (3) a variety of unconscious factors affecting attention, including memory, automatisms (behavior), motivational systems (emotions), and interpretive/meaning systems that are elicited by (4) "context operators," particularly the "director" or self that selects among the options presented in the environment.

Consciousness reflects systemic properties of organismic functioning involving an ability to maintain adaptive interaction between internal and external environments. Consciousness begins with the need to assess and to analyze incoming information in relation to existing conceptual frameworks. Consciousness uses this information to formulate goal-oriented behaviors, which reflect communal dimensions—priorities defined by awareness shared with others. Consciousness mediates the organism's adaptation to the environment through modulation of a range of capabilities, including attention, representation, memory, learning, desires, planning, and behavior. It couples the organism with its environment and social group to make decisions regarding changing situations. Relating to

the environment in meaningful ways requires use of memory—information in reference to previous experiences and goals. Memory links sensations and perceptions, constituting the template for recognition of sensations, based on judgments about the relationship of present stimuli to past experience. A goal orientation cannot be based exclusively on reflexes; rather it requires an intelligent selection among behavioral options based on memory and judgment. Consciousness allocates attention in prioritizing biological, social, and personal goals. Goal orientation requires the abilities of discrimination and judgments based on a hierarchy of needs. This experience of needs comes from our emotions, which are the foundation for awareness of the self.

Variations in specific aspects of each of these components provide the basis for a variety of forms, levels, and types of consciousness. Different forms of consciousness can be characterized in terms of the system that the subject utilizes to know the world. These include different forms of attention (e.g., arousal, orienting, pure awareness); modes of representation (e.g., iconic, symbolic, social, language); memory (instinctual, perceptual, motor, episodic, semantic); learning (e.g., reflex, associational, conditioning, reversal); motivations/emotions (e.g., desire, questioning, attachment, various affects); and self-reference to various others (parental, social, mythological, religious) and dimensions of the self (e.g., somatic, social, mythical).

Features of Shamanic Consciousness

These perspectives provide the basis for characterizing shamanic consciousness in terms of the information-processing systems and forms of self that the subject utilizes. The shamanic forms of consciousness emphasize representations derived from internal images and their manipulation in analogical and metaphorical systems. These subsystem elements help in illustrating the specific nature of shamanic consciousness, which emphasizes

1. a concern with the emotional life and the multiplicities of the self;
2. experiences manifested in internal perceptual images and the body;
3. activation of memories of central emotional significance to self, particularly repressed emotional desires, identities, and complexes; and
4. evaluation and development of the self with respect to the social "others," including those provided by animals and within mythological systems of interpretation;
5. programming neurognostic structures of the self with spirit information from mythological interpretative systems.

Forms of Symbolic Consciousness: Representational and Presentational

Human consciousness is experienced through a number of different modalities, which are all fundamentally symbolic in nature.[4] Laughlin, McManus, and d'Aquili (1992) illustrated this in a neurophenomenological or biogenetic structuralist

approach to the relationships among perception, symbols, and consciousness. The symbolic process emerged over phylogenetic evolution as a nervous system function in which neural networks are entrained by partial information. The content of experience is a construct resulting from interaction of the nervous system with the contents of the socialized mind operating through paradigms provided by previous learning; for humans, this is largely happens through the enculturated mind and self. External perceptions and their interpretation are intrinsically symbolic, reflecting the dominance of the brain's preeminent function, that of constructing cognized models that mediate our perception of environmental input. There is an intimate integration of the systems mediating perception and cognition in the symbolic processes that organize experiences perceived as the environment.

Any stimulus that elicits a model, functions as a symbol by evoking associated knowledge derived from the prior relationship between the stimuli and its associated meaning. "[A] minimal symbol [is] any stimulus that provides sufficient patterning for entree into a model that contains more information than that provided by the stimulus" (Laughlin et al. 1992, 165). This symbolic process operates on the principle of topographic projection, an abstracted pattern based in reproduction within the cortex of a cognitive model of the spatial patterns, frequencies, and physical relationships of the environment. The symbolic process is a fundamental principle involved in the development, elaboration, and maintenance of the neural networks that underlie the construction of conscious experience, including the physical environment. This symbolic basis of consciousness is derived from embodied images that operated prior to the emergence of spoken language. The original form of symbolic communication is manifested through visual kinesthetic mirroring in mother-infant exchanges, and while later subordinated to speech, continues to develop apart from it. These perceptual presentational structures also constitute the basic form for awareness within nonsymbolic organisms.

Hunt (1995a&b&c) distinguished two fundamental modalities of symbolic cognition involving a self-referential capacity, which he referred to as representational symbolism and presentational symbolism. Hunt contrasted representational and presentational symbolism in terms of the relation to conscious and unconscious processes. With representational symbolism, a highly automatized communication code is employed. This is typified in ordinary language use where the medium of expression is so automatic that the processes are largely unconscious—unless struggling with a new language. Consequently, awareness of the expressive medium is subordinated. With presentational symbolism, the expression in the visual medium is focal and a polysemic meaning emerges out of the unconscious. The meaning of presentational symbolism appears to emerge directly and spontaneously as a consequence of an experiential immersion in the symbolic medium. This symbolism is exemplified in the expressive arts, where an open-ended meaning emerges from the forms that are sensed. Images can also provide knowledge beyond that embedded in propositional knowledge, particularly as illustrated in dream imagery, which has meaning beyond that found within waking symbolic consciousness.

In contrast to linguistically based forms of representation, Hunt characterized presentational development by building on Geschwind's (1974) views of

symbolic thought as derived from cross-modal translation, a re-representation of knowledge. Hunt (1995a) extended Geschwind's ideas on the basis of symbolic cognition in capacities for cross-modal translation across perceptual modalities, echoing his argument "that the potentiality for the symbolic rests in a capacity for neocortical cross-modal translations between the structures of vision, kinesthesis, and audition, . . . emergent out of cross-modal fusions and transformations between . . . separate cortical 'analyzers' for vision, hearing, and touch-movement" (Hunt 1995c, 410, 416).

The emergence of consciousness in the interaction between different systems of representation is illustrated in Hunt's (1995a) characterizations of consciousness as involving cross-modal synesthesias. Synesthesias entail subjective experiences of one sensory modality in terms of another sensory modality (e.g., the sound of color or somatic sensations from music). Hunt proposed that thought is based in emergent synesthesias resulting from the transformations across the modalities of vision, kinesthesis, and vocalization. These synesthesias provide the basis for the symbolic capacity, the mind of the organism, in the cross-modal synthesis that results from mediation, translation, and re-representation across different sensory modalities. Their core representations are visual images combined with bodily sensations.

Visionary Experience as Presentational Symbolism

A central aspect of shamans' activities involves a visual experiential relationship to a dimension of reality known as religious, spiritual, and numinous. Whether thrust on the shaman as a consequence of illness or sought through deliberately induced procedures, visionary experiences are a central tool of the shaman's development and interaction with the spiritual domain. The functional nature of these perceptions of the spirit world is in the internal imagetic flow that provides the basis of shamanic diagnosis, journeying, healing, and other activities. Although the shaman's intentions and cultural background play an active role in the construction of these experiences, the cross-culturally common structures of visionary experiences in shamanism represent fundamental aspects of human consciousness that reflect neurognostic structures. These visionary experiences involve the engagement with neurognostic representations of the fundamental forces of life and death, self and others, and the cosmos. These images represent the most pressing concerns for the individual relevant to self, significant others, and the emotional and social dynamics of life. These experiences may occur spontaneously, but the shaman's training involves the deliberate cultivation of this internal visionary state within the context of a cultural tradition that guides their development. Noll (1985, 445) characterized this deliberate development of enhanced mental imagery as the central feature of shamanism and proposed that at its core, shamanism was concerned with using techniques for inducing, enhancing, and interpreting visual imagery.

Visionary experiences are a natural phenomenon of the central nervous system, resulting from disinhibition of the regulation of the visual cortex. This disinhibition results in hyperactivity of the visual regions, which are experienced as

ongoing visual panoramas. A central part of the shaman's cognitive potentials lies in being able to stabilize this internal world and utilize its images for a variety of purposes, including divination, diagnosis, healing, and psychodramatic social manipulation.

Noll (1985) suggested that the shaman's cultivation of visions involves two phases of training. First, the shaman learns to increase this internal imagery, enhancing its vividness through a variety of procedures. A focus on internal visual imagery provides an internal experiential focus, a figure-ground cognitive reversal that enhances the primacy of the internal imagetic reality to the degree that it provides an alternative experience to the external world. Second, the shaman develops increased control over the internal images, known as the inner-sight or inner-vision. Shamanistic traditions exploit internal imagery as an innate human capability that uses the mind's capability for producing representations from its own materials and through its own agency. This internal visionary world presents the spiritual beings and experiences that are found universally and must be accepted as an experienced reality, independent of their ultimate ontological status. In shamanism, these experiences of spirits play a fundamental role in representing shamanic power and the illnesses from which the shaman's patients suffer. This visualized spirit world constitutes a symbolic system in which metaphors are used for representing others, self, and social and psychological processes.

Hunt (1995a) characterized presentational modalities as based on symbolic arrangements of perceptual structures. The structures of this nonverbal symbolic intelligence involve inherent physiognomies and behaviors, entoptic structures (genetically based visual geometric design patterns), and microgenetic structures of perception. Hunt (1995a, 47) called these "the maximum experiential expressions of a conscious awareness system" constituting a "nonverbal symbolic intelligence," a language of the psyche that provides a basis for expression of a range of meanings. These inherent forms of perception provide a universal grammar or deep structure analogous to that of spoken language. Hunt (1995a, 157) analyzed "white light" experiences as cross-modal synesthesias, "a cross-translation and transformation between the modality-specific properties of the tactile-kinesthetic body image and the visual field." Hunt suggested that the vortex tunnel and "hollow body" experiences found in many mystical traditions "can be understood as a complex synesthesia between this 'hollow' tactile structure and the symmetrical funnel or cone of the visual field itself" (158). Their widespread presence in shamanic, mystical, near-death, and other experiences reflects their natural self-referential presentational foundation and structures of abstract intelligence in the imagetic mode.

Presentational Symbolism: Imagery and Action

Consciousness depends on an organism looking for patterns in data (Ellis 1995). The focusing of attention, looking for a form, elicits an image. This imaginal consciousness is necessary for perceptual consciousness, which results from the match of a mental image with a pattern of sensory input. The physical-visual field and the mental-imagery field have the same experiential space and elicit the same parts of

the cortex, having the same properties as an experiential space (Baars 1997). The image is a form of consciousness, and "[p]erception of the physical world may be the most ancient mode of consciousness" (Baars 1997, 64). This provides a structure for knowledge from iconic visuo-spatial representations of perceptual experiences that preserve information in an isomorphic relationship that is an analogue representation of an object. The combination of activated imagery with current sensory input, a combination of the view of the world within our embodied selves, is fundamental to consciousness.

The generic image is semiotic, portraying some relationship of a concept or an object to the percipient. Hunt integrated the works of Arnheim (1969), Johnson (1987), and Lakoff (1987) in demonstrating that images and visual spatial metaphors provide the basis for all symbolic cognition, using reorganized and recombinant visual perception to present meaning. The most basic image is a proprioceptive image of what it is like to move one's own body. This conceptualization of image as behavior, a "truncated efferent response" (Ellis 1995), reflects the integration of spatial and visual images with bodily awareness. Newton (1996) similarly contended that this sensorimotor basis for cognition is primarily visual, an experience in the visual modality that includes memories and information from other senses. Conscious understandings, whether of objects, actions, or others, are all based on imagery that is derived from a reactivation of past sensorimotor experiences.

This presentational modality is illustrated in what Newton referred to as the sensorimotor and image-based foundations of consciousness. Consciousness and intentionality are based in "nonintentional sensorimotor states associated with the basic goal-directed action abilities that humans share with simpler organisms" (Newton, 3). Meaning involves being able to think of something in terms of sensorimotor experiences, a "knowing how to" in terms of sensorimotor experiences and actions. Newton details cross-disciplinary support for the sensorimotor theory of cognition that indicates that all fields of knowledge, including abstract ones, are based in spatial, kinetic, and kinematic terminology. The sensorimotor theory of cognition is also supported by phenomenological studies of intentionality, which show human experience, including cognition and language, to require embodiment. Newton (1996, 29) posited a central representational system for all modalities of knowledge, including spoken language and abstract cognition derived from the common brain mechanisms for movement that are manifested in sensorimotor representations.

The work of Werner and Kaplan (1952), McNeil (1979), Johnson (1987), and Newton (1996) illustrated that sensorimotor ideas and representations derive from physical experiences. The memory traces of sensory and motor experiences provide the basis for signs; through semiotic extension they provide the media used to organize all abstract thought and cognitive structures. In both abstract and concrete domains, bodily systems are the ubiquitous system of reference, reflecting the sensorimotor basis for all of cognition. Johnson examined how metaphors describing mental states have their basis in the construction of images or memories of previously performed sensorimotor activity, that is, imaging and remembering how it feels to use our bodies in particular ways. The organism's action on that environment provides a body-based template for symbolism.

The representation of abstract symbol structures in ways isomorphic with sensorimotor structures is through combinatorial arrangements of sensorimotor representations (Newton, 23).

Newton illustrates that self-awareness is in essence awareness of bodily responses to sensory input. This somatically generated input is the basis for the perception of the externality of perceptual objects. Understandings of objects are based on how it feels to use them; Newton further illustrated that intentional mental states are also best understood in terms of actions. Both physical and mental actions share a common structure of intentionality in reactivated traces of sensorimotor experience, which are the basis for planning of action and the construction of mental representations.

The work of Lakoff (1987) and Johnson (1987) illustrated that even language is based in these experiences of embodiment. More-complex abstract forms are derived from bodily and spatial experiences represented in image schemas. Image schemas provide the basis for all logical relationships, with perceptions providing the template that permits the operation of propositional logic. Newton considered the comprehension of natural language to involve analogical representational structures derived from the agent's experience of its own basic voluntary actions. Understanding linguistic material involves creation of mental image models based in sensorimotor representations constructed through the same mechanisms that underlie perception and action.

Newton illustrated how sensorimotor structures use analog models to represent perceptions of self, environment, intentionality, and all higher cognitive activity. The use of these sensorimotor structures as a medium for representing the conceptually more abstract relations is based on analogical reasoning. This is necessary because central to any mental activity is the use of structures of reasoning from familiar domains to understanding novel domains. Cognition depends on metaphor, beginning with others serving as the basis for representing our own self (e.g., "mirroring") and continuing with the use of one's own state of mind and emotions to interpret other minds. These processes are exemplified in mother-infant interactions, where one's own body and emotion are understood through their manifestation by others.

Mimesis: The Body as Metaphor

Hunt (1995a) illustrated how the experiences of shamanic and meditative consciousness involve images that are physical metaphors. Analogical cognition within this bodily sensorimotor foundation and expressed through the visual modality is a core aspect of the out-of-body experience, or soul flight. Hunt characterized the classic phenomena of shamanism such as soul flight as using the presentational imagetic mode. These images reflect the structures of abstract intelligence operating through a self-referential capacity, an imagetic expression of Mead's (1934) concept of social awareness. This awareness involves taking the role of the other towards self, imagining how others perceive our person. The social capacity to internalize others' perspectives regarding one's own self is used to perceive/construct an image of one's own body as would be seen from the perspective

of the other. These perspectives illustrate that shamanism and the mystical traditions involve ritual and symbolic technologies for manipulation of experiences of the self by separating awareness from its basis in the body scheme.

These perspectives reflect Piaget's approaches to cognitive development as occurring through *schemes*, forms or structures of knowledge based on organized patterns of behavior. Early cognitive development is based in a sensorimotor scheme, an action scheme involving acting like what is symbolized (or acting out the visual scanning of its form and dimensions). This stage of development, based on the coordination of the senses with perceptual schemes, is centered in the body. This body-centeredness is superseded in the final sensorimotor stage, when the child acquires the ability to mentally represent objects and actions not immediately present. This deferred imitation is based on internal symbolic forms that are represented in visual images. Piaget's second major epistemic stage of development of cognition and consciousness is that of preoperational thought, a semiotic function involving "the ability to represent or symbolize by means of imitation, play, signs, and symbols" (Kitchener 1986, 18). This mimetic symbolic ability is primarily stored in images rather than words and with thinking expressed in motor behavior.

Arnheim's (1969) *Visual Thinking* illustrated these forms of uniquely human symbolic cognitive abilities manifested in behavior. These operate independent of language skills, as evidenced in individuals with language-debilitating brain lesions or pathologies, and in children prior to language acquisition (Donald 1991). This uniquely human cognitive competence is manifested independent of language in various forms: "mimetic and gestural representation, categorical perception, various generative patterns of action, and above all the comprehension of social relationships" (Donald, 167). Other contexts in which humans without language manifest these advanced cognitive capabilities include games, sports, arts, crafts, emotional responses, work—and shamanistic experiences.

This language-independent symbolic representation of mimesis uses bodily actions to express intentions. It is the *intentional* reenactment and imitation which distinguishes mimesis from the involuntary nature of mimicry. Metaphorical similarity based on perceptual resemblance represents a relationship between the self and the external world in movement. The inherently cross-modal nature of mimetic representation in integrating sensory and somatic modalities provided the basis for a uniquely human prelinguistic level of symbolization. Mimesis has properties that preceded speech and are necessary for it. These "include intentionality, generativity, communicativity, reference, autocueing, and the ability to model an unlimited number of objects" (Donald, 171).

Donald illustrated that use of mimesis for representational purposes constitutes "the core of an ancient root-culture that is distinctly human . . . [and] still form[s] the expressive heart of human social interchange" (189). Mimetic skills are represented in a wide range of performance systems, including gestures, physical (manual) signals, postures, and rhythm. Mimesis is episode-bound and concrete but provides a medium for the expression of complex social interactions. The visual-motor domain, including facial expressions, gestures, postures, and rhythmic movements, provides the principal means through which mimesis expresses nonverbal and emotional communication, an ancient mimetic social adaptation.

Human facial emotional expressions have less of a voluntary character than other mimetic acts, often manifested unconsciously; others can "read" our feelings even if we are trying to keep them to ourselves (e.g., crossing the arms against the chest may convey sentiments of which we are not aware).

Mime provides the basis for the acquisition of many aspects of behavior, including mannerisms, body postures, social behavior forms, communicative gestures, and many skills for the construction of cultural artifacts. Mimesis provides a means of modeling and rehearsing others' social roles—in essence, expressing the social structure, social relations, social roles, and other social activities.

The mimetic skills required highly specific brain adaptations that involve a functional system distributed across brain systems (Donald). The mimetic controller is not localized but depends on systemic functions with a widespread and complex anatomical basis because mimesis is so rarely absent in humans. Some aspects, such as emotional expression, prosody, and rhythm, are apparently right-hemisphere controlled, whereas others, such as visual manual skills, are apparently left-hemisphere based. Mimetic cognitive capabilities, including gesture, tool making, emotional expression, and social intelligence represent a prelinguistic level of cognitive development that provided the groundwork of basic semantic structures. Mimesis is more restricted than language and ambiguous in its representation, but nonetheless persists today as a superior form of representation of certain forms of knowledge: "modeling social roles, communicating emotions, and transmitting rudimentary skills" (Donald 1991, 198). This mimetic controller was the dominant representational device until the evolution of language, producing "[m]ime, play, games, tool making, skilled rehearsal, and reproductive memory" (Donald 1991, 190).

The generative skills and capabilities of the nonlanguage areas of the brain for comprehension of social behavior and thought illustrate that the unique intellectual skills of humans are independent of language, including planning, semantic representation, and most of the cognitive activities considered to be uniquely human. This language independence is manifested in semantic memory, propositional knowledge, planning skills, social interaction, and evaluation skills that persist in the absence of language. Donald proposed that mimesis provided an independent generative system, an unbounded central system with generative capabilities responsible for analysis and production of discourse and narrative, formation of plans and scripts, and enhancing coordination with others.

SOCIAL CONSCIOUSNESS: OTHERS IN SELF AND MIND

Human perceptions of spirits depend on an innate intelligence involving "mind reading," an ability to infer the mental states of others of our species. The apes manifest their most complex behavior in the specialized social intelligence that has been referred to as Machiavellian, reflecting the highly developed skills of many primates in using these skills in the cunning deception and alliances that are a

pervasive aspect of their social life. This requires a developed social intelligence that reflects adaptations to the social demands and processes that group living creates for primates. These social processes produce a need for cognitive skills for cooperation and in-group competition, and selected for a new level of mental processing that enables individuals to predict others' behavior, providing a theory of mind or "mind reading" that can be used to intuit the mental processes of others. These predictions are models based on their own minds and motivations, combined with hypothesis-building and testing. This intuitive psychology attribution of mental states is based on the organism's use of its own mind and its feelings and behaviors in similar contexts to provide a model of a mind of another and the behaviors it would likely produce. This social cognitive capability to predict others' behavior entails social forethought, a prediction of future behaviors. Mithen argued that these social behaviors constitute the biological function of consciousness, with the evolution of reflective consciousness derived from these social behaviors. The ability to read others' minds constituted an essential basis for the maintenance of social cohesion and a foundation for a primordial aspect of human consciousness, "knowing with" and knowing self through others.

Consciousness and self are necessarily linked; because consciousness involves relationships between knower and known, it requires a knower with some sense of entityhood (self-representation) and for whom priorities are weighed. Selves operate as subsystems that selectively modulate an organism's behavior in relationship to a changing hierarchy of environmental demands, both physical and social. The self capacities select among different elements in forming consciousness, particularly ranking priorities based on motivations, emotions, and selective meanings.

The aspects of consciousness referred to as *reflexive awareness* also involve this social capacity in order to direct awareness toward one's own ongoing subjective experiences. Hunt (1995a) contended that it is the cross-flow, or cross-modal translation, between different modalities that provides the basis for self-referential awareness. Self-referential functions arise from a basic self-reflexive capacity that is based in the other, "a special consequence of our capacity to 'take the role of the other' toward ourselves as personal awareness" (Hunt 1995c, 17). This self-awareness is not only reflexive but also evaluative, derived from social engagement and using social others as a point of reference.

Fundamental aspects of the nature of the self and consciousness are derived from social relations and their symbolic bases. Hunt (1995a) illustrated this with Mead's (1934) perspectives on the capacity of humans to "take the role of the other," based on internalizing and imagining the expressions of others toward self. Mead emphasized the central role of the group in self-understanding, where the individual depends on the incorporation/internalization of others' perspectives to coordinate one's own behavior. This is Mead's concept of the generalized other, involving the self's internalization of the roles and knowledge of others in society. The use of others/society as a model for self entails a form of metaphoric understanding, using one frame of reference or modality (others) to

elucidate another area, the self. These "other" representations provide the content for the self and the context (others) that makes possible consciousness and the communicative interactions of social life. The self and ego depend on these models and their conflict for personal development. These conflicts are provided by social relations, where others provide norms for self characteristics and frustrate goals and desires. In this sense, consciousness is fundamentally dialogic, based on social concerns, a dimension of consciousness clearly indicated by its etymology.

Hunt (1995a) suggested that these capacities for self- and other-reference are based in nonverbal presentational symbolic processes. This recombinatory symbolic capability is first manifested in facial mirroring in infancy. This biologically based capacity for cross-modal translations between visual image (mother's face) and the kinesthetically felt face of the infant is the first manifestation of symbolic communication, providing the basis for learning how to take the role of the other, and, consequently, to produce self-awareness. "Social mirroring—as incipient 'taking the role of the other'—and cross-modal translations—as the core of the symbolic capacity—are coemergent and inseparable. Human cognition is, from the beginning, structured in the form of dialogue" (Hunt 1995c, 88).

The cross-translation between self and other found in mirroring capabilities is present from birth. This mother-infant exchange enables the infant to discover its own face through the return of mirrored expressions and to take on the role of the other in mirroring the mother's facial expressions. This mirroring constitutes the first form of symbolic expression. The other as image and physical object subsequently emerges as the model for understanding of one's own unseen physical self, illustrating the social foundations essential for self-consciousness. The process of social mirroring of the other developed in mother-infant dyad plays a fundamental role in subsequent self-development. This process is based in a common auto-symbolic, or self-specifying, system, and is manifested in the sense of recognition of an "other," a presence. This notion of felt presence, the sense of self in the unknown other, is a basic manifestation of our plural symbolic capabilities in relation to the environment (Hunt 1995a). This sense of the "other" is derived from the use of one's own (dis)embodied self as a model of the unknown other, providing a basis for relations with the spirit world and others.

Forms of Self-Agents and Consciousness

Baars (1997) characterized the concept of *self* as having an indispensable role in consciousness. Consciousness is "for something," and that is a self, the organism's auto-representation of the organism for the organism. Roles of self in conscious experiences include perceiver, actor, narrator, and the context for the long-term stability of identity. The self accesses the elements of the system necessary for consciousness, including sensory information, memory, affect and personal facts, as well as intentions. The self guides the organism's most basic expectations about the world, a goal hierarchy to differentiate the priorities encountered.

The conceptualization of consciousness as a framework for processing information to guide behavior in adaptive and meaningful ways makes the

interpretations used to construct meaning also central to consciousness. These interpretations begin with different concepts of the self as agent and social others as the contexts for evaluation.

Proto, Core, and Extended Self

The different forms and roles of the self can be understood in terms of a hierarchy of functional systems proposed by Damasio (1999). He proposes that the clinical evidence and various deficits of the self indicate that we need to understand consciousness in terms of the different forms of the self, which he labels the protoself, core self, and extended or autobiographical self. The protoself is based in the momentary maps of neural patterns that represent the multiple conditions of the physical structure of an organism in that moment. Baars pointed out that a sensorimotor self based on sensorimotor mapping provides a basic self/other differentiation that is necessary for any kind of sensory system. Core self depends on second-order interpretations derived from experiences of the protoself. Consciousnesses of emotions produces core self. The core self is the ever-changing self derived from the content of experience. The autobiographical extended self is the permanent self derived from personal history, and depends on core consciousness and conventional and working memory. The basic capabilities to function as a social being are found in the core self, where behavioral habits and skills and the ability to respond meaningfully to the environment may persist in spite of loss of personal autobiographical identity. Extended consciousness involves an elaborated sense of self-identity that evolves across the lifetime. Although it may be found in nonhuman animals, it is a phenomenon that reaches its pinnacle in human language and the synthesized memories across the person's lifetime. It is based on the contributions of more fundamental aspects of the self.

Protoself

Damasio describes a protoself derived from nonconscious processes that represent the organism in the organism's own brain. This protoself does not have consciousness, however—no perceptions, no interpretations, nor any knowledge. The protoself derives from structures involved in survival activities, homeostasis, wakefulness, attention, emotions, and learning. The protoself and its second-order maps are primarily produced by phylogenetically older structures of body regulation and representation found along the midline of the brain. This midline location begins in the brain stem and continues upward to the cingulated and somatosensory cortices. Damasio proposes that a central area maintaining the protoself is the midbrain or misencephalic reticular formation (MRF), a collection of nuclei that regulate basic life processes, including wakefulness and sleep, giving rise to the name ascending reticular activating system. The protoself is based on functions managed by brain stem nuclei, including reticular, monoamine, and acetylcholine nuclei; the hypothalamus and basal forebrain that connect the brain stem and forebrain; and the somatosensory cortices, especially in the right hemisphere. The protoself does not require, however, the early sensory cortices, cerebellum,

hippocampus and hippocampal-related cortices, temporal and most frontal cortices; and prefrontal cortices.

The Core Self

The capacities of core consciousness are based in the organism's representations of the protoself and derived from an account produced of the protoself's representations of the states of its internal systems (organs) as well as those of the musculoskeletal frame. Damasio (169–170) characterizes the production of core consciousness as deriving from the enhanced nonverbal image of an object that results when an organism produces a representation of how its own state of affairs has been affected by information processed regarding that object. "The first basis of the conscious *you* is a feeling which arise in the re-representation of the *nonconscious proto-self in the process of being modified* within an account that establishes the cause of that modification. . . . The core self inheres in the second-order nonverbal account that occurs whenever an object modifies the proto-self" (172, 174). Consciousness thus has its origins in the processing of the sensory qualities of an object and their changing effects on the organism. These changes are represented as second-order maps of the relationship between the object and perceiving organism. The enhanced image of the causative object places it in a spatial and temporal context. The mental images that describe these organism-object relationships and second-order maps are feelings and body-related maps. These experiences are the subject of a nonverbal account, a "wordless narrative" based on images providing a causal explanation of the organism-object relationships expressed in second-order maps. The brain's ability to produce somatosensory maps of both our plans for actions and the actions in second-order maps provides multiple mechanisms for constructing the narratives that are at the foundation of our primordial consciousness. These narratives are wordless, but stories nonetheless in the sense of a second-order mapping among related events that exists prior to their third-order mapping into language, a nonverbal conception of a never-ending series of actions upon the self that may be translated into words.

The core self is conscious of the here and now, an organism's inner sense based in images and feelings of its relationship to an object. The core self and consciousness of humans does not depend on humans' higher cognitive capacities of language and reason, nor does it require conventional or working memory, attention, language or reason—not even the ability to remember or produce images and use them for problem solving. The core self is transient and constantly recreated in the information provided by the protoself. The anatomical dysfunctions that affect core consciousness are located along the midline (central positions) of the brain, particularly the brain stem, thalamus, and hypothalamus, reflecting ancient evolutionary adaptations that humans share with many other species; consequently, Damasio proposes that the core self is not exclusively human. Damasio (180) proposes that there are several brain structures capable of producing such second-order neural patterns derived from a cross-signaling across several structures, specifically: the superior colliculi in the midbrain, the cingulate cortices, the thalamus, and the prefrontal cortices. Damasio considers the cingulate cortex to

provide the most integrated view of the body. Cingulate cortices combine sensory and motor information with emotional processes, engaging processes that are particularly active during dreaming. Damasio proposes that dispositions that generate images and actions are found in these neuron ensembles in subcortical and higher order cortices that serve as convergence zones. Core consciousness is also intimately related to emotions; without core consciousness, the person does not display emotional expressions. Core consciousness is an essential resource for all of thought. While not dependent on higher cognitive and consciousness processes, core consciousness underpins them. Core consciousness influences attention, working memory, learning, language, and intelligent thought.

Damasio notes how the impairment of extended consciousness may produce self-dissolution, depersonalization, mystical states, and conditions such as multiple personality disorder. This reflects manifestations of the core self, the level of self and consciousness engaged by the shamanistic traditions. These engagements involve a variety of self-forms, including the mystical no-self, alternate forms of social self acquired through possession, and the animal selves of shamanic practice. However, these experiences may also involve extended consciousness, as Damasio suggests that it is the extended conscious that has the capacity to move forward and backward in time, accessing anticipated futures and the relevant past.

Adaptive Roles of Self in Consciousness

Actions that ensure survival depend on images that provide information about possible patterns of action and the opportunity to review scenarios and options and choose among possible responses. Consciousness is the device or process through which an organism can purposefully simultaneously consider and manipulate multiple images, assess them in terms of the organism's interests, and select among the possible courses of action. Consciousness derives from connecting the images with the basic systems involved in life regulation, allowing for a manipulation of those images in relation to the options that produce outcomes that are in the organism's advantage. "Consciousness opens the possibility of constructing in the mind some counterpart to the regulatory specifications hidden in the brain core, a new way for the life urge to press its claims and for organisms to act on them" (Damasio 1999, 25). Consciousness allows for the mental concerns of the organism to act on the innate regulatory systems and their conditioning.

The adaptive roles of the self in consciousness are illustrated by Waller (1996) and Scheff (1993), who suggested that consciousness has been selected for problem solving under novel conditions. The solution of nonroutine problems requires a mental capacity to manipulate one's self in relation to the tasks of problem solution. Waller concluded that the sense of self has evolved to maintain the appropriate problem-solving and task orientation. There is a fundamental and necessary role of self in consciousness in its contribution to a theory of mind and in expansion of the roles of agents. Scheff emphasized at least three different forms of self-agents: (1) instinctive genetically inherited patterns, (2) learned skill sequences, and (3) command-control. Whereas instinctive and learned sequences agents become stereotyped and constant, command-control agents are variable in order

to detect conflict and to serve as a mediator in making decisions. These three agents provide the basis for behavior sequences and the development of ego and self in response to the need for mediation of conflict between the different agents. Self and ego mediate among the demands of different agents and resolve initial conflicts through serving as higher order agents within a hierarchy of goals. The ego can be characterized as the highest level command-control agent, with control over a large number of lower level agents (Minsky 1985). The ego, however, is not always in control of what the body does, with lower level command-control agents potentially able to circumvent the goals of the ego. Shamanic practices manipulate lower level agents through the alteration of consciousness, providing more direct access to unconscious aspects of the self.

Scheff (1993) characterized the self as a multilevel structure or process of agents that may be expanded laterally at the same level and vertically across a number of levels of command-control. The self's intelligence is a direct function of the number of levels that it controls. Although proliferation of agents increases the likelihood of conflict, a larger number of levels permits the more effective management of conflict. Various forms of the self provide a hierarchy of levels of control necessary to deal with different kinds of goals and internal conflicts. The simultaneous processing by different self-agents, combined through associative processes, provides a complexity of processing and the basis for intuitive solutions to problems. Shamanic practices exemplify processes for accessing these intuitive solutions through a variety of practices that access the unconscious and body-based modes of knowledge (see Winkelman and Peek 2004).

Intelligent behavior depends on a combination of the serial analytical processes and the intuitive parallel ones, combining a wide range of contingent associations characteristic of an open system. Humans require an open system because human interaction and interrelationships are inherently ambiguous, with meaning contextually dependent. Scheff suggested that interpretation is based on participants' ability to decode messages through using part/whole thinking. Meaning is derived by relating elements to a vast amount of knowledge and information available in a variety of local contexts, including biographical knowledge, the physical surroundings, earlier conversations, and a semantic and cultural network of relevant meanings. Cultures everywhere have produced systems for such interpretation in the mythological systems and spiritual beings that inhabit them. The use of the mythological and spiritual world for modeling the self derives from our innate capacities and need to model the self on others. The spirit world provides abstract representations that expand the repertoire of possible self models.

The Guardian Spirit Quest

The vision quest, or guardian spirit quest, whether individualistic or as a form of shamanic training, was the most fundamental and widespread religious complex found in Native American cultures (Benedict 1923). It had its parallels in shamanistic practices around the world. Central to the vision quest and the guardian spirit quest were efforts that exemplify the shaman's seeking of a relationship with the spiritual world as central to training and development. The vision quest activities

were conceptualized as involving the individual development of a special relation with the spirit world based on seeking a personal relation with spirit allies or guardian spirits. The guardian spirit encounter was often seen as central to the development of one's special skills and competencies as an adult. In some cultures, it was central to religious activities for all men, as well as for women in some cases. A person's training for the vision quest began as young as six or seven years old, when instruction was provided in how to attract guardian spirits and how to behave with respect to them. The process for producing the experiences of contact with the spirit world involved submission to conditions requiring considerable personal endurance, sometimes withstanding extreme pain for extended periods of time. This included the use of purgatives, prolonged fasting, self-imposed isolation, exposure to temperature extremes, exercise to exhaustion, extreme physical punishments like whipping and scourging the body, and other austerities, including extensive self-inflicted wounds in some cases. If these procedures were successful, they produced experiences that were interpreted as a vision or a visitation from the spirit world. The spirit allies encountered in the vision experience provided powers, strength, fortitude, or good fortune represented in an object that symbolized and served as a source of power.

Swanson's (1963) in-depth analysis of the psychosocial functions of the guardian spirit quest indicated that they gave many different kinds of power and advantages—endurance and strength, luck in hunting, protection in battle, assistance in love, protection or restoration of one's health, and the power to cure others. The guardian spirit enabled people to do things, providing possibilities that people could use or reject. Guardian spirits were viewed as distinct from the person's soul, spirit, and vital force. The guardian spirits did not take over the person, nor were they viewed as part of the individual's own personality. Guardian spirits were the spirits of specific plants, animals, or other natural phenomena. The guardian spirits had selected the individual with whom they were associated as a gift bestowed on the recipient.

These experiences were part of the process through which a person engaged the transition from childhood into full adulthood. Swanson suggested that the guardian spirit quest is a search for the charisma that will enable the person to perform as a competent adult. The guardian spirit complex meets the individual's need for empowerment and guides the individual in the personal and social choices from among the options available for adult development and specialization. The guardian spirit quest serves as a means of self-assessment and examination of the commitment to pursue a specific interest in life. This perspective illustrates the role of spirits not as external supernatural agents, but as aspects of one's self and individual identity.

Shamanism and the Self

Shamanism developed traditions for constructing, manipulating, and using a variety of selves for psychological and social integration. The complex nature of personal identity is apparent when examined within the context of shamanism, possession, and the mythological systems used to interpret human nature.

The numerous forms of self-reference found in mythological systems provide for polysemic representation of the organisms' operators, including the diverse aspects of the self. Animistic entities and processes, particularly, the shamanistic guardian spirit complex and possession, provide mechanisms and symbolic systems within which the self develops in interactional symbolic relationships with others. The most important representations in shamanistic thought are in the spirit world of "sacred others" (Pandian 1997), who operate in both the spiritual realms and human social worlds. Pandian showed these religious phenomena to involve processes for identification of the cultural locus of the symbolic self (also see Chapter 5 here).

These systems also serve other cognitive and social functions, including the resolution of contradictions between the reality of suffering and broader systems of cultural meaning. These religious-meaning systems include models for the representation and, hence, the development of the self. The beliefs of these systems constitute the projective systems and norms for psychosocial relations that structure individual psychodynamics and collective patterns of behavior. Pandian characterized the "shamanistic sacred self" as involving processes that provide protection through a psychocultural therapeutic communication system that produces and maintains the symbolic self and culture. The phenomena of spirit worlds constitute models for transformative functions of the self.

Death and Rebirth as Self-Development

Eliade (1964) pointed out that selection for the role of the shaman may be derived from a crisis, a period of illness, or insanity characterized as a spirit affliction, a consequence of a divine being choosing the individual for the shamanic role. This illness or a spirit attack leads to experiences interpreted as death.

This initiation crisis typically involved (1) an experience of suffering, followed by death, dismemberment, and rebirth; (2) an ascent to the sky and descent to the lower world; and (3) conversations with spirits and souls. These entities may attack the initiate, slashing the body or devouring it piece by piece. A recurrent motif is the removal of the eyes and their strategic placement for the observation of the total dismemberment and destruction of the body. The skeleton may be stripped of all flesh and cleaned, while flesh and organs are consumed by various mythological parties. The body of the initiate is then remembered, or reconstructed, a process that imbues the shaman with power and spirit allies. The initiate shaman's development of a dialogue with spirits is a sign of the improving condition of the initiates as they engage in and imitate conversations with the spirits, invoking them through chanting and singing. During this period the spirits give the initiates new rules for life that healed the individual, and in the process making him or her a shaman, a "wounded healer."

Although all of this initiatory crisis may not be a universal feature of shamanism, some of its features such as the death-and-rebirth experience do appear to be universally associated with shamanism (Winkelman 1992). Walsh (1990) suggested that the emotional turmoil and distress associated with the shamanic call in many cultures suggest that it may constitute a brief reactive psychosis,

atypical psychosis, or schizophrenia or schizophren-form disorders. However, such interpretations require that the shaman's condition be examined from the perspective of psychopathology rather than as a form of psychological deconstruction designed to permit the manifestation of other neurognostic symbols and forms of self-reference.

The shaman's initiatory sickness involving personal death reflects the fragmentation of the conscious ego. Walsh suggested that these experiences represent a psychological transformation process, which tends to occur at times of overwhelming stress, resulting from the intrusion of unassimilated neural structures. The cross-culturally recurrent aspects of death, dismemberment, and rebirth represent deep archetypal or neurognostic processes in response to the inability of the psyche to maintain balance. The death-rebirth experiences reflect the death of one identity in development of another. As a consequence of the inability of the existing psychological structures to manage the stress, the organization of the psyche—identity, beliefs, habits, and conditioning—collapses, resulting in a period of introversion and reduction of intentionality. Laughlin, McManus, and d'Aquili (1992) suggested that this collapse of internal structures is experienced homeomorphogenetically as dismemberment, "autosymbolic images" of one's own breakdown.

Following the collapse of the psyche, experienced as dismemberment and destruction, a psychological reorganization follows, guided by an archetypal drive toward holism or holotropism. Walsh suggested that the spontaneously occurring threatening images symbolize the shadow, aspects of the self and the psyche that are disowned and repressed because they are considered to be bad and evil. When these structures are forcibly re-elevated into consciousness in distressing symbolic forms, they may be perceived as threatening external entities. The spiritual world provides a conceptual domain for organizing the experiences of these structures, whose locus of intentionality is dissociated from the conscious neural networks of the ego. The symbolic manipulation of these spiritual constructs and their relationships to the ego can produce changes in affect and other psychodynamic processes. As one becomes more accustomed to the experiences, and as they are associated with symbols with positive affect, they lose their terrifying nature as representatives of death and become objects of exploration. The progressive development of the shaman requires that the ego have sufficient strength to reciprocally assimilate conflicting structures through transformations that can resolve the discrepant internal models. The shaman's experiences are structured by the cultural conventions and beliefs and, in some cases, by the tutelage of more experienced practitioners.

Resolution of these experiences leads the shaman to transcendence, a new level of identity. The universal experience of magical flight symbolizes this transformative experience. These are homeomorphogenetic (common form or structure) transformations in structures of consciousness, a restructuring process of the ego produced by the symbolic models and the holistic imperatives toward psychointegration. The death-rebirth experiences frequently result in dramatic alleviation of psychosomatic, emotional, and interpersonal problems resistant to previous psychotherapy, with reorganization guided by archetypal drives

toward wholeness (holotropism) (Walsh). This reflects the integration of the individual sense of self and experience within neurognostic structures of the organism. Walsh suggested that linkages between initiatory psychological disturbances and the widely reputed exceptional health of shamans may reflect a well recognized phenomena. Psychological disturbances are often followed by increased mental health, a consequence of the growth experiences that they provoke, such as exemplified in the death-and-rebirth motif which reflects fundamental processes of transformation of self.

Shamanic Structures of Consciousness

Shamanic experiences of death and rebirth are not intrinsic signs of psychopathology but represent neurognostic structures of the collective unconscious. These shamanic structures have been examined by Grof (1992), based on his decades of supervising more than 20,000 shamanistic sessions with people from diverse cultures using holotrophic breath work and psychedelics. This provides data for characterizing structures of consciousness that fall outside of those conventionally recognized in Western psychology. In addition to the traditional biographical level of consciousness created in a person's experiences from infancy onward, there are two other major levels of consciousness—the perinatal and the transpersonal. The *perinatal* level reflects birth trauma experiences; while the *transpersonal* levels reflect dimensions of consciousness that extend beyond a person's body and ego. Both of these levels of consciousness are central to death-rebirth experiences and other aspects of shamanic practices. In comparing his findings with those of shamanistic systems, Grof (1992, 17) concluded that "the ancient spiritual systems had actually charted with amazing accuracy different levels and types of experiences that occur in non-ordinary states of consciousness." Shamanistic techniques for altering consciousness reveal aspects of the deep structures of human consciousness and psyche, providing the organism with mechanisms "to free the bonds of various traumatic imprints and limitations, heal itself, and reach a more harmonious way of functioning" (19).

Grof described these structures as organizing the psyche and the unconscious with themes fundamental to both positive and negative emotional experiences of life, particularly, anxiety, fury, pain, and suffocation. Grof analyzed perinatal phenomena as involving four distinct experiential phases or matrices: (1) the amniotic universe; (2) cosmic engulfment; (3) the death-rebirth struggle; and (4) death and rebirth. These four perinatal matrices are aspects of the structures of the unconscious. Grof (1992) referred to structures formed around the experiences of agony and ecstasy of birth as "volcanic" or "Dionysian" ecstasy. This is a combination of the polar opposite experiences of pain and pleasure and is induced in shamanic rituals through painful induction procedures. The death-rebirth experience's culmination is the struggle of " 'ego death,' an experience of total annihilation on all levels—physical, emotional, intellectual, and spiritual" (73). Grof characterized this loss as the death of one's paranoid aspects, one's false egos that view the world as dangerous and that feel the need to be in control to guard against danger. The sense of rebirth that follows this release from fear produces a sense of great energy,

which may be interpreted as light, pure god, or unitive feeling of reunion with the true self.

ANALOGICAL THOUGHT AND METAPHOR IN SHAMANISM

Mental models represent structural analogues of the world, with images as their perceptual correlates. This mapping provides the basis for pattern-recognition processes that underlie all forms of reasoning, from primitive categorization through logical inference. This construction of meaning is based primarily in analogue processes that map relations between systems through metaphoric processes. These metaphors are analogical tropes involving the ability of something to resemble, represent, or stand for something else (Friedrich 1991), such as in totemism, where animal species represent social groups.

Innate models are used in cultural-meaning construction, which involves analogical processing linking socially derived experiences to capacities of these innate capacities for metaphoric models (Shore 1996). Culture plays a fundamental role in the formation of metaphoric models (e.g., see Fernandez 1991), and these analogies may be derived from cultural traditions that provide their meanings and functions. Consequently, formal tropes have considerable differences across cultures. The universals of the shamanic world view are not, however, derived from culturally unique interpretations, but reflect underlying psychobiological structures that are manifested in basic tropes.

Friedrich (1991) placed these processes of analogy and metaphor in the broader context of the different types of macrotropes (imagetic, modal, contiguity-based, formal, and analogical), which constitute independent and nonhierarchical systems. Image tropes "represent various kinds of perceptual images that 'stand for themselves'. . . . Epistemologically, these tropes depend on the experience or feeling of qualities that are in some sense primary or irreducible" (Friedrich 1991, 27). For example, the skeleton is a perceptual image of the person long after death and hence a natural symbol of death. Image tropes are omnipresent in language use because of their pervasive presence in mimesis. For example, we imply a search for knowledge and understanding by intently looking at or for something, and "seeing" is a basic metaphor for understanding. "Do you *see* what I am saying?" "Can you *see* a way out of this situation?" Modal tropes involve the underlying matrix of emotions that are at the basis of shamanic healing. Modal tropes are concerned with expressions of mood, as well as with the combination and interaction of moods. Modal tropes function as deep, organizing principles that are rooted in a mimetic expression of emotions and feelings, as well as their synthesis through symbolic mediation.

Analogical schematization refers to processes of translation between inner models and outer models, which provide the basis for the construction of meaning. Analogical schematization occurs at a number of different cognitive levels; the body and its ability to act are the most fundamental of these schema. For example, "Are we *heading* in the same direction on this? Can you get your *arms*

around this? I know it is a *mouthful* but see if you can *swallow* this idea and *stomach* it" Anatomical features and relations constitute the basis for a variety of contiguity tropes that use analogies between body parts and other contexts. Various forms of analogical representations are found throughout shamanism, for instance, the body-referenced out-of-body experience. Friedrich characterized this projection of anatomical relations as the most powerful and universal form of metaphor based in part/whole relations. Anatomical relations are at the core of shamanic contributions to human cognitive evolution beyond the mind-in-body into the mental spheres of abstracted image-based knowledge.

Animism and Analogical Processes

The use of the body and self to represent "other things" is epitomized in the qualities of animism. Processes of metaphoric thinking in shamanic thought include animism, the belief in spirit beings, particularly its anthropomorphic attribution of humanlike qualities to nonhumans. A basic metaphoric reference in shamanic thought involves spirits that are conceptualized through representations derived from one's own sense of a disembodied self and mind (Winkelman 2004a). Around the world, spirits are conceptualized in terms of their humanlike mental, personal, emotional, behavioral, and social qualities. Humans and their qualities are models of—metaphors for—the structures and princples of the unknown forces conceptualized as spirits. Attributing human qualities to the unknown is exemplified in the humanlike mental and emotional characteristics of gods, spirits, nonhuman entities, and even animals. Metaphoric thought involving attribution of human characteristics to animals and vice versa is ubiquitous in shamanistic practice, manifested in animal familiars and transformation, totemism, and the guardian spirit complex.

Tylor (1871) suggested that animism constituted the original basis of religion, derived from the primitive philosopher's attempts to explain the differences between alive and dead, awake and asleep, and the meaning of dreams—phenomena that are fundamental to distinctions related to consciousness. Tylor proposed that primitive philosophers falsely reasoned that a spirit, an animating principle separable from the body, was responsible for the differences between life and death, waking and sleeping, and for the content of dreams. The presence of a humanlike spirit in the body explained life and waking consciousness, whereas its absence caused sleep, dream experiences, and even death. Guthrie (1993) recharacterized this aspect of religion as providing explanations through anthropomorphizing—offering the concept of humanlike beings that provide the design and the purpose to the observed phenomena of the universe. Guthrie (1997, 489) suggested that the influences selecting for animistic beliefs lie in "perceptual uncertainty and the gaming strategy with which we meet it." Humans' attribution of humanlike characteristics to the unknown is not based on a desire to find comfort, but in an effort to make sure that they do not fail to respond to a humanlike actor if necessary.

Bird-David (1999) reframed Guthrie's position, suggesting that the human tendency to animate things is engendered by socially based cognitive skills. Bird-David proposed an interpretation of animism as a relational epistemology

derived from relations with the environment. Animism is central to hunter-gatherer societies because people share with the environment through relations that enable humans to be situated in their world. They personify animal and other entities to create relations in which they socialize and share with them. Bird-David suggested that there is a universality to this relational mode of animistic principles because the concept of spirits represents "super persons" who are central to sharing relationships with the environment. This relationship is central to developing personhood and communal affairs and maintaining identity. These spirits are models providing common images of the other for internalization in self-development.

Shamanic Flight: The Out-of-Body Experience

Self-development is also central to soul flight, soul journey, out-of-body experience, and astral projection, experiences involving a universal and essential feature of shamanism: the experiences of some personal aspect of the self which leaves the body and travels to the spiritual or supernatural world where one encounters other entities. The neurognostic basis of the shamanic soul flight is indicated by the cross-cultural distribution of experiences sharing a common structure: the out-of-body experience (Shields 1978; Alvarado 2000); near-death or clinical death experiences (Greyson 2000; Moody 1975; Ring 1981, 1986; Sabom 1982); and "astral projection" experiences (Blackmore 1982; Green 1968; Irwin 1985; McIntosh 1980). Although there are important distinctions among these experiences and shamanistic visionary experiences found cross-culturally, they share some basic experiential features and structures. These homologies indicate that the core shamanic experience—soul flight—is an innate psychophysiological structure reflecting neurognostic structures and psychosocial processes.

This biological basis is supported by Shields's (1978) cross-cultural study of belief in the out-of-body experience, which he found to be reported nearly universally. Phenomena sharing fundamental experiential similarities with shamanistic soul journey occur both spontaneously and deliberately among modern populations (Blackmore 1982; Green 1968; McIntosh 1980). The availability of these experiences is widely attested to in postmodern cultures by individuals who seek out the shamanic path (Harner 1982). These individuals report experiences similar to those of shamans—flying through diverse worlds, interacting with spirit beings, and acquiring information about both the ordinary and nonordinary realities. This experience in which some aspect of the person—soul, spirit, or perceptual capacities—is thought to travel to or to be projected to another place is not an exclusive property of shamanism. Rather, it is a potential available to people who avail themselves of the experiences that evoke these innate structures, as indicated by the near universality of reports of these experiences (Shields 1978). Although the ASC of mystics, mediums, and other shamanistic practitioners are not typically soul journey or flight, similar experiences may occur in the meditative traditions and can be developed as *siddhis*, the psychic powers associated with meditative development (Eliade 1969). These shamanistic experiences are also similar to the spontaneously occurring near-death experience, where individuals come close to

physical death from accident or trauma or may be clinically dead for some period of time before resuscitation. During the period of clinical death a set of core experiences emerges in the most complete cases that mirror features of the shamanic soul journey.

The Near-Death Experience and Soul Flight

Many basic features of the shamanic soul flight are paralleled in a natural transformation of consciousness that is produced in response to trauma, as illustrated in the widely studied near-death or clinical death experiences (Blackmore 1982; Greyson 2000; Moody 1975; Ring 1986; Saboom 1982; Schoonmaker 1979). These involve circumstances where, according to clinical evidence, the people die, but they are eventually resuscitated and return to life with incredible stories of their experiences.

The near-death experience (NDE) typically involves a sense of the self often identified as the soul separating from the body and moving upward; an observation of the physical body in a different location from their sense of self and point of view; a movement away into a hole, tunnel, or portal and eventually another world; and encountering a bright light, spiritual beings, and perhaps God and deceased relatives. The individual is usually told to return to the physical world and may reenter the tunnel to return to the body.

The NDEs are generally profoundly positive emotional experiences, a joyous entry into the afterlife. The person is, nonetheless, told to return to the physical world where they then reenter their body and return to life. Alive and in their bodies again, they remained convinced of the reality of their experience, of the eternal immortality of their soul, and their eventual return to the afterlife.

In addition to these features, there are a variety of common mystical themes that occur in some near-death experiences, including ineffability, a sense of an inability to explain the experience in words; positive affective features of peace, tranquility, calm, and joy; a panoramic review of one's life and other dramatic visual images and memories; an experience of being all-knowing or experiencing the realm of universal knowledge; a sense of hyperalertness or awareness; a deep depersonalization, including a sense of complete separation from the body; detachment and loss of emotion; a sense of cosmic unity; transcendence of the physical world and an engagement with supernatural realities; and an experience of a void, nothingness, a realm of total nonexistence.

The source of the phenomenology of the NDE must be in biology since it is manifested in such similar ways across cultures. Its innate nature is reflected in the complete accounts of NDE experiences by young children never subjected to such information. These experiences are not merely a product of modern medicine and its enhanced abilities to bring people back from the brink of death. The NDE was a well-described clinical phenomenon in the nineteenth century, provided by people who had recovered from near-death or unconsciousness from drowning, accidents, war wounds, and other traumas (Greyson 2000). The inherent nature of these experiences is reflected in the reports from a large percentage of contemporary people who nearly die; there are reports by about half of all

children who survived critical illnesses that were potentially fatal (Greyson). While the severity of the health crisis may contribute to evoking these experiences, they can also be provoked by a fear of death rather than the actual physical threat or debilitation, being also reported by individuals without trauma or organic brain malfunctions (Greyson).

The universality of NDEs suggests that they are related to biology, but as by-products or as adaptive benefits? In the modern world, these NDEs typically have a profound and beneficial psychological impact on the person, transforming the personality to one with an increased concern with religion and spirituality. They often manifest in dramatic increases in selfless behaviors, a focusing on the importance of personal relationships, helping others, and a profound engagement with spirituality and the afterlife. Such individuals almost look forward to death, but engage vigorously with life in overcoming challenges and exhibiting a spiritual purpose in their compassionate behavior towards others (Greyson, Ring). This suggests that spirituality is a normal by-product or outcome of these experiences, engaging an altruistic dynamic well-recognized for its adaptive benefits. Such enhanced altruistic behavior could have further fixed the near-death spirit/soul experiences.

The near-death experience of one's self as a spirit or soul suggests that it may have been a factor leading to postulating of spirits and the generation of religious beliefs in general. Like religion, NDEs can be seen as a personal engagement with a fantasy world that protects one from the emotional shock of reality—imminent death—a form of dissociation that provides for emotional tranquility. The out-of-body experience (OBE) self provides an antidote for anxiety regarding the physical trauma to self and body, an assurance of continuity in the face of potentially mortal crisis. Engagement with an image of a pleasant afterlife allows one to remain calm and to preserve one's energies while awaiting assistance from others. This engagement with an alternative reality, referred to in the psychological literature by terms such as "fantasy proneness" and "absorption," is intimately related to other aspects of human consciousness such as hypnotic susceptibility and dissociation. The occurrence of these kinds of anomalous experiences is part of the natural response of the organism to threats to its well-being. This is illustrated in other natural sources of mystical SoC, those associated with fasting, self-mortification, and the induction of sleeplessness (see Chapter 4). The NDE features provide an important point of reference for recognizing the neurognostic basis of a variety of features of mystical and shamanistic experiences, as well as drug-induced altered states of consciousness.

Soul Flight as Symbolism: Body Image Metaphors

The communality in experiences across diverse cultures suggests that the shaman's soul flight derives from an archetypal or neurognostic structure. Laughlin, McManus, and d'Aquili (1992) illustrate how the experience of soul flight involves a natural symbolization of the shaman's transformative experiences and experience of transcendence. Flight and ascension metaphorically reflect the movement of the shaman's consciousness upward through the levels of consciousness.

Laughlin (1997) provides a biogenetic structuralist assessment of the body image to illustrate why use of the body as a symbol system is universal, as well as at the center of shamanic cultures. This somatocentric-derived cosmology uses the innately structured body image as a neurocognitive model with which humans organize diverse forms of internal and external experiences. Although the model of the body develops under sociocultural influences, it begins as a largely hardwired program that constitutes a neurognostic foundation for human experience. This body image is a construct of the nervous system, incorporating sensory, somatic, and skeletal information, as well as memory. These organizational principles are largely genetically determined, providing universal patterns of neural activity, specific behavioral and experiential components, and phenomenal body attributes central to the organism's synthesis of "conceptual, imaginal, affective, metabolic, and motor operations. . . . [Body and self image are] composed of symbolic transformations of meaning at various levels of organization, from primitive arousal, vestibular, postural, metabolic interoception, and affect to more advanced conceptual and imaginal functions" (Laughlin 1997, 52). These body images combine memory and perception, which enable the evocation of the image to produce associated effects on affects, sentiments and emotional cognition.

Although the body as metaphor—exemplified in the OBE—is central to the major SoC of shamanism, the experience is primarily visual. Hunt (1995a) characterized the OBE as a synesthesia based on visual images of the body and bodily sensations, a presentational metaphor that is at the basis of the cross-cultural similarity of accounts regarding OBEs. The OBE involves complex synesthesias based in the capacity for cross-modal translation across perceptual modalities. Central to Hunt's perspectives is Mead's (1934) work on the capacity of humans to "take the role of the other"—communicative interactions in which one monitors messages from others to construct a model of the general social perceptions regarding one's self and personal characteristics. Hunt proposes that the prototype of soul journey involves the capacity to take for one's self the imagined perspectives of others. This is manifested in using visual imagery to represent one's own body as it would appear from another's perspectives rather than one's own.

The taking of the perspectives of the other toward one's self provides a form of self-awareness or consciousness. This capacity for self-reference involving imagining and internalizing the expressions of others toward self is most obvious in speech and verbal thought. Out-of-body experiences involve manifestations of this self-referential capacity in a visual-spatial mode operating independent of the constraints of the physical body/world. This reflexive self-awareness provides the capacity to direct awareness at one's own ongoing subjective experiences, as well as explore aspects of visual-spatial memory.

The Biological Bases of the Out-of-Body Experience

The OBE is similar to a broader class of anomalous body and self experiences (such as autoscopy and sleep paralysis) that may also exhibit the central features of OBEs, such as flying, falling, floating, and spinning. These anomalous self-body experiences may also involve alien presence syndromes or the sense of a felt

presence, someone or something nearby. This sense of a felt presence may include visual perceptions of a presence. Various self-hallucinatory syndromes (heautoscopy, autoscopy, OBE, sleep paralysis) have different degrees of identity with a body that is present. The classic OBE sees the body as one's own but distinctly different from the locus of subjectivity and self. At the other extreme, the body is not identified as related to self, but experienced as an alien presence or intruder. The intruder is not recognized as the self, but such common identity is suggested by the typical features of understanding the thoughts and intentions of the alien intruder.

OBE and related anomalous body-self experiences help reveal the functional architecture underlying human consciousness, particularly, the relationships of the elements involved in producing a sense of self and body consciousness. OBEs reflect three aspects of abnormal self-representation: the self experience as lacking unity; the self as located in a different place than normal (generally above the physical body); and the visual perspective of seeing the world and one's own body from a different perspective than the body (Metzinger 2005, 2009). These OBE experiences illustrate the predominant role of the visual field over the somatic field in the experience of the self.

Neural and Functional Correlates of Anomalous Body-Self Experiences

Blanke and associates[5] have identified the neural correlates and likely causes of OBEs and related anomalous body-self experiences through studies of clinical populations with similar experiences and with laboratory studies in which OBE-like experiences are induced in normal people. OBE-like experiences of a sense of the self at a location different than that of the body can be produced by several means: electrical brain stimulation of select brain regions; manipulation of tactile, mental, and visual data, particularly, by false visual feedback regarding actual body location; through mental and visual simulation of various positions for the body; and by manipulation of conflicting sensory inputs regarding the body.

This data indicates the area of the temporo-parietal junction (TPJ) as central to the neural mechanisms underlying anomalous body experiences. Evoked potential mapping and transcranial magnetic stimulation identified selective brain activation associated with OBEs at the TPJ. OBE and other anomalous phenomena reflect interference with the normal integration of body-related information in the TPJ. In addition to interference in the TPJ, other factors must also be considered in the self-model disintegration and disattention to external visual information that permit the dominance of the internal visual frame of reference. The TPJ is adjacent to areas responsible for the integration of somatosensory information and the vestibular system that provide balance. The TPJ mediates low-level vestibular processing, as well as the interaction among the higher level processes that underlie the production of a sense of the phenomenal self. The vestibular cortex functions as an area for multisensory integration of vestibular information and visual, proprioceptive, and tactile cues to coordinate signals regarding body movement and position. Interference with this integration or

the transfer of vestibular information to other parts of the brain can lead to altered senses of body ownership and disembodiment. The TPJ has a central role in managing mental imagery regarding one's own body, mediating self and body inputs that underlie the normal experience of the unity of the self (Lopez, Halje, and Blanke 2008). Interference with the linkages across vestibular, proprioceptive, and tactile senses and their match with visual references produces disintegrations of subjective self-consciousness with body ownership and embodiment.

Those disposed to OBE also have interference with interconnections between the TPJ and the prefrontal cortex (PFC), a functional disconnection between parietal and frontal areas that inhibits egocentric perspectives. While OBEs indicate a loss of connectivity of the motor, somatic, and balance functions of the TPJ area with the executive and egoic PFC, these experiences are always *visual* experiences, illustrating that self-connectivity with visual regions persists. The self-image of the OBE is, however, not engaged with the actual visual field, but an imagined visual field that is also disconnected from actual body proprioception. The illusion of movement characteristic of OBE experiences is a feature shared with the dream mode of consciousness—the ability to move experientially without an actual movement of the body. The loss of this integration of information regarding balance and motor experience underlies the ability of the self and experienced false body to travel through space without the actual constraints of the physical body.

The OBE indicates interference with the vestibular areas that provide an integrated sense of balance central to body sensations. In shamanic OBEs, this deactivation of normal vestibular system functions apparently results from the extensive dancing and drumming by the shaman. These excessive repetitive activities lasting hours can overwhelm the ability of the vestibular system to maintain balance and manage input about movement. Functional areas of the TPJ are literally overloaded by the excessive stimulation. This habituation is typical of overstimulation, which leads to shutdown of a sensory system. Consequently, the body-processing and self-processing systems are allowed to operate free of actual body input. Cheyne and Girard (2008) noted that the inputs to the normal bindings of body and self-information include both vestibular and motor components, but proposed that it is the visual-body synesthesia that appears to be the most significant feature triggering the perception of an anomalous body-self relationship.

Metzinger (2005) noted that the OBE features include a "cluster of functional and phenomenological core properties similar to the proto-concept of mind" (2005, 57). OBEs and related anomalous body-self experiences provide an opportunity to examine the separate components that contribute to ordinary awareness. These special forms of mental representation provide functional properties and processes, with the two self-models present in OBE providing potentially adaptive features manifested in this proto-concept of the mind. A central phenomenal feature of the OBE models is a visual representation of one's own body from third-person perspectives—seeing yourself from the perspective of someone else. The body seen is not the focus of experience nor of self-identity. Rather, a second self-representation model—the astral self that is removed from the body—is the locus of the phenomenal perceiving self and subjective experience, including proprioceptive and spatial perceptions. It is this second self that provides an

integrated representation of reality and has the attentional, experiential, kinesthetic qualities and the capacities of intentionality. The physical body as perceived is not recognized as the experiential self, although it is still seen as linked to one's physical identity. Rather it is this disembodied self that has the first-person perspective from which the phenomenal world of spirits and supernatural powers are experienced.

Metzinger characterized the OBE as a phenomenal self-model, "an integrated, conscious representation of the organism *as a whole*, including spatial features . . . [and] its own psychological properties" (2005, 59). Metzinger noted that the OBE has a particularly important feature of transparency, that the person does not recognize the self-experience as a model, but, rather, takes a naïve realist perspective that experiences the OBE model as the self. Nonetheless, there may be awareness of nonveridical and contradictory features of the OBE experience with respect to the physical world.

Metzinger suggested adaptive and functional features of the OBE. The associated physical immobility parallels freezing responses and feigned deaths exhibited by many animal species when confronted by predators. Such death maneuvers may dissuade predators, who instinctively avoid dead prey because of its possible contamination. Some of these are extensions of the psychological functions of dissociative phenomena in self-maintenance (also see Chapter 5). By separating certain capacities from the physical self model (which is unconscious), the person preserves vital cognitive functions. The OBE self provides an antidote for anxiety regarding the physical trauma to self and body, an assurance of continuity in the face of potentially mortal crisis. Metzinger (2005, 69) proposed that the mental clarity associated with the OBE may reflect "representational division of labor" and a "transient functional modularization" that allow the information processing systems to differentially distribute functions to different self-modules. For instance, when physical trauma cuts off somatosensory input, a separate sense of self can play the role of integrating higher cognitive functions such as attention, problem representation and solutions, and agency and volitional processes. The OBE self has notable control over attention and thought processes. The OBE is a perceptual version of self-consciousness, one that provides a subject representation separated from the body object. In the OBE condition, the phenomenal self, locus of identity, and intentional agent aspects of the person are now free to explore possibilities independent of the spatial and perceptual limitations of the physical body. This allows the higher cognitive functions to control attention and use categorical thought to provide a global model. These phenomena also tell us something about the constituents of our essential identity. Although the OBE self is egocentric and referenced to a body and space, "spatial self-representation and cognitive self-reference are not necessary for selfhood" (Metzinger 2005, 70).

Metzinger contended that the OBE involves a veridical, accurate, and truthful experiential account. The neurological and functional substrate of the experiences is responsible for the human tendencies to postulate the existence of souls, a folk phenomenology that reflects our neural architecture for self-modeling. OBE experiences have undoubtedly been at the basis of human's postulation of spirits,

souls, and other supernatural phenomena. OBEs are an empirical experience and a subjective paradigm for humanity's construction of cognized models of the world. The force of the OBE experiences invariably leads to dualist perceptions of reality, seeing the material and mental aspects, body and soul, as separate, and concluding that consciousness exists apart from the physical body (Metzinger 2008, 2009). These phenomena are the basis of a neurophenomenological archetype of humanity, a reflection of a neuropsychological potential that is at the basis of the experience of one's self as a soul-like entity.

These perceptions may be erroneous, but their experiential impact must be seen as central to the generation of mythological and cosmological systems and their associated spiritual beliefs. Metzinger noted that even if they are confabulatory states, they may nonetheless be "information-bearing states correctly representing certain aspects of the environment" (2005, 78). Although the assumptions of these models regarding the actual relations among the perceived body, the experiential self, the actual body, and the physical world may be materially wrong, the falsely cognized environments, nonetheless, have effects on behavior. These include developing explanations of the nature of humans and the universe and presumptions about the possibilities and powers of a spiritual and supernatural dimension that exceeds those inherent in human capacities (see Chapter 6 for elaborations).

The central features of soul flight reflect fundamental characteristics of human consciousness. These experiences are at the basis of a theoretical self-awareness and self-modeling that move beyond the primitive concrete processes. The OBE reflects our ability to transcend the present moment and to experience both the past and predict our future. Arzy, Molnar-Szakacs, and Blanke (2008) called this "mental time travel" (MTT), a uniquely human facility to experience the self traveling back in time and to future events. This mental time travel to the past and future involves similar neural mechanisms and brain regions. Arzy et al. examined the neural correlates of this time-travel experience by combining electrical neuroimaging and evoked potential (EP) mapping of the brain with behavioral measures. The ability of study participants to project themselves into future events more quickly than into past events indicates that our "time travel" capacity primarily functions in anticipating future events. They conclude that our capacities for MTT reflect selection for mental processing of future predictions and rapid decision making regarding anticipated behaviors.

CONCLUSIONS: SHAMANIC CONSCIOUSNESS AS SPECIAL KNOWLEDGE

Etymological analyses and multidisciplinary approaches concur that among the many meanings of consciousness is a fundamental concern with an informational relationship between an organism and its environment, the processes and properties of "knowing" systems. The different processes and structures that can produce information about the environment and the knower (self) provide the basis for many different forms of consciousness. These different selves mediate the epistemic relationships that the knower constructs between the organism

and the reality known. Shamanic knowledge emphasizes the use of body-based images and analogy to provide a number of natural systems of expressing emotions and personal identity in visual or presentational symbolism. Shamanic traditions involve modes of knowing that provide an extension of representation through metaphorical predication based on the body, the self, animals, and social others. Shamanic experiences and thought play important roles in representing basic human perceptual and conceptual structures. Shamanic thought extends these in analogical and metaphoric thought processes, producing a variety of synthetic integrations that provide individual and collective self-representations of social life and self. Shamanistic phenomena such as soul flight and death-and-rebirth involve representations of self that reflect self-development.

The soul flight of shamanism reflects a variety of human cognitive adaptations that took our ancient hominin consciousness beyond the bases in concrete material mind and extended it spatially and temporally. The OBE requires the mimetic capacity and exceeds it. This mimetic capacity provided the ancient body-based sense of awareness as a physical reference that is explicitly exceeded in the out-of-body experience of soul flight. This parallels the shift in cognitive development from body-based concrete reference to abstract context-independent thought. These experiences provided the basis for essential aspects of consciousness and its evolution. These more abstract levels of self representation involved spirit and soul concepts, such as those manifested in the experiences of alter-identities in the spirit world of animal allies.

NOTES

1. I have relied primarily on Kitchener's (1986) extensive analysis of Piaget's epistemology as the basis for this characterization.

2. Piaget's (1969, 1971) stages of development are cognitive in an epistemic sense, that is to say, concerned with issues of the nature of knowing and the evidence and justifications regarding questions of truth. These epistemic concepts include perceptions; sensorimotor schemes and operations; categories such as space, time, causality, and object permanence; formal categories such as classification, number, and quantity; semiotic categories (ideas, images, symbols, signs); and a variety of moral, emotional, and social categories (Kitchner 1986, 41). Piaget's epistemology is Kantian, combining both empirical and developmental elements in extending Kant's perspective through constructivism, the epistemic subjects' construction of their knowledge. Piaget emphasizes "the active cognitive role of the epistemological subject in interpreting, categorizing, and structuring experience" (Kitchner, 75) and constructing knowledge and objects. Piaget's conceptions of reality and knowledge correspond to Kantian notions of noumena and phenomena. He maintains a distinction between metaphysics and epistemology, differentiating epistemological issues of what is known from metaphysical questions of what really exists. This distinction is made by Kant between the metaphysical object (the thing-in-itself, or *noumenon*) and the epistemological object (the thing-as-known, or *phenomenon*) (paraphrase from Kitchener 1986, 104). Piaget also incorporates the Kantian notion that there are certain concepts and categories that are necessary for knowledge, including the formal laws of logic; concepts of space and time; and ideas such as cause, quantity, and classification that are imposed on experience. He also adds additional concepts and categories not considered essential by Kant. Piaget's difference

with the Kantian formulation is that he claims that there is a developmental process underlying those structures, rather than representing fixed (transcendental) categories. Piaget's theories involve an "interactionism" in which the subject's interaction with the environment through the epistemic structures employed in the processes of assimilation and accommodation is essential for knowledge.

3. Reflective abstraction is characteristic of each stage of epistemic development, involving the abstraction of elements from an earlier stage and their reflection onto a higher stage where they are restructured. Reflective abstraction consists in the transposition of properties from actions on the object onto a higher plane, where the structure of a lower level becomes the content of a higher level and subject to logical coordination by the epistemic subject's actions. Reflective abstraction involves two aspects: (1) reflecting as a projection from a lower plane to a higher plane, and (2) reflecting as a process of cognitive reorganization of the projected material. Reflective abstraction involves a creative reconstruction, operations on operations. Reflective abstraction is an unconscious process, but it can lead to both conscious products and formulations, as well as to unconscious results, especially when the phenomena cannot be incorporated into the conscious system of concepts.

4. The possibility that consciousness may exist in nonsymbolic forms is explored in Chapter 4 in reference to void-consciousness.

5. For principal sources see Arzy, Molnar-Szakacs, and Blanke (2008); Blanke, Landis, Spinelli, and Seeck (2004); Blanke and Mohr (2005); Blanke, Metzinger, and Lenggenhager (2008); Blanke and Metzinger (2009); Blanke, Mohr, Michel, Pascual-Leone, Brugger, and Seeck (2005); Blanke, Morand, Thut, Michel, Spinelli, Landis, and Seeck (1999); Blanke, Ortigue, Landis, and Seeck (2002); Lenggenhager, Mouthon, and Blanke (2009); and Lopez, Halje, and Blanke (2008).

4 The Integrative Mode of Consciousness

CHAPTER OVERVIEW

A variety of ritual procedures for altering consciousness are found cross-culturally, reflecting social adaptations to the biological potentials of the integrative mode of consciousness (IMC). The different states of consciousness (SoC) in the IMC follow several principal patterns, which are manifested cross-culturally in three major forms: (1) shamanic soul flight; (2) mystical/meditative states; and (3) mediumistic/possession. These consciousness traditions also have a variety of different states of consciousness (SoC) within them, for instance, soul flight and death-and-rebirth SoC within shamanism. In this chapter, the primary ritual induction procedures of these different traditions are examined in terms of their physiological effects. This illustrates bases for differences in shamanistic SoC and how diverse procedures nonetheless engage functionally similar SoC, producing increased synchronization and coherence in the slow brain wave patterns. Shamanic SoC stress the body to a sympathetic extreme to provoke a parasympathetic response to alter consciousness, while meditative traditions emphasize a direct parasympathetic approach that diminishes body activity. "Possession" SoC capitalize on existing neurological sensitivities to select practitioners with a tendency to enter various SoC. The different SoC of the shamanistic traditions are examined in terms of differences in physiological, emotional, self, and social parameters, including their sociocultual influences, cultural beliefs regarding them, phenomenologically different experiences (e.g., flight, external domination, and void), and physiologic and behavioral conditions (e.g., amnesia, convulsions, unconsciousness, and dissociation). These different forms of consciousness are examined from an epistemological perspective that links the characteristics of the IMC to functions of brain subsystems, particularly, the elicitation of the paleomentation and the emotiomentation processes of lower brain structures (R-complex and limbic brain). This engagement allows for management of emotions, attachment, social relations and sense of self. Although possession and dissociative experiences

do not appear as typical exemplars of the IMC, their integrative aspects are also seen in dissociative and possession states at physiological, psychological, and cultural levels.

INTRODUCTION: DIFFERENT STATES OF CONSCIOUSNESS IN THE INTEGRATIVE MODE OF CONSCIOUSNESS

Similar descriptions of SoC experiences are found cross-culturally, with people in diverse times and places giving similar reports regarding the phenomenal nature of their spontaneous and deliberate experiences. The idea that there are substantial similarities in the mystical experiences of many cultures has been long noted in the idea of a perennial philosophy, that there are universal spiritual truths and experiences reported in religions around the world (Smith 1976). These similarities in religious experiences were a central point of Stace's (1960, 1961) classic work *Mysticism and Philosophy*, which contended that the common characteristics of mystical experiences, in addition to their sacredness, included being ineffable, incapable of being expressed in ordinary language and conceptual categories; being transient rather than permanent; passive, occurring outside of will and intention; having paradoxical and contradictory properties, with a sense of unity and the reconciliation of opposites; possessing the quality of nonconceptual and intuitive perception of ultimate truth; having a strong affective tone, both positive and negative, but particularly with powerful positive emotions such as joy and bliss; and producing a sense of the development-enhanced discernment.

However, many mystics and scholars have also emphasized that there are different types of mystical experiences. Stace proposed a distinction between two principal types of mystical experience: extrovertive mystical experiences, where there is a perception of oneness, a unity with all of the universe; and introvertive mysticism, typified by a "void consciousness," an experience in which all sensation and conceptualization, including a sense of self, time, and space, disappear into a state of nothingness.

Hood (e.g., see Hood et al. 2001) has assessed these constructs of introvertive and extrovertive mysticism in cross-cultural research, establishing their validity as objective principles representing two poles of mystical experience. People in different cultures have experienced similar conditions of extrovertive mysticism, such as feeling absorbed as one with all of the universe; a sense that all things are alive and aware; a sense of one's self and all of the universe, a merger of the self with the Universe; a sense that time and space do not exist, with all of the universe part of the same whole, a sense of the unity of all things. People in diverse cultures have also encountered a different dynamic, the introvertive mystical experiences of a sense of timelessness and spacelessness, a void or total absence of anything; and absorption into something greater than the self that was incapable of expression in words or language.

Similarities in mystical and other shamanistic experiences across time and cultures must to some extent reflect something intrinsic to our nature, manifesting a

neurophenomenology, a neurological structuring of phenomenal experience. Laughlin, McManus, and d'Aquili (1992) suggested that manipulation of the divisions of the autonomic nervous system (ANS) is a key to understanding these cross-cultural patterns in mystical experiences. Laughlin et al. (1992) proposed that manipulations of the ergotropic-trophotropic balance of the ANS are the basis for experiences of higher phases of consciousness. These experiences are characterized by homeomorphogenetic relationships—sharing common form—between the activities of the ergotropic-trophotropic nervous system and the experiences, which are the result of proprioceptive sensing of energies in the ANS and endocrinal system and the sympathetic plexus of the body (nerve bundles and concentrations corresponding to the chakras).

Diverse procedures activate the ANS and its ergotropic and trophotropic divisions. Laughlin et al. propose that extreme activation of either the ergotrophic or trophotropic system (sympathetic andparasympathetic divisions of the ANS), or their combined stimulation, can produce a variety of mystical experiences. The extreme ergotrophic activation ("hyperergotrophic tuning") produces the ecstatic sense of endless energy, the quintessential "flow experience," that can result from extreme motor activity such as prolonged dancing and long-distance running. Extreme trophotropic activation ("hypertrophotropic tuning") produces extraordinary relaxation typical of sleep but experienced in meditation as a sense of peacefulness and "oceanic tranquility" and a total loss of body sensations. Hunt (1995a) suggested that the physiological states of trophotropic activation involve such profound muscular relaxation that it induces a feeling of "letting go" that produces a deep sense of calm and, consequently, detachment and acceptance.

Elicitation of these two extremes of the ANS also may be combined in other mystical experiences, such as the "active bliss experiences" produced during hyperergotropic tuning with ergotrophic eruption, and the orgasmic rapture and ecstatic rush, produced by trophotropic eruption during hyperergotropic tuning. Any of these experiences may be perceived as "ecstatic," reflecting the powerful activation of the basic stimulatory and/or relaxation features of our nervous system and the associated structures of the limbic or paleomammalian brain.

Experiences similar to those produced in deep meditative states and sleep transitions are cultivated by a variety of shamanic practices, and appear to be natural consequences of the activation of neurognostic structures. But if these changes in the ANS alone were sufficient for ecstatic and mystical experiences, they would not be the uniquely human capacities that they appear to be. Spiritual experience has long been regarded as a uniquely human capacity, and likely reflects effects of humans' evolved symbolic capacities.

To understand these transcendental or transpersonal dimensions of the alteration of consciousness requires a framework that goes beyond the simplistic contrast with the valued properties of the baseline state of consciousness or waking mode of consciousness. The qualities of these SoC in the IMC that make them significant are concerns with special forms of knowing related to the processes dominated by our ancient reptilian and paleomammalian brains. These processes of consciousness make available a variety of prelanguage structures and processes of knowing, a rich symbolic information system preceding the language-based rational consciousness

of modern humans. What characterizes the special nature of these forms of knowing involves the integration of these ancient levels of understanding into the processes of the frontal brain and our more advanced senses of self. This is a psychointegration of behavioral and emotional processes into our preeminently symbolic brain processes through elevation of the preconscious protosymbolic processes of the ancient reptilian and paleomammalian brains. However, there are also variant kinds of shamanistic and mystical experiences. These differences involve several factors: the specific technologies of consciousness used in different traditions, which are as diverse as dancing, dream engagement and drugs; and the interactions of underlying psychobiological structures of self and identity with the psychosocial dynamics of the culture.

Shamanistic SoC in the IMC

Terms such as shamanic journey, vision quest, soul flight, possession, mediumship, mystical union, and others have been used to refer to the various SoC. While some of these may be synonymous, others are distinctly different. Cross-cultural analysis (Winkelman 1986b, 1990, 1992) of many descriptive features of ritually induced alterations of consciousness among religious practitioners indicates three primary forms of SoC: shamanic soul flight, meditation, and mediumistic possession. The three primary clusters of SoC types and the associated altered state induction variables are

- soul flight—preparatory restrictions (such as fasting, celibacy) followed by extensive chanting, drumming, and excessive motor behavior (e.g., dancing), leading to a collapse and period of apparent unconsciousness during nighttime rituals;
- meditative absorption—induced by an internal focus, often using auditory driving (e.g., chanting and drumming), as well as sleep deprivation, fasting, austerities, and sensory deprivation; and
- possession—characterized by factors indicating neurological predispositions to epilepsy-like seizure phenomena involving spontaneous tremors, convulsions, and amnesia and responded to in rituals involving singing, chanting, and percussive music.

Across all of these three principal types of SoC are commonalities in the use of music, singing, and percussion. The perspective of the IMC emphasizes the commonalities underlying these diverse SoC, but they also have physiological differences among them. These differences reflect the use of ritual techniques with very different effects on the ANS, as well as practices of selecting specific psychiatric profiles for mediumistic possession. While some, like shamanism, emphasize the stimulation of the ANS, the meditative traditions tend to emphasize the opposite, a relaxation response. But they, too, may use sympathetic nervous system-activating activities like dance. What is common to all of these SoC is the end state of parasympathetic dominance and the integrative brain wave patterns that are

associated with them. Previc (2009) has proposed that these commonalities reflect direct and indirect activation of the dopamine system.

Shamanic SoC

The cross-cultural similarity in shamanic soul flight and its structural similarities with many features of near-death experiences indicate that it is a manifestation of neurognostic structures discussed above in terms of the basic awareness of body. These similarities must in some respects also reflect the effects of the procedures typically used by shamans to induce their SoC. The typical procedures include intensive periods of drumming, dancing, and singing that lead to collapse and unconsciousness. These basic dynamics indicate that the sympathetic nervous system is activated to the point of exhaustion, which leads to collapse and parasympathetic dominance. Shamanic practices use a variety of agents and procedures to manipulate the sympathetic nervous system to the point of exhaustion and collapse into a parasympathetic dominant state in which the shaman experiences visions. Shamans and initiates typically engage in procedures such as fasting and water deprivation, exposure to temperature extremes, various austerities, sleep deprivation, extensive auditory stimuli (such as drumming and chanting), extensive exercise (such as prolonged dancing to the point of collapse), and psychoactive substances, particularly, psychedelics and tobacco. General principles characterizing shamanic ritual induction procedures involve effects on the dopamine, serotonergic, opioid, and endocannabanoid neurotransmitter systems. These effects on neurotransmitters involves directly engaging natural drives, either restricting them (i.e., thirst, hunger), inducing them (painful stimuli and dreams), or provoking them with exogenous sources such as psychedelic plants or tobacco. Diverse features of shamanic SoC induction procedures produce a parasympathetic dominant state with augmentation and synchronization of alpha and theta brain wave patterns.

Meditation

Meditative SoC and practices are found in agricultural rather than hunting-gathering societies and across all levels of social complexity. Some of the shamanistic healing practices found in Winkelman's (1992) cross-cultural research have obvious connections with the classic mystical traditions, such as the Japanese Buddhist ascetic and the Kurd dervishes. Although the meditative SoC are not always directly apparent, shamanistic healing traditions use many procedures for altering consciousness that are found in the Eastern meditative practices, including repetitive chanting, percussion and music, fasting, sexual restrictions, sensory isolation and austerities, and ritual activities that focus and occupy attention. While dominant meditative traditions emphasize the direct approach to parasympathetic dominant states, there are traditions that also engage the route of sympathetic stimulation, such as in the dancing of the Islamic mystics, the whirling dervishes. Walsh (1990) nonetheless emphasized important differences between shamanic and meditative SoC. The shamans' personality changes involve highly emotionally charged identities that are enacted in a sustained communicative interaction with an audience;

subsequently, during periods of unconsciousness, the shaman's experiential focus is in an OBE and the content of inner experiences interpreted as nonordinary realities. Meditators may have similar experiences of OBE, but their typical activities contrast with shamans in terms of more self-control and concentration, lower arousal, a sense of calm and emotional detachment, a loss of sense of self, a greater awareness, and contentless experience. Although the meditative practices may have universal aspects, even those who claim universal features also point to a number of distinct SoC within meditative traditions.

Possession

The distinction of possession from other SoC has not been emphasized by some researchers (e.g., Heinze [1991]; Peters and Price-Williams [1981]; Siikala [1978];). While there is some justification for this subordination of differences of possession and soul flight to their commonalities within the IMC, there are, nonetheless, good grounds for distinguishing them. Possession SoC experientially differ from shamanic SoC in emphasizing auditory experiences in contrast to the shaman's visionary experience. Furthermore, possession involves domination of the person by spirit entities, in contrast to the shaman's control of the spirits. There is an association of possession with specific psychophysiological, psychological, and social conditions (Winkelman 1986b, 1990, 1992). The association of possession with a psychiatric profile and distinctive physiological conditions (an epilepsy-like temporal lobe discharge) points to basic differences of possession from shamanic SoC. The different relationships of shamans and mediums to the socioeconomic conditions (hunter-gatherer versus political integration beyond the local community, respectively) indicate that mediums are the form that the potentials of the IMC take in complex societies. Political and social processes appear responsible for prompting the possession conditions involving symptoms of lability in the central nervous system—compulsive motor behavior, tremors, convulsions, seizures, and amnesia—that have been linked to trauma and nutritional deficiencies.

This diversity of forms of shamanistic SoC illustrates the necessity of a neurophenomenological approach to examining meditative experience in terms of the relationships of physiological and phenomenological aspects to the intentionalities of the practitioners. The differences represented by these three principal SoC reflect stable attractors for our biological capacities associated with the IMC. The different patterns of SoC reflect causal sociocultural influences on shamanic potentials associated with the IMC (Winkelman 1986a&b, 1990, 1992). These include socioeconomic conditions: hunting and gathering, agriculture, political integration, and social stratification. The physiological and phenomenological features of these different SoC are discussed in this chapter to illustrate both the diverse ways in which the IMC can be elicited and the phenomenological differences among these SoC.

SHAMANIC STATES OF CONSCIOUSNESS

The shaman's signature alteration of consciousness has been characterized as a flight, soul journey, or OBE. Shamans' alterations of consciousness may also take

forms other than the soul flight, including a vision quest experience in which one engages in a variety of austerities to have an experience of an encounter with a spirit power; an animal transformation during which the identity of the practitioner becomes that of an animal; a death-and-rebirth experience in which one engages in a personal experience of death; and other forms of entering into nonordinary experiential worlds in which one engages in interaction with spirit entities. These all involve a personal aspect such as a soul or spirit that is believed to have left the body and traveled into other worlds. During the soul journey the practitioner appears unconscious, but is actively engaged in an experiential realm and these experiences can be recounted on return. Harner (1982) emphasized the shaman's remembering what happened during the soul journey as a characteristic of the shaman's SoC. Winkelman's (1986b, 1992) research supports the contention made by Eliade (1964) that this experience is not one in which the shaman is possessed by spirits, but, rather, one in which the shaman exercises a control over the spirits. Nonetheless, these spirit entities, especially animal spirits, may be part of the identity of the person.

There are a number of central features of shamanic ritual practices that contribute to the typical features of shamanic SoC. A range of activities and agents used to induce shamanic SoC shares properties in being related to natural processes and functions of the human organism. This point was exemplified in the Chapter 3 discussion of the underlying similarities in the structures of NDE and shamanic soul journey. Biological roots are also found in the universals of shamanic percussion and singing, activities which have deep phylogenetic roots as signaling and communication mechanisms (see Oubré [1997]; Wallin, Merker, and Brown [2000]; Randall [2001]). Features of typical shamanic procedures such as overnight rituals also contribute to another signature feature of shamanism, the visionary experience. Overnight rituals engage this visionary potential by integrating shamanic activities with the dream mode of consciousness, integrating its natural cognitive potentials into shamanic SoC. Many shamanic induction procedures reflect ritual efforts to override basic biological drives by forcing the body to physical extremes and enduring fasting, painful stimuli, and sexual restrictions. Finally, shamanic induction procedures involve the ingestion of natural substances known as "psychedelics" that stimulate integrative visual information processes.

Music and Drumming

A universal feature of shamanistic healing practices involves singing or chanting and the use of drumming or other percussion instruments. Rhythmic auditory stimulation can impose a pattern on the brain, driving entrainment of both alpha and theta waves (Neher 1961, 1962), with a predominate activation of the EEG (electroencephalogram, the measure of gross brainwave activity) in the theta range (see Maxfield [1990]; Wright [1991]; also see Maurer, Kumar, Woodside, and Pekala [1997]; Vaitl et al. [2005]). This auditory driving can evoke visual sensations of color, pattern, and movement, and even hallucinations, seizures, and emotional and abstract experiences (Neher 1962). Chanting and music-making

are also capable of evoking a driving response in the brain, producing widespread EEG coordination in theta and low alpha ranges among the experienced chanters, and dominance in the alpha band for naive listeners; when people listen to music it has a tendency to evoke slow wave coordination in the EEG (Rogers 1976; Rogers and Walters 1981). The responses to auditory driving parallel those of photic driving (flashing lights), which include (1) driving of the brain waves at the frequency of stimulation; and (2) driving of the brain waves at alpha frequency regardless of the frequency of stimulation (Vogel, Broverman, Klaiber, and Kun 1969).

These findings suggested that the cortex is easily set into oscillation at the alpha frequency or slower and that singing, chanting, and percussion procedures produce or enhance slow-wave frequencies. Chanting is a vocal communication system that predated speech and functions in enhancing group solidarity by providing information about emotional states to other members of the group. The evolution of the human singing and musical capacities were clearly central to the evolution of the shamanic potentials and play a fundamental role in inducing shamanic SoC. Similar effects are also produced by drumming, both of which are further discussed in Chapter 6 (also see Randall 2001).

Music as an Innate Capacity

Music's effects on the body reflect information processing distinct from language. Language and music share some brain and body capacities; they nonetheless involve capabilities that can be completely dissociated from one another and can function as autonomous systems (Aniruddh 2003). The modular basis of music processing and the localization of uniquely musical abilities in the right hemisphere (for right-handed nonmusicians) allow its persistence in people for whom left-hemisphere trauma has interfered with the language capacity (Peretz and Coltheart 2003). The musical capacity preceded language, deriving from common roots with primate vocalizations and their communicative capacity. Music catalyzed brain development, selecting for those with a greater capacity for expressive vocalization and its functional roles in group communication (see Brown, Mercer, and Walin [2000]). Music appears to affect emotions in ways that are transcultural, indicating innate capacities for music processing and perception (see Hauser and McDermott [2003]). A multitude of emotional and synthetic effects of music reflect its operation on right-hemisphere processes, eliciting its recognized holistic and analogical brain processes and communication with subcortical areas of the brain. These expressive capacities are epitomized in song as a medium for expression of emotions (Newham 1994).

Music and the Brain

Crowe (2004) reviewed mechanisms through which music induces physiological effects, with the sound of music imposing a resonant pattern that can elicit a similar brain wave response across the brain. Crowe reviewed evidence indicating that the amygdala and hippocampus of the paleomammalian brain are central to the

effects of music. Sound input to the brain travels from the thalamus to the amygdala, carrying input from the reptilian brain and combining it with input from higher brain centers. Sound information received by the hypothalamus triggers activation of the ANS, producing a significant activation of the emotional processing centers. The rhythmic properties of music entrain neural oscillations that synchronize perception and action to the beat of the music (Janata and Grafton 2003). The spatial and temporal sequencing in the information of music has a broader impact on unifying perception, cognition, and behavior, constituting a basic and primordial form of psychointegration (also see Aldridge and Fachner [2005]; and see further discussion of music's features in Chapter 6).

Incorporating "Dreamtime" into Shamanic Consciousness

The activities and experiences of shamans are explicitly linked to dreams in many groups; in some cultures shamans are explicitly thought to enter "dreamtime" (e.g., see Elkin [1978]). Dreams have specific physiological effects and functions that make them both a specific mode of consciousness, as well as mechanisms for altering consciousness (Hunt 1995c). This induction process is reflected in the deliberate use of sleep and dreams in shamanistic ritual in order to induce a warp in consciousness that produces a shift towards the IMC. Sleep involves the basic shift to parasympathetic dominance and shares characteristics with meditative states (Davidson 1976; Schuman 1980). REM sleep (dreaming) has substantial parallels with yogic ecstasy in terms of cortical and visceral arousal, inhibition of skeletal muscle tone, loss of distinctiveness in the sense of time, vivid perceptual imagery, and parasympathetic dominance (Gellhorn and Kiely 1972). REM sleep patterns are very similar to the effects of psychedelics in evoking visual imagery and hippocampal-septal slow waves (Mandell 1980); LSD in small doses will evoke REM sleep and dreams (Nichols and Chemel 2006).

REM sleep is active or "paradoxical" sleep with desynchronized waves more characteristic of waking than deep sleep. In contrast to deep sleep (characterized by depressed levels of cortical arousal, synchrony of brain waves in the EEG, and continued behavioral muscle tone), REM sleep is characterized by higher levels of CNS arousal, sympathetic system activation, desynchrony of brain waves in the EEG, and loss of muscle tone. REM sleep is an active condition relative to deep sleep, manifested in eye movements and muscle twitches, and, in spite of muscle and reflex inhibition, increases in the rates of respiration, cardiac function, blood flow, and brain temperature (Pivik 1991). Other features of the dream mode include reduced sensory responsiveness and marked alteration of homeostatic control, manifested in skin temperature responding to ambient temperature rather than being maintained. During late phases of the deep sleep cycle, control of the autonomic system by the hypothalamus is reduced, allowing for a brain pattern similar to wakefulness. During dream sleep, the nervous system behaves as if it were in a state of continual orientation, but with motor inhibition and suppression of homeostasis. Similarities of REM sleep physiology to the general

orientation response include the involvement in the same areas of the brain stem in their initiation; motor paralysis with an activated cortex; hippocampal theta rhythms; and common neural systems involved in their control (Hunt 1989b). REM sleep is like a paralyzed hallucinatory state, with sensorial structures, functions, and activities operating according to similar principles during waking and dreaming. This is possible because centers in the lower brain stem inhibit the striated muscle system, allowing for cognitive and emotional reactions and intentional behavior to proceed without movement of the body.

Because of these similarities of REM and the IMC, shamans explicitly sought to integrate dream processes within ritual to induce alterations of consciousness. Peters (1989) proposed that shamanic practices produce an integration of the potentials of dreaming and waking consciousness. Shamanism achieved this integration through rituals typically lasting throughout the night, which made the integration of dream cognition with shamanic activities inevitable. The functional basis of the use of dreams in shamanism is illustrated by reference to the evolutionary and functional roles of dreams, the physiology of dreams, and the nature of dream cognition and experiences.

Comparative Perspectives on Sleep and Dreams

Sleep allows for modulation of the fundamental cycles that synchronize biological periodicity of cells and coordinate physiological adaptations to inner needs (Graham 1990). The physiological patterns of sleep found in humans are shared with other animals, reflecting their basic organismic functions. Sleep of a generalized form is found in fish, amphibians, and reptiles, with a differentiation of sleep into NREM (nonREM sleep, or deep sleep) and REM (dreams) found in birds and mammals (Graham 1990). Evolutionary changes in mammals' brain function, which emerged about 140 million years ago in the ancestor of the marsupial and placental mammals, provided the basis for the distinctive REM sleep (Winson 1985). Both REM and NREM sleep have remarkably similar characteristics across marsupials and mammals, including humans, reflecting the status of deep sleep and dreams as cross-species functional modes of consciousness. The ubiquity of dream sleep in mammals and the drive to recoup lost dream time reflect the biological basis of this mode of consciousness and its necessity for normal functioning. Winson (1985) suggested that the mammalian adaptations involving extensive learning created the resultant need for integration of experience over time in order to guide future behavior. The mammalian adaptation or solution (except for monotremes and echidna) for achieving learning without a large prefrontal cortex was "off-line processing" or REM sleep, where association of recent memories was achieved during periods of sleep. This "off-line" processing facilitated use of the frontal cortex for advanced cognitive and perceptual activities (Winson 1990); such functions of dreams are explicitly sought in the shamanic use of dreams.

Laughlin, McManus, and d'Aquili (1992) characterized dreams as the aspect of the unconscious in closest contact with ego awareness and as a manifestation of the operational infrastructure that provides the basis for ego consciousness. Shamanic practices exploit this ritually produced dream access to enter into their

own unconscious infrastructures and those of their patients and to access the special cognitive capacities of dreams. Given that the dream capacities are basic mammalian adaptations and central to the perspectives of shamanism, they must be considered the zone of proximal adaptation for shamanic experiences. Examining the properties of dream cognition helps to illustrate why they are important in the practices of shamanism, providing access to special forms of experience and knowledge that reflect the functioning of the presentational symbolic system.

Evolutionary Adaptations of Dreaming Winson (1985, 1990) suggested that REM sleep/dreams and the Freudian unconscious represent a phylogenetically ancient mechanism in which memories, associations, and strategies are formed, modified, or consulted. This neural system of information processing existed before rational consciousness arose in humans, involving types of information processing distinct from the processes of the frontal cortex (Winson 1985, 209). REM sleep is a basic mammalian memory process for evaluating experience and forming strategies, reviewing experiences for their transfer from short-term to long-term memory (Graham 1990). The hippocampus and amygdala structures have a fundamental role in dreams and memory, providing a core information-processing area for information derived from assessment of events and their emotional associations (Winson 1985). Hippocampal theta rhythm (3–6 cps brain waves) is an indicator of a special type of information processing during which the information from the primary sensory areas is integrated, processed, and transferred to the neocortex (Winson 1985). Theta activation varies across species, but in each species appears associated with behaviors central to species survival. The same neurons perform the task of synchronizing sensory information, species-specific survival activities, and REM sleep. The function of the theta waves in sensory information processing in the lower mammals suggests that a similar process occurs in REM sleep, but with information input from memory reflecting the processing of previously acquired information.

Dreaming and waking modes of consciousness are normally exclusive. Ordinary dreaming has a distinct neurotransmitter profile from waking consciousness (Hobson 1992). The dream mode has a cessation of serotonin and norepinephrine activity. The cholinergic system is responsible for the REM sleep induction and maintenance system, whereas the serotonergic system has an inhibitory or gating role, suppressing intrinsic cholinergic neurons (Hobson 1992). The role of serotonergic pathways in integrative neuromodulation suggests that the differences in dreams reflect the lack of integrative influences of serotonergic pathways linking cognitive appraisal and ego systems.

Dream Cognition

Dream mentation differs from the typical mentation of the waking mode of consciousness (Hobson and Stickgold 1994), including cognitive processing and intense imagery and emotions that appear bizarre and delusional from the perspectives of waking consciousness. The recognized bizarreness of dreams reflects their imaginative and creative capacities; they appear illogical from the point of

view of the waking mode of consciousness because dreams involve a different system of information representation, processing, and consolidation. Although the psychoanalytic perspectives have emphasized the deficient character of dreams (e.g., repressed desires or compensatory mechanisms), these pathologization perspectives reflect the monophasic approach of Western culture. Dreaming is a specific type of mentation—the presentational symbolic modality manifested in imagery involving analogic reasoning and organized on the basis of similarity in configuration (Hunt 1995a). Although the body remains relaxed, the activity of the lower brain suggests the active rehearsal or enactment of customary behavioral patterns. Winson (1985, 1990) suggested that so-called dream distortions involve normal associative information processing, interpretation, and integration in the REM mode. Dream condensation is not a disguise or distortion, but a symbol that expresses an unconscious concept for the person. Dreams include strategies for dealing with the external world that are organized in a way that constitutes an "unconscious personality" (Winson 1985, 245). Laughlin, McManus, and d'Aquili (1992) illustrated that dreams subserve the experiential and emotional needs of both the conscious and the unconscious personalities. Dreams involve the interaction of the supporting structures of egoic consciousness with structures disentrained from egoic consciousness, operating independently of the environment.

Hunt (1989) characterized dreams as involving the presentational symbolic intelligence and engaging abstract cognitive and emotive processes. Dreams share a core of the presentational symbolic capacity, a cross-modal synesthesia—a fusion of visual imagery, spatial information, body expressions, and analogic metaphors. The predominantly visual (rather than verbal) nature of dreams reflects this visual-spatial presentational symbolism. Dream imagery constitutes a surface structure expressing meaning of a deeper knowledge base.

Evidence that the imagery of dreams is represented in a form distinct from that of language is found in the ability of the visual modality of dream imagery to present information not accessible to the linguistic system. This visual-spatial system of symbolic presentation is normally inhibited by the dominance of left-hemisphere verbal representational systems; conditions that attenuate the left hemisphere's verbal representational systems allow the expression of this presentational intelligence.

The complexity of information extracted from the dream images attests to the existence of a separate nonlanguage system of symbolism, construction, and meaning. The geometric images often found in these states are autosymbolic characters, an abstract-dynamic geometric imagery that has been considered the root of thought processes (Arnheim 1969). Hunt suggested that these geometric patterns manifest transformational operations that constitute the deep structure of an intelligence that operates independently of the linguistic representational systems and constitutes "the deep structures of all representational (left hemisphere) symbolic intelligence" (Hunt 1989b, 207).Two distinct but interactive cognitive processes are present in dreaming; one, a sequential narrative component and the other, a visual-spatial component, embodying representational and presentational symbolism. These are both normally present and in

interaction in the dream processes, but with a relatively greater predominance of the right-hemisphere capacities.

Many cultures have believed that dreams are a source of creativity and insight that can be applied to solving everyday problems through accessing information not normally available. In contrast, Blagrove (1996) argued that there is a lack of evidence for claims to these cognitive functions of (ordinary) dreaming. Dreams lack aspects of waking consciousness, such as its self-reflective nature and sense of conscious control, manifested in a lack of single-mindedness and a single thematic track to dream content. Dreams lack a self-reflective awareness that one is in the dream state. Situations that contradict waking knowledge of the world are accepted without critical reflection. The dreamer does not appear to have any perspective, but rather is completely engaged in the dream interaction without waking consciousness's ability to use reflection. In contrast to the daydreamer's engagement with fantasy, the REM dreamer usually is not capable of recognizing the delusional nature of experiences, nor of exercising conscious control or stopping to reconsider the possibilities.

Nonetheless, dreams can make important contributions to decision making. REM sleep was found to improve creative solutions and, in particular, the integration of unassociated information for the purposes of problem solving (Cai, Mednick, Harrison, Kanady, and Mednick 2009). This advantage of REM for creating problem solutions that is greater than just the passage of time reflects the ability of REM sleep to facilitate formation of new nerve connections in the brain and in priming associative processes. REM facilitated development of creative solutions by the reduction of interference from other thought processes typical of the waking condition. "REM sleep would allow neocortical structures to reorganize associative hierarchies, in which information in the hippocampus would be reinterpreted in relation to previous semantic representations. . . . We propose that REM sleep is important for assimilating new information into past experience to create a richer network of associations for future use" (Cai, Mednick, Harrison, Kanady, and Mednick 2009, 10133).

Lucid Dreams

Lucid dreams differ from ordinary dreams in the dreamer's conscious awareness of the ongoing dream (Gackenbach and LaBerge 1988; LaBerge 1985). Qualitative differences in lucid dreams include possession of waking faculties, such as reason, memory, reflection, and volition. The experiences of lucid dreams are subject to deliberate cultivation, as is evidenced in the reports of yogic traditions (Norbu 2002). Hunt (1989b) provided an overview of lucid dreams and related phenomena that showed that the physiological, phenomenological, and cognitive aspects confirm their nature as spontaneous meditative states. Similarities between dreams and meditative states are also found in common EEG and autonomic changes; in increased incidence of lucid dreams among long-term meditators; and in physical detachment, inactive conditions, social withdrawal, and enforced motionlessness. Their relationship to shamanic experiences is illustrated in the similarities between lucid dreams and out-of-body experiences.

Consciousness of oneself dreaming is extremely rare (although cognitive training does increase self-reflectiveness during dreams). Recognition of dreaming (lucidity) generally leads to spontaneously awakening upon awareness of the dream state. LaBerge (1985) has also pointed to the difficulty of maintaining a sense of conscious awareness during the dream state even among those who practice lucid dreaming. Laberge has pointed out that the lack of intentionality during ordinary dreams is also manifested in lucid dreaming. Rather than intention determining lucid-dream outcomes, it is the power of expectation.

This sense that ordinary dreams have of occurring to us in an automatic fashion is quite different from what typically occurs during waking consciousness. The altered sense of dream self also reflects the lack of frontally based systems of reference from which one ordinarily obtains an additional perspective from which to think reflexively about one's self, creating self-consciousness.

Although dreams may include material indicating goal-directed action, intentionality, or planning, Blagrove (1996) contended that dreams provide a passive representation of such activities: the dream symbolizes waking life's goal-directed action rather than an act of engagement typical of waking life. In waking consciousness and active daydreaming, we engage in rehearsal, imagining consequences and possible reactions, and exercise a degree of conscious control. These cognitive limitations can be reconciled with the widespread anecdotal reports of insightful dream cognition and processing by recognizing that *extraordinary* dreams, such as those associated with shamanism, have unusual cross-mode integrative processing present. These dreams have a special integration between the dream and waking modes of consciousness. Intuitive, archetypal, and other forms of dreams reflecting transpersonal and cross-modal potentials are a consequence of additional information provided through limbic-frontal integration. The rarity of such integrative experiences reflects the failure to maintain awareness during the warps of consciousness in order to transfer (or cross-phase) the contents dreams to the waking mode of consciousness, particularly in monophasic cultures.

Shamanic Ritual and the Dream Capacity

Shamanic traditions used ritual during the waking mode to modify the dream experiences and produce integrative consciousness. Dream incubation and other ritual activities prior to or during sleep enhance cross-modal transfer of dream cognition back into waking consciousness. These deliberate cultural activities engage conscious self-awareness within the dream mode to access the presentational modality in management of emotions and self. Brereton (2000) analyzed adaptive aspects of dreaming in shamanism as involving processes of scenario construction that provide a risk-free construction and examination of options. Research on dreams suggests that their content involves a "replaying" of emotionally marked memories that have not been effectively resolved and incorporated into new adaptive behavior patterns. The nonverbal body-based aspects of dreaming indicate their ability to connect the body-self at a preegoic and prelinguistic level, engaging levels of symbolization that preceded egoic consciousness.

The shamanic ASC also produce forms of self-awareness that transcend the embeddedness of biologically based body consciousness. Shamanic ritual has the potential to produce an activation of lucid dreams because REM sleep is enhanced by high levels of physical activity prior to sleep (Laberge and Gakenbach). So, drumming at night engages an enhanced connection with the lucid dream and its cognitive capacities. Lucid dreams engage an interaction between waking and dream consciousness that can produce cognitive integration and therapeutic outcomes, reflecting a greater awareness of information-processing capacities of the unconscious. Shamanism used dreams to enhance information transfer to the waking mode to apply it for healing.

The normal occurrence of integration of the waking and the dream modes is illustrated in Rossi's (1986) research on the ultradian rhythms, the approximately 90-minute cycles of activation and relaxation that repeat continually, day and night. The relaxation period of these cycles shows that the information-processing capacities of dreams also occasionally intrude in waking consciousness. Rossi suggested that these ultradian rhythms are a psychophysiological basis for alterations of consciousness, involving the phase of extreme relaxation in the Basic Rest-Activity Cycle. This cycle involves regular fluctuations in brain waves during waking consciousness. This involves episodes of external vigilance and maximal verbal, logical, and analytical mental activity which are followed by periods of drowsiness, daydreaming, fantasy, and increases in alpha EEG waves. It is during this later phase that the functions of the dream mode of consciousness intrude on waking consciousness. Underlying the ultradian cycle is the relaxation response during which parasympathetic activation is strongest during the waking mode and facilitates normal penetration of the dream mode of into waking consciousness.

Inhibition of Natural Drives

Procedures that shamans typically use in preparation for ritual activities include restrictions on basic natural drives such as desires for sex, food, and water; these are also shared with the practices used in inducing meditative SoC. In addition to inhibition of these basic drives, shamanic induction procedures also engage in behaviors called "austerities" that forcibly override natural drives through engaging in painful activities. These efforts to override normal adaptive behaviors of the organism provoke neurochemical alterations of consciousness. A global effect of these process is the stimulation of the ANS to increase activity in the SNS, leading to a collapse into a PNS-dominant state, as discussed above. A characteristic feature of shamanic induction procedures involves extreme exertion from hours of drumming and dancing, an extreme activation of the SNS that eventually leads to a collapse and the rebound effects induce the parasympathetic-dominant state. Among the procedures that induce this rebound effect are the exhaustive stimulation of drumming and dancing, the oxygen depletion of singing and chanting, the effects of painful austerities, and other physically and emotionally exhausting activities such as fasting and sleeplessness (see Vaitl et al. 2005).

Extreme Exertion

Extensive motor behavior (such as dancing), exertion and fatigue can result in slow brain wave activity, hallucinatory experiences, and the release of endogenous opioids.[1] The effects of motor activity on consciousness are numerous, including SNS activation, opioid release, and various mystical experiences. Opiates directly affect the hypothalamus, producing slow-wave activity, increasing delta and theta brain waves (Fink 1978). The extreme stimulation of the body by dancing can induce the release of endogenous opiates because the central opioid systems are activated by prolonged rhythmic activity and exhaustive anaerobic exercise, with high-intensity exercise stimulating the release of opioid peptide beta-endorphins. Exercise can also overwhelm temperature-regulation mechanisms and can cause increased circulation of endogenous opioids (Appenzeller 1987).

Dietrich and McDaniel (2004) integrated a range of research on the relevance of exercise to the release of the endocannabinoids, the marijuana-like neurotransmitters found naturally in our brains. Exercise has a direct effect on the serum concentrations of the endocannabinoids, likely contributing to the analgesia and sedation, as well as the anxiolysis and sense of well-being, associated with exercise. This exercise-induced ASC involving the endocannabinoid anandamide supplements the traditional opioid-mediated effects associated with long-distance running.

Pain

A variety of stressful stimuli (burns, extreme cold, pain, injury, and toxic substances) all lead to hypertropic activity of the adrenal cortex and contribute to extreme stimulation of the SNS to the point of collapse and result in a PNS-dominant state. Endorphin release is provoked by diverse trauma and stress. Extremely painful stimuli can result in the direct stimulation of the hypothalamus and hippocampal-septal area, resulting in the emergence of synchronized slow-wave potentials in the EEG. Emotional stress can also provoke the release of endogenous opiates and increases in theta activity (Gellhorn 1969). A number of typical shamanic procedures result in the release of endogenous opiates or endorphins (Prince 1982a). Endorphin levels are highest at night (Henry 1982), a typical time for shamanic activities. Austerities such as self-flagellation, self-inflicted wounds, exposure to temperature extremes, and feats of endurance all result in the release of endogenous opiates. Exposure to extreme cold can elicit both opioid and nonopioid pain-inhibitory systems (Bodnar 1990; Kiefel, Paul, and Bodnar 1989).

Fasting and Nutritional Restrictions

Restrictions on foods in general, and specific foods such as meats, are typical preparations for the shaman. Training of the neophyte typically involves dietary restrictions for several weeks to a few months, and may extend for as long as several years. Fasting induces in the body a hypoglycemic state, which can cause seizures, and increases susceptibility to driving influences on the EEG, reflecting

effects on the pituitary and adrenal glands, which stimulate the hypothalamus and hippocampal-septal systems (Leukel 1972). Kehoe and Giletti (1981) discussed how nutritional deficiencies can contribute to changes in central nervous system functioning that induce alterations of consciousness. Diet can affect serotonin synthesis, resulting in emotional disturbances, hallucinations, and changes in cognitive and emotional functioning (Gussler 1973). Fessler (2002) illustrated the effects of semi-starvation in altering consciousness, producing neurotic and hysterical features, dissociation, auditory hallucinations, paranoia, and megalomania. Fessler proposed that severe dietary constriction results in an adaptive reduction of serotonin activity which promotes increased risk-taking that could have the effect of enhancing survival. Reduced serotonin levels, which are associated with anorexia nervosa, obsessive-compulsive disorder, and self-mutilation, result in enhanced impulsivity. Food deprivation has established effects in producing depersonalization experiences as well as dissociation, and such nutritional restriction may cause sleep disruption due to reduced levels of melatonin precursors and serotonin levels and serotonin synthesis (Fessler). These disruptions can produce the visionary experiences associated with mystical and shamanistic ASC; such dietary deprivations also appear as central mechanisms in the production of possession experiences (see below).

Sexual Abstinence

Sexual abstinence and other sex restrictions are central to shamanic traditions. Cross-culturally, shamans are expected to be celibate before and after their ceremonies, a restriction that may be imposed for years during training. Requirements of celibacy are often explained in terms of purity and the idea that spirits are attracted to the celibate. There may also be important physiological reasons that have to do with the physiological dynamics of both sexual orgasm and ecstatic altered states of consciousness (Davidson 1980). Sexual activity requires a simultaneous increase in the activity of both the sympathetic and parasympathetic nervous systems. When a peak of sexual excitation is achieved, the sympathetic system collapses exhausted and the parasympathetic state becomes dominant. Shamanic alterations of consciousness induce similar patterns of excitation to collapse, a sympathetic activation followed by a parasympathetic-dominant state. Prior sexual activity leading to a similar physiological collapse could preclude the profound parasympathetic collapse that typifies shamanic SoC. Sexual prohibitions can be seen as functional in facilitating more powerful ritual ASC.

Sensory Deprivation and Stimulation

Social isolation, reduction of motor behavior, and muscular relaxation lead to an increase in cortical synchronization, a greater sensitivity to parasympathetic stimulation, parasympathetic-dominant states with an increase in cortical synchronization, and a slowing of the alpha band and emergence of delta waves (Gellhorn 1969; Gellhorn and Kiely 1972). Sensory deprivation and prolonged absence of environmental stimulation leads to hallucinatory experiences,

resulting from a loss of serotonin inhibition similar to the interference of psychedelics in serotonin synthesis and release (Mandell 1980). Extensive, prolonged, and intense sensory stimulation can lead to the same effects as sensory deprivation through habituation and the complete blockage of perception of stimuli, leading to a profound alteration of consciousness.

"Sacred Medicines": The Hallucinogens as Psychointegrators

A wide variety of psychoactive plant substances are used in shamanistic traditions (e.g., see Dobkin de Rios [1984]; Furst [1976]; Rätsch [2005]; Schultes and Hofmann [1979]; Winkelman and Andritzky [1996]). The major classes of hallucinogens are (1) tryptamines (LSD, DMT, psilocin, and psilocybin) and (2) phenylethylamines (e.g., mescaline) (Fantegrossi, Mernane, and Reissig 2008; Nichols 2004). While the tryptamines are similar in chemical structure to the neurotransmitter serotonin, the phenylethylamines are not; but, nonetheless, they exert similar influences on target neurons (Nichols and Chemel 2006). The experiential effects of the indoleamines, tryptamines and phenylethylamines, are "virtually identical" (Aghajanian and Marek 1999, 20S), and the basic similarity in their biological effects is illustrated by a partial cross-tolerance across LSD, mescaline, and psilocybin (see Passie et al. 2008 for review). Although characterized by a number of different chemical structures and modes of action, the substances classified as hallucinogens produce common physiological effects. While they likely affect most neurotransmitter systems directly or indirectly, since the 1960s their principal effects have been recognized as derived from their interaction with the serotonergic neurotransmitter system. Their effects derive from both general aspects of altering consciousness, as well as from specific mechanisms related to effects on serotonin. Common general effects include production of high-voltage slow-wave synchronous brain wave activity in the hippocampus, synchronizing the frontal cortex and inducing a parasympathetic dominant state (Mandell 1980).

Hallucinogens as Psychointegrators

The principal effect of these substances' interaction with the serotonergic system is to disinhibit the brain stem and limbic structures, resulting in enhanced information inflow, emotional lability, increased visual experiences, and synchronous brain discharges. Releasing the inhibitory effects of serotonin results in synchronous discharges in the temporal lobe limbic structures, inhibition of raphe cell regulation of the visual cortex, and, consequently, to hyperactivity of the visual regions (Mandell 1980). It is likely that all hallucinogens, known as such for their effects in producing the vision experience, have similar physiological effects in producing a state of hippocampal-septal slow-wave dominance, although they may act through different mechanisms. Passie et al. (2008, 305) summarized the research as generally indicating that "LSD acts to preferentially inhibit serotonergic

cell firing while sparing post-synaptic serotonergic receptors from upregulation/downregulation." "The major hallucinogens appear to activate the right hemisphere, influence thalamic functioning, and increase metabolism in paralimbic structures and in the frontal cortex" (Passie et al. 2008, 305).

To better conceptualize the effects of these substances, we need to reject the misconceptions implied by "hallucinogen." Winkelman (1996, 2001a, 2007a) proposed the term *psychointegrator* based on a synthesis of (1) the patterns of effects revealed in cross-cultural studies of traditions using these substances; and (2) neurobiological research on the mechanisms of action of LSD on the serotonergic system. The term psychointegrator reflects both the neurological and experiential effects of these substances, a neurophenomenological perspective that explains the cross-cultural similarities in perceptions regarding the effects of these substances. Psychointegration reflects the often-noted properties of these substances of engaging both mental and emotional processes in a dynamic integration that leads the user towards an integrative holistic growth experience (Grof 1975, 1980, 1992). The term psychointegrator incorporates the root "psyche," whose referents include mind, soul, and spirit; psychointegrator reflects the stimulation of the mind, emotions, soul, and spirit to integrative development.

The concept of psychointegration reflects similar effects of the serotonin system, which has multiple roles reflected in its special characterization as "neuromodulator," regulating the balance among many neurotransmitter systems. Understanding the normal functions of that serotonin system and how they are altered by the psychointegrators helps explain their effects. The roles of these substances in the alterations of consciousness include their general effects in inhibiting the serotonergic system and blocking its general roles in inhibiting specific aspects of brain functioning related to dopamine. Previc (2009) proposes that the psychedelics reverse the dopamine suppression effects characteristic of serotonin, allowing a greater dopaminergic activity.

The information summarized below[2] illustrates that the psychointegrators' primary effects are reflected in synchronized hyperactivity across the neuraxis, the main nerve bundle linking the structural levels of the brain from the brain stem to the frontal cortex (Role and Kelly 1991). These processes of psychointegration are manifested in the theta wave discharges that produce a synchronization of brain waves across the levels of the brain. Psychointegration is also manifested in psychological experiences, particularly those related to healing (wholeness) and the sense of interconnectedness (e.g., cosmic consciousness and other transpersonal experiences). This model of psychointegration is illustrated in Vollenweider's (1998) research on psychedelics, which illustrates their effects on the cortico-striato-thalamocortical loops, which link the sensory gating systems of the lower brain structures with the receptor systems of the frontal brain. The psychointegrators' interruption of the CSTC loops undermines the thalamic areas' ability to screen out information, leading to a flood of information on the ascending levels of the brain. The primary inhibitory role of serotonin is released by the net effects of LSD-like psychointegrators.

Serotonin as a Neuromodulator

Serotonin is a monamine neurotransmitter, whose projections primarily originate in the lower brain structures (especially the raphe nuclei of the upper brain stem), from which they project upward to the locus coeruleus and many other regions of the brain (Nichols and Chemel 2006). These locus coeruleus neurons extend to a wide range of ascending targets in the paleomammalian brain (hypothalamus, hippocampus) and frontal cortex (Passie et al.). Their long, highly branched axons, slow latency and conduction, and diffuse projections to many terminal fields enable serotonin to operate more as a modulator than as a classic synaptic transmitter. Their projections extend from the brain stem area (locus coeruleus and raphe nuclei) to virtually all areas of the brain, where impulses originating in a few neurons eventually reach hundreds of thousands of other neurons. Modulatory neurotransmitters are unconventional in the sense that they modulate the effects of other neurotransmitter systems, even affecting nerve terminals and blood vessels that do not have serotonergic innervations (Kruk and Pycock 1991; Ribeiro 1991). There are different kinds of serotonin (5-HT) receptors in the central nervous system (CNS) with different effects on and kinds of interactions with psychointegrators in different parts of the brain (see Aghajanian 1994; Aghajanian and Marek 1999; Nichols 2004; Passie et al. 2008; Ribeiro 1991).

Serotonin acts as a modulator across all levels of the brain, from the brain stem and limbic system to the frontal cortex. Serotonin is the most extensive monoaminergic neurotransmitter system in the brain, a key neurotransmitter with a wide range of functions in sensory processing and perception, motor activity and behavior, hunger and feeding, thermoregulation and pain, release of growth hormones, sleep cycles, learning and memory, moods, and modulating the sympathetic nervous system (see Kruk and Pycock 1991, 122–23; Role and Kelly 1991). The central importance of serotonin as a modulator means its overall effects are in determining the strength of the responses of the postsynaptic cells in response to changing levels of arousal or motivation of the organism. The highest rates of firing of 5-HT neurons are during active waking periods, with their activity undergoing progressively greater reduction during quiet waking and slow-wave sleep; 5-HT firing virtually ceases during REM sleep.

There is a wide range of areas of the CNS that are affected by 5-HT. The neurons are concentrated along the midline area and the raphe nuclei in the brain stem, from which they project upward into the limbic system and frontal cortex. The primary projections are ascending, with a widespread distribution throughout the neuraxis and diffuse influences over vast neuronal populations. Serotonin neurons are found primarily in the raphe nuclei, from which they project upward into the anterior hypothalamus and thalamus; the limbic system, particularly the amygdala, hippocampus, and limbic forebrain; and the corpus striatum, basal ganglia, and the frontal cortex, particularly the visual and auditory areas. These structures are directly responsible for a range of human capabilities central to consciousness: attention, alertness, and maintenance of waking/sleep cycles; control of organismic processes through regulation of the autonomic nervous

system; integration of emotional and motivational processes; synthesis of information from the entire brain; and visual conceptualization and representation.

A central feature of serotonergic systemic function involves an inhibitory function, repressing activity. The functions of the serotonergic system relate to MacLean's model of the evolution of the brain, functioning as the most central and powerful system of integration and coordination among the three brain subsystems. In the reptilian part of the brain, serotonin functions as a regulator system within the R-complex. Serotonergic functions in the paleomammalian brain involve control over the R-complex, inhibiting limbic brain emotional functions, and distribution of information through connections with the prefrontal and neocortex. Psychointegrators stimulate this serotonergic system but also produce other effects that enhance paleomammalian brain functions by inhibiting some of the effects of serotonin.

Psychointegrators' Effects on Serotonin

Psychointegrators' effects on serotonin provide the principal mechanisms of their effects and therapeutic applications. Psychointegrators exercise both inhibitory/blocking (antagonist) and excitatory/facilitating (agonist) effects in their interaction with the serotonergic system. While showing an affinity (binding capacity) for the serotonin receptors, they are activating at some receptor sites acting as agonists, while at other sites, functioning as antagonists (or blockers), which prevent the normal responses of receptors (Kruk and Pycock 1991; Passie et al. 2008). LSD has a net effect of a serotonin agonist, acting at postsynaptic sites in inhibiting serotonin release while simultaneously increasing serotonin retention (Passie et al.).

Knowledge of the mechanisms of psychointegrators is primarily based on laboratory and clinical studies of LSD in rats (Nichols 2004). Therefore, there must be qualifications regarding the findings, especially if they do not correspond to phenomenological and experiential dynamics in humans. Nonetheless, generalizations to the broader group of psychointegrators other than just LSD are substantiated by the partial cross-tolerance among the substances known as hallucinogens and psychedelics (e.g., indoleamines like psilocybin and LSD; harmine and harmaline found in the genus *Banisteriopsis*; DMT [dimethyltryptamine]; and the phenethylamines such as mescaline (Passie et al.). The effects of the psychointegrators on the brain are more complex than just serotonin; they are reflective of the many compounds found in a single plant and the diverse types of serotonin receptors in the brain. The serotonin model is not exhaustive, however, as there are also significant effects of the psychointegrators on other neurotransmitter systems, because LSD also binds with dopamine and adrenergic receptors. Furthermore, there are muscarine- and nicotine-related substances and others which are not addressed here.

Psychointegrator Effects on Select Serotonin Neurons

Passie et al. (2008) reviewed animal research indicating that the highest levels of absorption of the psychedelics are in the basal ganglia and thalamus (reptilian brain area); the hippocampus and hypothalamus (paleomammalian brain); and the

pituitary and pineal glands and visual and auditory areas (frontal cortex). Primary effects of LSD-like psychointegrators are through the action on the 5-HT_{1A} and 5-HT_2 serotonergic neurons, where they are partial agonists (Passie et al.).[3] While there is also binding with the 5-HT_3, 5-HT_5 and 5-HT_7 receptors (Vollenweider 1998; Nichols 2004), indoleamine and phenethylamines cause greater activation of 5-HT_2 serotonin receptors relative to other serotonin receptors (Aghajanian 1994).

LSD appears to act on the 5-HT_{1A} receptors in the raphe nucleus and locus coeruleus as an agonist, with a net effect of inhibiting the firing and release of serotonin cells (Passie et al. 2008). However, this interpretation is questioned by some (Fantegrossi, Mernane, and Reissig 2008; Nichols 2004). The 5-HT_{1A} receptors in the raphe nuclei mediate collateral inhibition of the raphe system and are affected by LSD-like indoleamines as powerful agonists, inhibiting serotonin receptor firing (Aghajanian 1994, 140). A consequence of this suppression of raphe cell firing is an increased excitability of the cortical pyramidal cells, which makes them more sensitive to the psychointegrator-induced activation of the 5-HT_{2a} cells (Nichols and Chemel 2006).

The principal effects of LSD-like psychointegrators, however, are thought to result from their high affinity for 5-HT_2 receptors, where they function as partial agonists (Aghajanian and Marek 1999; Nichols 2004; Passie et al. 2008). 5-HT_{2A} activation increases cortical glutamate levels, as well as its effects on the dopamine system as both an agonist and antagonist. The 5-HT_2 receptors found on postsynaptic neurons mediate LSD effects on the cerebral cortex, on the locus coeruleus, and on other areas of the brain (Aghajanian 1994). LSD affinity for 5-HT_{2A} and 5-HT_{2c} receptors facilitates the functioning of the locus coeruleus, which receives numerous somatosensory and visceral inputs and projects diffusely to most of the brain (Miller and Gold 1993). Large concentrations of serotonin 5-HT_2 receptors are found in the limbic system in the hypothalamus and basal ganglia, where sensory-processing functions are antagonized by LSD (Kruk and Pycock 1991). LSD has effects in the hippocampus by blocking or suppressing the typical depressant functions of serotonin, permitting the release of responses similar to dreaming and contributing to production of the typical visual experiences by disinhibiting postsynaptic neurons in the limbic and visual areas.

Aghajanian and Marek (1999) summarized evidence for significant LSD effects in enhancing the excitatory post synaptic potentials of glutamate within the cortex (also see Nichols and Chemel 2006). Glutamate is an excitatory neurotransmitter and its activation increases the sensitivity of the cells of frontal cortex; the effects of the psychointegrators are to increase the cells' action potentials (Nichols and Chemel 2006). Aghajanian and Merek note that one of the effects of these substances is making the neurons more sensitive to incoming signals by decreasing the threshold for excitation and consequently affecting high-level processing in perceptual, affective, and cognitive systems.

Systemic Effects of Psychointegrators

A model of common neurobiochemical pathways involving diverse agents and activities that produce transcendental experiences was proposed by Mandell

(1980, 1985) as based in a biogenic amine-temporal lobe interaction manifested in high-voltage slow-wave EEG activity originating in the hippocampal-septal area of the limbic system. This limbic system discharge pattern produces strong theta wave discharges. These theta wave discharges ascend the neuraxis, eventually producing an integration of lower brain processes in the frontal cortex, a physiological synthesis or integration of the behavioral, emotional, and cognitive levels of the brain. This produces enhanced coordination across the levels of the brain. This is reflected in several patterns: a general increase in the coherence of the brain waves; synchronization across the neuraxis; and interhemispheric synchronization of the two halves (left brain-right brain) of the frontal cortex (Mandell 1985).

Psychointegrators exert systemic effects by affecting activity of several key areas of the brain:

1. Reptilian brain: the raphe and reticular formations and thalamic structures of the brain stem area that control the amount of information the higher levels of the brain receive;
2. Paleomammalian brain: the limbic system, particularly the hippocampus and amygdala, which provides emotional information and personal memories and sense of self; and
3. Neocortex: the visual and auditory areas of the frontal cortex.

Psychointegrative effects are derived in part from action in blocking serotonergic inhibitory action in the lower brain systems. Serotonin inhibits firing in the raphe area and depresses neuronal firing in lower areas of the brain. LSD-like psychointegrators act on the serotonergic neurons in the locus coeruleus to reduce this inhibition. The locus coeruleus is a nodal point for convergence of somatosensory and visceral information and innervates most areas of the neuraxis, principally, the thalamus, hypothalamus, cerebellum, basal forebrain, hippocampus, and neocortex. At lower dosages psychointegrators can increase arousal, heightening sensory receptivity and responsiveness to the environment. This is a reflection of the release of the screening mechanisms of the lower brain, allowing into consciousness the vast array of stimuli that are habitually screened out through habituation. The enhanced amount of information, combined with the blockage of some serotonergic circuitry by the psychointegrators, contributes to reduced or reversed habituation of typical response patterns and new patterns of behavior.

LSD's inhibitory effects on serotonin autoreceptors in the raphe nuclei also produce a disinhibition of higher brain targets. The release of the tonic inhibitory serotonin effects increases activity in the lateral geniculate nucleus and amygdala, enhancing emotional processing. LSD-like psychointegrators also potentiate serotonin's excitatory effects on brain stem and spinal cord areas where serotonergic input results in excitatory effects on the cerebral cortex and brain stem. Nichols and Chemel (25, 26) concluded that these substances amplify incoming stimuli and "greatly enhance the sensitivity and excitability of cortical processing . . . but receiving data only from limbic structures, memory stores, and phylogenetic old brain structures."

Psychointegrators disinhibit the mesolimbic temporal lobe structures, reversing the habitual effect of serotonin in depressing the action of target neurons in the forebrain and releasing the visual representation processes manifested as visions. The most intense disinhibition and, therefore, greatest release of activity is on the limbic system's emotional-processing areas and the visual areas of the cortex, resulting in intense visual and emotional experiences. This disinhibition of the mesolimbic temporal lobe structures is manifested in a key feature of psychointegrator-induced changes in overall brain organization—high-voltage synchronous activity in the hippocampus and synchronous discharges in the temporal lobe limbic structures manifested in synchronous theta range (3–6 cps) brain wave patterns. These theta waves are propagated up the neuraxis of the brain, driving impulses into the frontal cortex where these slower, more coherent, wave patterns replace the normal desynchronized fast-wave activity characteristic of the frontal cortex.

The limbic-frontal driving elevates information from the behavioral and emotional brains, integrating unconscious material into consciousness. This results in an integration of feelings with thoughts, enhancing integration and insight. Mandell (1985) suggested that cognitive effects also are derived from improving information exchange between the two hemispheres and their specialized functions in cognition and affect, producing interhemispheric coherence and fusion that results in insight. These synchronizing effects in the brain are the neurological causes of the integrative experiences of psychointegrators, their potential to produce experiences of connection, understanding, and oneness. Psychointegrators stimulate the brain to process information in this integrated fashion. These combined effects of psychointegrators on the various serotonergic regions of the brain result in the increase in information from the environment, body, and memory; the enhanced experience and recall of emotions; the stimulation of basic motivations and cognitive processes; and increases in awareness and internal attention. These diverse effects result in synthesis of information from the entire brain, enhancing the integration of emotions and other aspects of the archetypal psyche in visual representations.

Vollenweider's (1998; Vollenweider and Geyer 2001) research ilustrated that these effects derive from actions on the principal organizational networks of the brain, the cortico-striato-thalamo-cortical (CSTC) feedback loops. These loops are regulated at lower levels of the brain in the thalamus, which limit the ascending information; psychedelics disrupt this serotonin regulation and functioning as a "gatekeeper" filtering information from the environment and body. Releasing these regulatory systems can flood the frontal cortex with information, leading to breakdown of the integrative capacity of the ego with an overload of information, resulting in a breakdown of the ego structures, a contributory factor in induction of shamanic and mystical experiences.

Psychointegrators and Consciousness

The overall blocking effect of psychointegrators on serotonin neurons results in a disinhibition of their typical repression. The areas with the densest serotonin axon

terminals—the limbic system's emotional processing areas and the visual areas of the cortex—have the most intense disinhibition and, therefore, the greatest effects, exemplified in the typical visual and emotional experiences. Releasing inhibition of the visual cortex gives rise to the visual hyperactivity called visions or hallucinations. The limbic system's control of the hippocampus, a link between the reptilian brain and the frontal cortex, suggests heightened integration of hierarchically ordered brain functions. Psychointegrators primarily activate the paleomammalian brain and its functions, evoking and processing important emotions and memories. Psychointegrators also stimulate the R-complex, maintaining alertness and awareness, interfering with routinized (habituated) behavioral routines, and providing an enhanced integration of information. The reptilian and paleomammalian brain's information-processing modalities involve cognitive processes that play a predominant role in managing emotional and social life, providing mechanisms for shamanistic healing.

Consciousness is based on the integration of the left hemisphere's objectifying activities; the right hemisphere's integration, interpretation, and pattern construction; and the paleomammalian brain's evaluative functions and social-empathic responses, integrated with R-complex-based behavioral routines. Human behavior requires the coordination of information with motivations and personal significance, a linking together of emotions and the cognitive and rational faculties. Psychointegrators enhance information integration across the neuraxis, enhancing information integration, particularly with respect to attachments, emotions, and the role of social "others" in our lives. The antagonism of dopamine in the R-complex by serotonergic psychointegrators suggests another effect of psychointegrators is to shut down the habitual routines related to social behavioral displays. This has the effect of forcing the frontal cortex to consciously process information that has been relegated or automatized by the R-complex and paleomammalian brain.

Summary of Shamanic ASC Induction Practices

The diverse activities used by shamanic practitioners to induce alterations of consciousness have numerous effects on the brain and nervous system. Among the most significant effects are activities and agents that stimulate the major neurotransmitter systems, specifically, the serotonin, opioid and endocannabinoid systems. Secondary consequences of these stimulations include effects on both dopamine and the excitatory glutaminergic systems. General effects of shamanic induction processes increase the availability of these neurotransmitters. Their net effects enhance the transmission of ascending information in the brain, typified in coherent theta wave discharges and the experience of a visual panorama, exemplified in dreaming, hallucinations, and visionary experience.

MEDITATIVE STATES OF CONSCIOUSNESS

Meditative traditions are primarily associated with religious traditions of Asia (e.g., Hinduism, Buddhism, Taoism), but similar esoteric practices are also found in early

Christian, Islamic, and Judaic religions. Nonreligious traditions of contemplation further illustrate the diversity of meditative traditions. While the contemporary meditative traditions emerged some three thousand years ago, there are direct continuities of the meditative traditions with shamanic roots, as was illustrated in Chapter 2 with linguistic, mythological, and historical data.

Meditation is generally understood as a practice of exercises in which the focus of attention or awareness is developed in order to cultivate personal consciousness and acquire greater spiritual insight. Shapiro (1990) and Walsh (1983) offered similar perspectives that emphasize that meditation involves a range of practices, a family of techniques. These have a common concern with the conscious training of attention in order to heighten nonanalytical awareness and develop greater voluntary control over mental processes. Enhanced attention and control contribute to development of insight into the nature of mind, personal identity, and consciousness, providing a sense of alignment and harmony with the deepest wisdom of the universe. This perception of reality reveals an interconnectedness of the entire universe and contributes to alterations of consciousness that can inspire lifestyle and behavioral changes that provide psychotherapeutic and psychophysiological benefits.

What characterize meditative traditions, East and West, are concerns with the interaction of spirituality and consciousness and the development of self-awareness in the evolution of more advanced forms of consciousness. Meditation practices are also found outside of religious traditions in secular meditation activities (e.g., Transcendental Meditation) (West 1987a), but even there we see a persistent core involving the intersection of spirit, self, and evolution.

Underlying the diversity of meditative practices and traditions are fundamental commonalities, such as agreements about the nature, processes, and stages of development of consciousness, that reflect neurognostic structures. This is exemplified in EEG research on various meditative traditions which illustrates that physiological parameters coincide with phenomenological descriptions of meditative conditions—greater attention, focus, coordination, integration, and insight. This section examines commonalities in meditation practices in terms of the processes of contemplative development; the brain patterns of meditation; the development of attention; the constructed nature of perception; the development of new senses of self and identity; and views of the levels of consciousness. The different senses of self are examined as a basis for constructing a neurologically based epistemological system to characterize various meditative SoC within the integrative mode of consciousness.

Neurophenomenological Perspectives on Meditative Commonalities

Investigators of diverse meditation traditions have concluded that underlying the variety of cultural forms are common objectives, practices, processes, and stages of development (see Wilber [1977, 1980]). These commonalties constitute a "perennial psychology" (Wilber 1977) and "perennial philosophy," a universal set of

beliefs about human nature and consciousness found in mystical traditions around the world (Smith 1975, 2000). This consensus about the nature of consciousness, the functions of the human mind, the mind's construction of reality, and the varying forms of consciousness reflect an empirical understanding of consciousness. The consciousness disciplines (Walsh 1980), Asian psychologies (Walsh 1988), and contemplative traditions (Laughlin et al. 1992) emphasize an examination of the nature of human consciousness and its operations through "state specific sciences of consciousness" (Tart 1972). Their focus on observation of subjective, or internal, experience and on reporting on its processes provides a basis for understanding consciousness.

These meditative traditions involve an examination of the relationship between the knower and the phenomena known through transcendental inquiry (Wilber 1979). This inquiry and validation are based on the mental processes of (1) injunction to proceed in certain ways to produce observable experiences; (2) the experience, apprehensions, and observations; and (3) the subsequent mental and social verification or confirmation of the experience. The verification process occurs in a different mode and epistemic structure than does the observation, with language and social norms employed to verify perceptions derived from experiences that are transrational and transverbal.

Laughlin et al. (1992) characterized contemplative development as involving maturational processes that reflect the development of structural features of human neurophysiology through the conscious application of the individual to his or her own development. They characterized these developments as relatively rare because they require both considerable effort and the supportive social institutions and "technologies" to transform the relation of the physical substratum with the mental realm. The symbolic reorganization of the functioning of the neurobiological systems derives from the role of symbols in communication between the conscious and the unconscious aspects of the nervous system and from the ritual manipulation of neurognostic structures to activate specific patterns of response within the nervous system. The universal features of meditative traditions reflect a conscious engagement with neurognostic structures manifested in attentional, perceptual, and conceptual processes, and through this examination, development of the ability to control physiological responses, including EEG, respiration, pain, oxygen consumption, and bleeding (see Taylor, Donovon, and Murphy [1997] for review).

Meditation and the Brain

Different disciplines may produce different autonomic conditions and psychophysiological responses to stimuli while in meditative SoC (e.g., see Kasamatsu and Hirai 1966; Anand, China, and Singh 1961). Nonetheless, there appear to be fundamental physiological similarities across disciplines: a shift toward parasympathetic dominance (e.g., reductions in cortical arousal, in muscle tension, in skin conductance, in cardiac function, and in respiration rate); an overall decrease in frequency of the brain wave pattern to alpha and theta ranges; and an increase in alpha and theta amplitude and regularity in the frontal and central

regions of the brain (Davidson 1976; Kasamatsu and Hirai 1966; Gellhorn and Kiely 1972; Taylor, Murphy, and Donovan 1997; Wallace and Benson 1972).

This early evidence—that meditation leads to an increase in slow-wave brain patterns—continues to be confirmed: typical changes in brain waves involve an increase in alpha waves, which then decrease in frequency toward dominant theta rhythms. Takahashi et al. (2005) found that meditation was associated with significant increases in fast theta power and slow alpha power, principally in the frontal area. Cahn and Polich (2006) reviewed a wide range of studies confirming enhanced alpha and theta in meditators, as well as increased EEG coherence (the cross-correlation in the power of a frequency band across different cortical areas). EEG measures show that the overall levels of theta and alpha activation reflected proficiency in meditation practice. The alpha enhancement involves both trait and state EEG measures, including alpha slowing that is interpreted as evidence of enhanced theta activity and power, a trait frequently found with advanced meditators. This theta is manifested as "increases in frontal midline theta power," which is associated with an increase in attention as well as reduction in anxiety. Takahashi et al. found increases in fast theta power of the frontal lobes to reflect enhanced mindfulness and harm avoidance. They proposed that this reflects aspects of meditation enhancement of two major mind factors, internalized attention and mindfulness.

These associations of meditation with alpha and theta EEG have stood the test of time and are supplemented by more recent research that also implicates an additional level of meditation-induced EEG: biphasic hypersynchronous high-frequency gamma waves (35–44 cps; see Lehmann et al. [2001]; Lutz et al. [2004], Vialatte et al. [2009]). The presence of gamma is very significant for the model of the IMC because gamma is associated with binding of diverse signals within the brain. The gamma waves have a significant implication for the general hypothesis of the IMC because gamma is associated with the same principle as integration in its roles in binding activities from diverse areas of the brain. These gamma findings do not contradict, but rather strengthen, the theta-wave psychointegration model of the IMC. "The strength of gamma-band synchronization is modulated with the phase of lower-frequency rhythms, particularly the theta rhythm . . . and the alpha rhythm" (Fries 2009, 217). Advanced meditators also have an increased gamma to theta ratio in comparison to novices. Hebert et al. (2005) implicated alpha EEG during meditation as a form of "information transfer and integration in the brain that leads to high-level cognitive processes." They proposed that the enhanced alpha frequency phase synchrony that occurs during meditation may have effects of improving functional integration and mind-body health. These are the same basic systemic physiological changes associated with the IMC—a parasympathetic dominant state with enhanced theta brain waves and systemic neural integration.

Meditation is not primarily a right-hemisphere experience, although it does involve a relative shift toward right-hemisphere mentation as habitual left-hemisphere activities (language, logic, etc.) are deliberately attenuated. It is not the frontal hemispheres, but the lower paleomammalian brain that is the focus of meditative activity. Meditation's overall pattern of enhanced interhemispheric synchronization reflects activation of attentional processes of the lower brain

structures (Delmonte 1987a; Stroebel and Glueck 1980). Fenwick (1987, 109) noted this dominance of the discharges of lower brain structures and a "synchronization and spreading out of spindling within the thalamic structures, thus causing an increased similarity of spectral frequencies in different cortical areas." The physiological findings of increased interhemispheric synchronization, a relative decline in left-hemisphere activation, and greater coherence or integration across cortical areas are consistent with what the contemplative disciplines themselves consider to be the consequences of meditation on the functioning of the human mind and consciousness. Increased theta activity as a function of a meditator's competence substantiates attentional development because the sustained low-amplitude theta is associated with sustained attention. These neurophenomenological correspondences illustrate the importance of seeking the concordance between physical and phenomenological data. Commonalities across meditative traditions that reflect these neurological processes include the nature of attentional processes; the operation of perception; the nature of human identity and self; and the different forms or levels of consciousness and their characteristics.

Attention

Meditative traditions retrain attention to enhance awareness and the ability to concentrate and focus attention for an extended period of time (Odajnyk 1993; Taylor et al. 1997). Meditation enhances preattentive processes, visual imagery ability, and internal locus of control. Enhanced attention results in an increased awareness of unconscious mental processes and in insight into the nature of mental operations. A common point of meditative traditions is that most human behavior is mindless and unconscious, a kind of culturally induced hypnosis in which people habitually identify with their ego, thoughts, and behaviors (Walsh 1983). The development of attention permits enhancement of awareness through disidentification with one's mental content. When concentration becomes habitual and automatized, it creates a complex that enables an autonomous and permanent process of meditation, enhancing all levels of awareness. Changes in attentional processing reverse habituation, increase perceptual awareness, and lead to a reduction in habituation to external stimuli. Deautomatization and interference with the automatization process free up mental energy.

Meditation literature (e.g., Goleman [1977]; Ornstein [1972]; Shapiro [1990]; Walsh [1983]) indicates two principal attentional strategies. The primary differences contrast (1) awareness, mindfulness, or insight meditation, characterized by a focus on the field or on the contents of mind, consciousness, or awareness; and (2) concentrative meditation, characterized by a development of focus of attention on a specific object or activity (e.g., breathing). Castillo (1991) described three stages in the development of attention in meditation in the Yoga Sutras: (1) *dharana* (fixed attention); (2) *dhyana* (continuous attention); and (3) *samadhi* (coalescent attention). Fixed attention, holding the attention of personal consciousness on a specific object of meditation, is followed by continuous attention, the holding of attention on the object of fixed attention without a sense of self-consciousness. Coalescent attention becomes so concentrated that all awareness of the external world is

lost, resulting in the experience of void or nothingness, in which all that exists for the meditator is attention.

Perception and Presentational Intelligence

Meditation involves the analysis and understanding of perception, developing an awareness of the habitual perceptual and cognitive processes, which leads to a cessation of the ordinary unconscious projective and associative processes (Claxton 1987a, Delmonte 1987b; Odajnyk 1993). Concentrative meditation techniques constrict the perceptual field to facilitate recognition of the constructed nature of perception. Awareness of the construction of perception and experience provides a basis for questioning ordinary perceptions as inaccurate assumptions. This awareness leads to the realization that the objects of the world of perception are derived from one's mental models. Meditative practices inhibit "all four psychological functions—sensation, thinking, feeling, and intuition" (Odajnyk 1993, 57). With the deautomization of the cognitive constructs habitually employed, one is then capable of observing them and enhancing awareness of nonverbal, somatic, and imagetic processes.

Hunt (1995a&b&c) characterized meditative traditions as constructing systems of knowledge from microgenetic imagetic features of biologically based perceptual and conceptual systems. Contemplative traditions involve cognitive processes based in presentational states "understood as a reconstitution on the level of symbolic cognition of presence-openness as the basic structure of perception in motile sentient creatures" (Hunt 1995c, 220). Hunt suggested that the experiences of meditative states of consciousness involve the structures of presentational symbolic cognition and are derived from basic structures of perception. Mystical experiences involve the microgenetic iconic stages of perception, geometric perceptual patterns that provide the basis for the more complex and abstract mental processes through cross-modal synesthesia.

The neurophysiological basis of these perceptions is indicated by the common forms and experiences reported by contemplatives cross-culturally. These structures are given cultural explanation, but they reflect an immediate perception of sensory events before interpretation, experiences that are universal because of their neurognostic basis. They provide a metaphoric vehicle for meaning based on their use in "an abstract presentational metaphor also based on cross-modal synesthetic translation" (Hunt 1989, 191). These experiences include the "white light experiences" and the imagined body that are widely reported in mystic and shamanic traditions. Hunt characterized the "light-of-the-void" experience, a luminescent glow, as the most basic quality of the visual system and, through cross-modal translation, a metaphor for openness. The meditative traditions use these metaphors for expressing knowledge of consciousness itself, as embodied in the concept of "enlightenment." Light as the most basic quale provides an inclusive metaphor for the totality of consciousness, epitomized in the metaphors of enlightenment and illumination.

The synesthesias involved in the translations between different sensory modalities provide a basis for symbolic meanings. These meanings are felt meanings produced by transformations between the information regarding the body image and

the visual field (Hunt 1995b, 157). Vortex tunnel experiences found in many mystical traditions and the "hollow body" chakra experiences "can be understood as a complex synesthesia between this 'hollow' tactile structure and the symmetrical funnel or cone of the visual field itself" (158). Evidence that these mystical experiences derive from cross-modal integration is provided by studies that advanced meditators have more direct access to the experiences provided by properties of their visual field and enhanced visual-spatial intelligence (Hunt 1995a&b).

Self: Divided Consciousness and Enlightenment

Meditative development of the presentational symbolic capacity involves a special form of self, a witnessing consciousness that "comes to observe its own developed forms as the immediate medium for presentational felt meanings—the more diffuse the patterns thereby synthesized (space, bodily presence, and holding), the more all-inclusive the felt significance" (Hunt 1995b, 131). Meditation promotes development beyond concrete levels through the formation of abstract metaphors for consciousness and self that are based on qualities of the physical world (e.g., light, space, and energy).

Meditation-induced changes in identity result from the increased attention given to internal experiences, which lead to increases in self-conscious and self-evaluation, a greater psychological differentiation, and clearer understanding of one's own psychological needs and attributes (West 1987). This examination leads to a deconstruction of the permanent sense of self, an abandonment of false beliefs about the nature of the self that derived from mindless and unconscious automatic information processing. Unlearning conditioning and automatic processing leads to the realization that one's sense of identity is distorted by a lack of awareness of the unconscious processes that construct the perception of continuity of identity. Meditation practices bring about a greater awareness by disrupting habitual identification with thought and behavior. The development of greater attention and awareness reveals that the appearance of a continuous sense of self is a selective and arbitrary construction from fluctuating mental contents, and that it is only one of many possible selves.

Castillo (1991) analyzed Hindu yogis' development as involving co-conscious selves and divided consciousness. The personal self, or *jiva*, participates in the world, in contrast to the uninvolved observing self, called witness, or *atman*. Participating consciousness is "physical, impermanent, and engaged with the world, . . . performs actions in accordance with social norms, . . . [and] is comprised of the personal mind, thoughts, emotions, sensations, and memories" (Castillo 1991, 1–2). *Atman*, or *purusha*, observing consciousness or witnessing self, is "nonphysical, permanent (immortal), an uninvolved witness of the physical self and the world . . . and experiences those actions as if they were performed by someone else" (1). Taimni (1968) discussed the *purusha* as the essence of the substrate of the subjective: the power of consciousness to function through and in collaboration with vehicles of the mind, providing the connecting link of matter and energy. The *purusha*, along with all of the vehicles that have not been separated off from consciousness, constitutes the subjective part of this dual relationship referred to as "seer."

The goals of yoga are the separation of these two aspects of self and consciousness. The control of attention permits transcendence of the participating self through the development of attention to the point where only the experience of attention itself exists. Training of attention allows for a permanent meditational attention in addition to the habitual focus on everyday activities. Permanent development of this inner consciousness is referred to as *atman*, true self, witness, or looker (Castillo 1991).

Meditators experience both aspects of consciousness simultaneously through restraining participating consciousness. The ultimate goal of yoga meditation, the separation of the observing self or true self (*atman*) from the participating self or false self (*jiva*), is referred to as *moksha*, meaning "liberation." With liberation, the observing self only witnesses events (does not participate in them) and is, therefore, freed from the pain and suffering that come from an identification with the personal self. Castillo suggested that this split in consciousness is recognized within Western psychiatry as depersonalization, the experience of being detached from one's own body or mental processes, an uninvolved witness to one's own behavior, with the feeling that one's personality is unreal and not associated with one's identity.

Contemplative Views of the Postformal Development of Consciousness

Disparate meditative traditions recognize similar features of consciousness, including specific layers or levels of the functioning of consciousness that correspond substantially with conceptual frameworks of Western science, in particular, regarding views of cognitive, emotional, motivational, social, moral, physical, and cognitive development and evolution (i.e., Wilber [1977, 1980, 1986]). Wilber characterized development of consciousness in terms of the Vedic perspectives on the evolution of the self, which postulates that development proceeds through fixed ordered stages that constitute a universal hierarchy. These stages incorporate Piaget's four basic stages (sensorimotor, preoperational, concrete operational, and formal operational thought), but they extend beyond formal operational thought in a series of transpersonal stages of development (visionlogic, psychic, subtle, causal, and ultimate or absolute levels of consciousness).

Alexander, Davies, et al. (1990) and Alexander, Robinson, et al. (1994) analyzed the meditative system of Maharishi Mahesh Yogi's Vedic psychology and suggested forms of consciousness both similar to and different from those of Wilber's analyses of Vedic perspectives. Vedic psychology views the development of the higher stages of consciousness as involving systems underlying all dimensions of human consciousness—perception, action, affect, self, cognition, and ethics (Alexander, Davies, et al. 1990, 52). But their states of consciousness begin with sleeping, dreaming, and waking, followed by transcendental, cosmic, glorified cosmic, and unity consciousness. Although these latter states address many of Wilber's stages, and even use the same terms, they do not correspond exactly. In particular, they differ in not characterizing these states as having an inherent developmental sequence. "According to Vedic psychology, because all

the fundamental structures or levels of mind are inherent, they can thus be experienced whenever awareness settles down to a sufficient degree" (56). This illustrates the importance of a multidimensional approach; rather than a single domain of development, the transcendental developments involve integration of a number of different domains and specialized mental faculties.

Hunt (1995a&b) suggested that mystical experiences represent lines of intellectual and affective development that are not post-formal or post-representational, but instead involve achievement of formal capabilities within affective lines of development, addressing cognitive aspects underlying valuation, feelings, and the personal experience of others. Hunt tied this to Piaget's proposal that affective development lags behind intellectual development because it lacks a fixed point of accommodation, which the physical world provides for intellectual development. Hunt suggested that a framework for affective development is provided by the observing self, which generates a permanent sense of presence, openness, and compassion. These constitute "formal affective operations" (Hunt 1995b, 118).

Alexander, Davies, et al. (1990) and Alexander, Robinson, et al. (1994) differed in characterizing post-formal developments as achievement of autonomous integrated ego stages based on self-actualization and post-conventional moral reasoning. These higher states of consciousness proposed by Vedic psychology constitute a developmental achievement superseding the stages proposed by Piaget. The evidence includes entirely new modes of knowing and solution of problems of prior developmental levels; increasing differentiation and hierarchical integration of cognitive structures, which provides more veridical or invariant knowledge of objective reality; and increasingly adaptive and effective thought and behavior (paraphrase from Alexander, Davies, et al. 1990, 57–58). Central to these developments is achievement of a self-referral mode based on separation or differentiation of the self from other mental activities, "a new 'self-referral' mode of knowing that allows consciousness to know itself directly as Being without conceptual mediation" (Alexander, Davies, et al. 1990, 53). These developments transcending representational thought do not eliminate it; rather, they enable representational thought to occur effortlessly and with a liberation from the habitual domination of attention by the symbolic representations of language. This permits the integration of the affective and intellectual functions and the interpenetration of operations. This is exemplified in Wade's (1996) emphasis on an affective dimension in post-formal development.

Contemplative developments do involve changes superseding Piaget's formal operational thought. Piaget suggested there would be developments following formal operational thought as a consequence of the continuation of the process of equilibration. Riegal (1973) characterized post-formal developments as involving relativism, dialectical thought, and acceptance of contradiction. Post-formal thought overcomes concern with contradictions and the rejection of personal considerations and subjective feelings characteristic of the "objectivity" of formal operational thought. Post-formal thought is based on a relativistic logic that recognizes that different points of view are equally valid from their respective perspectives and that one's own view of reality is only one of many partially valid views. Post-formal thought recognizes that reality embodies many inconsistencies and

integrates inconsistencies within a broader context recognizing complementarity of perspectives.

Dialectical and relativistic thought within mysticism was discussed by Schoun (1975) as "speculative formulation." Schoun (1975, 5) characterized this approach as "comparable to the infinite series of possible views of the object, views that are realized through indefinitely multiple changes of point of view . . . so the different aspects of truth, however contradictory they may appear and notwithstanding their indefinite multiplicity, describe the Integral truth that surpasses and determines them." Speculative formulation accepts apparent contradictions because each statement is from a point of view and can only be part of the whole truth because expression assumes a specific form that cannot be the only possible expression of the truth (Winkelman 1993). This view entails a realization of cultural relativism in superseding the limitations of specific cultural perceptions to recognize universal truths (e.g., see Smith 1975, 1976). The recognition of cultural relativism entails an evolution of consciousness, moving beyond culturally specific and limited frames of reference, a partial transcendence of cultural conditioning factors. The esoteric traditions' recognition of the relative truths of each individual tradition embodies a recognition that culture frames human knowledge and experience, a realization that there is no way to express an absolute objectivity, only relative objectivities created within cultural systems. These perspectives make epistemology a fundamental aspect of meditation in particular, and of consciousness in general, as is exemplified in Piaget's genetic epistemology.

Contemplative Development from Epistemological Perspectives

Forms of meditative consciousness can be viewed as resulting from the suspension of limiting epistemological assumptions made at earlier stages of development. The epistemic structures that genetic epistemology proposes are adopted at early stages of cognitive development are suspended in meditative development, permitting manifestation of presentational and affective modes of cognition. Suspension of automatization of perception, social evaluation, affect, and self permits utilization of nonlanguage imagetic symbolic structures. This epistemological approach to consciousness is justified by the nature of consciousness, as well as by the perspectives of many contemplative traditions. Consciousness shares commonalities with epistemology in being concerned with the nature, characteristics, and processes of knowing (Winkelman 1997a). Epistemology is concerned with the nature of knowing, making it a basis for understanding the essence of what is consciousness ("knowing with").

An epistemological approach to consciousness is also justified by the central features of the psychological doctrines of Buddhist meditation, which Claxton (1987a&b) characterized as constructivist. This approach understands ordinary consciousness as a construction—a mental model that subserves and provides the basis for one's experiences and actions. The view of transcendental consciousness in Vedic psychology is explicitly epistemological, being concerned with the processes of knowing and the relationship between knower and known. Flier (1995) used the theories of basic subject-object structures of consciousness proposed by Kegan

(1982, 1994) to illustrate developmental epistemic relationships in mysticism. Flier characterized mysticism as ways of knowing that involve the kinds of differences that Piaget posited as distinguishing levels of cognitive development. Similarly, d'Aquili (1982) analyzed mystical experiences as epistemic states, outlining nine a priori primary epistemic states.

These confluences of epistemology and consciousness justify the use of an epistemological perspective in examining meditation traditions and their stages of the development. I propose that meditative development involves the suspension of assumptions and points of reference that change understanding of the nature of self, reality, and knowledge. Suspension of previous epistemic structures also permits integration of previously repressed levels into a more complete experience of the self. The meditative SoC are central to changes in reflexive self-awareness, enabling development of the detached observational attitude. Meditative approaches supersede previous epistemic structures by interfering with the automatized structures that organize experience of the world and the level of consciousness. This permits reemergence of earlier symbolic forms, the presentational modality.

The integration of these two epistemological actions—suspension and reelevation—provides a basis for changes in the constructs used to understand the nature of self and reality. The construction of knowledge and experience requires epistemic structures, assumptions about the nature of the knower and what is known. Although they provide a fundamental basis of knowing, they also constrain what can be known. Epistemic structures assimilate to their own principles rather than accommodate to the nature of what one seeks to know. Consequently, the suspension of epistemic structures can enhance knowledge and experience by removing limitations. This leads to recognition of several principal characteristics of meditative consciousness: the culturally relative nature of knowledge (cultural relativism) and the adoption of universalistic perspectives; the constructed nature of human perception (suspending habitual cultural programming of the structures of attention and perception) and the development of an awareness of neurognostic structures; the false and incomplete nature of one's sense of self (suspension of participating self as the point of reference) and the liberation of the "observing self"; and transverbal and transconceptual apperceptions (suspending language descriptions and conceptual thought), which permit the manifestation of neurognostic structures of perception and awareness.

The relationship of brain development and functions to epistemic structures had been suggested by d'Aquili (1982), d'Aquili and Newberg (1999), and Winkelman (1997a). MacLean's (1990, 1993) model of the triune brain is used to illustrate the neuroepistemological nature of consciousness, that is, the relationship of forms of meditative consciousness to the epistemic structures of the functional organization of the brain.

Psychic Consciousness

Wilber (1980) characterized development into the transpersonal realms as beginning in self-integration of body, shadow, persona, and mind, which permits disindentification with the different persona and transcendence of the exclusive and

restrictive identification with these structures. Wilber suggested "psychic consciousness" was based on suspension of some of the previous assumptions about the world, using control of attention to produce suspension or deautomatization of the perceptual and cognitive constructs habitually employed. The application of attention to the processes of perception and interpretation makes the constructed nature of reality apparent. Also, it provides a deconstruction or substruction of perceptual and cognitive activities and an awareness of the neurognostic structures of human consciousness. This provides an ability to act on physical levels with the intentions represented in the mind, for example, using the power of attention to eliminate physical distractions or the power of love to overcome anger. In addition to the perceptual characteristics (brilliant light, luminous forms, color perception) of psychic consciousness are a variety of emotional characteristics (rapturous feelings, tranquility, devotional feelings, equanimity, and attachment). These characteristics together constitute what is often referred to as pseudo-nirvana, which must be overcome if the meditator is to continue to develop. The features also indicate an activation of the positive emotional system of the body without reference to external conditions of assessments.

Subtle Consciousness

Subtle consciousness involves what Wilber referred to as archetypal structures, illumination, and transcendental insight. These changes in awareness depend on the creation of coconscious selves through the separation of the participating and observing selves. Self and individual identity change as a consequence of unlearning of automatized (habituated) information processing and conditioning of thought. The freedom from the pain and suffering comes from developments of self at this level, which depend on the ability to both suspend and elicit attachments and emotional processes. The experiences of nirvana and bliss are a reflection of this suspension of attachment and the ability to experience rapturous emotions independent of immediate stimuli for such pleasurable experiences.

But it is the Vedic cosmic consciousness that is described as based in the unbounded or nonattached self, no longer identified with thought but with an inner contentment reflecting a self not dependent on reinforcement from external sources. This state has significant similarities with the subtle stage described by Wilber (1980, 1986) in its concern with rapture, bliss, and overwhelming love and compassion. These characteristics of positive affect are associated with the state of refined or glorified cosmic consciousness in Vedic psychology, characterized as reflecting a unification of self and the world and enhanced feeling or affect, particularly, love and devotion.

Vedic psychology characterizes feelings as having a role in interconnecting the different levels of the mind, particularly "the interface between mind and senses and between the intellect and ego" (Alexander, Davies, et al. 1990, 304). A fundamental role of feelings in early development is in their role in mediating social influences providing symbolic constructions of self and knowledge. Feelings provide the basis for attachments to others, which define the social group and

moral definitions, and, reciprocally, one's sense of self. In meditative development, emotional attachments are suspended to permit socially decontextualized evaluations (cultural relativism) and joy and bliss independent of surrounding circumstances. Feelings also link "the intellect back to the intrinsic evolutionary motivation of the ego and ultimately to the inner self" (304). Feelings play an important role in guiding decision-making processes, but in a more relaxed mode, being more flexible, relational, and sensitive to context. They also operate through the intuitive mode, which is holistic and more rapid.

A central aspect of d'Aquili's (1982) neuroepistemological perspective is the affect associated with epistemic states. Beliefs about a wholeness, goodness, and purpose to reality are attested to in the mystical experiences of many world religions, where it is interpreted as union with god. Meditative experiences labeled as cosmic consciousness and absolute unitary being are both tied to positive affect. D'Aquili linked these to right-hemisphere and limbic processes, which provide emotional coloring to experience. This illustrates the fundamental role of the limbic brain; first, its manipulation in achieving the ecstatic rapturous emotional states of the limbic brain; and second, the suspension of limbic processes in achieving equanimity, nonattachment, and other forms of emotional detachment. D'Aquili (1982, 374) suggested that biological bases for affective components associated with cosmic consciousness derive from connections of sensory association areas and the inferior parietal lobe with the limbic system.

Causal Consciousness

Wilber (1980) characterized the causal level as involving the unmanifest realm or void, manifested as consciousness without objects in the field of awareness and without the experience of the universal self. Void consciousness is achieved by completely cutting awareness off from the outer world, concentrating it under the complete control of the will. Wilber characterized this development as based on the subordination and abolition of the predominant centralizing tendencies of the ego sense, leading to the experience of the formless universal self (over mind) in which all manifest forms are radically transcended and no longer arise in consciousness. This development is recognized as an advanced state in many traditions and known by terms such as "the void" and "the void consciousness" (Wilber 1977, 1979). This final state is generally considered to be an experience beyond description and conceptual distinctions, permitting the development of a perception of reality beyond concepts. In this sense, voidness refers to the perception of reality without conceptualization—personal, cultural, or linguistic—a state free of conditioning. This experience of voidness requires the obliteration of all conceptual distinctions and the development of a perception of reality beyond concepts. Although void consciousness is considered to be "beyond description," there are characterizations of this experience as reflecting a seamless universe void of boundaries. Reality involves wholeness and a connectedness, an interdependent nature, where perceptions of separate self-identity and perception of isolated objects are an illusory imposition on the undifferentiated nature of ultimate reality.

The epistemological realizations of causal consciousness involve recognition that the objects and the self known are the consequence of the separations, divisions, and distinctions that humans impose on the world, not something intrinsic to the world. These realizations provide the possibility for a nondual mode of knowing. Whereas thinking distorts ultimate reality in creating things, nondual awareness provides an understanding of perceiver and perceived as part of a system of mutually interdependent interactions. This realization provides the basis for recognition that objects are mental phenomena in the sense that they are created through habitual processes of constructing the perceived environment. This realization is explicitly epistemological. With this realization, seer and seen, or subject and object, are no longer considered to be separate and inseparable, but part of this ultimate level of reality.

Odajnyk (1993, 66–67) characterized meditative experiences as involving changes occurring as a consequence of meditation, pushing the reductive and selective operations of the brain and the nervous system to such a point that they essentially shut down the entire sensory apparatus. D'Aquili (1982, 375) suggested that there are neurophysiological mechanisms generating the epistemic states of absolute unitary being, involving "an extremely rare subjective state in which there is no perception of any discrete being and in which even the distinction between self and other is obliterated. All being is apprehended as unity." D'Aquili also suggested that the parietal lobe of the nondominant hemisphere is responsible for holistic perception and generates the subjective sense underlying the experience of absolute unity. This sense of an absolute unitary being may be manifested in either positive affect, which is usually referred to as god or, with neutral affect, referred to as the void.

A Hierarchy of SoC?

This neuroepistemologically grounded neurophenomenological model of consciousness is outlined in Tables 4.1 and 4.2. These tables identify the epistemic constructs associated with the levels of consciousness proposed by Wilber (1980) (with modifications, particularly, the social mimetic stage) and their relationship to the evolutionary strata of the brain proposed by MacLean (1990). I hypothesize that the different levels of consciousness identified in the perennial psychology have underlying epistemic structures (Table 4.1). Although the considerations here focus on the developments subsequent to formal operational thought, Table 4.1 identifies the epistemic constructs of the full range of consciousness (including the first levels of consciousness documented by Piaget) in terms of the awareness of self, environment, emotions, mind, social relations, and language. These forms of consciousness represent the sequential development of different forms of information processing derived from the interaction between the different brain systems identified by MacLean (1990) and the intentionality of the organism in interaction with the different forms of the self (Table 4.2).

These levels of consciousness do not strictly replace one another but emerge in an additive fashion through the prepersonal and personal levels. Some development involves an "add on" model, whereas other developmental sequences are based on repression of epistemic states to allow for the dominance of other states. It appears

TABLE 4.1 Hypothesized Relationships between Levels of Meditative Consciousness and Epistemic Constructs

Levels of Consciousness	Epistemic Constructs					
	Self	**Environment**	**Emotions**	**Mind**	**Social Bonds**	**Language**
Sensoriphysical	Subjective	Awareness Objective world	Survival Reflexes	Behavioral schemes	Absent	Absent
Phantasmicemotional	Biophysical body	Object constancy	Survival and pleasure	Image mind	Attachment	Absent
Representational mind	Egocentric Social	Concrete symbolic Social categories	Preconventional Social egoic	Mimetic, episodic Social rules	Egocentric Social roles	Behavior Iconic
Rule/role mind	Social	Cultural	Repressed	Concrete operations	Membership	Verbal
Formal-reflexive	Egoic Dissociated shadow	Verbal description	Repressed	Formal operations	Postconventional	Verbal
Vision-logic	Mind/body integration	Relationship Object suspended	Integrated	Dialectic/ integrative	Relativist/ universal	Transcended
Psychic	Deconstructed	Deconstructed Subject-object suspended	Self-other integration	Transverbal	Suspended	Suspended
Subtle	Archetypal/Suspend participating	Formless Preverbal	Activated bliss/ nonattachment	Suspended	Suspended	Suspended
Causal	Interpretations of experience are suspended Archetypal Overmind Universal self	Suspended/Seamless void	Suspended	Suspended	Suspended	Suspended

TABLE 4.2 Levels of Consciousness/Forms of Self and Hypothesized Relationships to Triune Brain Systems

	Form of Self/ Consciousness	Mechanism
Sensoriphysical	Limited self-differentiation and self-awareness as a separate entity (vertebrate ego)	Reptilian brain developed through behavioral intentionality
Emotional	The sense of self developed in contrast to the physical environment and social others (sensorimotor intelligence)	Emergence of paleomammalian brain and socioemotional dynamics
Representational mind	Mythic group membership identity; preconceptual and preoperational thought	Emergence of the frontal cortex and symbolic representation
Rule/role mind	Conformist "superego" self and concrete operational thought	Frontal/mental
Formal-reflexive	Individualistic formal operational ego dominant sense of self	Subordinates paleomammalian brain and automizes reptilian brain
Vision/logic	Integrated body and mind, intuitive thinking, self-actualized self	Frontal/mental suppresses/ dissociates paleomammalian and reptilian brains
Psychic	Culmination of vision logic in a pluralistic universalistic perspective that examines and deconstructs perceptual and cognitive activities	Integration of frontal brain with paleomammalian and reptilian brains
Subtle	Archetypal levels, collective unconscious and formless experience; the pseudonirvanic realm of illumination, transcendental insight, absorption, rapture, and bliss	Frontal brain operates within and controls paleomammalian and reptilian brains
Causal	The unmanifest realm or void, the transcendent ground of lower structures, manifested as consciousness without objects in awareness and a sense of the cosmic experience of the universal formless self (overmind)	Suspension of operations of frontal brain and activation of paleomammalian brain

that personal-level development first involves repression of the functions and drives of the reptilian and paleomammalian brain and that the completion of the personal levels in the vision-logic developments involves a reintegration of capabilities from these phylogenetically earlier systems. What is added in the suspension of epistemological assumptions is recognition of ordinary awareness as being based in a construction, an awareness which is realized through meditative experiences. This process is a central feature of Piaget's models of the development of consciousness embodied in the concept of reflective abstraction. Reflective abstraction is characteristic of each stage of epistemic development, involving the abstraction of elements from an earlier stage and their reflection onto a higher stage where they are restructured as content.

The meditative suspensions (habituated attention, emotional detachment, self-identity, conceptual structures) generally follow the sensorimotor through formal operations in the sequence of acquisition (attention to objects, emotional attachments, self, and cultural constructions). The initial suspension of the exclusive (ethnocentric) monocultural descriptions of the world leads to realization of cultural relativism. The psychic levels lead to the suspension of patterns of habituated perceptual habits and behaviors, followed by subtle level suspensions of emotional attachment and self-identity and the causal level suspension of conceptual structures. This appears to generally follow the sequences of acquisition. Cultural descriptions, a late epistemic acquisition, are suspended first, followed by a suspension of constructs in the order acquired earlier (perceptual structures, emotional attachments, self, mind).

Determination of whether the epistemological sequencing proposed here reflects an arbitrary order of epistemic suspensions or whether this reflects necessary and fixed sequences determined by neuroepistemic structures requires further study. First, there is a need to determine if the transpersonal experiences necessarily emerge in a fixed order. The differences between Wilber's (1980) account of hierarchical consciousness levels and other models of transpersonal consciousness (e.g., the Vedic psychology of Maharishi Mahesh Yogi [Alexander, Davies, et al. 1990]) suggest that transpersonal states of consciousness may not occur in fixed sequences but emerge in different orders based on the intentionality of the specific traditions.

POSSESSION STATES OF CONSCIOUSNESS

The commonalities in possession cross-culturally and the importance of the distinction of possession from other SoC is well established (Bourguignon 1976a&b; Winkelman 1986b, 1992). A classic cross-cultural review of the common patterns of possession phenomena was provided by Oesterreich ([1921] 1966) in his *Possession Demoniacal and Other among Primitive Races, in Antiquity, the Middle Ages, and Modern Times*. Possessed people generally undergo such a dramatic transformation that it appears that they have become other people, manifesting changes in behavior, voice, expressions, movements, physiognomy, or appearance, and the presentation of an alternate personality or identity. The continuity with similar possession phenomena in the modern

world is illustrated by Goodman (1988). Oesterreich's and Goodman's reviews illustrated nearly identical cross-cultural cases, suggesting a common psychophysiological basis for possession experiences. These biological dynamics have been explored by generations of psychiatrists who have attempted to relate possession to their diagnostic categories for mental illness. Attributing hysteria, dissociation, and other diagnoses to possession cases has been based on symptoms associated with these conditions, including psychomotor activity such as shivering and convulsions; loss of memory and self-orientation; dramatic changes in expressions and voice; glazed eyes and an internal focus of attention; psychosomatic ailments; anxiety and panic attacks; and excessive sleep and periods of unconsciousness (Bourguignon 1976a; Ward 1989a). Castillo (1997) however, warns of the dangers of attributing pathological evaluations to culturally valued or normative activities.

Winkelman's (1992) cross-cultural research found possession SoC was not associated with shamans, but with another type of shamanistic healer, the medium, who is found primarily in complex societies with two or more levels of political hierarchy above the local community. Cross-cultural research (Winkelman 1992) shows that the concept of the medium is a valid etic concept, corresponding to a type of magico-religious practitioner distinct from shamans. Mediums are frequently referred to as shamans, but mediums are empirically clustered in a group with different characteristics in formal quantitative analysis (cluster analysis).

The differences between shamans and mediums involve thematically related characteristics reflecting the socioeconomic conditions under which each type of shamanistic healer is found. The shamans were associated with animal spirits and hunting magic, reflecting their subsistence patterns, while mediums were involved in agricultural rituals. Mediums had lower social and economic status than shamans, while shamans had high social esteem derived from their informal political power. Mediums are predominantly women, generally of low social status, whereas shamans are predominantly men and of high social status. Shamans were also involved in malevolent activities designed to magically harm their enemies, which were absent among mediums.

These differences illustrate the importance of differentiating shamans and mediums, particularly the medium's experience of possession, in which a spirit takes over the person's behavior. Although both shamans and mediums engage in the deliberate alteration of consciousness followed by illness, involuntary dreams, or visions, mediums are more likely to continue to have experiences that occur beyond their control or intention. Although shamans' spirits could act outside of their direct control, shamans were generally thought to control the spirits, whereas the mediums are thought to act under compulsions from the spirit world. Indeed, the selection of the medium neophyte was generally based on the person suffering from an affliction involving possession by a spirit.

Nonetheless, although the initial altered SoC of the medium occurs spontaneously, the neophyte then engages in deliberate procedures (e.g., dancing, chanting, fasting, and ingestion of alcohol)[4] to alter consciousness. Once the medium is trained, the experiences generally no longer occur spontaneously, but only when the medium intends to enter into an altered SoC. Nonetheless,

mediums' professional practices still involve possession, with the medium being controlled by the possessing spirit. The medium is believed to lack control during the episode, often reporting amnesia for all that transpired during that time.

A Diversity of Possessions

The label of "possession" has been used to refer to a wide range of phenomena—ASC, trance, dissociation, hysteria, spirit domination, displacement of personality, obsession, mental illness, and a variety of other conditions. To facilitate research about the putative phenomena, Bourguignon (1976a&b) established the precedent of using the term "possession" in a more restricted way to distinguish it from other types of spirit relationships established during altered consciousness. Bourguignon (1976a, 8) defined *possession trances* as those involving "alterations or discontinuity in consciousness, awareness or personality or other aspects of psychological functioning" that are accounted for by possession, a belief that a "person is changed in some way through the presence in or on him of a spirit entity or power, other than his own personality, soul [or] self." Bourguignon has also defined possession trances in a stronger sense as cases "in which the altered state is explained as due to a takeover (possession) of the body by a spirit entity" (Bourguignon and Evascu 1977, 198).

The definition of *possession* proposed by Bourguignon (1976a&b) does not, however, represent all emic perceptions of the phenomena. While some uses of the term possession have negative and pathological implications, many cultural conceptions emphasize the desirability of the phenomenon. This is illustrated in Goodman's (1988, 2) definition of possession as a situation in which a "supplicant asks a being of the other, the alternate reality, who possesses no physical body of its own, to descend into his/her body for the duration of the ritual and to use it as it sees fit." This concept of possession as an invited phenomenon is elaborated by Asante (1984) as a transcendent state of consciousness. The African traditions emphasize a concept of possession that involves a perfect harmony of the person with the spirits and the universe. In possession "it is not the person who is being possessed, but the gods and goddesses. Therefore, the act of possession always starts as an act of volition on the part of the person, not on the part of the gods. The person possesses the 'gods' through searching in the proper mode and finding harmony" (Asante, 174–75).

Brazilian spiritists provide further differentiation of possession (Krippner 1987). "Grade One Possession" is "obsession," in which people feel under the control of an alien spirit but retain their basic sense of self and identity. This can be seen as corresponding to an obsessive-compulsive neurosis. "Grade Two Possession" involves cases interpreted as past-life personalities or splits within the individual's psyche. This can be viewed as a hysterical personality syndrome that results from the development of a negative alter-personality. "Grade Three Possession" involves the control of the individual via the influence of another human, as is attempted in the practice of sorcery or witchcraft. "Grade Four Possession" and "Grade Five Possession" involve cases in which

the individual is believed to be controlled by other spirits, who may inhabit their bodies.

Different spirit influences during possession illustrate that it involves a variety of relations that are flexible and negotiable, and not reducible to a single conceptual entity. Possession involves a wide range of psychodynamics, psychosocial conditions, and therapeutic mechanisms, as well as variant degrees of influence (e.g., influence, obsession, and domination). Even the normal and pathological models of possession subsume a range of phenomena.

Possession as Normative Communication Behavior

Shekar (1989) characterized possession enactments as an assumption of the sick role, which motivate socially significant others to provide the possessed person with personal, emotional, social, and material benefits. Explicating the communicational intent requires consideration of spirits' roles in the person's social world, their effects on behavior, and their cultural meanings. Such analyses reveal the role of possession in shifting responsibility from self to other, objectifying emotions in terms and referents that transcend the other, and placing the locus of responsibility in the broader social order. These communication idioms may function even for those not suffering pathological distress and, nonetheless, contribute to health, modulating relationships in both public and private life and providing a social support network.

The sociocultural explanations see possession as a phenomenon that people emulate because of repeated exposure to its normative manifestations across their development. Possession has adaptive functions, including political, theatrical, expressive, and therapeutic ones. Possession cults provide a basis for personal transformation of one's relationship to the world. Spirits can vary in gender, status, personality, and ethnicity and provide role flexibility, differences in forms of the "other" that one can emulate, internalize, and enact. Possession can alter relations between groups and provide benefits of group membership, particularly for women under conditions of patrilocal marital residence and class oppression. Kinship terms extended in cult membership provide primary relations in the context of separation from natal kin. The possessing spirits provide ties of kinship and a new frame of reference for the self. Possession provides a mechanism for the incorporation of various "others" to reformulate identity and to provide for other mechanisms of self-expression. Possession plays a role in managing problems of everyday life and in changing relationships between wives and husbands, enabling women to indirectly make demands and to achieve catharsis of emotions. Possession experiences can also provide identity changes that alter power relations and interpersonal hierarchies, a social resource for managing stress and exerting social power.

Possession as Pathology

The dominant Western medical perspective on possession is that it involves pathology, evidence of a psychological disorder. The specific diagnosis has generally

followed the vogue psychiatric trends—hysteria of the nineteenth century was replaced with diagnoses of neurosis and dissociation. A diagnosis currently in vogue for explaining possession is multiple personality disorder (MPD) or its more recent designation, dissociative identity disorder (DID). These conditions involve the development of separate personalities that exist dissociated from the ego. In the dissociative reaction, major aspects of psyche, emotions, and behaviors acquire autonomy from the ego and control the individual's intentions and behavior. When the alternate personality is dominant, the ego is unconscious and, subsequently, amnesic, generally being unaware of the periods of time controlled by the secondary identities. People in modern societies with DID have symptoms similar to those of schizophrenia and are often misdiagnosed as schizophrenic (Castillo 1997). But in many societies with a premodern orientation, DID is integrated into other syndromes, particularly possession by spirits.

The similarity of modern pathological states to shamanistic SoC has been noted (e.g., see Hultkrantz [1978]; Noll [1983]; Siikala [1978]; Silverman [1967]). In contrast, there is abundant evidence that shamans are not pathological from their own culture's point of view, nor from the perspective of descriptive clinical diagnostic criteria (Noll 1983); indeed, shamans have been characterized as exceptionally healthy individuals (Walsh 1990). It remains an open question, however, whether or not a psychological disorder is a key feature of the possession crises of mediums. Anthropologists have recognized the presence of symptomology readily labeled as reflecting psychological or neurological disturbances. Siikala (1978) characterized shamans as having a nervous condition, and Hultkrantz (1978) suggested hysteroid or hysterical traits and a heritable labile nervous constitution. However, both reject interpretations of mental disorder, pointing to evidence that shamans are among the best-adjusted people in their communities. There may, nonetheless, be a link between shamanistic SoC and psychiatric concepts of psychopathology.

Epilepsy and the Temporal Lobe Syndrome

The presumption of pathology in ASC conditions is often derived from the similarity of those conditions to characteristics of epilepsy. Epilepsy refers to a range of disinhibitions or electrical discharge patterns of any of the lobes of the cortex, most frequently the temporal lobe. Epilepsy is not a disease in and of itself; rather it is a generalized symptom of the failure of the brain to inhibit normal patterns of discharge and the synchronized spread of the discharge pattern to the point where it takes over all regions of the brain. Epileptic manifestations range from the generalized seizures involving both hemispheres and resulting in convulsions and the loss of consciousness (e.g., grand mal seizures) through intermediate forms to the partial seizures, generally involving only one hemisphere and not resulting in impairment of consciousness. Epileptic electrical discharges are characterized by the dominance of a slow-wave pattern in the EEG that reflects common synchronous entrainments across diverse areas of the brain.

Epilepsy may result from fevers, injury, or disease, or it may be produced by metabolic imbalances, nutritional deficiencies, endocrine disorders, and many other diseases or traumas to the central nervous system. While the majority of

the cases of epilepsy have no known organic causes, they are most prevalently associated with partial seizures focused in the temporal lobes of the limbic brain (Schachter 2006). The temporal lobe epileptic may experience fear, panic, and terror or experiences interpreted as ecstatic or religious. Neppe (1981, 1983) found temporal lobe phenomena to be associated with deja vu and subjective paranormal experiences. Some temporal lobe seizures consist primarily of subjective experiences of visual, auditory, tactile, or olfactory hallucinations; a distorted sense of time; or feelings of intense emotion, such as fear or ecstasy (Adams and Victor 1977). These episodes are occasionally followed by a decrease in awareness, motor automatisms, agitation, amnesia, and a need to sleep.

The Temporal Lobe Personality Studies[5] show consistent personality changes associated with the temporal lobe epilepsy syndrome. This provides a biological basis for a long-standing realization about the relationship of divine experiences and epilepsy. There is a distinct temporal lobe personality or "interictal personality" (Schachter 2006) and behavioral syndrome characterized by emotional deepening, preoccupation with philosophical and religious interests, hyposexuality, hypergraphia (automatic writing); an increased need for social affiliation; changes in the personality, including increased aggressiveness and religiosity and changes in sexual behavior; and a deepening of affective response. While such religious features may be associated with other disorders, the temporal lobe personality is notably absent of psychotic features. The specificity of this temporal lobe effect is also found in normal populations (see Schachter for review). There is a strong relationship between self-reported temporal lobe symptomology and a variety of mystical, paranormal, and religious experiences in nonclinical populations. Characteristics associated with the temporal lobe conditions such as tremors and epilepsy and paranormal experiences are used in many cultures for selecting shamanistic healers. These conditions are interpreted as signs of divine favor and selection for religious and healing roles because these conditions have adaptive value in the professional functions of shamanistic healers through "kindling," a long-lasting or permanently reduced threshold for neural excitability and greater susceptibility for entrance into ASCs because of previous seizure or excitation (Mandell 1980). This indicates that the incidence of possession should be directly related to conditions that provoke such trauma in the body.

Social and Physiological Correlates of Possession

The manifestation of possession is in part due to biology and part to social influences. The widespread manifestations of possession illustrate an underlying biological basis related to seizure phenomena. Winkelman (1986b, 1992) found that possession was associated with behavioral manifestations of tremors and convulsions that indicate organic causes, which can be provoked by poor diet, trauma, stress, and disease. The conditions associated with possession—spontaneous illness and seizures, amnesia, tremors and convulsions, and compulsive motor behavior involving excessive, violent, and uncontrolled movements—indicate that behaviors

and beliefs regarding possession may result from temporal lobe and epileptic syndromes. Cross-cultural findings (Winkelman 1986b, 1992) using Bourguignon and Evascu's (1977) more restrictive definition of possession (involving the "takeover" of the person by what is presumed to be an external spiritual entity) found that practitioners and societies with possession are associated with specific psychophysiological and social conditions.

Possession ASC and Societal Complexity

Societal differences in the incidence of possession ASC are revealed by cross-cultural analyses (Bourguignon and Evascu 1977) finding positive relationships of possession ASC with stratification, jurisdictional hierarchy, food production, and agriculture. Winkelman's (1986b, 1992) replication found that possession correlated positively with all social complexity variables from Murdock and Provost (1973), particularly, political integration, population density, and social stratification. Political integration, however, was the only variable that independently explained significant variance. These results refine previous hypotheses, indicating that development of possession beliefs is specifically associated with political integration. But these political conditions account for only half of the variation in the distribution of possession.

Physiological Correlates of Possession

A difference between shamanic flight and spirit possession is found in the association of the latter with amnesia. Although memory does occur in some situations of possession, amnesia does not occur with soul flight, and in the cross-cultural data, all cases of ASCs with amnesia are associated with possession (Winkelman 1986b, 1992). The amnesic aspects of possession have frequently been suggested as fraudulent. Oesterreich ([1921] 1966) rejected the fraud hypothesis for amnesia and possession on the basis that the extreme agitation, contortions, and dislocations could not be due to voluntary actions. The organic basis of amnesia and possession beliefs is revealed by differential involvement of the structures of the limbic system in various emotional manifestations (Wright 1989). The occurrence of amnesia with epilepsy and the empirical association of amnesia and possession suggest a relationship of the physiology to the beliefs. Cross-cultural research (Winkelman 1992) showed variables reflecting the temporal lobe syndrome—amnesia, spontaneous seizures, the rapid onset of illness, compulsive motor behavior (excessive, agitated, violent, or uncontrolled motor behavior apparently beyond the control of the practitioner), and the presence of tremors, or convulsions—were all positively and significantly correlated with possession. A temporal lobe measure based on compulsive motor behavior, tremors, and convulsions accounts for substantial variance in the societal incidences of possession beliefs, suggesting organic contributions to the incidence of possession ASC. The empirical association of possession with amnesia, convulsions, and spontaneous seizures supports the contention that temporal lobe conditions contribute to predispositions to an ASC interpreted as possession.

Combined Physiological and Social Predictors of Possession

Physiological measures (temporal lobe conditions) and social conditions (political integration) have independently significant correlations with possession (combined 75% of variance; Winkelman 1992b). The physiological measure (temporal lobe discharge) accounted for greater explained variance (58%) than did political integration (40%), suggesting that psychophysiological factors are central to the basis that motivates the development of beliefs in possession. The relationship of possession with social conditions provides insight into why such associations may occur; societal conditions and institutional practices can contribute to the production of temporal lobe symptoms. The incidence of temporal lobe discharge features in SoC is significantly predicted by social complexity variables, particularly, social stratification (Winkelman 1990). Possession traditions predominate in the lower classes of stratified societies, indicating that their deprived status and resultant experiences may contribute directly to the physiological conditions (Winkelman 1986b, 1992). The predominance of women in possession cults often corresponds to geographical areas in which women lack adequate nutrition can cause behavioral symptoms (e.g., tremors) found in the temporal lobe syndrome (Kehoe and Giletti 1981). Dietary deficiencies can contribute to changes in the central nervous system that result in emotional disturbances and seizures (Gussler 1973) and produce temporal lobe syndromes as a result of metabolic imbalances such as hypocalcemia and hypoglycemia (Forster and Booker 1975; Adams and Victor 1977). Thus, social conditions creating dietary deficiencies appear responsible for triggering physiological conditions that predispose individuals to seizures and the interpretations of their conditions as possession.

Active ASC Induction and Temporal Lobe Control

Possession conditions may also reflect the absence of cultural traditions that provide early direct training in altering consciousness. Training in deliberately altering consciousness appears to preclude the manifestation of temporal lobe discharge conditions that contribute to possession interpretations. Although the shamans often deliberately seek their initial alterations of consciousness, mediums typically have illness and seizures overwhelm them before seeking training. Shamans seek their positions at earlier ages (childhood or puberty) than mediums (late adolescence and early adulthood). This appears related to the differences in the manifestation of seizure phenomena and possession interpretations. Active induction of altered SoC may prevent involuntary induction of the physiologically triggered states by developing conscious or ritual control over temporal lobe discharges. Shamans are not possessed, nor do they suffer from seizures and amnesia, supporting the hypothesis that deliberate involvement in altering consciousness may preclude such conditions.

Drug-Induced ASCs and Temporal Lobe Discharges

The relationship of drug-induced ASCs to temporal lobe symptoms was examined at both the level of the individual practitioners and at the societal level (Winkelman

1990, 1992). Among shamanistic healers with temporal lobe discharge symptoms or drug-induced ASCs, the use of hallucinogens has a strong negative correlation with temporal lobe discharge symptoms. A similar relationship is found at the societal level, with use of hallucinogens significantly and negatively correlated with temporal lobe discharges. These findings suggest that when societies use hallucinogens in their institutionalized ASC-induction procedures, this usage tends to preclude seizure disorders associated with their practitioners' ASC. This active versus passive approach may be responsible for the negative relationship of drug-induced ASC and seizures in that active ASC induction may prevent involuntary ASC and possession experiences. This prevention of seizure-induced ASC may be achieved by developing conscious or ritual control or release of these psychophysiological discharges through drug action.

Possession and Dissociative Identity Disorders

These characterizations of possession as a dissociative disorder—where a split-off part of the personality temporarily controls the person—seems compelling but may still be questionable. Cardeña and Gleaves (2003) proposed two major aspects to dissociation: an experiential detachment of self from the environment; and a compartmentalization of psychological processes that may involve a lack of integration of self, memories, bodily sensations, emotions, agency, and identity. Dissociative disorders in general resemble possession in that they typically involve a loss of consciousness or some loss of integration of perception, motor function, memory, cognition, and sense of personal identity (Castillo 1997). While dissociative amnesia is characterized by the inability to recall extensive amounts of information, when amnesia is associated with possession, it is amnesia for what happened during the possession ASC episode, not a general amnesia for what has happened in the immediate past. Dissociative fugue states involve a person acquiring a new identity or persona without awareness of past identity and forgetting the new identity when they return to the previous identity. The long time frame of the fugue state makes it an inappropriate diagnosis for possession cases, since the medium returns to normal social identity following the possession episode. The dissociative trance disorder (DTD) involves a possession trance interpreted as involving the replacement of ordinary personal identity by an entity. Castillo considered DTD to be an appropriate diagnosis only in conditions in which the possession trance is not part of the culture's religious practice or healing rituals and when it causes significant distress and social impairment, particularly in important areas such as occupational functioning. Castillo (1997) considered this distinction necessary because of cultural differences in responses to dissociative disorders.

Possession and Dissociative Identity Disorders as an Innate Capacity

Possession and DID (or MPD) involve similar features in which two or more distinct personalities or identities have different periods of control over individual experiences and behavior. But Goodman (1988) illustrated why DID and

possession are not role-playing, faking, acting, or self-hypnosis, but instead, psychological functions related to the neurophysiology of ASC. Although they involve similar psychophysiological processes, there are also important differences between possession and DID in the cultural perceptions of the phenomena. DID experiences are not interpreted in religious terms, and DID patients are generally ignorant of both the processes and occurrences (Krippner 1987). Yet most DID cases have an onset between the ages of 16 and 25, the same age range during which mediums and possession phenomena emerge cross-culturally (Winkelman 1992).

Goodman suggests that behavioral similarities between possession and DID indicate that they are two different manifestations of the same human capacity. Cultural differences in interpretation of the experiences and social responses to the person produce different consequences for these dissociative experiences. In cultures where possession is accepted, dissociation can provide relief from distress. In modern cultures where such spirit possession is not normative, the dissociative experiences can increase distress. Major differences involve the ritual control exercised in possession cults, where cultural interpretations play an important role. Western cultures produce greater difficulties for the patient by treating the incidents as evidence of pathology, which compounds the patient's negative experiences and limits therapeutic success, in contrast to those cultures where the possession is accepted (see Seligman and Kirmayer 2008).

Numerous studies have shown an association between a dissociative identity disorder diagnosis and an antecedent history of childhood trauma, usually multiple, sustained forms of maltreatment beginning in early childhood. Platt reviewed the evidence indicating that dissociative states involve distinct neural networks that are triggered by severe childhood trauma. The core of self and identity is mediated through interpersonal relations developed in the first year of life and through neural connections mediated primarily by the right hemisphere and its orbital prefrontal areas. These right hemisphere areas are responsible for self-regulatory systems involved in maintaining a unified sense of self. These systems are disrupted by stressful parental relationships that induce autonomic hyperarousal, which, in turn, disrupts the right-hemisphere contributions to the integration of consciousness. These dissociative reactions can be adaptive, resulting in creation of a separate identity and stream of consciousness that enables the person to continue to function by dissociating from the stress they experienced.

Seligman and Kirmayer (2008) reviewed research on dissociation in normal populations, where its similarities with pathological forms include an intense focus of attention, isolation from the external environment, and absorption, particularly with internally generated thoughts and images such as daydreams. A dominant hypothesis is that dissociation evolved as a mechanism to block awareness and memories in order to escape the intolerable stress of interpersonal situations, for example, protecting one's self from extreme emotional stimulation and associated autonomic arousal and stress that comes from an attack or betrayal. The ability of traumatic stress to block consolidation of conscious narrative memories provides an explanation based on evolutionary adaptations.

Distancing of self and identity that produces a sense of unreality provides emotional numbing mechanisms that can inhibit the flight-or-fight response, which in turn encourages a search for more relevant survival strategies. The detachment encourages the hidden observer mode, where the depersonalization allows the ability to consider circumstances more objectively rather than being driven by emotional fears. In order to seek solutions to pressing problems, certain information is compartmentalized, kept out of consciousness, so that adaptive responses may be made.

Seligman and Kirmayer showed how we can reconcile the adaptive paradigm of dissociation with the obvious nonadaptive and pathological dimensions by examining how the social context interacts with the psychophysiological bases. Dissociation following stress does reduce physiological arousal. Dissociation involves a regulation of attentional mechanisms that allow a selective suppression of perceptions and memories, inhibiting the normal integration of cognitive processes and experience. DID undoubtedly interrupts the normal integration of different aspects of the self.

In shamanistic rituals these traumatic dissociative experiences are addressed in processes that allow the emergence of an integrated sense of self linked to "others" who provide a variety of attachment functions for self-integration. Sar and Ozturk (2007) propose that dissociation involves a detachment of the psychological self from the sociological self. In this dissociation, the sociological self becomes amplified. This sociological self, which functions in the interface between the individual and society, undergoes an accelerated development as a consequence of trauma. This development allows for a protective dissociation of the psychological self, a reestablishment of connections between the inner and outer world through the sociological self.

Human evolution resulted in the ability to subordinate basic needs to second-order desires, those acquired through socialization. This ability allows one to consciously choose to identify with—or not—the more basic desires that we have as biological beings. Socialization can also lead to disidentification and pathologicalization and demonization of aspects of our own self. This engages our human capacity for higher order representation of the self in order to be able to disidentify with the lower order, where the "I" of self does not identify with the "my" of the body. This response is a cultural imposition on the weak biological/innate determinism of human development. Social roles of possession exemplify this "I" control of biological potentials, where higher order representations embodied in the personalities of possession spirits redirect identity and behavior to adapt to varying social circumstances. Possession must be seen in light of an extreme tendency to identify with idealized social norms rather than the embodied self (also see Chapter 6 on hypnosis as social acquiescence).

Dissociation as Integration? Inner Spirit Helpers

Since dissociation is by definition "a lack of integration of psychological processes that normally should be integrated" (Cardeña and Gleaves 2003, 474), it would seem that the dissociative interpretation of possession directly contradicts the

fundamental thesis of the *integrative* mode of consciousness. Without question, possession involves some forms of dissociation and separation, rather than integration, as manifested for example in amnesia. But what do the symptoms or processes of possession tell us about the functioning of the individual? These processes of dissociation have been viewed as defense mechanisms to protect the self from emotional trauma, to allow the integrated functioning of the emotional self in the face of self-destroying trauma.

Allison and Schwarz (1999) developed an understanding of the DID person in terms of the operation of what Allison called an "inner self helper," a source of unconscious inner guidance. This personality structure that Allison considered unique to the MPD patient was aware of all of the multiple identities and had a greater consciousness and control than did the ego. This inner helper also could help and strengthen the ego in its struggles with the other personalities. The inner-self helper (ISH) provides a psychological space for control, stability, clarity, and self-understanding. Comstock (1991, 168) emphasized the ISH's ability to operate as an organizing force for the person and characterized it as "some unifying or central organizing force within a MPD patient" that concretizes the normal integrative potentials of the human personality for the patient. Therapists working with MPD patients characterize the ISH as the real self, the higher self, the true self, the observing ego, and other terms and descriptors that have direct relations to the self concepts of Buddhism. These mystical-like interpretations are echoed by Allison and Schwarz, who characterized the processes of therapeutic resolution of the dissociated aspects of the ego as an integration or psychological fusion or merger of the personalities.

Brain Conditions of Possession and Dissociation

The characteristics of the brain under possession SoC may be inferred in part from the similarities of the possession episodes with other psychological conditions. This information alone is not sufficient, however, as it assumes that possession states are synonymous with pathological states. The perspective developed here suggests a variety of normal and abnormal conditions involving different adaptations to the potentials of a common underlying biological dynamic. This is seen in the contrast of outcomes for biomedical and cult treatment of possession disorders like DID. Different forms of possession also differ dramatically, being distinctly different SoC, and, in some cases, may not involve the IMC.

Nonetheless, there is reason to expect that possession episodes in general involve the slow brain wave pattern of the IMC. The general dynamics of epilepsy-like disorders are the highly synchronized and coherent brain wave discharges that dominate the brain and consciousness (Forster and Booker 1975). In addition to the slow-wave effects of dancing, drumming, singing, and music discussed above under shamanic SoC, there is direct evidence that possession traditions engage the IMC in their practices. Links of shamanistic practices to possession are illustrated by their induction in ritual hot and cold water baths in India (Mani, Gopalakrishnan, et al. 1968; Mani, Mani, et al. 1972; Subrahmanyam 1972).

Repetitive alteration of hot and cold water on the head of participants resulted in temporal and generalized seizures in individuals without evidence of neurological disorder. In a study of Balinese trance possession performers, Oohashi et al. (2002) found changes from baseline EEG measures that included an "enhanced power in theta and alpha frequency bands during trance" (Oohashi et al. 2002, 435). They further noted that these enhanced theta and alpha patterns were distinct from those of epilepsy and other mental disorders and persisted for some time after the ritual activity. In a study in normal populations, Giesbrecht, Jongen, Smulders, and Merckelback (2006) found that there was a direct association between dissociative experiences and heightened levels and power in the slow wave range, specifically, theta.

The physiological basis for the association between the IMC and pathological symptomology is illustrated in Mandell's (1980) model of transcendent states. The physiological changes that result from CNS disinhibitions associated with epilepsy and other temporal lobe discharge phenomena, as well as from other CNS conditions associated with trauma, toxicity, and seizure, involve the same basic pattern of brain changes. The relationship to psychopathological conditions is based in the increased facility for altering consciousness that psychopathological conditions produce and in the physiological structures and processes common to both. Bear and Fedio (1977) proposed that the emotional features associated with the temporal lobe syndrome reflect a hyperconnectivity between the sensory and limbic lobes, a basic feature of the IMC.

The religious experiences associated with epilepsy-related conditions also share features with mystical experiences (Schachter 2006), including the inability to be expressed and described, characterized as ineffable in the mystical literature; noesis, a sense of illumination from connection with some deep layer of truth to the universe; a transiency and passivity, occurring outside of the will and for a brief period of time; and *unio mystica*, a unification of opposites, time and space. Other mystical features associated with the temporal lobe personality syndrome include depersonalization and derealization, as well as intense positive emotions and ecstasy. These associations suggest that the possession SoC are triggered by epilepsy-related discharges providing access to the innate structures and SoC that are at the focus of the mystical traditions.

FUNCTIONAL ASPECTS OF INTEGRATIVE CONSCIOUSNESS

Psychophysiological dynamics of diverse SoC engage the common human biological potentials that I have called the integrative mode of consciousness. Ritual activities produce a state of parasympathetic dominance in which the frontal cortex is synchronized by slow-wave patterns originating in lower centers of the brain. These patterns are driven by several mechanisms that have effects manifested in theta and alpha EEG, reflecting an integration of information transfer across the neuraxis and access to the unconscious mental activities that provide the basis for higher cognitive processes.

The triune brain model of MacLean (1973, 1990, 1993) provides a framework for explicating the functional effects of the modifications of consciousness involved in the IMC. A central feature involves the evocation of activities of the paleomammalian brain or limbic system, the focus of the production of theta and alpha waves. The structures of this "emotional brain" play a vital role in subjective perception, using feelings for guiding behavior. Limbic system activities are responsible for an integrated sense of self, which provides a locus for memory and self-realization, generating the feelings of conviction and a sense of authenticity that are used to substantiate mental ideas, concepts, beliefs, and theories (MacLean 1990). The origins of the synchronous theta in the hippocampal-septal area must have the effects of stimulation of these personal capacities. The paleomammalian brain mediates patterns of social signaling that promote a sense of community and provide for cooperation—physically, socially, and mentally—in ways that enhance self-security, social relations, and bonding and attachment. This reflects the integration of the interconnected heritages of the instinctual responses of the reptilian brain, the autonomic emotional states of the paleomammalian brain, and the cognitive processes of the neomammalian brain. Behavior, emotions, and reason are synthesized in the integration of these three functional systems of the brain.

The paleomammalian brain acts on information provided through emotional mentation and its processes related to fundamental aspects of the self. These communicative behaviors use facial expressions, vocalizations, and gestures that provide information about the mind and evoke similar experiences in other individuals, creating a common or collective awareness that affects others. The primary functions of the paleomammalian brain involve modulation of affect to guide behavior and transforming emotional mentation into physiological effects. Emotional mentation can provoke profound physiological changes when the organism is confronted with situations that threaten or affront fundamental aspects of self, survival, and interpersonal attachments.

The paleomammalian brain's functions are central to concerns with emotions, self, social relations and illness. The relationship of innate drives and needs, physical and social influences, and the representational systems of the brain constitutes the matrix for many different kinds of health problems—chronic anxiety and fears, behavioral disorders, conflicts, excessive emotionality or desires, obsessions and compulsions, dissociations, repression, and so forth. The ritual processes that integrate different sources of information and that reassess their significance for the organism provide a basis for shamanistic healing.

Operation on the structures of consciousness is another characteristic of integrative forms of consciousness exemplified in meditation. This provides great variability in the options available in physical and mental system activations. The autonomic nervous system may show activation or deactivation of either subsystem; somatic and skeletal muscles may be inactive or highly active; brain wave patterns may assume a number of parameters (but particularly in alpha and theta ranges); attention and awareness may range from omnisentience to total void; aspects of conscious and unconscious identity may be manifested or repressed; programming and learning may be accelerated; and different brain systems may

be activated or deactivated. Integrative forms of consciousness increasingly subjugate the organism's experiences and functioning to conscious goal-oriented control.

Consciousness is manipulated in shamanistic practices to produce psychodynamic integration through the elicitation of functions derived from components of waking and dreaming modes of consciousness and through the use of ritual to control consciousness. Shamanic states of consciousness constitute conditions akin to a "waking dream," derived from coactivation of processes normally associated only with the dream mode (e.g., vivid internal imagery) or waking mode (e.g., ego functions, voluntary focus of attention). These potentials are further developed in contemplative traditions in enhanced understanding of the nature of human consciousness and its processes. This knowledge and awareness provide an enhanced ability to selectively and deliberately access a greater range of functions of consciousness as needed.

In possession, the structures of consciousness become further dissociated—and also integrated. The concept of dissociation would seem to falsify the concept of the *integrative* mode of consciousness. Yet dissociation can also be functional in enabling the person to function effectively within given social relations. Possession separates and compartmentalizes consciousness to manage emotional trauma and incorporates and integrates others' emotions and self-qualities.

CONCLUSIONS

The ontological and functional bases of shamanism and other shamanistic healers lies in the psychophysiological potentials provided by a particular pattern of biologically based organismic operation, the integrative mode of consciousness (IMC). The pattern of parasympathetic dominance, in which the frontal cortex is synchronized by slow-wave patterns that originate in the limbic system and related lower brain projections into the frontal parts of the brain, creates an interaction, coordination, and increased coherence of the potentials of many parts of the brain, particularly integrating lower brain processes into the frontal cortex. The diverse circumstances and procedures that evoke this condition indicate that it is a natural state of the human organism, a mode of consciousness. The independent discoveries of access to this IMC and its potentials have given rise to universal shamanistic practices. Potentials of the IMC are integrated into cultural institutions associated with shamans, mediumship, and other shamanistic healing practices because they meet human needs.

The differences in the SoC of the various contemplative and shamanistic traditions may call into question the idea of a single functional mode of consciousness underlying all SoC discussed here. Experientially distinct conditions that have distinct psychobiological characteristics and *functionally* different features may also qualify as separate modes of consciousness. If so, then we would need to propose a modification to the hypothesis of a generic IMC, the existence of several distinctive modes of altered consciousness within the shamanistic traditions. However, the hypothesis here is that they all share similarities related to the

selective adaptive integration of consciousness that facilitates a variety of forms of healing. Testing this model of the IMC requires brain research that is integrated with experiential reports on a variety of meditative and shamanistic traditions.

NOTES

1. For sources see Leukel (1972); Mougin et al. (1987); Rahkila et al. (1987); Sforzo (1989); and Thoren et al. (1990); also see Chapter 5 on social-opioid effects and Chapter 6 on the effects of long-distance running. The endorphins released by ritual activities that are found in blood measurements are peptides, which are not thought to cross into the brain and affect central activation (personal communication Arne Dietrich). If the peripheral activation of opioids does not cross over into the central opioid systems in the brain, it leaves to science the challenge of explaining why these opioid-releasing activities are central to shamanic ritual. This is likely through their direct or indirect effects on other neurotransmitter systems.

2. Many of the sources relied on in the first edition have been eliminated because they were outdated. Aghajanian and Marek (1999); Nichols (2004); Nichols and Chemel (2006); and Passie et al. (2008) were primary resources consulted for this update. See Winkelman (1996, 1997b, 2001a, 2007a) for original sources.

3. The 5-HT3 receptors in the peripheral nervous system at the autonomic nervous system nerve endings release acetylcholine and norepinephrine from the parasympathetic and sympathetic nerve endings, respectively, and may also facilitate the release of dopamine (Kruk and Pycock 1991). They have a role in the regulation of analgesia, anxiety, and schizophrenic symptoms, but they do not appear to be involved in the mediation of the visual effects of LSD (Glennon 1990).

4. Although alcohol seems to produce a different response than other shamanistic substances, it also induces a slowing of the brain wave pattern and a state of parasympathetic dominance. The most consistent effect of alcohol on the EEG is a slowing of the alpha frequencies and the appearance of slow-wave spindles of theta and delta as a reflection of ethanol action on the amygdala and the hippocampus (Okamoto 1978). Chrusciel (1982) noted that a general effect of alcohol is an improvement in the synchronization of the cortical discharges, a decrease in beta EEG, and an increase in the alpha and theta waves. The effects of alcohol are mediated at least in part by an action on central opiate (endorphin) receptors (Chrusciel 1982).

5. See Bear (1979a); Bear and Fedio (1977); Bear, Levin, et al. (1982); Bear, Schenk, and Benson (1981); Geschwind (1979); Geschwind et al. (1980); Ramachandran and Blake (1998); Sachdev and Waxman (1981); Schenk and Bear (1981); and Waxman and Geschwind (1974).

5 Shamanistic Therapies

CHAPTER OVERVIEW

This chapter addresses the principal physiological processes that underlie the therapeutic bases for universal aspects of shamanistic healing—the use of a variety of procedures to alter consciousness to enter into interaction with a symbolically constituted spirit world in community rituals. The universal distribution of shamanistic treatments using these three features—special SoC, spirit beliefs, and community rituals—derives from manipulations affecting the biological potentials. The healing effects derived from the potentials of the IMC are exemplified in shamanistic techniques such as dance and music therapy and the use of sacred plant medicines. Perhaps the most significant of shamanistic healing derives from the ability of ritual to manage the general adaptation syndrome and its stress response.

Shamanistic healing practices also share common therapeutic approaches in the use of spirit beliefs as representations that provide psychosocial, psychocognitive, emotional, and projective mechanisms. Spirits produce symbolic manipulations of psychosocial relations and psychophysiological dynamics, especially psychosomatic and psychoneuroimmunological responses. Spirit beliefs play fundamental roles as cognitive models of the self and its psychosocial system, providing models that are used in rituals to restructure psychodynamics, self, and social relations. Neuropeptides and neuroreceptors function as an information network that links body and mind through emotions. The opioids and emotions serve as an intercommunication system in which opioid release stimulates emotional experience and emotional experiences stimulate opioid release. Spirit manipulation and the mind-body interface play a central role in the management of emotional states, particularly anxiety, fear, and attachment. A biopsychosocial dynamic—better characterized as psychophysiological symbolism—produces symbolically induced biological changes by eliciting endogenous healing responses and other recuperative potentials. Socialization links symbols and physiological processes, providing a mechanism for ritual therapies to manipulate physiological processes through their relationships with symbols that were

established through socialization; this relationship enables them to entrain physiological processes and to produce affective responses. A basic mechanism in shamanistic healing involves symbolic healing, particularly the use of natural metaphors that represent intrapsychic dynamics and provide a means of producing psychosocial and emotional integration.

The community ritual dynamics of shamanic healing also elicit endogenous healing responses. The symbolic and ritual aspects of shamanistic healing practices provide therapeutic mechanisms that elicit the opioid systems and produce psychological and sociophysiological effects related to attachment and bonding. A neurological basis for ritual structure is illustrated by the cross-cultural similarities in the characteristics of ritual and their homologies with obsessive-compulsive disorder. This illustrates that one basis for shamanistic healing lies in manipulation of the processes of the R-complex (reptilian brain) and the paleomammalian brain.

INTRODUCTION: BASES FOR SHAMANISTIC THERAPIES

The ability of shamanistic healing practices to provide therapeutic relief is apparent from ethnographic research because the users often obtain symptomatic relief. The healing functions engaged by altering consciousness represent important human potentials. Noting that shamans are individuals of exceptional mental health, Walsh (1990) proposed that shamans were the first to engage in the therapeutic transformation of emotions, particularly, the reduction of fear and anger and the development of love, joy, and compassion.

Shamanistic healing involves a number of healing modalities which are generic to religious healing. Shamanistic healing represents the most primordial form of religious healing, seeking the restoration of well-being through ritual and symbolic interactions within what is understood as the spiritual world. The worldwide presence of religious elements in healing attests to their special role in promoting well-being, something intrinsic to human nature. The ubiquitous association of religion with healing practices has a functional basis in religion's ability to evoke physiological responses. Religion provides fundamental assumptions, values, world views, and meanings. This evaluative system produces psychophysiological manipulations through the implications of meanings and attachments for well-being. In manipulating psychological and social life and cognitive structures and beliefs, ritual practices can trigger physiological responses and emotional reactions, providing powerful mechanisms for healing.

The therapeutic procedures of shamanistic healers reflect the universal physiological, psychological and symbolic dynamics of the healing encounter. Shamanistic healing engages universal principles of healer-patient transference that facilitate a cure through constructing the interpersonal relations in which social expectations and attachments produce change. Healing involves the intercession of a socially dominant specialist (healer) who provides relief for the sufferer through ritually structured contacts. These interactions involve the

identification of the nature of the malady (diagnosis) and treatment within a culturally shared framework of meaning and explanation that connects the illness experiences of the patient to broader systems of meaning within which the malady and procedures for its resolution are understood. These interactions can reduce stress and anxiety by a number of processes, including instilling hope and expectations of improvements in health.

Spiritual assumptions have special functions in human psychology, engaging fundamental aspects of the psyche. The ritual and mythological interactions of these personal spiritual identities such as souls with external spiritual entities or powers help people address perennial human problems, meeting needs for meaning and enhancing self-esteem and a sense of control. Shamanistic healing engages the interaction of symbolic and physiological levels through rituals that elicit previous associations that instill confidence and hope in ways that counteract anxiety and its physiological effects. The multiple mechanisms include the "biology of hope"—attitude-induced immunological system responses through positive expectations by patient and group; the restructuring of social relations and attachments contributing to the resolution of the sick role; and psychodramatical enactments, (re)conditioning experiences or desensitizing stressful events through catharsis.

Valle and Prince (1989) proposed that religion elicits self-healing mechanisms through giving people a sense of belongingness that engages feelings of euphoria and omnipotence produced by the body's own morphine-like substances, the endorphins. Religious healing involves a dynamic function of the psyche that broadens the individual's repertoire of coping abilities. Valle and Prince characterized religious healing experiences in terms of activations of the non-dominant-hemisphere processes that elicit endogenous healing mechanisms by experiences that reduce uncertainty, anxiety, and depression.

Eliade's (1964) characterization of the shaman emphasized engaging in ecstatic states to interact with the spirit world on behalf of the community. These three factors—altered consciousness, spirit relations, and community rituals—are used as the structure for examining the mutually reinforcing effects that shamanic therapies have in transforming consciousness and emotions to enhance health and well-being.

ALTERING CONSCIOUSNESS AS A BASIS FOR SHAMANISTIC THERAPIES

The universal distribution of shamanistic healing practices based in the alteration of consciousness reflects their functional relationships to the abilities of healing and divination (see Winkelman [1986b, 1992]; Winkelman and Winkelman [1990]). Religious practitioners who alter consciousness as a part of their training have professional roles that engage in divination (diagnosis) and healing. This cultural universal of religion—alteration of consciousness in community healing practices—is a ritual adaptation of human psychobiological potentials to psychosocial and therapeutic needs. This adaptation is so fundamental to human nature

that even societies that are disintegrating (e.g., the Siriono) and lack formal shamanistic healers still carried out collective ceremonial activities involving healing (Winkelman 1990, 1992).

The biological basis of the IMC allowed shamanistic healing practices to emerge spontaneously from a wide variety of circumstances that alter consciousness and provide both general and specific adaptive consequences. Understanding the therapeutic effects derived from altering consciousness requires recognition that a variety of drug and nondrug induction procedures engage the same endogenous physiological processes and induce common physiological changes that produce healing responses. These general physiological dynamics of the IMC—parasympathetic dominance, interhemispheric synchronization, and limbic-frontal integration—have inherent therapeutic effects. The effects reflect activation of aspects of the paleomammalian brain, specifically the hippocampal-septal region, the hypothalamus, and related areas that regulate emotions, self, and other perceptions, and the balance between the sympathetic and parasympathetic divisions of the autonomic nervous system (ANS).

The IMC as a Healing Modality

A paradigmatic aspect of shamanistic healing involves the cumulative effects of induction procedures that result in the eventual exhaustion and reduction of sympathetic nervous system (SNS) activity and enhancement of a parasympathetic nervous system (PNS) response. The SNS to PNS shift involves conditions that provide inherently therapeutic effects. These features were institutionalized in practices that produce this ANS shift to elicit a variety of endogenous healing processes. These facilitate healing by accessing unconscious information and psychological dynamics; inducing psychosomatic effects through hypnotic susceptibility and placebo effects; and evoking a general relaxation response by the body, a regenerative and recuperative state of physical relaxation that facilitates self-regulation of physiological processes.

Accessing the Unconscious

A general adaptive aspect of the IMC involves enhanced access to normally unconscious information through integration of different brain systems, which promotes behavioral, emotional, and cognitive integration. This information integration is exemplified in visions, where the symbolic image system underlying the dream mode of consciousness is stimulated to provide dramatic visual displays of information from unconscious processes, integrating the body-level awareness of the prelinguistic mind into consciousness. These engagements with our own unconscious potentials enable normally inaccessible information to be used in directing adaptations to the environment and re-modulation of self dynamics. Shamanic SoCs permit regulation of typically unconscious processes and resolution of conflicts by presenting to the conscious mind understandings of the unconscious mind. Although the unconscious mind is typically repressed by the dominant hemisphere, its dynamics, nonetheless, have effects on behavior,

emotions, and physiology. Characteristics associated with the alteration of consciousness such as dishabituation and increased suggestibility produce therapeutic effects derived from creating a labile system that is manipulated by the healer. Alterations of consciousness enhance emotions in ways that facilitate healing through expression of repressed aspects of the self. This is achieved through activities that fatigue, and, consequently, reduce the critical screening processes of the left hemisphere, releasing repression of the right hemisphere. This expression of the normally repressed side of the brain enables enhanced ritual reprogramming via the chants, songs, myths, psychodrama, and direct suggestion provided by the shaman.

Typifying the shamanic engagement with the unconscious is a special form of visual symbolism utilizing the same capacities involved in dreaming. A central feature of human cognitive evolution, the development of specialized innate modules, produced a fragmentation of consciousness, a dissociation of the conscious stream of awareness from our automatized cognitive systems. The IMC engaged by shamanistic practices provides mechanisms for linking these outputs into visual symbolic systems exemplified in visions and hypnotic states that allow for the transfer of information into consciousness.

Hypnotic Susceptibility and Placebo Effects

McClenon (2002) argued that shamanic healing capacities derived from an adaptive heritable quality that is manifested in hypnotic susceptibility and its interaction with suggestibility. Hypnotizability involves focused attention, reduced external awareness, and critical thought processes that facilitate a focus on internal images and expectations. Hypnotizability and increased suggestibility provide healing mechanisms through facilitating placebo effects and enhanced innovation derived from access to the unconscious mind. The thin cognitive boundaries characteristic of highly hypnotizable people give them greater access to their personal unconscious and the communication of this information to the conscious mind, providing survival advantages by facilitating the development of creative strategies.

McClenon contended that humans acquired the hypnotic tendency through the association of hypnosis with placebo effects and their ability to facilitate recovery from disease. Suggestibility enhances symbolically induced psychophysiological responses that facilitate healing. Shamanic practices appear successful in treating the same kinds of conditions for which hypnosis has been shown to have significant clinical effects: somatization, mild psychiatric disorders, simple gynecological conditions, gastrointestinal and respiratory disorders, self-limiting diseases, chronic pain, neurotic and hysterical conditions, and interpersonal, psychosocial, and cultural problems (see McClenon for review). This suggests that the origin of shamanic healing practices derived in part from adaptive effects associated with susceptibility to suggestibility and positive expectations, in essence, a placebo effect related to hypnotic susceptibility; this is further explored in Chapter 6 in considerations of the evolutionary origins of shamanism.

Placebo effects have consequences that parallel those of pharmacologically active substances, including side effects (Benedetti and Amanzio 1997). Effects of placebos have been predominately conceptualized in terms of their ability to

reduce pain, but also reduce symptoms of a variety of conditions. These include conditions with major psychosomatic components (asthma, hay fever, coughing, ulcers), mental health problems (anxiety, depression, and schizophrenia), and physical conditions such as cardiovascular problems (hypertension and angina pectoris), multiple sclerosis, Parkinson's disease, and rheumatoid and degenerative arthritis (Benedetti and Amanzio 1997). Benedetti (2008) reviewed research indicating that placebos exert effects on a number of biological mechanisms, including activation of endogenous opioids; release of dopamine in striatum and effects on subthalamic nucleus; conditioning of immune mediators; and reducing excitability in the limbic regions.

The Relaxation Response and Healing

The relaxation response has preventive and therapeutic value in diseases characterized by increased sympathetic nervous system activity, particularly in lowering of blood pressure, treatment of heart disease, and reduction of premature ventricular contractions (Benson, Kotch, et al. 1979). Therapeutic effects also can be achieved by rapid collapse into a parasympathetic dominant state that can lead to erasure of previously conditioned responses, to changes of beliefs, to loss of memories, and to increased suggestibility (Sargant 1974). Induction of a parasympathetic collapse from stress and emotional excitement can abolish conditioned reflexes and can produce an ultraparadoxical phase in which the conditioned behavior and responses are reversed. This relaxation response effect is a basic shamanistic healing mechanism as well as a generic form of religious healing. These endogenous healing responses are reinforced by a variety of shamanic activities that elicit biopsychosocial mechanisms that address the effects of stress and its physiological consequences in the general adaptation syndrome.

Stress and Its Psychophysiological Dynamics

The association of religious coping with more favorable outcomes suggests that people find it easier to deal with stress within a religious framework based on benevolent principles, particularly when people's coping responses have reached the limits of their personal capabilities and social resources (Spilka and McIntosh 1997, 52). This reflects the ability of religious healing to provide a unified psychosociobiological process in which personal significance (meaningfulness) plays an important role in the management of stress.

The central aspect of the coping response involves a "search for significance" which links religious healing to meaning-centered concerns and humans' need to understand problems of existence (Pargament and Park 1997). Although religion has often been characterized as a coping response involving avoidance, it is better understood as a structure providing ways to evaluate and to respond to situations that fall outside of conventional understandings. Religions may provide a passive or avoidant coping strategy, but many instill a sense of control and mastery.

This generic effect of religious healing involves the effects of the mind on the body. These are found not only in extraordinary phenomena such as hex deaths

and spontaneous cures; ordinary functions of consciousness have downward effects on the physical levels of the organism, as illustrated in the phenomena of stress and the general adaptation syndrome. Stress is a physiological response based in how the organism perceives itself and the situation and responds in terms of those assessments. Stress involves both psychological and biological dimensions and also complex emotional, cognitive, and behavioral responses to threats that have important implications for their sense of self or that challenge central assumptions that people make about their world. Stress results from perceived inability to effectively adapt to anticipated circumstances, producing a negative affective response and the resultant anxiety or fear experienced in threats to one's desires, goals, and well-being. Stress occurs when modes of adaptation are not adequate, when one's assessment of external demands exceeds one's perceived abilities to meet them.

This inadequacy makes the causation of stress symbolic and related to the interaction between the situation and the individual's perceived ability to meet it. Both the significance and symbolic meaning of the situation and the individual's repertoire of coping behaviors are crucial elements in the situation's effects on the individual. For humans, stress is predominantly social, occurring when the person experiences an inability to deal effectively with the demands of a perceived reality. This provokes a well-recognized set of physiological responses.

The General Adaptation Syndrome

Selye (1936, 1976) discovered the general systemic reaction to all different forms of stressors, which he labeled the general adaptation syndrome (GAS). The body's response to stress as manifested in the GAS involves three main stages: (1) stress or alarm reaction of the body; (2) resistance with a new adaptation at an increased level of pituitary/adrenal activity; and (3) exhaustion that consumes body because of the inability to maintain homeostasis. The GAS sequences—alarm, resistance, exhaustion—are characterized by anxiety, followed by a combination of anxiety and depression, and finally, depression. These physiological responses to stress are based in the ANS and the endocrine system and constitute distortions of normal adaptive mechanisms. Aversive stimuli provoke a state of hyperarousal in the ANS, contributing to pathological conditions by causing increased cardiovascular function and disrupting the ANS balance. The psychophysiological responses involve an increase in sympathetic (SNS) activity, with prolonged activations causing physiological changes that exhaust the body's resources and make it more susceptible to disease. Prolonged activation of the SNS can cause collapse and damage to organs and can lead to cardiac failure and death.

The pituitary-adrenal cortex (more generally, the activity of the hypothalamic-pituitary-adrenocortical system and the adrenal medulla) provides the mechanism mediating the GAS. The pituitary secretes hormones that in turn stimulate release of hormones by other endocrine glands and brain areas. These hormones produce a general, intense, undifferentiated arousal and activation of the sympathetic nervous system, which is basic to emotions, and a generalized physiological response to the environment, which prepares the organism for action. Sustained stress results

in increased peripheral and brain activity, particularly, central nervous system (CNS) noradrenergic neurons; but the long-term effects of stress are more complex (Gray 1982). Exhaustion leads to a fall in noradrenergic activity if the stressor's demands on the noradrenergic impulses are too severe. Synthesis then increases to restore noradrenaline levels, accompanied by an increase in the turnover of noradrenaline. This does not habituate, with the release and synthesis of noradrenaline maintained at a higher equilibrium when the adaptation to chronic stress is complete. The synaptic vesicles responsible for the synthesis, storage, and release of noradrenaline have a limited lifespan and are replaced by axoplasmic transport. The increase in brain noradrenaline levels can be maintained for only a limited time until the vesicles are depleted. Noradrenaline may also be replaced by new synthesis; but because of slow transport, it arrives at the nerve long after termination of the original stimuli, perhaps as long as six or seven days (Gray 1982). During the second stage of resistance, the prolonged activation can lead to an exhaustion of pituitary and adrenal defenses, as well as of other aspects of the endocrine system, leading to collapse. The response to stress is nonspecific in that stress affects the aspect of the system that is weakest.

The endocrine glands play an important role in the mediation of stress by the secretion of hormones, particularly from the pituitary and the adrenal glands. The hypothalamus stimulates the adrenal glands to release adrenalin, a vasodilator that accelerates the function of the heart and the CNS, and noradrenalin, a vasoconstrictor that increases cardiac activity and raises blood pressure. Noradrenalin and adrenalin act together to mobilize fatty acids for use as energy. Excess adrenalin, noradrenalin, and cortisol appear to have negative effects on the immune system, making the body more susceptible to infection. Stress can affect pathogenesis through the elicitation of activity in the sympathoadrenomedullary and the pituitary adrenocortical areas. Stress hormones link the psychological and the behavioral conditions to disease. Psychological, emotional, and environmental stress lead to elevated corticosteroid levels and may be considered necessary for the physical response (adrenal-pituitary) to occur. Emotional stress also elicits activity in the limbic system, particularly, the hypothalamus, triggering the release of ACTH (adrenocorticotropic hormone) from the anterior pituitary. The adrenal cortex synthesizes and secretes corticosteroids in response to stress and stimulation by ACTH. Cortisol modulates the stress responses, but its overproduction can cause damage to organs. The glucocorticoids break down body proteins and hinder the action of the lymphocytes, causing immunosuppression. The disruption of cortisol regulation also contributes to many other diseases through general disturbances of the ANS.

The Autonomic Nervous System: The Anatomical Basis of Stress

The experience of stress also disrupts the ordinary control of organic functions, which is maintained by the complementary activities of the ergotropic (sympathetic) and trophotropic (parasympathetic) divisions of the autonomic nervous system (ANS). The anatomical basis of the ANS includes the hypothalamus and portions of the endocrine system, the reticular activating system, the limbic system,

and the frontal cortex. The ANS controls heart and gastrointestinal functions and mediates the balance between stimulation (activation of the sympathetic division) and relaxation (activation of the parasympathetic division). Sympathetic activation provides the energy for muscles through the stimulation of the ergotropic system and through activities in the posterior hypothalamus that mediate alertness, arousal, strength, and vitality. Parasympathetic activity is involved in storing sugar, fat, and protein through the trophotropic system and the activity of the anterior hypothalamus, which mediates rest, recuperation, and sleep.

The ergotropic system provides adaptive responses to the external environment, whereas the trophotropic system maintains an internal homeostatic balance. The ergotropic system functions periodically; the trophotropic system has continual functions. The cyclical patterns of consciousness reflect a balance between the needs for maximization of external orientation and adaptations and the needs for internal adaptation and homeostasis. The tuning or balance between the ergotropic system and the trophotropic system is created through conditioning, which sets the relationships that establish and maintain the rhythmic interactions between waking and sleeping modes of consciousness. The ergotropic system subserves the fight-or-flight response, providing a global activation of the body. It is responsible for mediation and control of short-term adaptation (rather than long-term development). Activation of the ergotropic system is associated with either positive or negative emotions, dependent on the interpretation made of the physiological changes and the immediate situation. The trophotropic system regulates the vegetative nervous system, from cellular activity through digestive functions and sleep; and it is responsible for synchronization of the cortical EEG patterns, for relaxation, and for control of somatic functions vital for long-term well-being of the organism. The primary function of the trophotropic system is the repair and development of the organism, especially during undisturbed sleep.

The ergotropic and trophotropic systems can be driven top down (from higher cognitive levels and intentional control) and bottom up (discharges in lower levels of the nervous system); in both cases they operate on the principle of homeomorphogenetic recruitment across different levels of the nervous system and body (Laughlin, McManus, and d'Aquili 1992). The complementary activation and balance provided by the ergotropic and the trophotropic systems provide for a hierarchical integration of the activities of the somatic, the autonomic, and the neural systems. This manipulation of ANS balance is a central mechanism of shamanistic healing, managing the stress responses, psychosomatic reactions, and psychosocially induced diseases.

Symbolic Interaction and Stress

The elicitation of stress mechanisms by social situations and by symbolic meanings that do not permit a response leaves the body mobilized for actions it cannot undertake, contributing to the development of pathological conditions—ulcers, hypertension, cardiovascular problems, migraine headaches, and so on. These and many other problems are a consequence of the self's inability to manage social, psychological, and emotional aspects of life. Fear of or expectation of situations

can produce the same psychophysiological responses as actual situations. Physically, socially, or symbolically threatening situations call forth the same physiological responses.

Although the causes of stress are often social, cultural, and symbolic in nature, they nonetheless have physiological implications. Physiological reactions provoked by physical stimuli (attacker) may also be evoked by symbols or ideas (a shadow makes me think and feel that someone is going to attack me!). The body's homeostasis can be disrupted by symbolic threats to one's self, with the individual's subjective response of fear having powerful effects on physiological functioning. Since it is more the individual reaction than the situation itself that determines the body's physiological response, spirit beliefs can play a significant role in health.

The body can adapt to chronic physical stressors, but it does not adapt to chronic emotional stress. Emotional stress must be dealt with through defensive reactions and coping responses. Central to human adaptive responses to stress are coping reactions based on the effects of meaning on physiological responses. Beliefs manage the effects of the mind on emotions, altering the possible stressors through the significance that the organism attaches to circumstances. Beliefs about spirits play important roles in modifying emotional reactions, effecting changes in the autonomic nervous system and physiological responses.

Dance and Music as Core Shamanic Therapy

Cross-cultural similarities in shamanistic healing practices include dancing and singing, based in effects of auditory driving (see Chapter 4) and the linkages of music to ancient audio-vocal systems (Oubré 1997). Our capacities for music and dance involve uniquely human abilities that sharply distinguish us from our ape cousins (Malloch and Trevarthen 2009). These capacities provided a basis for a multipurpose human ritual dynamic found in cultures everywhere. Performance of music and dance are inseparable, reflecting a deeply embedded ritual dynamic derived from mimesis that binds groups into a common consciousness. Together they constitute an expressive dynamic of our species that engages a level of communication that is vital for our species' survival and provides a powerful intrinsic healing dynamic by connecting us with sociality.

Dance as Therapy

Woods (2009) reviewed ethnographic accounts of dance that illustrate the diverse therapeutic functions of dance based in its ability to relieve tension and stress and generate feelings of revitalization. Woods related the therapeutic effects of dance to group therapy, where the expressive modality provides opportunities for self-actualization and the release of frustration. Dance can also produce an alteration of consciousness that engenders an emotional state encouraging catharsis and emotional release. The nonverbal expressive aspects of dance provide therapeutic mediums for the release of repressed desires and energies, exemplified in the possession dances where participants act out repressed desires through the pantomime of dance. The expressive liberation of repressed emotions allows for a

rebound effect of tranquility. The dynamic engagement of dance can induce a process similar to hypnotic induction, leading to a release of ego control to a deeper level of the self related to the physical body. The literature on the therapeutic mechanisms of dance emphasize alterations in the experience of the self and body from ASC; the effects of rhythm and the rapid movement of the body that provides an energetic stimulation and revitalization; the psychosocial effects of the group dynamic and engagement with a community; the effects of spirituality and ritual; an expressive creativity that engages our dynamics for play; the absorption of attention; and emotional catharsis and abreaction (Woods 2009).

Shamanism as Music Therapy

The relationship of shamanic healing to music therapy has been explicitly made by individuals in the field (Winn, Crowe, and Moreno 1989). Crowe (2004) notes that throughout history music has been used as a curative agent and that its effects have been understood in terms of the ability of music to promote health and wellness through enhancement of natural balance and harmony in our emotional systems. The development of "singing cures" and voice movement therapy (Newham 1994) attests to the persistent value of music as a therapeutic modality. Music has a range of physiological effects on the body, beginning with the sensory neurological systems and including the involvement of glandular systems, the autonomic nervous system, involuntary muscular responses, and reflexes. The effectiveness of music therapy derives from multiple modalities through which music, singing, drumming, and related procedures affect the body, brain, and access to unconscious information in ways that facilitate its integration into consciousness. The impacts of music on the brain begin with the direct auditory nerve connections into the reticular activating system (Crowe 2004). This area plays a key role in perceptual alertness, behavioral responses, and maintenance of the body's homeostasis. These basic auditory processing areas in the medulla oblongata are located close to nuclei that control heart rate and respiration; music's physical effects on these areas mediating stress may underlie music's noted ability to reduce anxiety and tension and produce relaxation and reduction in stress. Vaitl et al. (2005) reviewed research that indicates that the motions of the body produce a rhythmic driving that induces coordinated oscillations in the heart (respiratory sinus arrhythmia). This results in a reduction of heart rate and cortical arousal and increases in brain wave theta activity.

Music elicits and expresses our feeling and desires. Health is enhanced by elevation, integration, and resolution of unconscious and repressed conflicts that create emotional illness and exacerbate physical problems. Functions of songs in shamanistic therapy include their ability to elicit repressed feelings, as well as confidence and positive expectations and the associated physiological responses. The universal use of song and music in shamanistic healing also reflects their ability to affect humans through symbolic meaning. Shamanistic practices may use music as a psychological therapy to elicit the patient's psychodynamics and unconscious and to provide emotional reprogramming through expression of cultural themes, psychodynamics, and motivations. Music may act at id, ego, and superego levels to release emotions and satisfy desires.

Music enhances human functioning at a number of levels that provide healing mechanisms, including engaging an innate primal biological function found in primates—the ability to express emotions through vocalizations. The affects of tone and sound on emotions allows music to have a number of adaptive effects on health from the physical vibratory effects on the body, through synchronization of brain waves, coordination of emotions, and a common focus of intention. These effects may underlie the intrinsic abilities of music to evoke repressed emotions and to stimulate an intensive expression of and experience of those emotional states. Music's effects on emotion involve its direct impact on nonverbal communication processes, a "language of emotions." Like spoken language, music has the ability to both communicate something specific (an emotion) and elicit that same experience in others.

Crowe considered the ability of music to stimulate emotions to be the consequence of biologically determined neural responses. Music has a capacity for healing through eliciting biologically determined emotional states that are innate and provide for constructive expression of repressed emotions. The subjective emotional experiences that are produced by music bring them to a level of consciousness where they may be reinforced by ritual. Music can serve as a tool for the generation of insight into our own feelings, as sounds elicit issues significant for our emotions, personal development, and values.

Brandt (2009) noted a primordial connection between music and our emotions, particularly, to love. Studies of musical compositions around the world show that music has an overwhelming focus on love as opposed to other emotions. It is also linked to our narrative and imaginative capacities—music is about something. Contemporary functions of music include its use to modulate emotional states that enhance and transform emotionality. Panksepp and Trevarthen (2009) noted music's ability to enhance our emotionality by relieving loneliness and negative emotions of sadness and loss while enhancing love, happiness, satisfaction and other positive emotions. Crowe reviewed research indicating that music appears to have a special connection with the strongest electromagnetic fields of the body—those produced by the heart. Crowe proposed that music therapy research and practice confirms that music has the capacity to function as an energetic power that elicits manifestations of unconditional love. She considered this elicitation of love to involve the most beneficial of all healing states. This activation of the heart through music and the resultant experiences of love and compassion appear to be universal, and are extended in caring responses to others. One of the effects of music is the induction of empathy, involving the ability to understand and identify with the experiences of others. Music produces empathy by synchronizing our experiences through rhythm, tone, melody, lyrics, and other dynamics which produce a common awareness.

Neurophysiological Aspects of Music Therapy

Panksepp and Trevarthen (2009) attributed the powerful effects of music on our emotions to derive from its capacity to elicit neurochemical responses from the opioid, dopamine, and other innate neurochemical systems. The musical

elicitation of our endogenous opioids bond not only mother and infant but also broader social groups by facilitating emotional and social processes. Panksepp and Trevarthen noted that music's established power to evoke emotional responses and healing reflects its ability to elicit core brain mechanisms that regulate well-being through mind-body interactions, positive associations, and affection. They reviewed evidence of the ability of music to regulate a variety of physiological functions, including heart activity.

Through its effects on the hypothalamus, music may elicit enhanced immune system functioning. Some of the established effects include the ability of music to produce short-term decreases in cortisol and increases in secretion of immunoglobulin A, both indicators of enhanced functioning of the immune system. Music can counter stress responses, reducing blood pressure, cardiac rate, and other ANS stress markers. By counteracting the effects of stress, music has implications for a variety of conditions, physical as well as psychological and psychosomatic. Music can counteract stress-related biological changes by producing significant improvements in galvanic skin response (GSR), muscle tension, heart rate and blood pressure, and mood and attitude (Hanser 1985). Music therapy has shown consistent decreases in verbal reports of anxiety and increases in relaxation (Davis and Thaut 1989). Rider suggested that potential audioanalgesic mechanisms of music include endorphin production from thrill response, dissociation through distraction, and autogenic conditioning. Physiological mechanisms for the therapeutic results may include increased breathing and enhanced oxygen content created by singing and chanting. Music has been shown to effectively reduce perception of pain, apparently interfering with the CNS transmission of pain stimuli. Positive effects of music on pain include its ability to stimulate the release of endorphins and their pain-killing effects.

A general effect of music on health involves entrainment of the brain, epitomized in the general characteristics of the IMC. The vibroacoustic affects of musical sounds produce resonant patterns in the body that initiate the entrainment process. Crowe proposed that these vibratory frequencies of music give it the ability to change the resonant patterns that give rise to disease, replacing them with an energetic balance. Music appears to elicit responses from the energy fields of the body, ranging from the physical structure, through organs, body tissues, molecules, the brain waves, and the emergent experiences of consciousness. The ability of music to infuse this hierarchy of the body, brain, and mind with energetic vibratory patterns gives it the potential to carry emotional and subtle biogenetic energies from singer/healer to the patient and community, amplifying the energy of the therapist's emotions and transferring them to the patient.

Psychointegration: The Therapeutic Effects of Sacred Medicines

Shamanic medicines include many substances known as hallucinogens, psychedelics, and "sacred plants." Support for their traditional use as therapeutic agents is found in their wide range of physiological, emotional, behavioral, and cognitive

effects and in contemporary clinical studies (see Winkelman and Roberts [2007] for overview). These traditions typically involve integrated religious and therapeutic applications, a ubiquitous spiritual interpretation of their medicinal effects. Indigenous terms for these plants embody the perceptions of these plants as having indwelling spiritual influences. This led to the introduction of the term "entheogens" from the Greek *entheos*, referring to "the god within," and *gen*, "action of becoming" (Ruck, Bigwood, Staples, Ott, and Wasson 1979; Wasson, Kramrisch, Ott, and Ruck 1986).

These substances alter experience in a dramatic way, shifting awareness to an experiential domain interpreted as sacred. Their uses include establishing direct contact with the supernatural or spiritual, relationships with animal powers and transformation into animals, divination and healing, promotion of social solidarity and reinforcing interpersonal and community relations, a personal relationship with mythical reality, and the dissolution or death of the ego and its transformation (Winkelman 1996). These substances engage the sacred or spiritual to enact therapeutic roles. The cross-cultural similarities illustrate that a biological substratum is responsible for these experiences and provides psychophysiological mechanisms for their therapeutic properties.

Premodern Uses of Sacred Medicines

There is a wide range of therapeutic uses of these plants among the indigenous cultures of the Americas (Schultes and Winkelman 1996).

Psilocybe species are used for both physical illnesses (e.g., fever, chills, toothache, pimples, and pain) and culture-bound syndromes (e.g., hexes, soul/spirit loss, witchcraft, spirit afflictions, exorcism). They are also used to address psychosocial problems such as resolving quarrels and disputes, finding lost family members and domestic animals, and answering questions.

Anadenanthera snuff is used for a variety of medical, religious, and social purposes. Its basic role in shamanistic healing practices involves diagnosis and healing, as a purifier, and for invocation of spirits. It is also used to induce courage, strength, and stamina in hunting and battle, and for foretelling the future. *Anadenanthera* use in social rituals includes annual harvest festivals, fertility rites, cremation ceremonies and ancestor worship, festive gatherings, and mock intervillage battles.

Virola is similarly used for intervillage feasts, building and solidifying alliances, the practice of witchcraft, and in funeral ceremonies. It is also used to treat both physical problems (stomach and bladder problems, malarial fevers, intestinal worms, hemorrhoids, malaria, mouth sores, in the treatment of rheumatism and swollen joints, cuts and wounds, child birth), as well as a variety of psychocultural ailments and social needs.

Lophophora williamsii (peyote) is considered to have general healing properties in cleansing the stomach, kidneys, liver, and blood. It is also used for curing, protection against witches and ghosts, maintaining good health and mind, incentives to work, release from guilt, temperance from alcohol, transcendence, overcoming misfortunes, guidance and future good fortune, access to knowledge,

foretelling future occurrences, and motivation. In the Native American Church it serves to give purpose in life, create internal peace and harmony, provide a reference group, meet needs for approval and esteem, provide a validation of identity, and to foster an adaptation to the dominant society.

Turbina species (e.g., morning glory) are used for physical conditions such as fevers, carbuncles, swollen or paralyzed limbs, rheumatic pains, and urinary retention or blockages. It is employed as a contraceptive and to facilitate labor, particularly in cases of difficult child-birth. It is also employed for divination of the causes of illness, death, or other problems, and to determine the means of treatment of witchcraft and other conditions caused by fright and fear, "evil eye," and anger.

The premodern use of psychedelic medicines was applied for a much wider range of conditions that contemporarily addressed within medicine and psychotherapy. This brief review provides a glimpse of this broader range of potential uses

Psychobiological Bases of the Therapeutic Effects

While biological mechanisms underlie the effects of the psychointegrators, their diverse uses and effects present a challenge. The panacea applications of the psychointegrators are explained by studies that indubitably implicate individual and environmental factors in the substances' effects. The "set" (individual characteristics and expectations including attitude, motivation, mood, and personality) and "setting" (the physical and social context of use) produce quite varied experiences under psychedelics (see Passie et al. 2008). The primacy of set and setting effects is reflected in the different psychotherapeutic traditions in the clinical study of LSD (lysergic acid diethylamide), three different models of the nature of its effects. These three paradigms—called psychotomimetic, psycholytic, and psychedelic (see Grof [1975, 1980]; Lukoff, Zanger, and Lu [1990])—show that different effects may be derived from the same substance as a consequence of the state of extreme neurobiological flexibility produced.

The Psychotomimetic Model Initial research on the effects of LSD viewed it as a substance that created or mimicked psychosis (psychotomimetic). LSD can produce psychotic-like reactions and temporary evidence of disturbed cognitive functioning, but can also produce experiences quite distinct from those of a typical psychotic state. These qualitatively quite-different experiences were exemplified in what Cohen (1971) described as a typical "good trip." The positive LSD experience leads to a change in the way in which one approached ordinary experience. The world is seen in a new light, with dramatically changed meanings and new or increased significance attributed to everyday objects. The individual becomes hypersensitive and hypersuggestible. Thought often becomes nonlogical and opposites reconcilable, with an increased tolerance for ambiguity. The individual might experience an oceanic feeling, a dissolution of self into a mystical union and a feeling of being at one with the universe.

The Psycholytic Model The positive aspects of the LSD experience led to the psycholytic paradigm, based in recognition that LSD could aid psychotherapy.

The term *psycholytic* means "mind-dissolving," reflecting the hallucinogen-induced relaxation of the ordinary sense of self, altering the relationship between the conscious and unconscious (Passie 2007). LSD could ease memory blocks, promote catharsis, and shorten the course of therapy. The psycholytic approach employed a series of low doses of LSD in conjunction with therapy sessions. This led to a weakening of psychological defenses, heightened emotional responsiveness, elicited repressed memories, and released unconscious material. The ability to relive early life memories and to retain the memories in post-LSD sessions facilitated the progress of psychotherapy. Psycholytic therapy appears effective with psychosomatic problems and psychic rigidity; isolated individuals and those fixated at egocentric levels; concentration camp survivors with rigid defenses; patients with whom classic psychoanalysis has been unsuccessful; disorders rarely healed by psychotherapy, such as severe chronic compulsions and severe alcoholism; and severe character neuroses, depression, and compulsion (Zanger 1989; see also Passie [2007]).

The Psychedelic Model The subsequent LSD paradigm was referred to as *psychedelic therapy*, a term reflecting the "mind-manifesting" properties of the substances. The psychedelic model derived from studies on the effects of large doses of LSD, particularly on alcoholics (see Halpern 2007; Yensen 1996). These studies indicated that those who benefited most from LSD therapy had reported mystical experiences associated with profound personality changes, suggesting that the mystical insights were responsible for the therapeutic outcomes. The psychedelic approaches induce peak and mystical experiences that produce a profound sense of interconnectedness, unity, and meaningfulness that contribute to a feeling of rebirth. These experiences gave the patient a greater sense of self-control and the opportunity to make use of these insights for life changes. This was achieved through activation of repressed memories, producing catharsis and abreaction, and leading to a new awareness and sense of freedom.

Shamanistic Approaches to Psychointegrators The different paradigms of the effects of LSD illustrate an ability of these substances to alter psychological functioning in a variety of ways, producing a state of emotional lability in which experience changes as a function of expectations and environment. The shamanistic healers manipulate these personal and situational factors as an integral part of the therapeutic system process. The extensive role of the shamanistic healer in manipulating these set and setting factors before, during, and following treatment is based on knowledge of the client's personal situation. Therapeutic sessions are preceded by meetings of the healer with the patient and the patient's family or community and incorporate ritual procedures to guide expectations of the therapeutic outcome. The treatment session itself is usually implemented in the context of a traditional ritual procedure that guides the ingestion of the substances. Ritual procedures guide and shape the patient's experience, particularly through singing and chanting, which present mythological and symbolic elements to elicit and to shape the patient's emotions and experiences. The shamanistic healer guides the experiences both within the immediate context of the ritual

therapy and following the treatment session to integrate experiences for the patient.

Psychointegrators, the Triune Brain, and the Integrative Mode of Consciousness

The diverse therapeutic effects of psychointegrators derive from the activation of emotional and personal processes of the limbic system and paleomammalian brain that underlie personal identity, attachment and social bonding, emotion, conviction in beliefs, and their integration with neocortex processes. Psychointegrators stimulate the integration of the brain's behavioral and social-emotional processing output with language-based ratiomentation, egoic representations, and personal identity. These biochemically based physiological effects can produce healing through integration of different functional systems of the brain. The process provoking the integration of these lower level brain processes into the frontal cortex has inherent therapeutic potentials in the elevation of traumatic memories into consciousness, which permits resolution through catharsis and abreaction, facilitated by the supportive ritual context. The tendency of these substances to elicit distressing personal material, unresolved conflicts, traumatic experiences, and unintegrated aspects of self reflects psychointegrators' stimulation of the limbic system, provoking manifestation of distressing issues related to self and social attachments.

Enhanced awareness of repressed memories combined with increased emotional activation and labiality and disruption of habitual behavior patterns can result in dissolution of egocentric fixations, permitting psychodynamic reprogramming. This epitomizes psychointegration, permitting expression of lower levels of awareness and self-representation, including repressed aspects of the self. Reduction of egocentric fixation and altering relationships between the conscious and the unconscious facilitate changes in self-perception and dissolution of the self. Increased interhemispheric coherence creates a greater degree of integration and insight. This facilitates therapeutic intervention through stimulation of memories into consciousness and the increased emotional lability, which enhance the individual's susceptibility to reprogramming.

Psychointegrators enhance activity in brain areas MacLean (1990, 1993) referred to as the R-complex and the paleomammalian brain, or limbic system. The paleomammalian brain is primarily concerned with self identity, species survival, family and social relations, as well as learning and memory and sexual and aggressive emotions and their integration in human behavior. The activation of the paleomammalian brain and its functions by the psychointegrators enhances systemic integration of emotional information into consciousness in the frontal cortex. The stimulation of the R-complex by psychointegrators enhances integration of all areas of the brain and heightens arousal and awareness. Experiences of lower structures of the brain and consciousness that are elicited by the psychointegrators were discussed by Grof (1975, 1980, 1992) as transbiological realms: the perinatal domain of experiences and the transpersonal domain. The transpersonal domain of the archetypal and mystical structures reveals dimensions of human

consciousness and identity beyond (or perhaps better characterized as "below") egoic identity. These innate processes of organismic self-representation and regulation that are part of our evolved mental structures are superseded in human development in the creation of social selves and culturally produced egoic psychological structures. The consciousness of these evolutionarily earlier structures reemerge into prominence because of serotonin disinhibition and loss of their inhibitory effects on the mesolimbic temporal lobe structures. The elevation of activity of early evolutionary structures of the brain is a common effect produced by psychointegrators, reflecting an innate mode of consciousness that is the basis for the universal presence of shamanistic healing practices.

These systematic changes involve an overall effect of high-voltage brain wave discharges originating in the limbic system that replace the normal waking desynchronized fast-wave brain patterns with slow-wave (theta) cortical synchronization, which characterizes the integrative mode of consciousness (IMC). The IMC seeks optimization of homeostatic balance among different functional systems of the brain and to enhance integrative or holistic operations of the brain.

Meditation as Biopsychosocial Therapy

In contrast to the excited behaviors of shamanic and mediumistic practices, meditation emphasizes an inward focus of attention that reduces emotional attachments in an effort to achieve emotional equanimity and nonattachment to desires. A central aspect of meditation is an affective (emotional) development provided by the observing self, which is developed through the processes of meditation (Hunt 1995a; Wade 1996). This witnessing consciousness is capable of observing its own forms and developing formal affective operations that are decentered through an "other," an alternative to the ordinary self developed in meditation. Meditation changes self and emotions through development of attentional control, which enhances integration of emotion and thought, and the suspension of emotional attachments to achieve greater objectivity, detachment, and freedom from suffering. Meditators' intentional enhancement of control of attention increases awareness of mental processes and enhances control of emotions. The focus of meditation on development of reflexive self-awareness creates a detached observational attitude that permits suspension of personal and social evaluative processes that engage painful emotions.

A common emphasis of the Asian psychologies is that most human behavior is mindless and unconscious. Unlearning this conditioning of thought and behavior is fundamental to realization of greater control of one's behavior and experiences. The development of this control leads to a greater awareness of the unconscious processes, with sustained attention increasing self-awareness. Meditation increases awareness of what are usually unconscious mental processes, through deautomatization, which changes perception, motor habits, and cognition from their habituated, repetitive, and routinized processes. By focusing attention, meditation enables the practitioner to develop a greater awareness of how all information, ranging from perceptual stimuli to concepts of self and the

universe, is habitually processed. Shapiro (1990) reviewed studies illustrating that meditation enhances self-actualization, particularly, through dealing with social conditioning and fears. Therapeutic effects of meditation also derive from systematic desensitization, the reduction of response to threatening stimuli. The meditative state appears to automatically lead to the manifestation of material that is emotionally salient, an automatic consequence of reducing ordinary fixations of attention. Meditation creates a relaxed physical state during which unpleasant memories are slowly manifested in nonthreatening contexts. Meditation then provides desensitization of distressing thoughts by permitting their occurrence in conjunction with extreme relaxation, a form of counterconditioning that produces a desensitization to anxiety-evoking thoughts. Insight into the processes through which the individual habitually constructs his or her personal version of reality enhances the possibility of changing patterns of cognition and psychophysiological reactions that are self-defeating or compromise healing processes. Meditation desensitizes one to distressing thoughts by permitting their emergence in conjunction with extreme relaxation, as exemplified in the practices of insight meditation, which focuses on arising perceptions, memories, and emotions and on the processing of their implications for self, thought, and behavior. This emergence of thoughts produces an enhanced awareness of unconscious processes, changing the ordinary sense of self and identity.

Meditative practices exemplify the shamanistic traditions' modification of self and emotions and relationships with others. Meditation plays an important role in development of new ways of managing emotions. Feelings mediate social influences on the self, providing for attachments to others that define sense of self and that provide security. Alexander, Davies, et al. (1990) characterized the views of Vedic psychology on feelings as interconnecting the different levels of mind. Meditative consciousness enhances the role of feelings in providing information, linking ego, inner self, the intellect, and motivations to guide intuitive decision-making processes. Meditation enables one to transcend the earlier stages of emotional development based on social constructions of self and desires and to exercise exceptional emotional control, both eliciting and suspending emotional processes. This extraordinary emotional control is manifested in experiences of rapture, bliss, and overwhelming love and compassion, which meditators are able to experience independent of any immediate stimuli for such pleasure. This is possible because of the control of attention and its use to develop new aspects of consciousness and self. The transpersonal self (*atman*, "true self," or witness), which is uninvolved in the world of the personal or participating self and its attachments, is consequently free from the pain and suffering of the personal self.

Meditation leads to greater psychological differentiation, with a clearer understanding of one's own psychological needs and attributes, leading to increased self-acceptance and self-esteem, enhanced self-control and confidence, increased empathy, and greater self-actualization. Insight meditation focuses on perceptions, memories, thoughts, sensations, and emotions. This provides primary material for psychodynamic processing of patterns of thought and behavior and an opportunity for examination of the nature of personal and psychological processes. The healthful quality of meditation is widely recognized in the context of "transcendental

experience." Walsh (1980) reviewed evidence that indicated that these experiences occur most frequently among those who are psychologically the most healthy. Transcendent experiences are most likely during advanced stages of psychotherapy, among those who are most self-actualized, those who are better educated and economically more successful, people who are less racist, and those who test at higher levels of psychological well-being. Maslow's (1971) analysis of the hierarchy of needs placed these transcendent experiences at the apex of human development; meditation clearly supports that development.

Therapeutic Effectiveness of Meditation

There are many assessments[1] of the therapeutic efficacy of meditation. Taylor et al. (1997, 25, 116) reviewed research indicating the effectiveness of meditation in treatment of "hypertension, diabetes, cancer, cholesterol regulation, alcoholism, anxiety disorders, asthma, pain control, and obesity . . . [as well as] relieve addiction, neurosis, obesity, claustrophobia, headache, anxiety, and other forms of stress." Meditative practices have numerous effects in improving individual psychological and physiological well-being and appear to be particularly useful in the treatment of psychosomatic disorders. Studies have shown successful outcomes in dealing with fears, phobias, personal integration and control, stress and tension management, and a range of physical changes, including the lowering of blood pressure. Meditation and other progressive relaxation techniques produce a similar physiological pattern ("the relaxation response"), including significant decreases in heart rate, respiration, minute ventilation, and EMG (Benson, Kotch, et al. 1979). The relaxed states characteristic of many meditation experiences are incompatible with this stress response, making meditation useful in the treatment of chronic anxiety and stress-related and psychosomatic illness. Physical and psychosomatic benefits of meditation are found in the treatment of myocardial infarction, bronchial asthma, insomnia, cholesterol levels, and high blood pressure. Meditation improves responsiveness to medication for a range of stress-related illnesses and contributes to reductions in addictive drug use, mood elevation, and improvement in affect. Meditation has also been used as an ego regression technique, which prompts the manifestation of unconscious material; in assisting individuals in gaining a sense of inner directedness and increased self-responsibility; and as a means of emotional management.

Studies continue to support the effectiveness of meditation as a treatment or adjunct for a wide range of disorders. A specific form of meditation, conceptualized as mindfulness-based treatment approaches, is effective for a range of ailments (see Baer [2006], Shapiro and Carlson [2009]). Incorporating features of stress-reduction practices, cognitive therapy, dialectical behavior therapy, and development of acceptance and commitment skills, mindfulness-based treatment approaches have the capacity to address both contributory and causal factors for many conditions: anxiety disorders, trauma, depression, food and drug addictions, mental illness and personality disorders, cancers, chronic pain, and a range of relationship problems (see Baer [2006] for review articles, also see Shapiro and Carlson [2009]).

There is also evidence of effectiveness in a variety of severe physical conditions (Chambers, Gullone, and Allen 2009). Studies of applications to chronic pain found both reductions in pain and enhanced functionality, independent of effects on stress. Other areas effectively treated with meditation included eating disorders, cancers, and a wide range of psychological disorders. In addition to treatment of anxiety related-dimensions of depression, meditation showed effectiveness in chronically mentally ill and psychotic patients, who showed evidence of increased awareness of the delusional nature of their thoughts; and borderline personality disorders, reducing suppression and avoidance of disturbing thoughts and emotions and enhancing emotional experiences and metacognitive awareness. The effectiveness of mindfulness-based meditation approaches in the treatment of cancer was found across a wide range of cancer diagnoses (Speca, Carlson, Mackenzie, and Angen 2006). The authors reviewed studies indicating reductions not only in stress but also in levels of depression, tension, anger, and sleep and mood disturbances, as well as a wide range of symptoms (neurological, gastrointenstinal,). Even more positively, there were reported increases in quality of life, as well as enhanced measures of immune system functioning (increases in T-cell production, interferon gamma, and natural killer cells). Shapiro and Carlson (2009) suggest that studies establish the long-term effectiveness of mindfulness-based interventions in cancer patients, specifically, reducing a variety of psychophysiological and physical symptoms; and in the treatment of cardiac conditions, including both psychological and biological outcomes.

Walton and Levitsky (1994) outlined a neuroendocrine model for the mechanisms of meditation. They noted the ability of transcendental meditation (TM) to reduce stress and enhance serotonin functioning, counteracting neurochemical and neuroendocrine dynamics caused by chronic stress. They proposed that mediation's primary actions are on the locus coeruleus, increasing serotonin availability and producing an inhibitory action paralleling the effects of sedatives and opiates. Meditation leads to increases in serotonin levels, leading to reductions in cortisol levels, and indirectly to reduction of stimulation of limbic anger and fear centers and the activity of the hypothalamic pituitary adrenal axis that contributes to chronic stress.

Chambers, Gullone, and Allen (2009) pointed out that mindfulness mediation approaches differ in fundamental ways from contemporary psychological approaches; instead of repressing emotional experiences, meditation retrains awareness to reduce reactivity and identification with troubling memories and emotions. By changing the automatic appraisal processes, mindfulness meditation can prevent the evocation of disturbing emotions.

Specific Stress-Related Effects of Meditation

Alexander, Robinson, Orme-Johnson, Schneider, and Walton (1994) provided a meta-analysis illustrating significantly greater effects of TM compared to other relaxation techniques in reducing arousal, trait anxiety, drug abuse, and hypertension. Meditation's therapeutic effects are in part a result of the general

relaxation produced by parasympathetic dominance and its beneficial effects on psychosomatic tension states, anxiety, and phobic reactions. While some earlier research concluded that meditation does not produce a unique effect, but, rather just the beneficial consequences that come from rest, subsequent research (Rubia 2009) has indicated otherwise. Alexander, Robinson, et al. (1994) reviewed studies on TM practices that suggested meditation may reduce arousal and produce a deep physiological rest that is distinct from ordinary resting. Rubia (2009) noted the evidence for the effectiveness of meditation in the treatment of a variety of psychiatric disorders that is a consequence of not just anxiety reduction but also enhancing endocrine functions and the functional upregulation of areas of the brain involved in the control of attention and emotional regulation. Meditation results in the induction of a restful metabolic state with decreased SNS activity and increased activity in the PNS, a process fundamental to relaxation, rest, and sleep. But these meditation-induced changes in the PNS and SNS reactions are different from the effects of sleep, as indicated by a wide range of physiological parameters. Differences in the effects of relaxation and meditation include meditation's recruitment of additional neural networks in the fronto-limbic emotional circuitry and the fronto-parietal attentional networks. Rubia proposed that this reflects the ability of meditation to engage a stronger entrainment of the autonomic control areas. The enhanced fronto-parietal connection is reflected in long-term effects on the structural plasticity of the brain.

THE SPIRIT WORLD AS A THERAPEUTIC RESOURCE: SYMBOLIC HEALING

A key reason for the shaman's ritual alteration of consciousness was to access the spirit world. Spirit beliefs are central features of symbolic explanatory models that represent aspects of personal and social consciousness. Spirits engage a variety of healing mechanisms involving symbolic processes in which manipulation of spirit beliefs and relations affect biological processes. Spirits play a central role in shamanistic healing rituals through the elicitation and manipulation of emotions and their physiological consequences. These processes intervene in stress mechanisms and in elicitation of psychoneuroimmunological responses. Rituals engage the emotional-neurological and mind-body interfaces by using spirit concepts to manipulate aspects of biological, social, and personal identity. Neuropeptides and neuroreceptors function as an information network that links body and mind through emotions and meanings, including those provided by spirit constructs.

Spirits as Representations of Mental and Social Processes

Spirits are a central feature of mythic beliefs and explanations regarding the motivations of humans, animals, and the forces of the natural and social world. Durkheim (1915) showed that spirit beliefs reflect structures and patterns of relationships in

society, representing abstract processes, relations, and groups. Spirits also represent basic aspects of human psychology, our drives, emotions, and other cognitive processes (Winkelman 2004a).

Spirits reflect human needs to make sense of experience, to attribute meaning to occurrences. The normal human practice of explaining events by attributing them to intentional actors is a fundamental cognitive tendency. This attribution is based in the metaphoric extension of the self and in its capabilities for modeling the unknown (Winkelman 2004a). This tendency is the underlying basis for the attribution of causal efficacy to spiritual actors.

Spirit conceptions also involve generic structures of human thought involving concepts of self and other, and structures of meaning attribution. These beliefs provide conceptual categories for representing structures of our self and the individual and collective unconscious. Spirit beliefs provide symbol systems for expressing our human intrapsychic dynamics and psychological and cognitive processes.

Understanding spirits as representations of social groups and internal forces illustrates how ritual healing involves a restructuring of individual psychodynamics and collective psychology. These psychodynamic implications of spirits derive from their roles as social actors. Spirit beliefs constitute a symbolic system representing norms, values, and ideal behaviors, directing people toward proper social behavior. Spirits and supernatural beings consequently communicate about social traditions, valued attitudes, morals, ideal patterns of behavior, and preferred psychocultural dynamics. These symbolic structures also represent humans' needs and feelings, shaping them in the relationships between the individuals and society.

The role of spirit beliefs as a language of the components of intrapsychic dynamics and psychosocial relations gives it the symbolic power to manipulate one's emotions and sense of self. These beliefs and the processes they evoke can provide resources for coping with stress because they are mediated by phylogenetically older forms of communication regarding emotions, self, and relations with others. Shamanistic practices engage this emotional communication processes using presumptions about the ability of spiritual agents to affect well-being.

While the specific properties of spirits may reflect predominantly cultural beliefs, there are a number of aspects of spirits that constitute neurognostic structures, universal properties of how humans experience the spirit world (see Chapter 6).

Wesselman (2008) provided a view of other underlying commonalities in spirit concepts, a synthetic perspective on the endogenous views of the soul found cross-culturally. He proposed a matrix of soul concepts rather than a single type of soul or spirit, providing a diversity of models of the self. Wesselman noted that many spiritual traditions have proposed a triune model of the self and its souls, including the Greek philosopher Pythagoras (physical body, mental psyche, and immortal spiritual soul), Sigmund Freud (id/it, ego, and superego) and Carl Jung (subconscious, conscious, and superconscious). This tripartite, or triune, conception of the self is more explicitly spiritual in traditions worldwide, reflecting what may be an inherent patterning of the human mind.

Basing himself in his long study of the Hawaiian Kahuna practices, Wesselman characterized three aspects of personal spirit in terms of

1. An immortal ancestral aspect of the self known in the Western traditions as the higher self or "oversoul." This powerful beneficent force maintains contact with our experience, carrying our accumulated knowledge of past lives for intuitive guidance and conveying a tranquility and peace through our breath. Wesselman noted that a connection of breath and spirit is found across languages. This "upperworld" essence conveys the essential aspects of our character, a divine breath that conveys the force of life arriving in the body at birth, where it encounters the body soul.
2. The body soul, a biological field that is derived from the spiritual and energetic properties of the mother and father passed on through reproduction. This biological entity is structured by the oversoul to produce an effective melding of ancestral, paternal, and maternal features in the personality. Conceptualized as the unconscious or subconscious in Western psychology, this aspect of the self is in charge of the organismic functions of the body. Functioning as the memory system, the body soul acquires the effects of our experiences, learned behaviors, and emotions. This seat of our emotional life guides our personal relations, desires, and dreams, and provides the portal through which shamans interact with the spirit world. Functioning as an inner healer, it operates on many mechanisms, including physical behavior, the genetic code, and the energetic fields of the body. The body soul also functions in the capacities of mind and reason, using the senses to mediate our relationships with the external world and following the patterns established by the mental soul.
3. The mental soul, our intellectual capacities, reflecting Freud's concept of the ego. This source of our intentionality, rational mind, and creative impulses is the decision maker. The mental soul's capacities are derived from the effects of learning and socialization experiences, and are closely tied to its ability to modulate emotional reactions.

Wesselman proposed that what we conceptualize as self is a matrix based on the interactions of these three spirit/soul dimensions. The interactions between the body soul and its emotional components with the mental soul and its directives are a major area for emotional disorders. If we are fortunate, the oversoul and its wisdom provide the guidance necessary for a balance between the two and the social context in which they form and must function.

Spirits and Emotional Well-Being

The spirit beliefs with which shamans work structure emotional life through affecting fears, stress, anxieties, and frustrations. These emotional dynamics, which are contributory to disease, provide a general mechanism through which shamanic healing can enhance health through their reduction. Religiously defined meanings and experiences provide important contributions to cognitive

labeling and the interpretations individuals make of their state. Proudfoot and Shaver (1997) noted that religion provides powerful attributions to actors beyond individual control; however, the attribution system of shamanism establishes relationships with the spiritual world that are subject to one's control, indicating a psychodynamic different from the dependency dynamics attributed to religion. This is exemplified in the guardian spirit complex.

Shamanistic healing has other effects on emotional processes in eliciting repressed memories, restructuring memories of painful experiences, and resolving conflict through symbolic ritual processes. Catharsis—the remembering, re-experiencing, and expression of repressed emotional memories with painful attachments—is ritually structured to reduce stressful impacts on the individual. Shamanic therapies create psychological and physical healing through confession, which relieves conflicts and repressions and provides for expression of unconscious concerns. Social knowledge of transgressions can exacerbate stress reactions through the social disapproval and interpersonal rejection expressed by others. Confession is often followed by social forgiveness, which can reduce social stress and reestablish harmonious interpersonal relations.

Shamanistic healing typically provides an explanation of misfortune in ways that minimize personal guilt and reduce emotional distress for the patient by attributing causation of illness—and, hence, responsibility—to others: spirits and sorcerers. A typical shamanistic treatment is the ritual removal of an object intruded into the body by a sorcerer. This can be understood from a psychiatric perspective as releasing a "negative introject," a critical self-perspective derived from internalization of an attitude from a significant other. The view of guilt in terms of conflicts between id impulses (considered here as processes of the paleomammalian brain) and the superego ideals (internalized standards for self-evaluation derived from significant others and enculturation) suggests that shamanistic healing mediates paleomammalian brain and neomammalian brain processes, the interactions between our innate emotional and socialized selves.

Rituals may also be used to evoke negative or unpleasant emotions (e.g., anger, fear) or memories, suggesting that shamanistic healers used the same principles of modern psychotherapy in enabling their patients to consciously confront their fears (Walsh 1990). The treatment of anxiety is linked across Western behavioral and psychopharmacological therapies in their common action of desensitization. In behavior therapies, the most common method of therapy used is exposure to feared objects, providing a learning desensitization based on a realization of one's own self-control. Although the effectiveness of pharmacotherapies is limited because cessation of medication often results in relapse, the behavioral desensitization becomes essentially irreversible once established. The treatment strategies for anxiety disorders focus on exposure to threatening, feared, or avoided objects, often incorporating significant others. Shamanic healing processes provide exposure to fearful stimuli, with the patient's fears evoked by songs and dramatic enactments. The clients' active role in engaging the images of their fears promotes catharsis and permits reduction of the impact of the feared objects and previous traumas.

The attitudinal aspects of the relationship between cognitive and emotional processes are central to the effects of religious healing. A fundamental role of religion is in the shaping of cognitive and emotional processes that form the bases for attitudes, the categorization of something along some good/bad evaluative dimension. Attitudes controlled by automatic processes may occur independently of higher level processing, reflecting the automaticity of affective responses. These responses reflect the anatomical basis of the emotional reactive basis described by Ledoux (1996), who found how little the cognitive processes may be able to control the biologically based emotional reactions. In contrast to the lack of cognitive control over emotions, the outcome of ritual processes engage control of emotional reactions. When individuals are operating under stress or when circumstances defy conventional explanations, it is more likely that the automatic emotional processes will take over in the evaluative processes. Rituals are used to guide these reactions towards adaptive states, shaping what is perceived at emotional levels. Situational, interpersonal, and other conceptual influences are part of ritual management that may determine whether—and which—cognitive or emotive processes are given priority. These emotional priorities and expectations are key aspects of our endogenous healing processes.

Spirits as Symbols in Endogenous Healing Process

Shamanistic healing shares with biomedicine and all forms of healing a common basis in the use of symbols to evoke healing responses. All healing occurs within cultural systems that symbolically manage illness through classification of conditions and determination of therapeutic practices to manage them. The meanings given by cultural symbols affect physiological responses through the attachments and evaluations they engender. Kleinman (1980) referred to this as "medicine's symbolic reality," which involves the evocation of psychophysiological responses through linkages among social events, cultural meanings, and attachments. These symbolic effects produce physiological responses and elicit endogenous healing responses such as placebo effects.

Symbolic effects initiate endogenous healing functions prior to diagnosis, resulting from how the person responds psychophysiologically to the interaction with the healing system. Ethnomedical systems diagnose—label, classify, and evaluate—illness, structuring the personal experience of illness through the characteristics assigned (severity, responsibility, etiology, likely outcome, etc.). Classification of illness constitutes a part of the healing process and can reduce stress and anxiety and their detrimental physiological consequences by addressing uncertainty, transforming an unknown condition into events that are understandable to and manageable by the social group. The act of classifying an illness is a form of symbolic treatment through the effects of cognitive, personal, and social mechanisms on emotions. Kleinman characterized healing as occurring along a symbolic pathway of words, feelings, values, expectations, and beliefs through which cultural events elicit affective and physiological processes. Psychosomatic and sociosomatic correlates—where our personal and social circumstances affect physiological responses—are implicit in all healing.

This symbolic model provides a framework for explicating the central role of spirits in healing processes. Spirits concepts are cultural symbols that have a variety of roles in eliciting psychophysiological responses that produce healing. This is based in relationships established through socialization of feelings and their linkage to physiological responses. This linkage is accomplished through language and other symbolic systems, which produce psychosomatic and sociosomatic effects by the association of symbols with physiological processes through affective/emotional evaluations.

Psychoneuroimmunology

The field of psychoneuroimmunology[2] (PNI) derived from findings that immune system processes are affected by the organism's responses in adaptation to the environment. PNI emerged from recognition of the ability of symbols, personal expectations, social relations and, above all, stress, to have effects on immune system responses and health. The interactions are not strictly material, but involve the organism's adaptations through cognitive models, psychological states, and social relations. PNI research has investigated interactions among the central nervous system (CNS), endocrine system, and immune system (Lyon 1993), particularly, how symbols tune the relationship between the nervous and immune systems (Varela 1997). PNI shows that the immune system is affected by the interactions between psychological and physiological processes, particularly the ways in which thought, feeling, and behavior interact in disease processes (Lyon 1993, 77).

Because of the social basis of immune system functioning, health and disease processes are affected by the interactions among social relations, emotions, and physiological processes. These interactions between the organism's social and biological levels are based in subjective emotional experiences and sense of self. Immunological responses involve relationships between biological and social levels of being, an interaction of individual physiology and social psychology that is the context for effects at cellular levels (Lyon 1993). Lyon suggested this context involves human emotions, which are both biological and cognitive, and produce both disease and healing. Interpersonal interactions and social experiences affect the immune system via intervening influences of emotions that involve individually felt meanings and their somatic responses (Lyon, 85).

The immune system operates as one of the most fundamental adaptations of the organism to the environment, a system that detects and responds in protective ways to pathogens—germs and other toxic threats from the environment. The immune system is one of the body's most complex systems, responding to an array of pathogens that threaten the body—microorganisms such as viruses and bacteria, fungi, allergens, and toxins (Hirsch 2004, 92). When these pathogens penetrate outer defenses in the skin, mucous membranes, and digestive systems, the immune system responds with the production of antibodies. Immune reactions are elicited by the detection of foreign proteins, distinct from the organism's own. When a foreign antigen is detected, the body produces memory cells that are prepared to combat this pathogen if it reoccurs in the organism. The immune response includes specialized white blood cells called leukocytes, including

lymphocytes (B and T cells), monocytes, and granulocytes (Hirsch, 93). When a B lymphocyte is triggered by the recognition of an antigen, it stimulates the production of antibodies (immunoglobulins), which have a wide range of specialized functions in combating entities that are foreign to the organism.

A systems perspective is necessary to understand how symbols bring about physiological changes in the body and how effects are communicated across domains of mind and body. Lyon proposed that these communicative functions of the immune system produce an "immunosemiotics" that involves "biological meaning" based in immune system cognitive functions of discrimination, inference, and memory that provide the basis for an "immunological self." The immune system can be conceptualized as a sensory system within which the white blood cells function as "messenger molecules" for communication among the CNS, immune, and endocrine systems (Lyon 1993). Peptides found in both the immune and neuroendocrine systems provide the basis for signaling the immune system in response to "noncognitive stimuli" of not-self— such as viruses and bacteria. The immune system's sensory function enables it to relay information to the neuroendocrine system and initiate physiological changes. CNS responses to emotional stimuli change hormone levels that affect the immune system as "information molecules" that act on the immune system indirectly through hormones and directly through neurotransmitters (Lyon 1993).

Varela (1997) characterized the immune system's structure and functions as a "second brain," providing a self-regulating control of the body's responses to the environment. The immune system has organs distributed throughout the body that manufacture or store its cells (lymphocytes, B cells, T cells of the thymus, the spleen, and the lymphatic system) that adapt through learning and memory. Through the interaction of mind and emotions with the nervous system, our psychological conditions have influences on health, as discussed above in the stress responses. This provides mechanisms for interaction between the CNS and the immune system. CNS response to stress causes the release of hormones (glucocorticoids) that interact with the lymphatic system, stimulating the immune system to release lymphocytes and immunotransmitters that act directly on neurons of the limbic system (paleomammalian brain), the center of emotions and self. Hirsch characterized the brain-immune system communication underlying the immune system response as involving the sympathetic-adrenomedullary system and the hypothalamic-pituitary-adrenocortical system, both of which are paleomammalian brain regions aroused by the SNS fight-or flight response. This activation triggers the endocrine system of glands to release a wide range of chemical messengers. Hormone receptors are found throughout the immune system, as well as in the organs and neurotransmitter systems. Their interaction across these different systems enables hormones to play a vital role in communication across self, body, social context, emotions, meaning, and immune system responses.

Self

The immune system functions as a level of the self, a system that has the function of distinguishing the "not-self" at the level of cellular recognition of foreign

entities (Lyon 2003; Wilce 2003). The concept of the self is central to theories of PNI because the most basic response made by the immune system is a response to the presence of an outside entity, something that is foreign to the organism, something that is "not-self." PNI approaches have traditionally assumed that immunological processes work through a precultural level of the self involving the body and its emotions, a primordial aspect of personal identity that includes a sense of the body and its internal processes and its emotional relations to family and significant others in society. The immunological self is not the rational, language-based thinking mind, but, rather, a much deeper embodied self of behavior, habits, nonverbal communication, and social and emotional dynamics that are the foundation of our participation in the social world. This behavioral level is a semiotic (meaning) system shared with other animals in our embodiment and expression of meaning and intention through behavior.

This body-based, preverbal system is the basis for a metalanguage of communication within the organism and across its verbal, behavioral, neural, and immune systems (Wilce 2003). The innately structured metaphors of the body found cross-culturally and throughout cognitive domains is the basis of this self. Wilce used the term *somatosocial*, "body-social," to expand on the bases of the concept of socio-somatic, where social relations affect the interaction between mind and body. Somatosocial describes the recognition that the body is prior to the conception of the social and is a metaphoric basis from which we understand social relations (for example, he is the "head" of the group; she is the "heart" of the organization).

Bodies are natural systems of meaning, but they also acquire their significance from local meanings and circumstances. The material bases of the symbolic and social world impose cultural concepts on the body. Mimesis is the core of the symbolic systems of the body, with its ability to act being the most fundamental representational system and basis for metaphor. Mimesis, the body's ability to imitate and represent through action, is the common basis of both somatic and symbolic levels of reality.

The level of representation of mimesis is manifested in our bodies as habits, the individual behavioral patterns produced by conditioning the lower centers of the brain into typical response patterns, an engagement of bodily processes and associated psychological reactions. Habit also provides an emotional engagement, with a sense of control and security derived from the regularity of patterns of experience. These reflect conditioned effects, derived from classic conditioning and associational learning, and in which personal experiences and social conditions are symbolically and physically incorporated into development of body responses.

These and other learned meanings affect emotions, morale, mood, and experiences of depression and powerlessness. These bodily expressions of internal states are the most fundamental aspects of our relationships to the outside world. Body metaphors have the power to express meanings by their natural ability to mediate between the sensory domains of felt experience and the verbal domains of expression, employing analogical reasoning processes that use the body as a common template for integrating felt experiences and social reality. Culture provides the social context in which the metaphors of our "bodyminds" are engaged by the social context that defines their meaning.

Social Context

Wilce pointed to the central role of social and cultural factors in immune systems, which reflects the intimate effects of our social relations and the symbolic expressions found in society on our immunological system functions. Social context is fundamental to the emotional processes of the self that integrate the effects of social life within bodily processes. PNI emerged from recognition of the vital role of not only psychological aspects but also social interactions in the functioning of the immune system. Our immune functioning is affected by our relative social status in society, making the hierarchy of social relations a part of the systemic effects on the health of individuals.

Lyon (2003) proposed that the relationships of social life to the immune system are mediated through the habitual effects of conditioning on our behaviors, producing a mimetic enactment of personal and cultural patterns, which provide the basis for emotional contagion, the linkages between social life and bodily processes. Kirmayer (2003) noted the cultural dynamics of sociophysiological responses, how the meaning of individual experiences has effects on physiological responses. These sociosomatic-psychosomatic interactions engage emotional dispositions to act through which cultural specifics shape the biological responses of emotion. Lyon noted that the role of emotions as mediators between social relations and our experienced body makes them natural representations of the processes in the broader social system. This makes cultural metaphors of the body relevant to management of our emotions.

Emotional Empathy and Contagion

Emotions are the representations of how the body subjectively experiences the self and the social world through their interrelations in intimate social networks. Our emotional capacities involve self and physiological mechanisms for adjustment to the social environment. It is through the derivation of emotions from personal experiences of social relations that our individual psychophysiological dynamics are intimately lined to the social world. The symbolic processes and social relations are consequently fundamental to elicitation of emotions and in the production of emotional empathy, a process that transfers experiences from one body to another. This emotional contagion is based in unconscious imitative bodily processes, derived from the bodily dispositions produced by attachment, where the integration of body, emotions, and the social awareness of others first occurred (mirror neurons also trigger these homologous responses). Emotional contagion is concerned with the co-occurrence of the same emotions among members of a group together in a setting. Across species, emotional contagion is based in imitative processes, including mimicry and other behaviors that place animals in attunement or synchrony. It is a multilevel phenomenon influenced by physiological, behavioral, and social levels and their respective meanings.

PNI theories consider the meaning of events to play a role in the regulation of the immune system. Kirmayer noted that there are many forms of meaning, including forms of cognitive, affective, behavioral, and social representation. These provide the bases for a variety of feedback loops between the psychosocial

dynamics of life and the functioning of the immune system (Kirmayer, Lyon). Some contributions involve unconditioned effects, natural biological responses of the body such as the grief from loss of a family member, marital conflict, and disruption of mother-child relations. Most have learned components, however, including conditioned effects from socializations and learned systems of meaning embodied in metaphors.

Symbolic Healing through Metaphor

Shamanistic healers' ritual activities embody many symbols that express concerns of the sufferer and of society at large, with treatment processes manifesting cultural conceptions of emotional conditions and social relations. Shamanistic activities construct a mythic world and symbolically manipulate it to elicit and transform emotional experiences for the patient. Dow (1986) described these universal aspects of symbolic healing and the psychological processes through which symbols affect mind and body. These psychological processes involve creating an experiential reality through ritual. The healer ritually enacts and elicits a commonly held mythic system and interprets the patient's condition within that system. The attachment of the patient's emotions to previously internalized mythic systems of meaning allows the healer to then transform the patient emotionally through manipulating the symbols that correspond to the self systems of the patient. A cure is produced through remodeling the self within the patterns of the mythic world, using social drama to transform psychosocial and physiological dynamics.

Dow (1986) characterized the mechanisms of symbolic healing in terms of the relationships among the hierarchies of living systems. Personality and its problems are part of a hierarchy of interrelated systems extending from the organic and somatic levels through the self and social systems. Although each level constitutes a complete system (e.g., body, self, personality), each system has parameters based in the other systems. For example, while personality is not organized in biological terms, physical illness can transform one's personality. Social conditions such as job loss can transform our experience of our physical well-being. These interrelationships across levels of the human system provide the basis for systemic self-regulation and causal effects. In shamanic healing, symbols provided by myth and embodied in ritual communicate to the self system and the somatic. The self system shares the unconscious thought processing of the body (somatic level) and exerts its influences through interpretation of affective significance of symbols at the biological level and their significance for the self system. The transaction of emotion in the self system allows healing to occur through unconscious and somatic processes elicited by symbolic communication.

The generalized link of self and body through emotions enable shamanistic therapies to catharsize (emotionally release), transfer, and transact emotions and other attachments. These emotional processes are reinforced through suggestion, persuasion, catharsis, social restructuring, psychodrama, and therapeutic relationships. Emotions constitute basic integrative control functions, providing higher levels of the organism with a summarization of complex processes

occurring at lower levels (Dow 1986, 64). Emotions can play this fundamental linking role because meaning determine patterns of physiological elicitation with information from personal, social, and cultural levels. Dow suggested that symbolic healing is based on a human capacity for interpersonal communication derived from a prior human capacity to communicate with one's self through emotion. This intrapersonal biological control and communication mechanism was extended into later evolutionary control systems based on symbolic systems and language. Consequently, symbols can reciprocally use the emotional-meaning system to affect biological processes and produce a cure. A primary mechanism of this symbolic communication is through metaphor.

Metaphoric Processes in Healing

Kirmayer (1993) developed a general theory of symbolic healing examining how metaphoric language creates meaning and personal changes. Kirmayer (162) characterized meaning in terms of the imaginative relationship of thoughts and feelings; metaphor engages the power involved in "thinking of one thing in terms of another" in the interaction among sensory, affective, and cognitive elements (Kirmayer, 172). Metaphors create and convey meanings or connotations derived from the juxtaposition of images and sensory and affective information that reshapes experiences. Myth is a key tool in linking these processes.

Myth and archetype are basic to ritual healing because they link biological and experiential meanings across the false dichotomy of objective and subjective knowledge (Kirmayer 173). Kirmayer suggested that myth, metaphor, and archetype represent distinct levels of meaning that are linked in the interactions of body, imagination, and society, providing mechanisms of symbolic healing. Myth imposes a structure on thought and behavior, and consequently on the body through their ability to evoke and reorder experiences. Kirmayer (1993) suggested that metaphors provide healing by bridging the archetypal and mythic levels of experience, structuring conceptual domains through evoking strong sensory/affective associations. The healing efficacy of myths derives from their ability to unite within a narrative the different levels of human experience. Myths still work today when they can be interpreted in ways that tap into the patient's archetypal structures by communicating empathy in meanings derived from their sensory and affective qualities. Metaphor becomes more complex and sophisticated with verbal expression, but earlier levels of meaning-making continue to contribute to abstract understanding through an integrated grounding of thought and action in sensorimotor experience and social life.

Metaphor bridges presentational and representational levels of meaning with imagetic metaphors that convey meaning in both domains. The meaning of metaphors is reciprocally shared by the representational systems and the lower levels of sensory affective processing. These metaphors underlie the processes of thought and action, enabling cognition to drive physiological responses by using metaphors to evoke bodily experience. The effects of metaphors are derived from the immediacy of bodily felt experiences grounded in archetypal patterns shaped by cultural and social factors. The healer uses symbols specific to the audience,

with the ritual manipulation integrating different aspects of the self. For instance, when Christian healers use the metaphor of the "loving heart of Jesus," this resonates with their audiences' own hearts and emotions of love as well as the natural metaphoric properties of the heart.

Kirmayer addressed multiple mechanisms of symbolic healing, characterizing the healing efficacy of psychoanalytic approaches as derived from the revelation of previously warded-off truth. The symbols of psychoanalysis may heal because they reveal underlying dynamics and provide a balance among different aspects of the self. Healing may occur because the metaphorization of distress provides the person with resources for managing self and emotions. Meaning is derived from the coordination of sign systems and symbols, an internal logic derived from the relationships in a total system that allows rituals and symbols to unconsciously affect individual thoughts, feelings, and conditions. Ritual efficacy derives from the psychophysiological effects of metaphor, including its ability to evoke nonverbal processes and responses. The physical and psychological associations of social context and symbolic actions produce a biological psychology through which symbolic cognition is grounded in the body.

The universal aspects of symbolic healing in Dow's (1986) model involved the establishment of a generalized mythic world, the persuasion of the patient to particularize his or her problems within that mythic world, the healer attaching the patient's emotions to the mythic world symbols, and the manipulation of those symbols for assisting emotional transactions. Kirmayer suggested that the verbs *establish*, *persuade*, *attach*, and *manipulate* involve processes that are not explored within the structuralist approach. We must understand instead the process of physiological and psychological levels, including nonsemiotic social and biological processes that produce healing through meaning. This meaning of metaphor is not just within the symbolic realm, but also in terms of the physical body and society: "Metaphor theory does this by insisting on three levels to action and discourse: the mythic level of coherent narratives; the archetypal level of bodily-givens; and the metaphoric level of temporary constructions." The processes of myth, metaphor, and archetype represent the social, psychological, and bodily domains, respectively (Kirmayer, 175). Metaphor links body and society through myth and the archetypes of the body. By archetype, Kirmayer meant processes that are rooted in the nervous system and presented in images that are subjectively compelling experiences appearing before reflection. These archetypal bases of thought are grounded in physical actions and the body's motor system. Archetypes arise from the interaction of the body with social relations that constitute a universal substrate of human experience; these are the neurognostic foundations of consciousness—"knowing how," related to images of the body's actions (see Chapter 3).

Biosocialization and Symbolic Penetration

The neurophenomenological or biogenetic structuralist perspectives (Laughlin, McManus, and d'Aquili 1992) illustrate how myths, metaphors, rituals, and symbols can affect health. These mechanisms involve socialization processes that symbolically canalize physiological development and habitualize and automatize

physiological responses to symbols. The development of the organism's genetic potentials requires symbolic input into the developmental canalization, a habitualization of physiological responses. For humans, this input includes the cultural environment and language. Symbolic effects on physiological levels are inherent aspects of the organism and its functioning and activities because processing of environmental stimuli and their significance is fundamentally symbolic. The symbolic process is fundamental to the development of models basic to cognitive development of models mediating the neural organization of experience. In its most fundamental form, perception is a symbolic process, a representation of present stimuli in terms of symbolic memories of previous experiences. Experience, development, and socialization involve entrainment, the linking of neurons into networks. The brain's (and consciousness's) developmental socialization is through entrainment of neurons into networks constructing cognized models of the operational environment. The networks mediate the cognized world and present the symbolic model into which environmental information is assimilated. The brain's preeminent function is to optimize adaptation through symbol systems that mediate between input (senses) and output (behavior). Enculturated humans no longer experience the world directly, but through the learned symbolic associations. We thereby experience the meaning of symbols rather than the actual world. For instance, when asked to put a piece of sterile rubber looking like feces in their mouth, most people refuse and are disgusted, even though they know if is just rubber. Our emotions are driven by the symbolic interpretation, which outweighs our actual knowledge of what the object is.

Fundamental to biological development is the repeated entrainment of networks of neurons stimulated in response to specific environmental conditions, including the symbols (such as words) that are associated with those conditions. The associated responses develop a neurological canal (a creode) which forms in repetitively responding to and modeling specific stimuli. Canalization processes include cultural association patterns and their linkages across behavior, emotions, and cognition, an associative chain within a hierarchy of specific and global physiological reactions (e.g., emotions). The canalizing process functions in individual development and social adaptation, and in the acquisition of perceptual discrimination, motor activity, conceptual differentiation, symbolic processes, and patterns of association. These adaptations produce adaptive coordination among members of a species in commonalities in self and world view.

These common relationship between cognition and the nervous system allows it to be activated through ritual in symbolic associative processes. Perception, cognition, and action are grounded in common neuropsychological and symbolic processes. A symbol may evoke any neural network or neurocognitive model with which it has been entrained, including autonomic and endocrine systems, brain structures, emotions, and abstract ideas. This is symbolic penetration, the effects of the neural system mediating a symbolic precept on associated physical systems. Symbolically evoking and entraining associated physiological systems allows meaning to influence physiological processes. That is why it is a crime to yell "fire" in a crowded theater; that symbol will evoke traumatic responses internally (stress) and behaviorally (chaos).

Shamanistic Healing as Ritual Symbolic Penetration

Symbolic healing processes operate on numerous associational patterns and their mediation through both the body and the ego. Laughlin et al. (1992) characterized the ego as a neural network that separates, differentiates, and integrates the environment while maintaining self-organization and adaptation to the operational environment. Outside of ego experience are automatized structures from earlier developmental stages and repressed or latent material, such as the genotypic and phenotypic progenitors of the ego. The ego tends to deny these structures that function outside of consciousness, although these complexes affect the ego and other structures of consciousness. Symbolic penetration created by ritual can evoke these structures and their intentionalities and can operate on them, mediating and transforming them outside of awareness. Symbolic healing processes can affect psychodynamic structures, destructuring the ego, evoking latent aspects of the self, transforming socioemotional aspects of the psyche, or activating and elevating deep structures into consciousness. Symbols may produce a cure by reelevating, transforming, and integrating latent or suppressed neural networks.

The neurophenomenological perspective provides an understanding of shamanistic healing processes as producing cures through entraining deep levels of neurocognitive organization. These repressed structures can produce conflict, allowing re-integration of this material into the conscious network to rework the individual's experience of self and world, including self-understanding and autonomic balance. Shamanistic healing synchronizes individual and collective consciousness through using rituals to control phases of consciousness, synchronizing the individual with the collective cognized environment of the group.

Shamanism epitomizes these principles of ritual healing involving a "theater of the mind" (Laughlin et al. 1992), the use of symbols as penetrating agents that entrain the individual's neurocognitive organization through myth, symbol, and ritual which induce experiences and interprets them for the participants. Myth and ritual behaviors include symbols that bridge iconic and verbal levels by including metaphors that cross domains of meaning. Myth serves as a means of molding, stabilizing, and integrating the patients' experiences through giving them meaning. Myth provides the symbolic framework for understandings that transcend the ego, permitting the integration of the ego into wider structures of consciousness. This integration may result in profound changes in the individual because the symbols are entrained with physiological processes associated with basic emotions; social attachments; needs of the self; a sense of comfort, security and certainty; and of fears, anxieties, and other psychodynamic processes that have effects on physiological processes.

Shamanistic Healing and the Self

Role theory is central to understanding shamanic development and healing, as well as the general social psychology of religious healing. Peters and Price-Williams's (1981) experiential analysis of shamanism provided insight into the therapeutic potentials present in role-taking and development of the self. The different

shamanistic traditions—shamanism, mediumistic possession, and meditative traditions—all engage role and self-development. These therapeutic processes are focused on mending self, particularly emotions and the relationship of the self to others. Development of the self involves the integration of other people's roles into one's personality by adoption of others' formulas or scripts for self and behavior. These processes of role-taking provide mechanisms through which personal development occurs, including relations with "divine others" or "sacred others" (Holm 1997; Pandian 1997). This role-taking through symbolic communication enables one to treat spirits as social others and incorporate their qualities as aspects of one's own identity. Identification with the social other in the spirit world's others provides the bases through which ritual healing practices have the power to transform a person's life, particularly emotions and identity. Spirits provide a variety of roles for defining the qualities of the self and adapting to the social world, providing models for personal development in the spirit world-symbol systems. Spirit models expand the human capacity for modeling the self by using ideal others from mythology.

Soul Loss as Shamanic Illness

The self aspects of shamanic illness are exemplified in soul loss, which was characterized by Achterberg (1985) as one involving an injury to the core or essence of the person's being. Ingerman (1991, 4) similarly characterized soul loss as "losing crucial parts of ourselves that provide life and vitality." This injury to one's essence is manifested as despair and reflects a disharmony in feelings of belonging and connection with others. Soul is characterized as constituting our vital essence, the "seat of the emotions, feeling, or sentiments" (Ingerman, 11). Soul loss is from trauma that causes some of our vital essence to separate in order to escape the impact. This separated part or aspect of ourselves carries with it the experiences that are then denied to our consciousness. The return of souls lost earlier in life allows the ego and the body to move forward instead of being emotionally stuck in that time and place where the loss occurred.

The recovery of these split-off parts of one's self and healing this loss can be achieved by a community ritual. Ingerman suggested that there is great power in another person witnessing the return of the soul. The person's community or social support network plays a vital role in the recovery and healing processes. An outcome of this is an experience of *communitas*—a recognition of the essential bonds that humans have with others. Turner's (1969) work illustrated the fundamental importance of this transformational experience of communitas in providing a means of bonding members of society together in recognition of their dependence on one another. Peters (1989) characterized communitas as an existential experience that transforms the individual in relationship to the transpersonal as well as to worldly and social life. Shamans elicit feelings of communitas in transformational experiences in which the boundaries of self are dissolved into a state of unity consciousness. The unity experiences and the resultant identity with others and all life provide the basis for the development of self in an integrative style of personality and an ethos based on service to others. Central psychodynamic effects of shamanistic healing evoke changes in the patient's self through the healer's projection and

elicitation of models of development (Laughlin et al. 1992). Shamanic projection involves positively projecting a more advanced state of development into another person, based on the unconscious transference of control of the individual's intentional processes to a powerful "master."

Laughlin, McManus, Rubinstein, and Shearer (1986) suggested that shamanic rituals provide greater control over changes of consciousness that enhance access to transpersonal (or integrative) levels of consciousness through the replacement of ego-centered consciousness with a variety of neurognostic structures. Symbolic processes produce changes in consciousness and provide new frameworks for interpreting one's experiences. The penetration and evocation of neurognostic structures through symbols can enhance developmental processes by bypassing existing cognitive structures that inhibit development and growth.

Shamanic practices produce an experience of an active participation in these transpersonal experiences, a "waking dream" analogous to Jung's transcendent function, "a uniting of conscious and unconscious ways of knowing that leads to self-actualization, or 'individuation' " (Peters and Price-Williams 1981, 406). These experiences induce transformation of self. Peters (1989) suggested that an underlying similarity common to shamanic, yogic, and other meditative traditions is found in the transformational structures that involve acquisition of a spiritual identity used to change relationships to one's social and physical world.

Healing in Shamanic Journeying

Although well-being is related to development of attachment, this can create a false self that involves identifications to please caretakers, producing dissociation from aspects of self that they disapprove of. This begins a psychological abandonment of the true self that manifests later in life in anger, frustration, and loss of access to one's own creative potentials (Gagan 1998). Shamanic journeying can heal these developmental traumas and reestablish contact with one's true self through "power animals" that represent dissociated aspects of the self. These power animal relations can nurture the traumatized aspects of the self and provide important substitute attachment experiences. Journeying allows a reframing of early traumas, particularly those that are still dissociated. Power animals encountered in shamanic journeying may be recovered as manifestations of "lost souls," reactivating lost potentials and dissociated aspects of self. Incorporating power animals can provide healing through their integration into the self, bringing qualities and characteristics that help address shortcomings, particularly deficits in personality development. It is the "journey time" that provides an opportunity for this work.

Achterberg (1985) analyzed the shaman's use of imagery to impact health in terms of a "pre-verbal imagery," in which imagination acts directly on the physical substrate, including tissues, organs, and cells. This type of communication functions outside of deliberation and consciousness, a capacity that evolved prior to language. Achterberg proposed a second type of healing imagery involving transpersonal symbols that are universal and act on the collective unconscious (or neurognostic structures). The symbolic encounter in visionary experiences

involves the unconscious and transcendent aspects of consciousness that provide a means for manipulation of and integration of the psyche.

The roles of internal imagery in cognition involve "metaphoric predication" between domains of experience and other forms of information processing. This imagetic capability engages the same brain capabilities and levels of information processing within the visual system (Baars 1997). Visual images link the somatic and the cognitive levels through analogical processes. The inner images attune the patient to the levels of psychobiological communication where images play a central role in muscular control. The effects of conscious images are widely distributed throughout the brain, which enables them to drive the unconscious control centers of muscles (Baars 1997). Images represent goals that recruit and coordinate a wide range of unconscious systems to achieve goals. Images provide for voluntary influence over the autonomic nervous system. "Imagery seems to be the only conscious modality that can trigger autonomic process" (Baars 1997, 141). Threatening images evoke the fight-or-flight response (SNS activation) and pleasant images stimulate the PNS's relaxation response.

Spirit illnesses, possession, and illness due to malevolent action of spirits can be viewed in psychological terms as a negative introject, a negative self-belief that the person has internalized. These unconsciously internalized ideas may have major impacts on individual psychodynamics and physiological processes. Ritual manipulation of spirit beliefs elicits the associated neurocognitive structures and the variety of physiological, psychosocial, and psychophysiological processes with which they have been entrained. The reintegration of these lower structures penetrates upward, integrating personal conditions (feelings) within the mythic symbol structures expressed in ritual to evoke these experiences. Reciprocal assimilation then permits the integration of the ego into new patterns by ritually elevating unconscious neurognostic structures and integrating them within the cognized environment expressed in the shaman's cosmology and mythology (Laughlin et al. 1992).

Jung regarded shamanic imagery to be confrontation with one's own unconscious psychological complexes. This supports a process of individuation or individual psychological growth. Complexes represent similar phenomena conceptualized in both psychiatric and spiritualist terms. Complexes are an organized dynamic of perception and behavior that are split off or dissociated from aspects of the person's normal personality and social identity. These "splintered-off," or dissociated, aspects of the personality (such as manifested in multiple personality disorders) are mechanisms that allow for the functioning of disowned aspects of one's own capabilities and characteristics or for the projection and manifestation of one's unconscious potentials. Shamanic practices symbolically induce therapeutic transformations by using the spirit world concepts to structure interactions among dissociated complexes of the individual and to integrate them within both collective social patterns and innate individual psychodynamics. Dramatic rituals produce psychodramatic transactions (e.g., see Jelik 1982) that restructure individual psychobiological homeostasis, psychodynamics, and psychosocial relations between individuals and their community.

Possession Illness and Therapy

The classical treatments of possession have used a wide range of procedures for exorcism of invading spirits, including incantation, exhortation, and a variety of purgatives and punitive measures designed to drive the presumptive possessing spirit away, including beatings, starvation, and near poisonings of the patient. Ward (1989b, 135) pointed out that anthropologists' reports of therapeutic benefits suggested that there is some efficacy in their treatments, which are likely the influence of "psychological factors and processes, such as perception, belief, expectancy, motivation, role playing, demand characteristics, and reinforcement." She detailed a number of mechanisms within exorcism rituals that have the potential for therapeutic effectiveness, including the following:

1. The sick role and therapeutic processes associated with the contextualization of the experiences within a cultural system of healing beliefs that provide a meaningful representation of the condition
2. The dynamics of therapist-client relationships in which the interpersonal bond and the charismatic, authoritarian, and omnipotent characteristics of the healer inspire the transformation of the patient's own expectations, resulting in a cure
3. Spontaneous remission or physiological adjustments based in the psychodynamics of placebo reactors, who have characteristics typical of those possessed (e.g., free-floating anxiety, hypochondria, depression, neurosis)
4. The cathartic discharges provided by abreactive techniques that permit a reliving and release of intense emotional experiences that underlie their psychological problems

These approaches to possession reflect conventional psychiatric perspectives that are considerably expanded by anthropological points of view. Possession plays a central role in psychodynamic transformation, providing models for the individual to reconstruct self and social identity. Possession systems can play prominent roles in the integration of cultural change, through incorporating and managing outside influences. Possession's sociopolitical implications and psychosocial therapeutic actions are exemplified in characterizations of possession phenomena as a manifestation of cultural resistance. Possession beliefs can emphasize a stabilizing traditional cultural response in the face of cultural disintegration caused by externally imposed social change. Possessing spirits and their behaviors can be a direct affront to the externally imposed value systems, expressing cultural pride and preservation of cultural identity in the face of powerful external forces that attempt to change social mores.

Kramer (1993) linked possession to experiences in which the self feels as if it were being acted on and affected by "others'" ideas and behaviors. But for some it may involve an experience of amnesia. The phenomena of possession illustrate the diversification of the self, incorporated as the other. There is also denial of self-responsibility in attributing responsibility for a transgression to a spirit other.

Spirit possession beliefs can allow for expression of repressed aspects of the personality, enabling the sick person to behave in ways not normally permitted. Ward and Beaubrun (1980) suggested that the attribution of responsibility to others, the spirits, allows possession to provide advantages for victims by allowing them to escape from conflict and guilt.

Charismatic Catholic Healing and Possession

Csordas (1994, 100) characterizes Catholic charismatic healing as being about self-processes that are analogous in function to shamanic healing, most specifically, shamanistic healing of possession. Among the prominent aspects of charismatic healing are activities of "resting in the spirit" and "slaying in the spirit," the experience of being overpowered by a divine presence, a phenomenon in which the individual falls backward to the ground, often with a total lack of awareness lasting several hours. This presence of divine power reflects cultural concerns with the integrity of the person, as the Holy Spirit hovers near the person but does not enter the person as in demonic possession. By engaging a range of aspects of the body-self, this experience of a relationship with the divine provides a companionship that surpasses the capacity of human relations. This divine presence and its intimate relationship engage self-processes that produce nurturing and healing.

The predominant theme in this charismatic healing is related to intimacy, with imagery revealing the lack of intimacy or failure in intimacy, often stemming from childhood or marital relations. The divine embrace with Jesus substitutes for absent or lost parental or spousal intimacy, providing an enduring relationship involving interpersonal intimacy. Divinities play a significant role as "internalized others" that facilitates the resolution of developmental blockages produced by trauma. Csordas characterized the divine images, and Jesus in particular, as a "internal transitional object" that serves as a "developmental way station" that leads to development of mature relationships (155–156). Csordas characterized the relationship with Jesus as a metaphor for selfhood, a coming to terms with the alterity of self that produces a new sense of self.

Csordas also analyzed the charismatic concern with demonology in terms of its implications for the nature of the self. These evil spirits are conceptualized as "persons" and "intelligent entities" whose essential qualities are represented in their names, reflecting sins and negative emotions (e.g., greed, lust, anger, bitterness, and jealousy). Csordas called the demons "photographic negatives," negative attributes of the person. Demonic spirits attach to the individual, thereby bonding him or her to these undesirable behaviors and emotions, which must be severed to release the person. These negative aspects are viewed as not-self, dissociated from the self and attributed to the demonic entity. But their effects upon the person illustrate a crisis of control, a contested self.

The effects of the demonic spirits provide insight into the cultural concerns about afflictions to the self, manifested in the negative emotions and behavior. The identification of the molesting spirits serves to formulate the patient's problems. The nature of one's problem is manifested in the qualities of these demonic spirits,

exhibited indirectly in mannerism and mood of the patient, including facial and eye expression and bodily posture. The deliverance of healing addresses these threats to self through ritual elicitation of emotional self-processes that engage the somatic mode of attention or awareness provided by the body. This is the existential ground of the self. Sacred healing addresses the physical body and its disabilities by changing the habitual mode of engaging the world in an incremental fashion. "Healing allows this by challenging the sensory commitment to a habitual posture, by removing inhibitions on the motor tendency toward normal postural tone, and by modulating the somatic mode of attention" (Csordas, 71–72).

COMMUNITY RITUALS: SOCIAL RELATIONS AND WELL-BEING

A core aspect of shamanism emphasized by Eliade was that ritual, which was on behalf of the community and that the entire community was expected to attend. The effects of community rituals on social life and individual physiological and psychological states are key aspects of shamanic healing. This healing dynamic reflects the primary social psychological functions of religion—meeting needs for belonging and comfort and shaping individual psychodynamics and psychophysiological responses in bonding the individual with others in society. Shamanism is a primordial form of group bonding, one with roots in the collective rituals of our ancient hominid ancestors (Winkelman 2009; Winkelman and Baker 2008; also see Chapter 6). Shamanic activities integrate and bond people in an intimate group, enhancing social cohesion and producing social support that results in opioid release (Frecska and Kulcsar 1989). Shamanistic healing practices evoke ancient mammalian bonding mechanisms involving neurobiologically mediated forms of attachment that release endogenous opiates and elicit endogenous healing processes.

The Functional Efficacy of Ritual

Rappaport (1999) emphasized that religion, ritual, and the sacred are adaptive properties of the human species, as well as adaptive social processes used by our species to organize the social world. It is the ability of ritual to transmit information about the state of the sender, including physical, social, and psychological conditions that enable ritual to play a variety of adaptive roles (Rappaport 1979).

In contrast, ritual has been traditionally conceptualized as repetitive behavior for which no evidence exists to substantiate the technical or physical effects believed by the participants, imputing faulty causal reasoning to the participants by the analyst who dismisses the effects participants presume their rituals to attain. Anthropological approaches have side-stepped this presumption of incompetence by a distinction of the presumed manifest practical (technical) aspects of ritual versus the latent expressive and symbolic dimensions. Because rituals generally assert means-ends relations not considered functionally possible, explanation has emphasized their latent effects on psychodynamics or social

behavior. Rituals are then understood as acting and explaining at symbolic levels rather than at technical or physical levels.

These social symbolic effects are communicative aspects of ritual embodied in values, cosmology, and social relations (e.g., see Skorupski [1976]). Rituals are seen as symbolic statements manifesting the culture's basic values, especially humans' relationships to other humans, nature, and the cosmos. Ritual may state obligatory conditions of social life and communicate that message to participants, binding them together in a group that feels a sense of commonality. Rituals express the structure of society and the culturally ascribed meanings to the moral and natural order, providing an interpretive system that humans use to order experience and behavior. Ritual activities communicate important meanings to participants, expressing traditional cultural knowledge and guidelines for social behavior.

Ritual action at symbolic and social levels can affect all levels of human functioning. Any ritual can have health implications, but those most central to healing activities are critical rituals (crises responses such as healing ceremonies) and rituals for social transition (rites of passage). These assist the individual and the social group with adjustments necessary to accommodate the individual's new status and the status's implications for behavior and social relations. Rituals for social transition affect health in many ways, including the integration of the individual into new roles. Transition rituals are often directed toward the relationships between social conditions and physiological conditions (e.g., puberty). This ritual relationship demarcates certain points of the life cycle as especially significant, with social meanings and biological processes integrated in social life and personal experience—rituals at birth, naming, puberty, marriage, pregnancy, death, and so on. The ritual association of symbols and biological drives is a means of shaping and controlling human emotions and drives by providing them with explanations within cosmological frameworks.

But even these perspectives fail to fully appreciate the technical aspects of ritual. Ritual psychodrama can produce personal and social therapeutic effects as intended by the ritual processes. Such perspectives also fail to consider the technical effects of symbols, how ritual elicits associations and beliefs that transform experience, as well as elicit physiological responses. Rituals may have direct physical effects as well, exemplified in the physiological consequences and, hence, technical effects of techniques for altering consciousness. Rituals can also alter physiological processes through a wide variety of mechanisms that induce retuning of the ANS balance. This retuning tends to block the dominant hemisphere's functions and produces an integrative fusion with functions of the nondominant hemisphere; this structurally synchronized condition tends to resolve internal conflicts and to produce euphoric states (Laughlin et al. 1992). This synchronization depends on the elicitation of processes of lower brain structures that are associated with basic behavior, intentionality, and emotions.

Ritual consequences for psychology, emotions, and physiological responses constitute basic technical effects of ritual. Shamanic rituals cause changes in the patient, ranging from adjustments in social relations to the alteration in the balance of the autonomic nervous system (ANS), which has direct implications for health. Although ritual healing is often characterized as symbolic, shamanic

healing also involves a range of physical manipulations, including massage or rubbing of the body; application of the healer's hands on or near the body of the client with the intent of transferring healing energies; blowing or fanning on the body; sucking on the body; surgery and incisions into the body; washing and cleansing; and ingestion of a wide range of plant materials or other natural substances (Winkelman and Winkelman 1990). The physiological implications of physical manipulations are numerous. Ample evidence exists that herbal remedies are likely efficacious in treatment of physical diseases, as would be simple surgical interventions. Rubbing, massage, blowing, sucking, washing, and cleansing can be expected to induce a parasympathetic relaxation response.

Ritual affects emotional, cognitive and interpersonal dynamics, producing physiological changes that provide a range of mechanisms for transformation of health. Ritual provides practitioners with a sense of conviction that they are proceeding correctly and efficaciously, reinforcing charismatic effects and patients' expectations. Confidence in the healer provides emotional assurance, which elicits the patient's own healing responses. The symbolic dimensions of shamanistic activity and their relationship to psychosocial dynamics provide mechanisms through which psychodramatic ritual enactments alter individual and collective psychodynamics. General characteristics of shamanistic healing rituals include elicitation of placebo responses through the use of trickery, sleight-of-hand, and expectancy effects. Deception is deliberately perpetrated by the practitioner because it is known to produce a successful outcome at another level (e.g., see Levi-Strauss [1963]). Trickery confirms belief and produces positive expectation, with direct implications manifested in the "biology of hope" and in psychosomatic and placebo effects. Placebo effects constitute *symbolic* manipulations in that the treatment procedure does not have the biological mechanisms to produce the physiological effects that are intended. But the presentation of a "mechanism" by which the desired physiological change could be effected (e.g., the placebo pill) elicits the desired condition in the body. These classically recognized psychosocial processes of ritual transformation are extended in the neurophenomenological perspectives of Laughlin, McManus, and d'Aquili (1992) presented above, which illustrate how the entrainment of symbols and physiological processes during socialization provides bases for the effects of social processes and symbols on physiological processes.

Physiology of Community Bonding: Endogenous Opioid Releasers

The therapies of shamanistic healers are typically realized in collective ceremonies involving the participation of the local residential group (e.g., the entire band in hunting-gathering societies). Collective social integration produced by shamanistic healing practices through the participation of the local community strengthens group identity, exerting an influence on well-being by enhancing community cohesion through reintegrating patients into the social group. The relationship of social support to morbidity, mortality, and recovery indicates that social relations can have prophylactic and therapeutic effects (see Winkelman [2008a] for review). Community participation and relationships have therapeutic effects derived from

psychological and social influences (e.g., positive expectation, social support) and the sociophysiological effects derived from the opioid-attachment mechanisms and the psychoneuroimmunological response.

Kirkpatrick (2005) illustrated the role of attachment to the psychology of religion, reflecting a fundamental adaptive need of a biosocial behavioral system that evolved to maintain proximity between infants and caregivers. Attachments based on affectional bonds and relationships provide a secure basis for the self, providing feelings of comfort, protection, and a secure basis from which to explore the world. Attachment relationships are a fundamental dynamic underlying religions, providing the assurance that a powerful figure is available for protection against danger and threats.

Shamanic healing practices engage psychobiologically mediated attachment processes that promote synchrony among individuals. Opioid release is implicated in mother-infant attachment; social attachment; alleviating, mediating, and moderating separation distress; helping elaborate the positive affective states of social comfort; social play; and mediating the pleasurable qualities of social interaction (Frecska and Kulcsar 1989). The innate drive for affiliation and processes for evocation of opioid mechanisms are integrated through shamanistic practices. A common aspect of shamanistic ritual is the enactment of an encounter with powerful supernatural forces, symbolic "others" that produce emotional experiences considered to be the most profound known in these cultures (Eliade 1964).

Opioids are specifically elicited by situations of helplessness (Maier 1986). Ritually induced release of opioids is likely triggered by the terrifying experiences enacted by the shaman. Maier formulated a mock hyperstress theory for the elicitation of endorphins by severe psychological threats, where the ego's involvement with highly personalized horror scenarios in alternate realities produces hormone release.

A wide variety of shamanistic activities directly stimulate release of endogenous opioids (see Chapter 4 here and Prince [1982]). Shamanistic healing activities associated with elicitation of endogenous opioids include running and extensive dancing and other exhaustive rhythmic physical activities (e.g., clapping); temperature extremes (e.g., sweat lodges); stressors such as fasting, self-flagellation, and self-inflicted wounds; emotional manipulations, especially fear; and nighttime activities, when endogenous opioids are naturally highest.[3] A fundamental mechanism of opioid elicitation found in shamanistic healing is the extensive dancing and clapping performed by healer and participants. The opioid mechanism triggered by the A-delta mechanosensitive afferent nerve fibers mediates the behavioral, analgesic, and cardiovascular effects of exercise (Thoren et al. 1990), which has widely recognized therapeutic effects. Thoren et al. indicated that disorders such as hypertension, anorexia nervosa, depression, and addictions may be therapeutically treated through exercise. Endogenous opioids have an anticonvulsant and inhibitory action with respect to interictal and ictal discharges (Molaie and Kadzielawa 1989). The opioid neuropeptides are recognized for reduction of pain, as well as for enhancing tolerance of stress, improving adaptation, and globally stimulating immune system functioning.

Neuroanatomical Bases of Ritual Healing

The basic processes of ritual are readily recognized across cultures in the similarity in "the forms of action and kinds of ideas that characterize rituals" (Dulaney and Fiske 1994, 213). A biological basis for these cross-cultural similarities is further suggested by the common behavioral and ideational features that rituals share with a specific neuropsychiatric syndrome—obsessive-compulsive disorder (OCD). These universal features of ritual and OCD are derived from neurognostic bases reflected in the brain systems and forms of mentation proposed by MacLean (1990).

Dulaney and Fiske's cross-cultural study assessing the incidence of OCD features in ritual activities and work activities found such features twice as common in ritual as in work. Although there are fundamental differences in meaning, legitimacy, cultural values, and functions of OCDs and religious rituals, a number of the features found in individuals with OCD have strongly significant associations with ritual: concern or disgust with bodily wastes or secretions; fear that something terrible will happen; fear that they themselves may cause harm to themselves or others; measures taken to prevent harm to self or others; repetitive actions; special significance attributed to colors; and attention to thresholds or entrances. Such features, characterized by spatial arrays and symmetries, repetitive and stereotyped actions and rules, and measures to protect against danger, typify both rituals and OCD (Dulaney and Fiske, paraphrase 245). In addition, the authors suggested that rituals address relationships among habitualized patterns of behavior related to the integrity of self, to the relationships with significant others, and to concerns with bodily processes, grooming, sexual impulses, and aggression. These regular features of ritual are also found in those with OCD, suggesting a common physiological basis in brain functioning.However, Dulaney and Fiske suggested that a neurological basis for the structure of rituals is manifested overactively and dysfunctionally in individuals with OCD. In contrast to Freud's pathological attributions, Dulaney and Fiske emphasized that rituals are not collective disorders, nor are they compulsive, obsessive, or pathological, because they constitute intentionally adopted cultural means of achieving culturally defined goals.

The morphological and functional similarity of the actions and thoughts in OCD and rituals suggests that the human disposition to enact rituals is the consequence of a specific human capacity or neurognostic structure. Similarities of the common OCD/ritual characteristics with specific forms of mentation associated with particular anatomical structures of the brain and their functions provide a basis for substantiating the hypothesis of Dulaney and Fiske. I hypothesize that the mentation processes of the R-complex and limbic system provide the common underlying features for both OCD and ritual behavior. The activation of the R-complex and limbic system is suggested by the serotonin abnormalities (excessive levels), because most serotonin in the brain is in the hypothalamus (MacLean 1990) and the hypothalamus serves as a central link between these two brain systems.

MacLean (1990) suggested that there are forms of human behavior mediated by the evolutionarily earlier centers of the brain. Bateson (1972) argued that these kinesthetic and paralanguage systems have been elaborated along with the development of verbal language and have become even more complex, reflecting their continued importance in human socioemotional communication. Forms of vocalization such as imitative song and chanting found in shamanic activities involve the tuning of this early communication system. MacLean suggested that these communication forms involve protomentation, rudimentary forms of cerebration responsible for regulating daily master routines and subroutines in the expression of the major behavioral displays used in communication. These expressive functions are primarily managed by what MacLean (1990, 1993) referred to as the R-complex, or reptilian brain. The R-complex is involved in the integration of the various levels of reaction of the organism and regulate the animals' daily routines and displays of communicative social performances.

The roles of the R-complex in ritual behavior and OCD are abundant, with explicit similarities of routinization, isopraxic, repetitious, and reenactment behaviors in OCD and ritual.The common aspects of ritual behavior and OCD involving concerns with self, violence, and sexual impulses are based in processes of the paleomammalian brain. It manages neural information that subserves self-preservation, feeding, fighting/defense, procreation and sexual behavior, nursing/maternal care, and audiovocal communication (MacLean 1990). Ritual/OCD features specific to limbic system functions include sexual feelings, compulsions, automatisms, stereotypy, species-preservation behavior, and the emotional behaviors of anger, aggression, protection, caressing, and searching. Ritual induces the paleopsychic communicative processes of the reptilian and paleomammalian brains. Rituals provide the basis for an expansion of consciousness by integrating information from these lower systems into operational activities of the frontal brain and by establishing a synchrony with the frontal brain that permits symbolic reprogramming of the emotional dynamics and behavioral repertoires of lower brain centers.

CONCLUSIONS

A neurophenomenological approach rescues shamanic ritual healing practices from a premature demise as delusional beliefs and establishes them as a set of sophisticated traditions for managing self, emotions, and consciousness. Shamanic practices elicit neurognostic structures to facilitate symbolic action on self, psyche, and biology. Psychointegrators, music and dance activate emotional and personal processes of the paleomammalian brain and stimulate memories and feelings underlying personal identity, attachment, and emotional stability. Psychointegrators stimulate the integration of behavior, protomentation, and socioemotional dynamics with language-based ratiomentation, egoic representations, and personal identity. Shamanistic traditions share effects on self and on emotions, but they differ in specific psychodynamics, reflecting different social conditions and their effects on psychological structures, self, and others. They, nonetheless, share a biopsychosocial

dynamic of healing through the effects of rituals, which have deep evolutionary roots, and provide the ultimate basis of shamanism.

NOTES

1. For earlier reviews see Shapiro (1980, 1990); Taylor, Murphy, and Donovan (1997); and Walsh (1979, 1980, 1983, 1988). For more recent reviews, see Baer (2006); Chambers, Gullone, and Allen (2009); and Shapiro and Carlson (2009).

2. This section, Psychoneuroimmunology, is based on material prepared for Winkelman (2008a).

3. For principal sources on release of endogenous opioids, see Chapter 3 of this volume; also Appenzeller (1987); Bodnar (1990); Kiefel, Paul, and Bodnar (1989); Mougin et al. (1987); Rahkila et al. (1987); Sforzo (1989); and Thoren et al. (1990).

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6 Evolutionary Origins of Shamanic Ritual

CHAPTER OVERVIEW

The biological bases of shamanism identified in previous chapters indicate that we must understand these practices from an evolutionary perspective. The perspectives of biogenetic structuralism identify the continuities in the rituals of humans and other animals as a basis for determining the origins of shamanic ritual. The prehuman origins of shamanic ritual are revealed in its homologies (similar structures) with the common characteristics of rituals of the great apes. These commonalities in rituals imply their presence in hominids, the family that includes the ancestors and descendant species of great apes and humans. Similarly, the necessary ritual dynamics of humans' unique ancestors, the hominins, can be inferred from these hominid commonalities and their homologies with shamanic ritual. The ritualized displays of chimpanzees (*Pan troglodytes*) and their associated individual and group functions are examined as exemplars of generalized hominid ritual capacities. This baseline indicates the following ritual features of our hominid ancestors which constitute pre-adaptations for hominin ritual: group reunification displays; aggressive bipedal displays ("dancing") by males towards "others"; emotional group vocalizations (chorusing and singing); drumming; group protection; and individual and group integration. Their adaptive foundations are illustrated by the many functions of these displays in chimpanzee society: greetings, hierarchy maintenance, group integration, intergroup boundary maintenance, and release of tension and frustration. The differences between chimpanzee ritualizations and shamanic ritual provide a framework for characterizing the evolutionary developments of shamanism. These derived from altruism, which provided the basis for the coevolution of the religious and healing capacities. Endogenous healing responses evolved from the potentials found in hypnotic suggestibility and placebo effects. Healing capacities were also elicited by a variety of factors that produced alterations of consciousness, specifically: enhanced opioid systems; exposure to the selective effects of psilocybin-containing mushrooms for their effects on serotonergic systems; the effects of

long-distance running; and dietary and behavioral activities that enhanced dopamine and its functions. Enhanced dopamine functions contributed to variety of cognitive features that emerged in shamanism, including the elicitation of the symbolic capacity in visions and spirit beliefs and their use as adaptations for distal planning.

RITUAL AND EVOLUTION

Ritual was once central to inquiries about the nature of religion, but the importance of behavior in explaining religion has declined, in contrast to cognitive orientations regarding beliefs. Nonetheless, explaining the biological nature of religion in general, and shamanism in particular, requires understanding their behavioral origins in ritual. The behavioral focus of ritual illustrates the direct connections of the ritualized displays of animals with the sacred ritual behaviors of humans. Theoretical frameworks for understanding adaptive aspects of rituals are provided by the perspectives of biogenetic structuralism (e.g., see *The Spectrum of Ritual* by d'Aquili, Laughlin, and McManus [1979]; Laughlin and d'Aquili [1974]; also see Eibl-Eibesfeldt [1989]). Ritual is integral to vertebrate species, providing mechanisms for communication and social coordination. Displays and ritualized behaviors provide a basis for mating, territorial defense, dominance and subordination relations, hierarchy maintenance and group integration, and psychological and social coordination of the members of a group.

Ritual uses genetically based behaviors as exaptations, the use of prior adaptations for new adaptive functions. Animal displays (ritualizations) use innate behavior dispositions to provide signals to others that indicate readiness for behavior, sharing internal information and dispositions with other members of the group. Animal displays have communication and social signaling functions that derive from partial behavioral enactments of an animal's intents (e.g., baring the teeth to indicate a threat of biting). Rituals provide information that facilitates intraspecies interactions, contributing to cooperative behaviors by making internal dispositions publicly available. Animal rituals facilitate the flow of information, synchronizing individual behaviors into socially coordinated patterns. Rituals constitute the most complex behaviors of nonhuman species, a mechanism in which behavior has been exapted as a sign to indicate a personal disposition towards a behavior that may benefit self as well as other members of the group. For instance, raising the wings involves a preparedness to fly and can communicate to other members of the flock the possible need for them to also prepare to fly.

Ritual is in essence a communication mechanism to enhance sociality of a species; this social focus to ritual has direct relationships to the well-recognized social enhancement functions of religion. Laughlin, McManus, and d'Aquili (1979, 40–41) characterized ritual as "an evolutionary, ancient channel of communication that operates by virtue of homologous biological functions (i.e., synchronization, integration, tuning, etc.) in man and other vertebrates." The biogenetic structuralist perspectives direct our attention to the ritual behaviors of closely related species and their homologies with shamanic ritual behaviors;

these homologies provide a basis for examining adaptive functions and biological foundations of religion (see Winkelman and Baker 2008).

Play and Ritual

The enactive engagements of ritual found in mammals have necessary relations to play, which has many of the expressive features that typify ritual. Social play is a mammalian phenotype directly related to cognitive evolution (Bekoff 1998). The evolution of shamanism also expats functions related to play, which MacLean noted as one of the principal developments in mammalian evolution. Play consequently has special significance for identifying biological roots of shamanisms, an importance magnified by the role of play in mediating personal development, cooperative social engagements and advance cognitive skills. Play involves the use of behaviors that are normally applied in a specific context (i.e., hunting, aggression) but with signaling added to indicate that they have a different meaning involving play. Play involves the ability to attribute mental states, to make-believe ("play"), to ask permission and to negotiate social relationship; bows are key features of the play signaling behaviors (Bekoff).

There are many different functions of play, including learning skills, socialization, physical and cognitive development, engaging in role reversals, and emotional release (Bekoff). Self-handicapping and role reversals are central parts of the negotiation of an agreement to play, where a dominant individual engages in submissive behaviors in order to engage an otherwise reserved subordinate animal. This behavioral flexibility not only points to variant identities, but also manifests the cognitive flexibility and adjustments to changing environmental and social situations. Play engages a future-oriented cognition, revealed in animal A's signaling that solicits from animal B a certain behavior that is expected. That behavior signals something contrary to the normal use of the behavior, an engagement with a make-believe imagined reality.

Ritual Processes in the Great Apes: Baselines for Hominin Ritual

Lawick-Goodall (1971, 52–54) used the term "rain dance" to characterize the behavioral dynamics of wild chimpanzees in response to a thunderstorm. Following a loud thunder burst, the alpha male began to stagger rhythmically, swaying from foot to foot and vocalizing (pant-hooting). He then ran up and down the hill, followed by other males, who flailed branches as the females and young watched the display. Such aggressive displays have the most complete manifestation in maximal threat displays. Mild threats conveyed by raising the head or an arm and gesturing as if throwing something may escalate to bipedal posture and running towards an opponent on two legs (often while waving the arms). Extended features of the display include leaping, hurling rocks and branches, beating on the ground, stamping the feet, and slapping hands against the ground and trees. The most dramatic is the charging display, during which a chimp (usually a male)

may flail branches and stomp on another animal. This display may be quadrapedal, but in its maximal form involves a bipedal charge that enables the animal to grasp branches and beat them on the ground.

Chimpanzees incorporate a variety of acoustic signals into their aggressive charging displays, including drumming, which is typically performed by males (Goodall 1986; Lawick-Goodall 1968). Drumming is a widespread mammalian adaptation with many features of conspicuous displays (see Randall 2001). Among chimpanzees, drumming is produced mostly by striking the hands and feet against tree buttresses, although sticks are also used. This hand and foot drumming provides a system of long-distance communication audible at a distance of up to one kilometer (Arcadi 1996). Drumming is usually accompanied by choruses of pant-hoots, providing a variety of contextual information. Drumming activities provide communication between individuals outside of visual contact, using an auditory signal that allows dispersed members of a group to remain in contact with one another as they forage separately. Individuals can be identified by their own distinctive patterns of drumming (rate of drumming, length of episodes, the number of distinctive beats, and their volume), allowing for identification of specific individuals (Arcadi 1996; Arcadi, Robert, and Boesch 1998). These acoustic signals provide mechanisms to call on the support of other members of the group.

Chimpanzee "Carnivals"

These dynamics are not unusual behaviors, but features that are widely distributed in chimpanzee behavioral routines. Reynolds and Reynolds (1965, 407 characterized as normal chimpanzee behaviors, these outbursts of calling and drumming: "[O]ccasionally, about eight times during nine months' observations but not at regular intervals, the chimpanzees in an area vocalized and drummed for several hours continuously. . . . Sometimes whole valleys along a stretch as much as a mile would resound and vibrate with the noise. These carnivals form part of the 'mythology' of chimpanzees from the earliest reports." The nineteenth- and early-twentieth-century descriptions of these "carnivals" noted that they might last all night on moonlit nights, and with such a ferocity of drumming, vocalizations, and wild jumping that they produced wonderment and trembling in human observers. Goodall (1986, 134, 491) similarly noted that pant-hoot choruses may break out during the night, and that particularly spectacular displays might be made around waterfalls and in response to the presence of other groups, who would elicit drumming, throwing, hooting, and vigorous displays. Reynolds and Reynolds (1965) noted that these collective behaviors, which they called "choruses" and "carnivals," occurred under a variety of circumstances, including nesting and awakening; meeting or splitting up of a group; before and during moving to new feeding areas; when on the move; in responses to hearing other's calls and drumming; when large numbers congregated in a limited area; when encountering humans; and commonly at night.

These behaviors of *Pan troglodytes* are also seen in *Pan paniscus* (bonobos), who also engage in vocalizations, drumming, and charging displays, especially

when defending their territory against other groups (De Waal 1997). The components of these "rain dance" activities and "carnivals" are not unique to chimpanzees and bonobos, but share commonalities with the displays of other great apes; this indicates the presence of similar behaviors in their common ancestors with the humans, the hominids. Aggressive displays, such as bipedal charges and the shaking of branches are widespread primate behaviors, especially among the great apes (Goodall 1968; Geissmann 2000), perhaps best known in the gorilla behaviors that incorporate chest-beating. Commonalities among the great apes in locomotor displays include kicking, stomping, and shaking branches; beating on the chest, ground, or vegetation; and jumping (Geissmann 2000).

Great apes' call episodes fulfill similar functions: interindividual and intergroup communication related to location, spacing, food sources, and danger, communicating emotional states that motivate other members of the group and enhance cohesion and unity (see Geissmann 2000; Hauser 2000; Marler 2000; Merker 2000). Their structural and behavioral similarities indicate that primate calls are the communicative precursors of human singing and musical abilities (Molino 2000; Wallin, Merker, and Brown 2000). The primates have been selected for the abilities to use verbal aggression, exemplified in screaming and shouting as part of intimidation displays used both within the group, and to other species, particularly predators. In these vocalizations we see the precursor to singing and other forms of musicality that eventually allowed for the more nuanced expression of human emotions.

The variety of contexts of threat displays illustrate that they are general behaviors with multiple adaptive functions. These displays occur in greetings, when separated individuals fuse back together in the larger group; at copious food trees; at waterfalls; as "rain dances"; during all-night displays; in intergroup confrontations; and for release of tension (Lawick-Goodall 1968; Reynolds 2005). The loud vocalizations and the dramatic charging displays provide an auditory beacon for those still distant from the gathering site. These dramatic ritual expressions are an important tool for reintegrating the dispersed society into a single group. The aggressive displays, which can continue as darkness settles, also can intimidate predators.

The threat displays of chimpanzees provide a variety of functional adaptations:

- Establishing and maintaining hierarchical status;
- Protecting the group and individual, including reduction of physical harm;
- Establishing and maintaining boundaries between groups;
- Producing emotional synchrony within the group;
- Releasing frustration and tension;
- Protecting the group members from predators, exemplified in drumming and striking with branches;
- Expressing a group identity, exemplified in the shaping of vocalizations to mimic alpha males; and
- Creating an auditory beacon, facilitating the individual reintegration within the protective community.

But first and foremost, these rituals must be understood in terms of establishing an individual as a dominant member of the group. The power derived from these "noisy displays" and their social function is illustrated in the rapid rise to alpha status of a chimpanzee, Mike. Mike was a low-ranking male when he began displays using empty kerosene cans, which he bounced and hit while making aggressive charges. These displays were far noisier than normal displays, and quickly catapulted him to alpha male status, a bluff that he was able to maintain in the face of 13 other adult males within the community (see Goodall 1986, 426–427).

Religion and Ritual Capacities in Chimpanzees

The calls, hoots, and aggressive bipedal displays with drumming that the great apes use for a variety of social purposes were presumably universal to hominids because they are shared by all of their living descendent species, the great apes and humans. This establishes that humans' hominin ancestors also engaged in group rituals involving displays, singing, drumming, and dancing among members of the group. However, if we compare these chimpanzee ritual behaviors with human religion, there appears little basis for commonality. Many central aspects of human religion appear lacking in chimpanzee rituals, such as supernatural beings, mythical worldviews, and a sacred domain. Also, notably absent from chimpanzee rituals are the cognitive elements of shamanism—the alterations of consciousness and associated visionary experiences that produce spirit world encounters. However, using Wallace's (1966) model of the 13 fundamental elements of human rituals, we see that most elements have counterparts in chimpanzee behaviors (adapted from Winkelman and Baker 2008):

1. Specific body postures and gestures used to petition or thank supernatural beings
   Chimpanzees: Postures of submission to dominant animals or for making requests
2. Activities such as music, singing, and dancing
   Chimpanzees: Emotional vocalizations and bipedal displays
3. Induction of ecstatic spiritual states (altered states of consciousness)
   Chimpanzees: Activities that alter consciousness in humans such as drumming and hyperventilation
4. Exhortation, addressing supernatural entities for their intercession
   Chimpanzees: Vocal challenges to unseen others; begging for handholding and reassurance
5. Recitation, behaviors that provide succinct statements of core beliefs
   Chimpanzees: Repeated vocalizations that express intentions and contextual information
6. Simulation, a symbolic representation of one thing with another
   Chimpanzees: Reading signs of other animals' intentions
7. Mana, an impersonal supernatural power that can be transferred to others
   Chimpanzees: Wanting to touch powerful others (grooming)

8. Taboo, a prohibited power
   Chimpanzees: Avoidance of contaminated areas and powerful others
9. Feasts, a sacred sharing of food
   Chimpanzees: Sharing of food, including cannibalism
10. Sacrifice, giving up something desirable to achieve a supernatural goal
    Chimpanzees: Sacrificing body parts to escape
11. Congregation of people
    Chimpanzees: Group congregation with performances by alpha males
12. Inspiration, the experience of supernatural intervention in life
    Chimpanzees: Sensing the presence of unseen others, as well as ASC-like behaviors
13. Symbolic expressions of supernatural beliefs
    Chimpanzees: Symbolic representations of dominance and submission to others.

The homologous behaviors do not imply the same cognitive states as humans have in their own ritual behaviors. But we nonetheless find homologous behaviors in chimpanzees and humans, particularly if we more broadly conceptualize supernatural relations as relating to "others" in general, rather than just a concept of spirits as disembodied entities. The differences are important because they provide a focus for understanding the evolution of shamanism in the differences or gap between maximal chimpanzee ritual and shamanic rituals. These differences notably involve the alterations of consciousness. Nonetheless, primatologist De Waal referred to the extending bouts of pant-hooting as resulting in the chimpanzee Luit being "nearly in a trance." Although the behaviors that alter consciousness in humans—extensive vocalization, dancing, and drumming—are present, alterations of consciousness do not appear to be significant features of the ritual outcomes for chimpanzees. So one of the most notable differences or gaps between maximal chimpanzee ritual and shamanic rituals involves the altered states of consciousness and the associated experiences of the soul and spirit world at the focus of shamanism and its healing practices.

Homologies of Chimpanzee Displays and Shamanic Ritual

The key features of shamanic ritual provide a paradigm for identifying the key similarities and differences with respect to chimpanzee rituals. Similarities show the continuities with our hominid past, the preadaptations for shamanism, while differences illustrate the key evolutionary developments in hominins leading to shamanism.

The key shared features are

Most dramatic community ritual
An inclusive community ritual
Nighttime activities

Drumming, including use of hands and sticks
Emotional vocalizations
Aggressive alpha male displays
Bipedal displays—"dancing"

At the basis of shamanic ritual activities are a number of aspects of chimpanzee rituals—such as charging displays, stomping, and drumming, which reflect hominid preadaptations, features already established at the beginning of the human line. Notably, chimpanzees often direct their maximal displays toward *unseen* others (e.g., other distant chimpanzee groups). The aggressive displays, which can continue as darkness settles, also can intimidate predators. These displays provide an emotional communication system that promotes social integration, enhancing group cohesion and unity. The use of music and song in shamanic activities reflects an expansion of the preadaptations involved in primate call and vocalization systems. These emotive vocalizations exhibited in loud calls and pant hoots have structural and behavioral similarities with human vocalizations that indicate that they are the communicative precursors of human singing and musical abilities, vocalizations that provide information about internal emotional states and external referents (see Brown 2000; also see Oubré 1997). Ritualized synchronous group vocalizations are at the core of shamanic rituals, and, as in nonhuman primates, provide an expressive system for communicating emotional states and enhancing group integration. The related display and vocalization activities that have been observed among the great apes, and the chimpanzees in particular, imply that our hominin ancestors had social rituals involving emotional vocalizations and, eventually, singing.

Drumming and dancing, which are universally associated with shamanism, have deep evolutionary roots as mammalian signaling mechanisms. Such vigorous activity that signals one's location to others—both allies and potential enemies—is seen as an indicator of vigilance, excessive fitness, and a readiness to act. "An amazing variety of mammals produce seismic vibrations by drumming a part of their body on a substrate. The drumming can communicate multiple messages to conspecifics about territorial ownership, competitive superiority, submission, readiness to mate, or presence of predators. Drumming also functions in interspecies communication when prey animals drum to communicate to predators that they are too alert for a successful ambush" (Randall 2001, 1). Drumming is a widespread mammalian communication mechanism used to convey information, functioning as a "costly signaling mechanism" that deters predators with a display of fitness, enhances survival opportunities for kin, and reduces the individual's need for more costly action.

The effects of costly rituals illustrate basic adaptive mechanisms of ritual. These activities eventually united and integrated the group in the evenings, providing protection by their intimidating sound. Displays are a form of intimidation of both the immediately present other and the unseen other that are used to threaten and intimidate other members of their group, other groups, and even predators. This illustrates how these ritualized behaviors played adaptive roles that were expanded in hominin evolution.

What were the factors that led to the evolution of these ancient hominin capacities into the rituals of shamanism? Shamanism's ritual activities provided selective advantages for those capable of vigorous displays. The idea that ritual displays have functional effects has a long history in evolutionary studies, conceptualized in terms of "costly displays" and proof of "excessive fitness" (Irons 2001). These costly displays provide evidence of excessive fitness—"energy to burn"—that both alerts kin to a potential risk (i.e., predators) and deters predators (who seek less vigilant prey). The costly display ritual is then a signal of the individual performer's commitment—demonstrated behaviorally—to help other members of the group.

The energetic bipedal charges, brandishing branches that are at the core of the chimpanzee maximal display, were also hominids' most important attack posture, intimidating other species (e.g., leopards) as well. The ability of extended displays to provide all-night protection undoubtedly allowed ritual activities to contribute to the survival of our ancient hominin ancestors on the savannas, where they lacked the safety of trees sought by chimpanzees in their nighttime displays.

Shamanism expanded these ancient phylogenetic bases manifested in primate and hominid ritual capacities, exapting them for much more prolonged display activities involving extensive drumming, dancing, and music and extending them throughout the night. The nocturnal timing of the rituals provided a zone for further development in integration of the cognitive processes involved in dreaming. Dream experiences are stimulated by activity prior to sleep, and consequently drumming and singing episodes likely enhanced lucid dreaming and associated alterations of consciousness. These experiences became central features of shamanism and its healing practices.

The factors involved in enhancing shamanic alterations of consciousness are addressed below in terms of a spiritual healing experience in the placebo capacity; the enhancement of social bonding in expansions of opioid bonding mechanisms; psychoactive plants that selected for enhanced use of exogenous neurotransmitter sources; and long-distance running, which induced mystical experiences by unusual manipulations of the autonomic nervous system.

THE COEVOLUTION OF HEALING AND RELIGIOSITY

A central aspect of the evolution of human ritual and religious capacities included the emergence of spiritual healing. This development involves a variety of capacities based in the effects of altruism. The evolution of this healing capacity also derived from hypnotic suggestibility and placebo effects, as well as the emergence of music and its healing effects discussed in Chapter 5 here (also see Crowe 2004).

There is an intimate relationship between the general capacities for religiosity and healing, reflecting interdependent co-evolutionary processes involving humans' "sickness and healing" responses, an integrated social and biological adaptation involved in helping others (Fábrega 1997). Assistance to others elicits

their innate, or endogenous, healing responses. This natural response to disruptions includes a psychosomatic mediation of physiological and hormonal changes, where beliefs, hopes, and rituals induce positive changes in physiological responses (such as a reduction of stress and increases in opioid levels).

These opioid-related healing capacities are a reflection of bonding capacities elicited in collective rituals that enhance emotional ties and commitment among unrelated individuals. "Sickness and healing" adaptations also involve direct-care activities (protecting injuries, maintaining temperature homeostasis through covering a sick person) and enhancing social support when sickness destabilizes relations. The sickness and healing response requires an emotional awareness of others, a capacity that is manifested in the primate tendency to respond to the emotional displays of others with expressions of empathy and sympathy. Some of the emotions that naturally elicit healing responses are states of pain, suffering, and distress in others; these can evoke responsive capacities of empathy, compassion, and altruism. The sickness and healing response represents a type of emotional communication based in the ability to take another organism's condition into consideration. This requires a theory of mind that can enable an individual to infer that another individual is suffering and needs assistance.

Our awareness of the needs of others reflects the enhanced social awareness that underlies belief in the supernatural other. Fábrega proposed that what links healing with religious concerns is death. Since sickness can result in death, healing is necessarily concerned with addressing one of the possible outcomes—death. Since failed efforts at healing lead to direct attention to death, healing becomes linked to beliefs about afterlife and spirits. Healing rituals are consequently extended to care of the deceased and their intangible remains, and, in essence, ideas about spiritual domains and afterlife, leading to the development of religion.

Fábrega proposed that the origins of the human "sickness and healing" responses involve an extension of ancient hominid biologically based tendencies to sociality. This sociality is manifested in chimpanzee behavior typified in the care of infants, and including caring, altruism, and compassion for offspring and relatives. These responses may be extended to the wounded members of their group, for whom chimpanzees may provide protection, caressing, grooming, assistance, and food. The capacity to respond to disease and injury to other members of one's group is an adaptation that was selected across hominin evolution because it could provide advantages that did not require reciprocity. In assisting the well-being of one's own group members, such healing behaviors could be selected for because they helped maintain the overall numbers of the group and its optimal functioning. "Indirectly, by means of the process of psychosomatic mediation, the acts might induce hormonal and related general psychologic changes that would improve function and sense of well-being in the sick person" (Fábrega 1997, 28). Healing efforts, whether or not successful, constitute a costly display that can enhance the morale of the group by providing evidence of commitments to others.

The significance of the healing capacity in hominin evolution is emphasized by the fact that chimpanzees do not in general have behaviors that can be strictly

characterized as involving healing. To the contrary, Goodall noted a lack of care for others: "Care of the sick is not a helping behavior commonly found among *unrelated* chimpanzees at Gombe" (Goodall 1986, 385, emphasis added). The ill and wounded may be shunned by the group, who often appear fearful of the sick, injured, and those with infections. Among captive chimpanzees, however, there may be a cleansing of wounds and extraction of diseased teeth. These behaviors reflect the chimpanzee's capacity to empathize with others, understanding their needs (Goodall 1986, 385).

The dramatically greater healing response in humans indicates it was part of divergent human evolution from our common hominid ancestors with chimpanzees. Nonetheless, there are healing capacities present in chimpanzees' ritualized displays. "The minor attacks and the wild charging displays with all their elements of aggression function to relieve social tensions and function to minimize the physiologically undesirable components of stress" (Goodall 1986, 356). There is also an intrinsic healing capacity in the typical counter-response to aggression, the grooming rituals that calm aggression between animals. Grooming is a basic primate social behavior, beginning with mother-infant bonding and continuing through life as a basic tool for building alliances. Attacks often result in a variety of "reassurance behaviors," which calm both the threatened individual and the aggressor. When subordinate animals seek reassurance from dominant animals their most frequent responses are to extend the hand to seek contact with the aggressor or to initiate grooming; the aggressor may respond to provide them with reassurance through grooming, touching, patting, contact with the body, embraces, and kissing. Self-calming may also be achieved by hand holding, embracing, and grooming.

Goodall concluded that chimpanzees learn that grooming has a calming effect on others and use it with the intent to manipulate others. The ability of grooming to reduce stress is generalized from mother-infant contact and the affiliative grooming relationships that are generalized to relations with all of the community. Dunbar (2004) proposed that grooming has psychophysiological effects that enhance commitment to others and increase cooperation. While grooming releases endorphins, the administration of opiates reduces interest in grooming. With grooming we see a significant chimp-human "gap," a loss of a functional activity in humans, who have the highest level of cooperation of any species, but without the extensive physical grooming characteristic of most primates. The traditional explanation has been that language came to substitute for grooming, but there is a big evolutionary chasm between grooming and language; furthermore, there is no evidence that language is a mechanism for releasing opiates! Dunbar proposes that music was an intermediate step, a bonding process with an ability to elicit emotional responses, as was discussed with respect to the endogenous opioids in Chapter 5.

Shamans' healing practices maintain the aspects of grooming; these behaviors are manifested in the shaman's diagnostic phase where they may carefully inspect all parts of the body, prodding lumps and abscess and cleansing them through a variety of procedures homologous with primate grooming activities. Shamanic treatments also involve physical manipulations of the body, including

massage and manipulations with feathers. Laying-on-of-hands and similar practices also are associated with enhanced functioning of the opioid system in humans (Kunz and Krieger 2004). The endogenous opioids and hormones such as oxytocin have powerful reinforcing effects on social bonding, enabling procedures that enhance release of these natural substances to also enhance social bonding.

Hypnosis as a Foundation for Religious Healing

McClenon (2002, 2006) proposed that a common biological root of shamanism, healing, and religion involves a heritable quality underlying hypnotic susceptibility and its associated effects (also see Chapter 1). I propose that we understand this interrationship in terms of a sociophysiological response, a social effect on psychological states and physiological responses. Notably, highly susceptible hypnotic subjects have experiences that are in contradiction with objective reality, but they nonetheless take precedence over objective reality. The alternative reality is one that is demanded by a social relationship with the hypnotist and the expectations engendered by that relationship, particularly the mind-set conveyed by the hypnotist. The concept of rapport has been used to refer to the special social, cognitive, and affective interplay that engages the subject with a sense of cooperation with the mental framework constructed by the hypnotist. Hypnotic susceptibility epitomizes the ability of humans to identify with the theory of mind manifested by others, in complying with the requests of the hypnotist.

Hypnosis is preeminently a phenomenon of social acquiescence to the demands of another, in that "hypnotized subjects seem to be characterized by the *lack* of volition and control over their own actions, with the latter being dictated by the suggestions of the hypnotist" (Egner and Raz 2007, 29). This control by an external social force is illustrated by highly hypnotic subjects' great efficiency in implementing the strategies suggested by another (the hypnotist), while having a general inability to voluntarily alter their own strategic performance. Under hypnosis, the higher order executive cognitive control systems that coordinate the interaction among a variety of semi-autonomous systems is superseded by the subject's accommodation to the demands of a social other—the hypnotist—to accommodate to a view of reality different from the objective physical reality.

Hypnosis shifts the interaction between the frontal and limbic systems to the latter's evolved capacities for processing of survival-related information and feelings (Woody and Szechtman 2007). Hypnotic susceptibility engages the motivational systems that manage social hierarchy, with the individual accepting a subordinate position and the imposition of the will of a dominant other, who shapes the person's experiences and behavior. This hypnotic response derives from the survival value of the capacity to subordinate the individual's personal perceptions and behaviors to the wishes of the leader. Highly susceptible hypnotic subjects experience a dominance of the limbic structures in an enhanced orientation to the emotional/motivation engagement with the hypnotist. This reflects the unconscious emotional control of volition that is characteristic of hypnosis,

where the higher level ego structures do not identify with the volitional qualities of behavior generated unconsciously.

Religious healing capacities were selected for through these adaptive responses involving acquiescence to a more powerful entity and the associated healing effects of the hypnotic capacity, dissociation and placebo responses. Hypnotic tendencies are rooted in ancient primate capacities that reduce aggression and stress and engage the relaxation response. These hypnotic tendencies are manifested in stereotyped repetitive behaviors like "pacing" and repetitive actions. For humans, the repetitive behaviors alter consciousness and produce a sense of intragroup cohesion experienced as union or oneness, classical aspects of religious and mystical experiences.

Hypnotizability involves focused attention, reduced external awareness, and a reduction of critical thought processes that facilitates a focus on internal images and an enhancement of expectations. This ability for inner focus provides an engagement with symbols experienced as spiritual entities. Hypnotizability and increased suggestibility also facilitate the placebo effect, providing a basis for miraculous cures that enhance faith and survival. Spiritual healing practices in cultures around the world reflect the common origins of religiosity and shamanic healing in placebo responses. Phenomena associated with hypnotizability and placebo effects include anomalous experiences such as ghosts, soul flight, possession, mystical awareness, ESP, and similar phenomena generally given spiritual interpretations. The beliefs in a spirit world may arise as a by-product of these anomalous experiences, but the survival impact of these healing practices also exerts selective pressures for a disposition to hynotizability.

The hypnotic capacity also enhances survival by providing enhanced access to the unconscious mind and its psychological and emotional dynamics causing illness. Many psychological and emotional problems involve a repression of feelings and memories, as well as the conflicts that they produce. Hypnosis elevates these repressed issues into consciousness where they can be addressed and resolved. Suggestibility enhances symbolically induced psychophysiological responses that facilitate healing. Elicitation of pain-reduction mechanisms is also part of the innate properties of hypnotic susceptibility. This makes hypnosis adaptive by enabling people to continue to pursue survival-related activities in the face of significant pain. Hypnosis is also established as effective for the treatment of a variety of conditions, including somatization; mild psychiatric disorders; simple gynecological conditions; gastrointestinal and respiratory disorders; self-limiting diseases; chronic pain; neurotic and hysterical conditions; and interpersonal, psychosocial, and cultural problems (see McClenon for review).

Dissociation as a Hypnotic Adaptation

The hypnotic capacity reflects a state of highly focused attention that creates a dissociation of experience from the environment and body. Dissociative processes are key to hypnosis, possession, and shamanic healing (McClenon 2002). Dissociation permits an engagement with an alternative reality generally interpreted in premodern cultures as a spirit world in which these powerful others

can act upon our well-being. Perceptions, emotions, and behavior become engaged with an alternative reality in which experiences of supernatural others have profound emotional impacts that can produce notable biological changes and significant long-term motivational and behavioral dispositions.

McClenon (2002, 2006) proposed that dissociation facilitated hominins' ability to cope with stressful experiences. Their general benefits were derived from the ability to use dissociation to evoke placebo responses and healing; such advantages enhanced survival and reproduction, leading to selection for genotypes that could benefit from shamanic healing. A standard psychiatric interpretation of the adaptive advantages involves the ability of dissociation to reduce stress. Dissociation provides adaptive benefits as a defense mechanism, allowing humans who are traumatized, particularly abused children, to compartmentalize (repress) memories of these traumatic events; this allows them to experience higher levels of health by ignoring their unhealthy memories (McClenon 2006).

Dissociation was also a necessary by-product of the modular evolution of the human brain, which allowed for unconscious processing of domain-specific information. This domain specificity of automatized modules meant that information may not be generally available to consciousness. Dissociation from the ego is a process for achieving access to information in the unconscious. Lynn (2005) proposed that dissociation was adaptive because of its ability to by-pass ordinary self-related cognitive and self-operations and instead develop alternative neural pathways that were not tied to awareness of others. By avoiding our ordinary ego states and their intimate linkages to the desires of others, we are better positioned to act in our own self-interest. Dissociation with possession provides a further distancing from apparent self-interest.

Ritual activities can provoke this dissociation from ordinary reality and facilitate engagement with the internal imaginal worlds. By using the ritual process to place the person into an altered state connected with aspects of the emotional unconscious (i.e., dreaming, paleomammalian and reptilian areas of the brain, visual imagestic presentations), shamans provided healing mechanisms in integrating these processes with the social and symbolic self and eliciting placebo responses.

Placebo Responses as Endogenous Healing Mechanisms

Placebos are typically considered inert substances, "sugar pills" without biological mechanisms for evoking physiological responses. What is often misunderstood is that placebos nonetheless produce measurable physiological and/or psychological changes, the placebo *effect*. Placebo effects include (Benedetti and Amanzio 1997) the release of endogenous opioids, the body's own natural opiate substances; reduction of pain and psychosomatic conditions (asthma, hay fever, coughing, ulcers); amelioration of mental health problems (anxiety, depression, and schizophrenia); and reduction of physical conditions such as cardiovascular problems (hypertension and angina pectoris), multiple sclerosis, Parkinson's disease, and rheumatoid and degenerative arthritis. Placebos are particularly effective for neurotic and hysterical conditions and other psychiatric disorders, gynecological

conditions, gastrointestinal and respiratory disorders, chronic pain, and interpersonal problems (see McClenon [2002] for review).

Placebo effects derive from a broad group of circumstances that evoke placebo responses. Placebo effects can be induced by set and setting factors such as customary settings of care, impressive buildings, special certificates and symbolic clothing (e.g., white lab coat). Placebo effects may also be derived from any interaction with someone who induces expectations of alleviation of one's problems. Moerman (2000, 52) defined placebo effects as "the desirable psychological and physiological effects of meaning in the treatment of illness." The placebo effect's basis in the *meaning response* suggests that it was an evolutionary adaptation derived from the ability of our symbolic capacity to elicit physiological responses.

Humphrey (2002, 261) suggested that the placebo response is a Darwinian adaptation that evolved to address disease, injury, and other threats to health, an emergent property of other adaptive features that provided our "natural health-care service." These adaptive responses exapted other human emotions, particularly those related to hope, that have the capacity to elicit immune system and healing responses. Humphrey noted that placebo responses are generated by three general factors: past personal experiences; the power of respected external authorities; and rational and logical arguments. Our personal experiences of previous positive treatment outcomes engender expectancy responses. The central role of meaning and expectancy in eliciting the placebo effect implicate the *interpretation* as key (Montgomery and Kirsch 1997; Moerman 2000, 55–56). Desire and expectation, like hope and faith, play roles in eliciting placebo responses that reinforce response expectancy and its self-confirming nature. Emotions are key to placebo effects and a key to the production of physiological consequences of expectation mediated through hormones and neurotransmitters.

Perhaps the most effective of all placebo elicitation mechanisms is the power of external authorities. Humphrey noted that placebo response cannot be self-administered, but rather reflects the outcome of some outside permission. The importance of power in the placebo effect is illustrated in the specific characteristics of healers who enhance placebo effects—those with high status (age, prestige, and authority) that enhance confidence in the healing process. The power of another in eliciting placebo responses is reflected in characteristics of placebo responders, who view their physician as competent and attractive and accept the physician's decisions regarding treatments (Benedetti and Amanzio 1997). This acceptance of the power of the healer and general acquiescence to authority reflect a submission dynamics that organizes hierarchy in society and which originates in the mother-infant dyad in mammals.

Having good reasons to believe in treatments also engenders positive responses; one generates placebo analgesia by doing something that one thinks is effective. This implies that expectation of improvement constitutes a form of human medical treatment, eliciting the placebo response. Placebo effects are a part of all treatment encounters that elicit the capacity of the individual's own body to respond positively to the hope of successful treatment.

Bulbulia (2006, 91) supported McClenon's hypotheses regarding the interconnection between religion and healing practices in the capacities for placebo

healing, characterizing a human as a "faith-healing primate." He proposes that human use of religious factors rather than secular ones to elicit placebo affects reflects the advantages of self-deception, "how beliefs that may be wrong (i.e., spirits) can, nonetheless, be able to heal." Bulbulia noted that self-deception serves self-interest by making it easier for us to deceive others about our true intents. Self-deception also gives us the self-confidence that can be adaptive, has a "low error cost" in comparison to the benefits it offers in strengthening individual and group confidence and enhances health by mitigating the debilitating effects of stress. Bulbulia proposed that these psychophysiological capacities are tied to a belief in a supernatural reality (rather than secular mechanisms) because of the well-recognized ability of spirit beliefs to provide a sense of control over unconscious mental mechanisms and uncertainty, contributing to a sense of well-being.

Since placebo responses are elicited by broader social expectations related to attachment responses—an ancient mammalian heritage—the placebo capacity must have preceded shamanic healing practices. These preadaptations are manifested in chimpanzee submissive, reconciliation, and grooming behaviors that evoke opioid responses. This capacity of expectations to evoke physiological responses was a preadaptation that was exapted in shamanic practices, linking them to symbolic capabilities to produce new healing functions. The hypnotic capacity for internal engagement with a visionary world also involves preadaptations tied to the dream capacity and the ability to represent in visually imagined worlds of the spirit realms the representations of self and others. The hypnotic tendency manifests the theta brain wave patterns (Crawford 1994) that typify the integrative mode of consciousness (IMC), illustrating that the hypnotic tendency was part of the selection for the capacity to adaptively experience alterations of consciousness.

Shamanism's central role in healing illustrates that it provided significant expansions of other forms of altruism. Religious behaviors contributed to the evolution of the human propensity to help other humans, part of a broader set of altruistic behaviors that can benefit one's self or one's own offspring through reciprocal altruism. The concept of spirit is an important mechanism for forming these connections between individual and collective well-being. A common "significant other" provides a basis for expansive group identity, particularly, exceeding the innate capacities to prefer close kin alone in engaging in reciprocal altruism. Kin recognition mechanisms involve both a disposition to identify kin and engage in favorable actions towards them. Shamanism was a central mechanism for expanding kin recognition mechanisms to others, using relations with "others" in the spiritual world as a basis for a common kinship that supersedes biology.

Attachment and Cooperation as Functions of Religious Ideology

A variety of authors[1] examine the biological basis for religion in terms of religion's potential for enhancing cooperation within groups and encouraging other

group beneficial behaviors. Shamanism is the primary biocultural institution that expanded the roles of attachment and cooperation from the mother-infant dyad to the broader group. Shamanic ritual practices and beliefs provide collective and individual adaptations in producing a community that is integrated through a psychosocial interdependence. This integration is based in eliciting a variety of biological mechanisms that enhance bonding and well-being.

Belongingness and the Opioid System

King (2007) suggested that the evolutionary origins of religion are found in the primate desire for "belongingness," a craving and need for emotional connection with the other. This belongingness needs to be understood in relationship to our enhanced endogenous opioid system. Since the divergence of hominins from our hominid ancestors, there has been a positive selection for polypeptide precursors and genes involved in opioid regulation (Rockman et al. 2005; Wang et al. 2005). Studies comparing human and chimpanzee genome sequences found significant differences, which indicates that there was a rapid evolutionary divergence in the human line involving xenobiotic metabolizing genes that reflect adaptations to frequently encountered plant toxins (Sullivan, Hagen, and Hammerstein 2008). Wang et al. reported that the uniquely human pituitary cyclase-activating polypeptide precursor (PACAP) emerged during human origins and that the precursor gene for PACAP underwent accelerated evolution in the human lineage since the time of separation from our common hominid ancestors with the great apes.

The significance of the selection for PACAP involves its roles in the central nervous system as both a neurohormone and a neurotransmitter. Rockman et al. (2005) noted that there have been waves of selective effects in the hominin line for genes associated with opioid cis-regulation. Natural selection resulted in an alteration of human prodynorphin, an opioid hormone that regulates gene expression. It is a significant precursor molecule for a range of endogenous opioids and neuropeptides that are expressed to a far greater extent in humans than in chimpanzees. These enhanced opioid systems must be seen as central to the emergence of the human capacity for religiosity, since opiates produce experiences that have been considered homologous with and indistinguishable from endogenously induced spiritual experiences (Smith 2000). This suggests that some aspects of religions experiences may have resulted as a by-product of these adaptations and the experiences these chemical produce.

Adaptive Advantages of Opioid Systems Why we have enhanced opioid receptors must be contextualized in broad evolutionary terms of mammalian adaptations, as well as in terms of uniquely human characteristics. Oldham, Horvath, and Geschwind (2006) characterized chimp-human differences as involving an increased connectivity in the gene co-expression networks in the frontal brain networks of humans. Humans have an intensification of expression of genes associated with the CNS and the frontal cortex innervations, particularly circuitry underlying higher cognitive processes. Opioids undoubtedly played a role in the factors that Hayden (2003) analyzed in relation to the evolution of shamanism.

Hayden suggested that linkages among resource stress, community relations, and intercommunity alliances enabled shamanism to contribute to human survival. Severe droughts several million years ago exerted important selective influences on hominin populations that gave rise to modern humans' shamanistic practices. Among the changes were abilities to forge close emotional bonds that helped survival in inhospitable environments. Emotional bonds with other groups helped assure access to resources for coping with crises through assistance with food and physical protection. Hayden attributed this enhanced emotional bonding that produced more secure alliances and helped ensure survival to the effects of ASC and their ability to create group bonding and identity. Hayden proposed that shamanic rituals induced ASC that helped forge a sense of commonality. Our enhanced opioid capacity would have also contributed to the sense of connectedness and belongingness, as is widely manifested in the sense of unity and panhuman identity associated with ASC experiences and opioids. These ASC helped to overcome the natural tendency to xenophobia and violence against outside groups, a tendency so well noted in the chimpanzees.

The need for belongingness of the original attachment capacity is expanded in an exapted adaptation or coopted adaptation. This enables an expanded elicitation of the attachment system and its rewarding effects on well-being. As this innate mammalian bonding capacity is deliberately extended to the processes of healing, it is being employed for new functions and constitutes a new evolutionary adaptation based on exaptations.

The enhanced survival success provided by these activities selected for those with enhanced opioid capacities. Deity representations of positive and protective entities allow for the same dynamics as secure attachment with a caregiver and elicit the benefits associated with secure attachments. The emotionally charged relationships with these dominant beings provide a mechanism for collective stress-management procedures in healing practices and beliefs that instill positive views of self and optimism and confidence that enhance strategies for obtaining support from others (Chisholm 1999).

Weingarten and Chisholm (2009) illustrated how religious concepts address the problem of the proximate psychological mechanisms that provide the basis for ensuring persistent group cooperation. Emotional attachments and valuations derived from the infant-mother attachment relationship are exapted in the positive emotional valuation of group leader to provide an affective mechanism for group cooperation. This within-group cooperation reflects cultural selection, a transference of the attachment system dynamics to provide a basis for enhanced levels of intragroup cooperation. By extension, attachment to a supernatural entity is a mechanism for enhancing intragroup cooperation in meeting the desires of a common entity. Mechanisms of the mammalian attachment system are exapted to enhance levels of cooperation and integration in even larger groups through religion, superseding the capacity of a single "alpha male" to garner group cooperation. The capacity to have an emotional attachment to leaders or a deity originally derives from infancy attachment to mother, making the religious attachment to deity an exaptation of mother-infant bonding. But deity relations involve more than originally found in the bonding of the mother-infant

dyad as these basic mammalian processes are extended to bond larger social groups, exceeding the limits of kinship.

Weingarten and Chisholm contended that multilevel and group-selection processes expanded the capacities of the attachment system for enhanced cooperation within groups by using the supernatural agent premise as a mechanism for intragroup cooperation. The capacity to conceptualize spirits is exapted from the dynamic of modeling the other's mind, emotions, and intents. The ability of spirit-other relations to expand the repertoire of possible others for self-processes constitutes a significant expansion of religiosity beyond the original functions of the social other. Spirits give us social possibilities not found in the actual social world.

These exaptations are used for a new function when supernatural agent beliefs have effects on individual behavior towards others, for instance, encouraging adherence to social norms. Johnson and Bering linked supernatural punishment to group cooperation, reinforcing moral behaviors in ways that enhance human cooperation. One widely noted aspect of deity concepts is that they are not limited by human constraints. Because human knowledge is limited, deity omniscience is a more effective deterrent against deceit, cheating, and free-loading, since there can be supernatural punishment for failure to conform to norms, even if other humans don't know about it. One of the mechanisms of religion used for group enhancement involves the models of the spirits and their desires for our behavior. The personified representations of social norms in the demands of deities to behave in specific ways help achieve implementation of moral systems that ensure fairness. Spirit qualities of omnipotence and omniscience are not exaptations of human's own self qualities, but explicitly supersede human capacities. The omniscient deity concept provides something more than that provided by prior altruistic and cooperative capacities, a new means of promoting moral adaptations by extending the ordinary human capacity for cooperation.

The adaptations provided by religion are illustrated in the way that spirit beliefs provide adaptive functions at the group level (Alcorta 2006; Bering 2006; Bulbulia 2004; Sosis 2004, 2006; Wilson 2002). Wilson's cross-cultural study of religion illustrated that spirit beliefs promote cooperation among members of a group. Wilson also illustrated how supernatural assumptions constitute proximate mechanisms that motivate prosocial behavior. Prosocial behaviors based in the supernatural model of forgiveness and punishment allow deity relationships to function as a basis for the group adaptive effects of religion.

Irons (2001) and Sosis (2006) illustrated how religion involves display of costly signals of commitment to the group. Shamanism, like other collective aspects of religion, provided a variety of mechanisms for enhancing intragroup cooperation through the same ancient biogenetic functions of costly signals and displays of excessive fitness as found in other animals. Shamans expanded these in the costly signals of group commitment in the vigorous dancing and drumming that demand excessive fitness. The practices of shamanic drumming and dancing epitomize the costly displays that provide a variety of benefits. These displays must be central to the physical defense of the group against predators, for

example, wielding branches as clubs against them. The drumming itself would have warded off predators or produced a disturbing and disorienting effects as seen when used in the hunting of animals. These displays also manifest the dynamics of dominance that elicit placebo healing mechanisms.

Bulbulia (2009) reviews a range of research that illustrates the adaptive roles of ritual as forms of what he calls charismatic signaling. These public displays of charismatic signaling reduce perception of risks to collaboration by supporting predictability in the social interaction patterns of partners in large-scale social exchange. Ritual activities help to reduce uncertainty by aligning the prosocial inclinations of individuals into committed groups, based in the common emotional and behavioral manipulation of intentions and motivations. These ritual signals have their effects unconsciously, operating outside of conscious awareness by provoking intrinsic emotional responses to coordinate one's behavior with others. Consequently sacred rituals and the associated culture can help solve the problems of group coordination and cooperation and produce reliable responses. Shamanism was the context in which the hominid charismatic signaling activities typified in chimpanzee maximal displays were shaped towards more dramatic social and emotional engagements with physical and non-physical others. This likely involved both physical evolution and cultural selection processes.

Human evolution led to significant divergences from chimpanzees in the ability to live in exceptionally large and internally complex groups that have intimate cooperation as a basis for success. In comparison with other species, we have a variety of ritual and other mechanisms permitting increased group size through the inclusion of outsiders within kinship ties, exemplified in religious communities. Weingarten and Chisholm linked our cooperative abilities to the attachment system on the basis of neurobiological evidence that there is an overlap of the neurobiological systems subserving the mammalian attachment system and those neurobiological systems that mediate the processes permitting social cooperation in large complex groups. This evidence involves the neuropeptides oxytocin and vasopressin, which are foundational to the systems of attachment relationships and affiliation, and also implicated in enhanced social cooperation. These substances also induce profound and significant alterations of consciousness.

HUMAN EVOLUTION AND THE ALTERATION OF CONSCIOUSNESS

A variety of natural processes alter consciousness and induce shamanistic and mystical experiences, including drumming, singing and music, trauma, long-distance running, near starvation, sensory deprivation or overload, nutritional imbalances, extreme fatigue, and plant substances. Consequently, these behavioral capacities of humans must be understood in relation to our biological capacities, especially endogenous neurotransmitter substances, which also have analogues in the environment, such as the serotonin-like analogues found in psilocybin- and psilocin-containing mushrooms. The enhanced human capacity for using exogenous neurotransmitter-like substances likely reflects selective

environmental effects derived from the consequences of ritual for social bonding through eliciting the opioid-attachment processes. These opioid related effects are also seen in long-distance running and its capacity to produce mystical experiences, as well as in dancing, a ritual activity found worldwide.

Human Evolution and Drug Use: Mismatch or Adaptation?

The dominant evolutionary approaches to explaining the human propensity for addiction characterize the desires for consciousness-altering substances and succumbing to their addictive effects as the consequence of a mismatch or discordance between our acquired tendencies and the current environment (see Lende 2008 for review). According to this view, drug-induced feelings, which are linked to adaptive behaviors, are the result of our recent exposure to evolutionarily novel drug substances. Harmful aspects of addiction result from a mismatch between our innate biological tendencies and the options for meeting those needs provided by the environment. Drugs of abuse are thought to falsely trigger natural reward circuits and their sense of fitness benefits by blocking or short circuiting the painful feelings that provide the adaptive functions of stimulating avoidance behaviors.

These perspectives have not considered the deeper evolutionary roots of the relationship between our nervous systems and these substances, which are both endogenous to our nervous system and were also found in our ancient environments. The evolutionary approaches to addiction address the effects that increase fitness (survival and reproduction). Since drugs have generally been conceptualized as causing problematic behaviors that reduce fitness, the idea that their use may confer fitness is initially counterintuitive. But this is the result of a particular paradigmatic perspective.

Sullivan, Hagen, and Hammerstein (2008) point to a variety of forms of evidence that the effects of these substances are not new, but were part of ancient environmental exposures that resulted in evolved countermeasures to these plant defenses. There is a paradox in this concept of drugs that stimulate our reward systems because they have functions in ecological relations as toxins that inhibit consumption by poisoning those who consume them. If the presence of these toxins in plants is an evolutionary adaptation to deterring consumption by animals, why is it that these same substances are viewed as producing pleasurable rewards? Since animals do not evolve genetic capacities to reward nonadaptive or fitness-reducing behaviors (rewarding the consumption of dangerous neurotoxins), Sullivan, Hagen, and Hammerstein conclude that humans evolved the capacity to make use of these exogenous substances.

Several aspects of drug effects suggest an evolved capacity to benefit from these substances. In contrast to the debilitating effects generally attributed to drugs, Smith (1999) illustrates there are a variety of fitness enhancing consequences associated with these substances. Fitness benefits may have accrued to our ancestors as a consequence of their ability to respond to these psychoactive substances. Smith notes that across the diverse classes of plant drugs there are effects

of enhanced vigilance, the ability to ignore pain in the interest of survival activities, increased access to mating opportunities, reduction of apprehension and stress, feelings of detachment and euphoria, increased endurance and self-confidence, enhanced sensory and mental acuity, reduction of defensiveness, and reduction of depression and self-defeating activities. Clearly, many adaptive mechanisms could have been involved in human's physiological and cultural adaptations to environmental sources of consciousness-altering chemicals.

The effects of these toxins on the brain's reward centers may be an accident of plant-herbivore coevolution, but it also displays hallmark features of natural adaptation (Smith and Tasnadi 2007). A reciprocal relationship between food consumption and taste is provoked by opioids—foods taste better when we are on opioids, and good tasting food—sugars—cause a release of β-endorphin. Mammals evolved to eat foods with nutritional value, and the rare presence of sugar in the aboriginal environment led to the selection for use of endogenous opioid release to reinforce additional eating behavior. Gestational nutritional needs may have selected for opioid systems that induce fruit cravings and the many associated nutritional advantages of their consumption.

Defining characteristics of humans, such as abstract, generative, and context-independent cognition and other advanced mental skills require dopamine as a neurotransmitter (Previc 2009). The use of executive intelligence activates the dopamine system, and dopamine deficiencies are associated with a wide range of cognitive deficits. Previc shows that dopamine's effects must be related to humans' evolved cognitive capacities because dopamine is central to advanced intelligence, not only in humans but other animals as well. All species with advanced intelligence have concentrated dopamine, the only neurotransmitter that expanded across the evolution of primates and hominids. Dopamine is highly concentrated in the prefrontal cortex, which is crucial to human's higher order reasoning and planning (Previc 2009, 15). The overall expansion of the dopaminergic system in primates and humans led to increased concentrations in most cortical regions, with high concentrations in the prefrontal and frontal regions, especially in sensory processing areas where cross-modal integration occurs. Primates also evidence a greater density of dopamine receptors in Level 1 of the cortex, the layer where coordination of activities underlying cognitive processes takes place. Dopamine and acetylcholine predominate as neurotransmitters in the left hemisphere, the brain area managing these skills.

Previc noted that in the overall human evolution of the dopaminergic systems, there was a greater expansion of the prefrontal/striatal dopaminergic system relative to the mesolimbic and mesocortical pathways. He proposes that this allowed for the sublimation of impulsive mesolimbic drives and their control by our rational intellect. Dopamine also plays a central role in goal-directed behavior and has a role in dampening the physiological aspects of the stress response. This most important dopaminergic function reflects parasympathetic action in the ANS, dampening physiological arousal and increasing peripheral vasodilation (which has roles in erectile function and male sexual behavior). Dopamine also mediates pleasant and euphoric states, but appears to have greater importance in inhibiting the negative emotional arousal of fear and anxiety,

leading to a greater sense of control, an internal locus of control. This ability to use dopamine as a stress reducer enables highly dopaminergic individuals to function more effectively in extreme environments (Previc 2009, 36). Dopamine helps in managing stress by assisting in active coping.

The long-term evolutionary relationship between psychotropic plant substances and humans' cognitive capacities indicates that there were selective benefits of substance use (Sullivan and Hagen 2002). Sullivan, Hagen, and Hammerstein (2008) point to the benefits of the ability to use plant neurotransmitter analogues. These analogues are primarily in the monoamine neurotransmitter system, e.g., serotonin, as well as acetylcholine, norepinephrine, and dopamine. Human genetic adaptations to use these substances are illustrated in human-chimpanzee differences in neurotransmitter and neurohormone systems and responses, particularly the opioids and serotonin.

Human-Chimpanzee Differences in Drug Metabolism and Neurotransmitter Systems

The conservation of aspects of the dopamine and serotonergic neurotransmitter systems across evolution is manifested in their basic similarities across mammalian species; there were also enhancements of these systems in human evolution. Genes that control protein sequences in the brain have evolved much more quickly in humans than chimpanzees (Shi, Bakewell, and Zhang 2006). Since the divergence of hominins from our hominid ancestors, there has been an accelerated evolution of and a positive selection for polypeptide precursors and genes involved in opioid regulation (Rockman et al. 2005; Wang et al. 2005). The rapid evolution of PACAP precursor genes was a consequence of positive selection, which occurred in the central regions of the gene, sites that have a critical role in enhancing the biological activity of neuropeptides by protecting them from enzymatic degradation and increasing their affinity for receptor binding (Wang et al.).

The Chimpanzee Sequencing and Analysis Consortium (2005) found significant human and chimpanzee differences which indicate that there was a rapid evolutionary divergence in the human line involving xenobiotic-metabolizing genes that provide an ability to metabolize plant toxins. Some of the most significant differences are in segmental duplication of genes, their repetition in specific areas of the genome. These gene duplications produce changes in the onset and extent of gene expressions, as well as provide mechanisms for a diversification of genes, which can occur during duplication, providing a basis for novel functions (Wooding and Jorde 2006). The human CYP2D6 gene illustrates the adaptive functions that can come from segmental duplication—its role in encoding an enzyme (cytochrome P450) involved in the metabolism of drugs. Sullivan et al. point out that the mammalian xenobiotic-metabolizing cytochrome P450 provides evidence of a deep evolutionary history of adaptation to plant toxins. Our hominin ancestors underwent further positive selection for CYP2D6, an enzyme that enables the body to metabolize opiates, amphetamines, and other drugs, including plant toxins and serotonin reuptake inhibitors.

There have been waves of selective effects in the hominid line for genes associated with opioid cis-regulation (Rockman et al. 2005). The prodynorphin gene is found in chimpanzees as well, but it is expressed to a far greater extent in humans. Natural selection processes have resulted in an alteration of human prodynorphin, a significant precursor molecule for a range of endogenous opioids and neuropeptides. This selection for prodynorphin expression and endogenous opioid precursors contributed in significant ways to the evolution of human perception, emotion, and learning.

Oldham, Horvath, and Geschwind (2006) characterize the chimp-human differences as involving an increased connectivity in the gene coexpression networks in frontal brain networks of humans. Humans have an intensification of expression of genes associated with the CNS and the frontal cortex innervations, particularly circuitry underlying higher cognitive processes. Highly dopaminergic minds are active, with above average intelligence, are achievement-oriented and goal seeking, and are confident in their abilities (Previc 2009). This is the positive side of the dopaminergic mind; there is also a dark side. This is illustrated in the many pathologies associated with deficiencies of dopamine. There are several different dopamine-mediated personality disorders because there are several dopaminergic systems (e.g., lateral and ventromedial). The ventromedial dopaminergic system provokes intense unconstrained aggressive drives to achieve distant goals, an unleashing of the motivation drives associated with wanting. It also stimulates the creative genius in a search for novel associations among stimuli. The stimulation of the lateral dopaminergic levels that enhances executive control and internal locus of control can at excessive levels lead to the delusion of grandiosity and invincibility, magical ideation about abilities to control distant events and to have control over others.

Evolution of Serotonergic Systems

The dynamics of dopamine is balanced by the serotonin system, the primary system that is affected by psychedelics such as LSD and psilocybin. Dopamine and serotonin are the two most important amines and play a complementary role in balancing the functions of the brain and body. The right hemisphere and its serotonergic and noradrenergic systems inhibit the left hemisphere and dopamine. These serotonergic agents were also part of environmental sources, neurotransmitter analogues found in many genuses and species of mushrooms, particularly in psilocybin-containing mushrooms found worldwide. These substances affect the serotonergic neurotransmitter systems, producing profound alterations of consciousness that typify human concerns with the soul and supernatural. It is notable that while humans and other animals tend to respond in similar ways to most classes of drugs, there is a one class of drugs that other primates will not deliberately self-administer—the psychedelics (McKim 1991). Although some humans may respond the same way after initial doses of psychedelics, the typical variations between humans and other primates in response to psychedelics likely reflects evolved differences in the serotonergic systems of our hominin ancestors.

Psilocybin-Containing Mushrooms as Sources of Spiritual Experiences

Fungal species containing psilocybin have been found around the world, providing an exposure to humans for millions of years. Guzman, Allen, and Gartz (1998) illustrated the worldwide distribution of neurotropic fungi that are used as sacred plants in cultures globally. The existence of such fungi deep in antiquity is illustrated by species unique to specific areas of the world. The premodern sacred use of these substances is attested to in language, art, and physical residues of psychedelic substances in cultures around the world (Dobkin de Rios 1984; Ratsch 2005; Schultes and Hofmann 1979; Schultes and Winkelman 1996). These substances produce experiences that are directly related to shamanism, including (Winkelman 1996)

- providing access to a spiritual world, the supernatural, bringing the mythical world to life;
- producing an experience of the separation of one's soul or spirit from the body and its travel to the supernatural world;
- producing a dramatic encounter with the personal unconscious, experienced as the spirit world;
- activating powers within and outside of the person, including the sense of the presence of spirits and their incorporation into one's body;
- establishing relationships with animals, particularly carnivores, and, perhaps, especially felines and serpents;
- inducing an experience of transformation into an animal;
- provoking death of the ego and its transformation or rebirth;
- providing information through visions;
- providing healing, especially through emotional experiences and release (catharsis); and
- inducing integration of the group and enhancement of social cohesion.

Since the features of psychedelic-induced experiences are also central to shamanism, exposure to these substances necessarily contributed to the development of shamanism and the emergence of religiosity. This hypothesis is supported by the objective ability of those substances to produce a variety of mystical experiences.

Griffiths et al.'s (2006) carefully designed double-blind study showed that psilocybin has the ability to induce mystical experiences and that the effects on participants' attitudes, moods, and their own experience of spirituality persisted for months. The comparison with control periods showed that psilocybin produced significantly higher ratings on the scales used to assess mysticism and altered states of consciousness, including introvertive mysticism, extrovertive mysticism, internal and external unity, sacredness, intuitive knowledge, transcendence of time and space, ineffability, positive mood, and experiences of oceanic boundlessness. Psilocybin sessions had significantly higher levels of peace, harmony, joy, and intense happiness. In addition, there were persisting effects noted for the psilocybin sessions, including an enhanced positive attitude about life and themselves, accompanied by positive mood changes and positive altruistic social behaviors noted by third-party community observers.

Human-Chimpanzee Divergences in Serotonergic Binding

These findings illustrate that something intrinsic to the biological properties of psilocybin and its effects on the human brain can induced mystical experiences. That hominins evolved to benefit from these kinds of exogenous substances is indicated by several lines of evidence. Raghanti et al. (2008) pointed to the wide range of evidence that indicates that the role of serotonin (5HT) in support of higher cognitive functions was modified in the course of human evolution and contributed to our cognitive specializations. The central effects of LSD and hallucinogenic drugs on 5-HT receptors indicate that these should be prime candidates for evolution of our capacity for the spiritual experiences produced by these substances. While humans do not have quantitative increases in serotonin innervations in comparison to chimpanzees, there are species differences in innervations patterns (Raghanti et al. 2008) and differences in the 5-HT_{1D} receptor amino acid sequences. While chimpanzees and human serotonergic ligands (including several indoles and ergots) have comparable, low nanomolar binding affinities and a remarkable degree of similarity in their binding profiles with other ligands (agents that will bind to receptor sites), there are differences that indicate molecular divergences of the 5-HT_{1D} receptors of humans and chimpanzees (Pregenzer et al. 1997). Pregenzer et al. found that while humans and chimpanzees do not significantly differ in serotonin dissociation, humans have significantly greater displacement (2.5 to 4 times greater) on the binding of LSD and other ergots (naturally occurring LSD-like substances metergoline and dihydroergotamine). This provides direct evidence that human serotonin systems evolved the capacity to more efficiently process this class of drugs (also see Sullivan and Hagan [2002]; Sullivan, Hagen, and Hammerstein [2008]). The importance of the psychedelics in human evolution is underscored by their ability to have effects on the expression of genes in the frontal cortex of the brain (Nichols, Garcia, and Sanders-Bush 2003).

The transcendent experiences produced by these substances suggest that they led to the evolution of uniquely human aspects of consciousness. Shamanism has been considered the first form of evolution of human consciousness to achieve the transpersonal levels. The role of psychedelic plants in promoting this evolution of consciousness is reflected in their psychointegrative consequences and manifested cross-culturally in shamanism and transcendent experiences. The ability of these psychointegrators to stimulate primary activities of the limbic system—emotions and interpretations related to emotions, self-preservation, sense of self, and social attachments—reflects their activation of these evolutionarily earlier levels of cognition. Activation of these evolutionarily prior aspects of mentation nonetheless represents evolutionary developments in human consciousness through cognitive-emotional integration.

Adaptive Effects

A significant aspect of these exogenous neurotransmitter sources, illustrated in the effects of psilocybin-containing mushrooms, is their ability to induce an animistic worldview regarding consciousness, an intrinsic influence of these

substances on consciousness. This biologically based "neurotheology" presents a mystical view of the world that has been fundamental to the understandings of consciousness for many cultures and reflecting an adaptive feature of the ability to use plant-derived exogenous sources of neurotransmitters. Their effects on the serotonergic nervous system and macro-level processing in the brain produce alterations of consciousness that have been core to consciousness traditions. These traditions have models of consciousness as spiritual, multileveled, and transcendent, with the manifestations of altered consciousness considered to represent the most significant levels of consciousness.

This coevolution of our capacities for using exogenous neurotransmitter substances and experiencing unusual forms of consciousness involved a variety of adaptive effects. As Sullivan et al. note, these are rare neurotransmitter substances, most require dietary precursors, so the capacity to metabolize and use exogenous sources of these substances provided intrinsic benefits. These psychotropic plants are capable of producing a variety of other adaptive effects as well. The toxic effects of their alkaloids on a wide range of intestinal worms would have contributed to human health, likely contributing to the ubiquitous sense that these plants are in some way "cleansing." There is a range of physiological effects as a function of dose and contextual factors, including increased awareness and attention, enhanced visual acuity, and excitement, including erection and sexual arousal (see Winkelman and Schultes 1996 for review). Psychotropic plants also provided adaptive advantages in their integrative and informational properties associated with the alteration of consciousness (Winkelman 2007a).

Mandell (1980) suggests that the common biological basis of diverse procedures, agents, and conditions involves disinhibiting the temporal lobe structures, which results in the emotional flooding experienced as ecstasy and visions from the "inner world." The activation of the hippocampal-septal system underlying these effects has terminal projections from the somatic and autonomic nervous systems, forming part of an extensive system of innervations connecting areas of the brain, in particular, linking the frontal cortex with the limbic system. The limbic system (the paleomammalian brain) is that part of the brain where emotions are integrated with memories. Enhancement of these processes with exogenous neurotransmitter analogues such as the DMT in psilocybin mushrooms illustrates their adaptive advantages.

The effects of these substances on neural, sensory, emotional, and cognitive processes illustrate their adaptive advantages produced by the inhibition of the serotonergic systems. This involves an enhancement of consciousness provoked by increasing integrative information processing, achieved by inhibiting the serotonergic circuitry controlling dopamine systems and repressing the lower structures of the brain (paleomammalian and reptilian). Psychointegrative effects derive from the disinhibition of these emotional and social processes, resulting in integrative brain functions as a result of the integration of limbic system emotional processes into the neocortex. This results from the loss of the inhibitory effect of serotonin on the mesolimbic temporal lobe structures, leading to synchronous discharges in the temporal lobe limbic structures, and resulting in a functional integration of the different systems of the brain.

There are a variety of adaptive aspects of altered consciousness in general. One feature involves their ability to enhance access to normally unconscious information and to integrate thought processes. These innate propensities produce an integration of different brain systems, enhance learning of information and promote behavioral, emotional, and cognitive integration. Religious ASC reflect an adaptive response involving enhanced integration of information from unconscious processes of the mind, integrating the body-level awareness of the prelinguistic mind into consciousness. Religious experiences are encounters with our own unconscious potentials in ways that are directly accessible to personal consciousness, enabling normally unconscious information to be used in directing our adaptations to the environment. The functional roles provided by the dream capacity are elicited both by shamanic ritual and the exogenous opioid and serotonergic analogues.

ASC and Unlearning

While cumulative learning is the normal for cultural beings, these adaptations eventually reach their limitations or even fail under catastrophic change or major life cycle changes such as adult transition, which require "a large scale conversion of the intentional structures of meaning (Freeman 2000b, 149). The need for radically new structures of meaning cannot be met by cumulative learning, but requires unique processes that can dissolve existing meaning structures and replace them with new ones. "The process of unlearning is a remarkable achievement of biological and cultural evolution of mammals" (Freeman 1995, 152). This unlearning involves a process which Pavlov discovered and labeled "transmarginal inhibition," in which collapse due to extreme stressors results in a complete loss of prior learned associations. This process of stress leading collapse results in the loss of former behavioral patterns, allowing for new learning without interference from the previous patterns. The dynamics of these processes in humans have been characterized as "brain washing," a "cleansing of the slate" that allows for learning of new bonds of social cohesion. Freeman notes that the breakdown allows for the persistence of general knowledge, motor skills, language abilities and personal memories, while dissolving social attitudes and values. The social support provided by ritual then allows for social guidance to reshape the person to new attitudes and expectations. Traditionally these activities have been key parts of the adolescent-to-adult transition found in many cultures, where rites of passage involving music, dance, and collective ceremonies are used to both provoke the transmarginal inhibition and to guide the restructuring that occurs when the person returns to consciousness. Socialization requires repeated unlearning, which is mediated by oxytocin and endorphins (paraphrase Freeman 2000b, 134). The processes of unlearning require that one "loosen the self-conscious control of individuals and dissolve their cognitive and emotional structures. . . . Unlearning is mediated by the neuromodulators in the brainstem, particularly oxytocin and vasopressin" (Freeman 1995, 11).

Ecological Consciousness

Brown (2009) noted the pervasive effects of the psychedelics on ecological consciousness, including the foundation of the deep ecology movement by Arne Naess, whose ecological awareness was profoundly influenced by LSD. Similarly, the organizer of Biosphere 2, John Allen, was inspired by peyote experiences. The enhanced awareness of the ecological system widely reported by those using psychedelics may reflect some of the more generic aspects of the effects of these substances: a reduction of ego boundaries; an enhanced sense of connectedness; a sense of the intimate relations to nature and one's own body; a sense of sentience to everything. There is a widely expressed tendency for psychedelics to enhance communication with nature, reflecting a long-denigrated "nature mysticism." These experiences enhance a sense of personal connectedness with nature and an enhanced valuation of nature that encourages care of the planet. A focus on nature may be a side-effect of our reduction of ego-centeredness, an enhanced consciousness of the presence of nature that comes from a diminution of self-importance. This relationship is often expressed as biophilia, a love of nature that is also discovered in another unique human capacity—long-distance running.

Bipedalism and Mystical Experience: The Runner's High

Another influence contributing to the human capacity for spirituality emerged as a by-product of one of the human line's unique features, long-distance running. Although humans are not considered as effective runners as many other mammals, "No primates other than humans are capable of ER [endurance running]" (Bramble and Lieberman 2004, 345). In *Homo erectus*, this capacity led to the emergence of spiritual experiences. A natural basis for inducing ASC and mystical experiences derives from endurance running, long-distance running, and ultraruning (Bramble and Lieberman 2004; also see Jones [2005]; Noakes [1991]). Commonly known as the "runner's high," it is also associated with features typical of mystical experiences such as positive emotions such as happiness, joy and elation; a sense of inner peacefulness and harmony; a sense of timelessness and cosmic unity; and a connection of oneself with nature and the Universe (Dietrich 2003).

The processes by which mystical experiences are induced by running begin with the saturation of the sympathetic-ergotropic system. In addition to the activation produced in many body systems by the running, the prolonged activity forces a kind of meditative breathing in the regular methodic inhalation and exhalation. Physical stress activated by long-distance running provokes the release of the opioid, adrenaline, and noradrenaline neurotransmitters, and elevated body temperatures, oxygen depletion, and chemical and neuronal imbalances that can create unusual state of awareness. Jones placed ultrarunning high in the context of the extreme activation of the ANS. Extensive running leads to a saturation of the SNS and associated structures of the hypothalamus and amygdala (particularly the left hemispheric), a "spillover" effect that leads to the simultaneous activation of the PNS and the amygdala and hippocampus areas of the

right hemisphere. This simultaneous activation of what are usually separate functions and areas of the brain results in a saturation of brain areas responsible for general orientation and attention, visual integration, emotional processing, and expression of verbal-conceptual phenomena (Jones, 44). This results from a general overload of both the sympathetic and parasympathetic nervous systems and associated structures (hypothalamus, amygdala, and hippocampus) and leads to a cessation of normal attention, emotional processing, and comprehension. This cessation of normal processes produces a sense of ineffability and a disintegration of the self, which is generally experienced as a condition of profound peacefulness (Jones, 44). It is the shutdown of the normal processes of the mind that lead to these special experiences.

Sands and Sands (2009) proposed that the selection for long-distance running in *Homo* subsequently selected for a form of spirituality, a "horizontal awareness," or *biophilia*, that operated through existing neurobiological reward systems. The "high" associated with long-distance running situated our ancestors in a dynamic environment within which they felt an intimate connection with nature. They reviewed evidence showing that the neurochemicals released during endurance running are tied into a variety of preexisting reward pathways, including monoamines (serotonin, dopamine, and norepinephrine), endorphins, and endocannabinoids.

The primary mechanisms postulated for the runner's high were endogenous opioids released in response to exercise, stress, and pain, with both serotonin and the endogenous opioids involved in regulating dopamine release. There is evidence that running also releases serotonin and dopamine, both of which have positive effects on mood, enhance performance, and elicit our basic reward systems. Dietrich and McDaniel (2004) found that endurance runners have increases in an endocannabinoid, anandamide, a substance that produces psychoactive effects similar to the THC of marijuana, including euphoria, a sense of transcendence, and a sense of contact with the divine. Thus a side effect of the acquisition of the capacity for long-distance running was a variety of mystical experiences and associated pleasurable sensations. This running capacity also provided a physical basis for the ritual capabilities of dance, as well as the expressive capacities of mimesis discussed earlier.

Bipedalism and Dance

Bipedalism also provided the capacity for another uniquely human capability—dance—which is associated with spiritual practices in cultures around the world. The dramatic chimpanzee charging displays are a limited capacity compared to the capabilities for running and dance that evolved in humans. Bachner-Melman et al. (2005) found specific gene polymorphisms associated with people who are engaged intensively with creative dance performance. While there are common genetic features of humans that give us all a uniquely human capacity for mimesis and dance, there are also variable gene expressions and interactions that are significantly associated with the engagement with professional dance.

Bachner-Melman et al.'s study identified a genotype associated with serotonin transporters (SLC6A4) and an arginine vasopressin receptor (AVPR1a), an opioid receptor. In comparison with normal controls and professional athletes, dancers had higher levels of both of these gene frequencies, which were significantly associated with a measure of spirituality and altered states of consciousness (the Tellegren Absorption Scale). "We therefore hypothesize that the association between AVPR1a and SLC6A4 reflects the social communication, courtship, and spiritual facets of the dancing phenotype rather than other aspects of this complex phenotype, such as sensorimotor integration" (Bachner-Melman et al., 3 of 33).

The SLC6A4 allele is a more efficient serotonin transporter and is considered to be more effective in the removal of serotonin from the synapses. The AVPR1a gene is widely associated with social communication and affiliative behavior in primates. They propose that the association between dance and the AVPR1a gene reflects the central role of communication and social relations in the functions of dance. An evolutionary basis for the linkages of the AVPR1a gene and dance reflect the role of vasopressin in vertebrates' courtship behavior. Vasopressin is well-recognized for its role in human bonding, both maternal behavior and romantic attachment. Thus, they propose that the interaction of these genes and human dance involves an engagement with the emotionality of dance experiences. Human dancing is an aspect of courtship and social communication that has neurochemical and genetic mechanisms that indicate a conservative evolutionary history, with the foundations of mating displays and affiliative behaviors found across vertebrates species (Bachner-Melman et al.).

There is an interaction between vasopressin and serotonin in the hypothalamus, playing a key role in control of communicative behavior. The association of serotonin and the opioid system (vasopressin) with ASC and mystical experiences, as well as enhanced dance propensities, suggest that these capacities of dance and ASC coevolved. The self-regulatory processes of the limbic system are mediated by neuromodulators, especially dopamine, endorphins, oxytocin, and serotonin, as well as melatonin and histamine, with vasopressin central to the neuromodulatory mechanisms by which basic mammalian bonding processes were extended to larger groups (Freeman 1995). Chapter 4 described the many ways in which shamanic practices alter these neuromodulatory systems. The association of serotonin and the opioid system (vasopressin) with alterations of consciousness and mystical experiences, as well as enhanced dance propensities, indicates a coevolution of the capacities of dance and the capacities for altering consciousness. Clearly, dance has that capacity to induce alterations of consciousness through a variety of mechanisms (such as stimulating the release of opioids, producing rhythmic stimulation of the brain, as well as inducing exhaustion and collapse; see Chapter 4). Further genetic adaptations involving the serotonergic and opioid systems in dance are linked to the evolution of a set of uniquely human capacities involving the expressive capacity of mimesis, the ability to intentionally represent through imitation. This body-based imagestic system of expression reflects a level of consciousness communicated through a variety

of expressive forms—such as play, drama, ritual, music, emotions, shamanic ritual, and ultimately human spirituality and religion.

Freeman (1995) characterizes the last half-million years of human evolution as based in the adaptations made for enhanced social communication. Given that our knowledge of the external world is limited to the representations produced within our brains, this solipsism can only be moderated by information signals from other brains. Freeman (1995, 2000b) characterizes music and dancing as the quintessential technology that humans developed to bridge the solipsistic gulf. Freeman characterizes dance as "the biotechnology of group formation" (2000b, 129), with rhythmic dancing, marching, clapping, and chanting constituting a central part of ancient socialization processes, engaging our entire bodies and the motor and somatosensory systems in a way that links the group into a cooperative community. The rhythmically repeated motions constitute a basis for cooperation by making the intentions and behaviors of others predictable, using movement and music as the system of coordination. The expression of intentions in commonly observable body actions of dance provides a basis for nonverbal communication and a basic mechanism for coordination and bonding of groups beyond the family. The capacities of "musical skills played a major role in the evolution of the human intellect" (Freeman 2000b, 134). Freeman notes that the development of ritual group identity in humans is mediated by music and dance, as well as other expressive activities such as sports.

A Hierarchy of Exapted Functions: Display, Mimesis, Dance, and Ritual

An ancient capacity of our hominid ancestors—exemplified in the aggressive *bipedal* displays of branch wielding chimpanzees—was a platform from which a variety of hominin adaptations occurred. This was a basis from which physical attack and defense capabilities led to the selection for characteristics that eventually established the uniquely human abilities of bipedalism, running, dance, and mimetic expression. These capacities together created a new level of ritual functioning when they combined with the emergence of the also uniquely human capacities of song and music. But while mimesis provided a new level of abstract representation, it too was an exaptation of more ancient functions. This expressive basis undoubtedly has deeper roots than our hominid ancestors, which is reflected in the way mirror neurons function. Mirror neurons fire not only during the carrying out of tasks but also when an animal observes another doing that task. Our ancient capacities for mimesis must have exapted those functions of identification with the mental and behavioral states of others and then extended them. Our capacities for social understanding of others must have their more ancient roots in these capacities and their ability to be used to deliberately express our behavioral intentions.

Music and the Origins of Shamanic Ritual

The evolution of our uniquely human capacities for music and dance provided a basis for a human ritual dynamic that sharply distinguish us from our ape cousins

(Malloch and Trevarthen 2009). Human ritual dynamics expanded the same capacities of ritual found in the animal kingdom—reduction of in-group conflict and enhancement of social cohesion. These capacities for displays and performance with music and dance provided an enhanced capacity to expand the functions of ritual of binding groups together into a common consciousness. This ritual social dynamic is a medium for expression of shared meaning, a system that provided a necessary substrate for language. This dynamic of rhythmic expression, exemplified in dance and music, illustrates one of the most fundamental of all human forms of communication—behavior and mimesis as discussed in Chapters 3 and 4.

The possible adaptive roles of music generally have been discounted or given scant attention. Yet there are several mechanisms through which music can enhance adaptation at individual and group level. The physical beat of music produces a synchronization that coordinates and organizes the group. Music has been considered one of the most effective devices for group coordination, whether it involves coordination of movement, interpersonal entrainment, or the creation of a spirit of teamwork (Brown 2000). Musical experiences contribute to formation of stronger emotional bonds among the members of a group, extending a sense of unity and connectedness. Group experience of music has the potential of a unifying the group's experiences, inducing common emotions and producing a synchronized response to the environment.

These musical capacities have many evolutionary foundations; Dissanayake (2009) sees the most important contributions as involving adaptations for interactions between mother and infant. The communicative rhythmic dynamic between mother and infant begins in the first weeks of life with musical and dance-like components that coordinate their communicative turn-taking. Dissanayake proposed that the origins of our musicality derived from the expressive emotional modulation of the love bond between mother and infant, a mutuality based in a dynamic of emotional cooperation. This expressive emotional modulation is a basis of all communication, including language. This fundamental role of rhythmic interactions in providing the basis for sociality and communication is one of the forms of evidence pointing to the biological and adaptive bases of music.

Dissanayake rejects theories postulating the adaptive origins of musicality in mate attraction and sexual selection, noting that the competition aspect of sexual selection contradicts the cooperative aspects of musicality. Competition cannot have been the selective force for the evolution of the musical capacity because some of the most salient aspects of music—pitch blending and synchronization—depends on cooperation and coordination, not competition. An evolutionary account of music based on concordance and bonding better explains why music is found at the core of communal ritual in small-scale societies. Music is intrinsic to a broader range of expressive activities such as clapping, playing instruments, expressive gestures, and dancing that are central aspects of human group ritual behavior because they express and facilitate affiliative intentions.

Dissanayake proposes that the evolution of musicality must be seen as a consequence of adaptations forced by bipedalism, which resulted in selection for more immature offspring because of the consequential narrowing of the pelvis and birth

canal. Musicality was a way for mothers to maintain a higher level of interaction with their more dependent offspring, using the vocal modality and its emotional modulation capacities for enhancing communication and connection. This has resulted in a species-specific human pattern of "motherese" that emerges in mother-infant interaction within weeks of birth. This dynamics of exchange—involving body movements, facial dynamics and emotional expressions—involves the same behaviors found in affiliative and submissive ritualizations of other primates. Dissanayake demonstrates how these mother-infant dynamics are the foundations of what evolved into uniquely human musicality. The same interactive and communicative dynamics that bond mother and infant are later extended to enhance other forms of bonding of larger social groups. Music evolves from capacities related to a dynamic of love that enhanced human survival through increasing bonding.

The evolution of these expressive capacities likely involved "an evolutionary exaptation of social-emotional systems that became the medium by which our ancestors harmoniously coordinated not only intimate engagements, but also ambitious group activities" (Panksepp and Trevarthen 2009, 108). These biological foundations as a social-emotional communication systems are suggested by the social roles of music-like vocalizations in other species. Music has its basis in the subcortical affective expressive emotional system, a mammalian communication system which provided the emotional regulation functions that constituted the preadaptations from which a uniquely human musical capacity evolved.

Dissanayake notes that there are other contributory factors to the foundation for musicality. Selection pressures on the capacity for long-distance calling resulted from the need for cooperative communication, providing a basis for a capacity for rhythmic group chorusing and vocalizations that are at the basis of our musical capacity (Merker 2009). Deeper evolutionary roots of musicality are in our rhythmic impulse and the emotional dynamics of motion of the body. Our intrinsic rhythmic capacities are the expressions of a full-body capacity related to the inherent rhythm of bipedal movement. Music is the vocal complement to the behavioral expression of mimesis, a vocal-cognitive shift that expands the communicative power of behavior; sound carries a signal further than sight at night and in dense foliage. Music was at the basis of the coordination of the mimetic capacity, where vocal learning of musical traditions provided a basis for transmission of group culture, especially through ritual. Music was a core feature of our ancient ritual capacities that provided a basis for expressive sharing and the foundations of culture.

Merker (2009) notes that although other animals engage in cultural learning, it is humans alone that have ritual culture, one in which the arbitrary form of doing things is obligatory for social participation. This arbitrariness is illustrated in the forms of music and song, which provide a foundation for costly signals. Cross and Morley (2009) point to the unique power of music to enhance group cohesion in a number of ways, including formation of group identity; synchronization of behavior and cognition; and group catharsis, the expression and release of emotions. Music and its effects on emotions provide an intrinsic reward for engaging in these activities that enhance social functionality.

Effects on the individual include the ability of music to enhance hormone release, with effects on oxytocin, which enhances social bonds (see Panksepp and Trevarthen [2009]). These hormonal effects have both individual and collective effects, coordinating and entraining the individual with the group. The intrinsic pulse of music and its coordination effects on the group creates intuitive linkages and a common sense of intentionality. The pulse that underlies rhythm creates an inclusive sense of meaning derived from the experiences of music.

Music provides a medium for metaphoric expression, a coordination of diverse expressive aspects (behavior, emotions, sound) that contributes to the formation of a coherent message or meaning that effects the participants." [M]usic can be interpreted as facilitating the formation of conceptual-intentional complexes across multiple domains of experience, providing a synthetic medium that can bind together the experiences of disparate situations and concepts" (Cross and Morley 2009, 70). Crowe (2004) reviews evidence that music manifests a complexity characterized by the emergent properties' novel features that reflect a deep level of organization, functioning as a form of communication that goes beyond the nonverbal expression of basic emotions, enabling it to express more developed forms of feelings.

Music produces a social coordination that allows for the exchange of information through diverse modalities (behavior, visual emotional expressions, emotional vocalizations) and must be seen as core to the evolution of the representational and therefore symbolic capacity. "Musical or protomusical behavior has the potential to make use of several cognitive capacities at once, relying on the integration and control of biological, psychological, social and physical systems; it gives the opportunity to practice and develop these *integrated* skills in a context of limited risk" (Cross and Morley 2009, 77; emphasis added). Cross and Morley (77) emphasize the role of music in "integrating important cognitive skills . . . [and] stimulation of fundamentally important human interactive capacities."

Mimetic Origins of Art and Shamanism

Donald (2006) places the human capacities of dance and music in the broader context of an underlying ability for artistic expression, which he views as a by-product of mimesis and "the ultimate refinement of the mimetic mode" (15). He characterizes art as part of the coevolution of cognition and culture, a primordial expression of the cognitive capacities of mimesis that became a central feature of uniquely human mental capacities. Mimesis constituted "a single neurocognitive adaptation . . . [for] mime, imitation, gesture and the rehearsal of skill" (15) that resulted from the cognitive elaboration of expressions of meaning based in embodiment (behavior).

The cognitive and evolutionary potentials of art are as a form of "cognitive engineering . . . an activity *intended to influence the minds of an audience*" (4, italics in original). This reflects a deep human tendency to engage in joint and reciprocal control of attention and the experiences of others for purposes of social communication. Here we see the continuity of displays and art and shamanism.

Donald considers these dramatic expressive manifestations that we call art to be at the foundation of human cultural processes of distributed cognition, the linkages among minds that hold a wealth of information in memory of experience. Although he spoke of art rather than shamanism, his statements can be applied equally to the shamanic model: "Art is constructivist in nature, aimed at the deliberate refinement and elaboration of mental models and world views . . . the outcome of the brain's tendency to strive for the integration of perceptual and conceptual material over time. The term *large-scale neural integration* refers to the nervous system's cross-modal unification of many sources of experience into a single abstract model or percept" (Donald 2006, 4).

Donald considers this capacity for large-scale integration to be the major adaptive advantage acquired by our complex brains, permitting more abstract thought, a greater temporal and spatial complexity to behavior, and an ability to manage future unfolding of complex and shifting social alliances. Art was a central manifestation of this metacognitive capacity to engage self-reflection and represent self-identifying symbols, especially of social groups. This capacity of representation through art had its first manifestations in the ritual expressions of our ancient hominin ancestors, who gave rise to a new cultural level, the Mimetic culture, nearly 2 million years ago; this expressive capacity continued to be the primary medium for the eventual evolution of the Mythic cultures of early anatomically modern humans (Donald).

Donald's models of the Mimetic and Mythic cultures give us a framework for understanding the emergence of shamanism in the expressive capacities of Mimetic culture. With Mimetic culture, the display capacities of hominids are superseded in a new expressive level of mimesis not found in developed forms in our ape cousins. The Mimetic domain allowed for the expression of an archaic level of hominin culture based on "gesturing, pantomime, dance, visual analogy, and ritual" (8). This, combined with the drumming elements and music, was the manifestations of a uniquely human religiosity and spirituality in early hominin shamanism. Here, shamanic ritual created the enactive context for the expression of a cognized universe that expanded the shared conceptual frameworks of our ancient forbearers and created a system of shared meaning for the foundations of culture.

Donald reverses earlier characterizations of mimesis as a modular capacity in saying it meets Fodor's (1983) criteria for a nonmodular adaptation. It is nonmodular precisely because it can work in any domain—perceptual, motor, auditory—to communicate information. It is the general basis for symbolic integration. "[T]he domains of art ultimately reflect the entire evolved structure of the human cognitive-cultural system" (20). This capacity was the context in which shamanism led us to the archaic human culture stage and then turned us into culturally modern humans.

SPIRIT ASSUMPTIONS AS ADAPTIVE MECHANISMS

The experience of what is interpreted as the spirit world is a fundamental aspect of shamanic practice; consciousness is altered to enter into contact with the spirit world, which is the source of shamanic knowledge and power. These experiences

include the spirit "other," as well as the spiritual dimension of the self, exemplified in soul flight. These spirit beliefs have been considered an "irrational commitment" that demonstrates allegiance to the group. But as shown in the review of the basic elements of consciousness, spirit assumptions are natural, derived from adaptive skills and assumptions. The exaptation of personal and social representations of self and others in spirit beliefs extends these original cognitive and social functions. These spirit concepts may, however, have more ancient origins in the dominance hierarchies of the ancient reptilian brain (see Ernandes and Giammanco 1998; Winkelman and Baker 2008).

Atran (2006) pointed out that the social functions of religion do not predict the cognitive characteristics of religion, in particular, the cultural universality and predominance of supernatural agents, specific features of supernatural agents, the validation of supernatural agent concepts in ways immune to logical and factual scrutiny, and the compulsion to amoral order that inhibits defection. The inability of social functional arguments to account for the universal features of spirit beliefs indicate "that social functions are not phylogenetically responsible for the cognitive structure and cultural recurrence of religion" (Atran, 185).

While Atran noted that there is good evidence that religious beliefs and practices have the functional ability to alleviate stress and anxiety, enhance social cohesion and reduce conflict, he nonetheless discounted these as evidence of evolutionary adaptation by characterizing them instead as a cultural by-product of humans' evolved cognitive, emotional, and social qualities. Atran's perspective was that religious beliefs survive because of their ability to accommodate to our folk psychology and its "theory of mind" that is a core aspect of supernatural agent concepts. Atran argued that a supernatural commitment helps maintain stable communities, but, nonetheless, considered religion to be a by-product rather than an adaptation. Are there adaptive aspects of supernatural belief beyond the "agency detection," "interpersonal belongingness," and "theory of mind" abilities found in behaviors of other animals? Does the supernatural assumption involve more than the theory of mind and other ordinary processes involved in how people explain phenomena? Do spirit beliefs take this capacity to infer the mental states of others and exapt them in new ways, providing new functional adaptations? Or in contrast, do spirit concepts merely represent previous capabilities? I propose that the functions of spirits provide more than the prior features of personal and social identity and theory of mind, using those prior traits for new purposes, an exaptation that results in a new level of adaptation (Winkelman and Baker 2008).

This is in direct contrast to the dominant perspectives that have characterized religion as involving by-products and complex side effects (see Deacon and Cashman [2009] for review). Deacon and Cashman reject the dominant scientific theories regarding religious universals, characterizing them as inappropriately reductive in treating religious thought and spiritual experiences as incidental, epiphenomena or corrupted predispositions of capacities that originally evolved for different purposes. These approaches overlook the *emergent* character of these experiences and their personal and social value, the importance of ultimate meaning in the transformational experiences, and the psychological and social functions they fulfill.

The Supernatural and the Symbolic

Our evolved agency detection devices may account for the perception of intentional agents, but not as well for other qualities of the supernatural, such as their counterintuitive properties. These properties of spirit entities that do not conform to human limitations involve an expanded set of behavioral capacities ("supernatural abilities"). Spirit concepts provide adaptations in enhancing access to intuitive and unconscious thought processes that are externalized and represented symbolically such as in visions and spirits (Winkelman and Peek 2004). The human unconscious and its wisdom are given a certain control over decision making, externalized in the concepts of spirits. The counter-intuitive properties of religious beliefs are adaptive in spite of their contradictions with factual knowledge because they provide possibilities not derived directly from our innate capabilities and modules.

Atran tried to sidestep this conclusion by suggesting that this "bypasses our hardwiring to form counterintuitive religious beliefs . . . through the cognitive process of *metarepresentation*" (194). The outcome of metarepresentation is symbolic processes that allow us to think about and represent one thing in terms of another. Atran pointed to the adaptations involved in spirit concepts in noting that "[s]upernatural ideas always remain metarepresentational . . . [and] allow people to entertain, recognize and evaluate the differences between true and false beliefs . . . to both generate and recognize false beliefs in others [that] would favor survival" (195, 196). If it favors survival, whether its assumptions are right or wrong, it is an adaptation.

Deacon (1997, 2002; Deacon and Cashman 2009) analyzes the interrelationships among symbols, evolutionary processes, and spiritual traditions. The creative and emergent character of evolutionary processes provide perspectives for understanding the spiritual in terms of the properties of humans' symbolic capacities. Deacon and Cashman link human's spiritual predisposition to the evolution of human's unique symbolic abilities that provide distinctive cognitive and emotional predispositions. These predispositions involve: understanding the universe and personal identity in narrative terms; a conceptualization of the world as involving hidden meanings that involve a level of meaning more fundamental than mundane experience; and emergent emotional experiences that provide the source of transcendent and spiritual experiences. Symbolic capacities produce a drive to create self-narratives and to look for hidden meanings. Human cultural universals postulating a hidden spiritual or supernatural reality that underlies the phenomenal world of experience is a consequence of our irrepressible tendency to see things as symbols. Since symbolic references acquire their meanings from a system of relationships among signifiers, the source of meaning is in essence unseen, found within an invisible conceptual world of interdependent signifiers.

Religion contributes to production of transcendental experience and novel meanings and values by expanding humans' perspectives beyond those produced by biology, personal reference and mundane experiences. These experiences as emergent in that they are not presaged in our evolved psychological mechanisms.

Religious experiences involve an emergent character in which our symbolic capacities fundamentally reframe life experience by radically reorganizing cognitive processes and emotional experience in reference to spirit "other." Religious experiences are centrally emotional in character, and the emotional qualities are directly related to development of character and values.

Social species understand reality through information derived from others, the perceptions in their minds. We acquired a capacity for a theory of mind because it facilitates social communication and organization. Symbols expand this ability to reveal and access minds and their intents. In constructing these views of others, symbols provide a substrate from which one can maintain awareness of the indexical information that produces an experience of what the other's perspective would be like. Symbols are required to mediate this double-referential relationship involved in the ability to form representations of another's mental experience. The symbolic capacity and its manifestation in spirit beliefs provide adaptations to expand awareness of others and their knowledge and intents.

The adaptive advantages of understanding and using symbolic relationships have derived from broader evolved predispositions to seek patterns and look for reasons for what we perceive. This search goes beyond the obvious surface features to find the "behind the scene" causes and actors. Our deep insatiable tendency to find meaning leads us to examine patterns in the natural world as displays of cryptic messages, symbols from an unseen communicator. This unseen communicator is the spirit assumption; these presumed, unseen but sensed, meaning-makers and actors are the source of the spiritual.

The symbolic and spiritual are intrinsically intertwined. True symbolic reference is not intrinsic to the representation, its form or sound, nor is it found within the mechanisms of the brain; rather, symbolic reference is found in an associational network of meanings entertained by minds of a cultural and linguistic community. It is not a physical reality but an imagined one with its meanings derived from a social context.

This experience of immaterial meaning constitutes a foundation of our experience of significant but disembodied spirits and their immortal qualities. The symbol systems that underlie our quest for understanding derive their meaning from referents to others and their imagined minds, disembodied and imagined abstractions such as the spirit world. The perennial referential other required for symbolism creates the omnipotent, omniscient, omnipresent properties of the supernatural.

Deacon suggested that the human intuition that we have of some aspect of our self or our mind that exists independent of our body, the disembodied souls that survive a bodily death, is the kind of experience of self produced through symbols, a kind of a virtual independence of identity from the corporeal basis of our existence. It must reflect in important respects the lower level iconic and indexical forms of representation in the visual substratum, where motor neurons link our experience and bodily self with the visual representations of others' behaviors. And it was in freeing our understanding from this bodily based foundation of knowing that the shamanic out-of-body soul flight gave rise to a significant evolution of human consciousness.

These symbolic capacities free one from the constraints of the here and now (embodied iconic and indexical thought), allowing imagined goals to take precedence over the immediate context in guiding adaptive behaviors. Symbolic representations extended experiences in virtual reference, using the evolved processes of mind to use internalized abstract models to engage in the processes of trial and error learning and in extrapolating different possible circumstances. This achieved something beyond the capacities of genetic evolution, a risk-free engagement of different possibilities and the consequent capacity for forethought and extended planning.

These capacities to experience the world apart from the body referent expanded in the context of the shamanic OBE, or soul flight. The capacity for self-representation provided through mimesis gave an embodied sense of self-consciousness that constituted a preadaptation for the experiences of a disembodied self. The self of the OBE is made possible by the symbolic capacity operating through the representations provided by the body. We must have an embodied self before we can have an out-of-body self.

Brereton (2000) analyzed these adaptive aspects of shamanism in relation to the capacities of dreaming that are exapted in shamanic rituals. Dreams involve representations of self in emotionally salient space, a process of "virtual scenario construction" that provides processes for risk-free construction and examination of options. This symbolic dream capacity is elicited in visionary states that were designed to engage these modeling processes to enhance personal awareness and social adaptations, using the visual symbolic modality as a workspace for exploring different scenarios with enhanced access to unconscious information.

Atran pointed out that supernatural agent concepts are particularly effective in triggering the powerful emotions associated with evolutionary survival templates, making them memorable and compelling. More significantly, Deacon and Cashman (2009) explain how the transcendent and mystical experiences involve the capacities of symbols to produce uniquely human emotions through their interaction with symbolic processes. The emotional qualities associated with mystical and transcendent experiences such as awe, equanimity and self-transcendence depend on symbolic representation and are emergent in that they are produced in the interaction among basic cognitive-emotional processes. Symbolic mediation generates new modes of experience that are different from the more basic component emotions, producing higher-order novelty that is discontinuous with and even in contradiction to the properties of the lower level components. Symbols can fuse ideas and emotions that fall outside the range of normal neurological processes, melding what are naturally mutually exclusive emotions based in antagonistic brain systems, producing novel experiences in conjoint activation of what are normally incompatible emotions. These conceptual juxtapositions are symbolic blends that are not merely additive, but produce a novel synergestic interaction. These are the self-transcending aspects of religious experiences that supersede immediate experience, and provide expanded cognitive integration and emotional synergy.

The argument that shamanism and other religious behaviors are not adaptations but functionless by-products would require establishing that the religious

behavior was based solely on the prior adaptations design to meet other needs and that they do not enhance survival and reproduction. But religion is well-noted for its ability to assist in coping, providing a collective process for engaging with our existential needs for security and our inevitable anxieties such as fear of death. Religion and the supernatural premise constitute effective adaptations for managing human emotional and cognitive dilemmas and expanding our capacities for emotional and cognitive processing. This poses a challenge to the view that religion is merely an evolutionary byproduct.

SHAMANISM AND HUMAN EVOLUTION

Religious beliefs and practices include a variety of social, emotional, and cognitive capabilities that provide a range of preadaptations for shamanism. For instance, our ability to relate to supernatural beings exapts a variety of preexisting social and cognitive skills designed to enable us to function effectively in relationships to the diverse roles found within a complex social group. The extent to which these prior adaptations embodied in religious beliefs provide a new adaptation depends on whether these cognitive mechanisms perform exactly the same functions in religiosity. Religious beliefs and practices constitute an exaptation to the extent that they provide new adaptive capabilities beyond those prior adaptations. In so far as the supernatural premise enables humans to deal effectively with existential anxieties (such as death) not addressed by previous cognitive adaptations, the supernatural premise constitutes an adaptation. To the extent that shamanic practices of totemism enable us to expand our kin-based biases and preferences to include others, producing larger more effectively integrated social groups, shamanism provides an adaptation. To the extent that shamanic practices such as visionary experiences engage cognitive processes and possibilities beyond our ordinary experiences of the waking mode of consciousness, they provide an adaptation.

The roles of shamanism as adaptations must be assessed in terms of how they facilitated the reproduction and survival of individuals and groups. Conceptualizing shamanism's origins in ritual provides a broader context for assessing the exaptations of prior adaptations for new adaptive functions that meet the needs of larger integrated social groups (Winkelman and Baker 2008). The biological solutions to cooperative living have their roots in the role of ritual in enhancing cooperation and reducing conflict in animal society. These ancient phylogenetic origins of shamanism in ritual have been expanded to meet the needs of larger and more complex social groups. In this sense, we can say that not only shamanism but all of religion involves exaptations related to the capacity of ritual to enhance social and individual integration. To the extent that shamanic rituals provide survival-related functions beyond that embodied in the rituals of other animals, shamanic rituals constitute new adaptations. Although exaptations (the use of a prior trait for a new function) are often thought to imply a lack of biological evolution (e.g., see Kirkpatrick 2005), exaptations are also forms of biological evolution (see Buss et al. [1998]; Wildman [2006]). If a trait associated with those previously acquired through natural selection undergoes further

selection to meet a new functional goal, or to do so more effectively, then it is a product of biological evolution.

Preadaptations and Evolutionary Developments of Shamanic Healing

The religious healing impulse has a range of preadaptations that shamanism exapted, extending their effectiveness by merging prior adaptations with capacities provided by symbolic processes. This produced a new level of human adaptation in which religious concepts played a central role in healing. Central to the healing capacity were a range of primate preadaptations, including

1. phylogenetic functional adaptations manifested in animal rituals used for group coordination;
2. mammalian opioid-attachment systems and community bonding processes;
3. use of elements of emotional vocalizations to affect others;
4. capacities of hypnotizability found in animals as a mechanism for stress management; and
5. nighttime drumming sessions used to integrate dispersed daytime subgroups.

These commonalities in chimpanzee displays and shamanic rituals point to the biological and evolutionary roots of religious healing practices in these ancient community rituals. The biogenetic functions of ritual as communication and social coordination capacities were selectively shaped to enhance collective ceremonies that contributed to the alteration of consciousness. These experiences engage the uniquely human innate representational modules, structures, and cognitive processes to produce symbolic thought in metaphors that facilitated social and psychological integration. Shamanism resulted from adaptive strategies for integrating a variety of capacities—biological, social, and cognitive—that contributed to human adaptation and survival.

The universal aspects of shamanic ritual reflect biological bases as adaptations and exaptations. Shamanism extended the capacities of ritual practices to integrate members of the group and produce endogenous healing responses; shamanic practices also stimulated new cognitive features (such as animal identities for self and society) that produced symbolic capabilities such as the beliefs in the spirit world, and their roles in internal psychological dynamics and personal relations with others in society. These aspects of shamanic cognition that involve exaptations of prior cognitive systems include:

- Detecting animacy and agency, intentional causal agents with personalities;
- Representations of social others as ideal models;
- Recognition of social others and making inferences about their mental states;
- Distinguishing animal species and their natural characteristics and tendencies;

- Representation through use of the body and animals as metaphoric systems; and
- The capacity for self-recognition and representation through internalization of the "other."

Evolutionary exaptations of shamanism in particular and religion in general derive from

- Expanding the ancient phylogenetic bases of nighttime group rituals to involve all-night rituals with dramatic expansions in music, dancing, and drumming;
- Expansion of community bonding rituals that healed through eliciting the ancient opioid-attachment mechanisms and exerting selective pressures for enhanced opioid systems and placebo responses;
- Elaborate mimetic enactments that expressed a mythic order and spirit world;
- Alterations of consciousness that produced experiences of the spirit world such as the soul flight or the "vision quest" through exaptations of the cognitive processes involved in dreaming;
- Exapting animal representation systems as symbols of spirits and their powers, providing mechanisms for identity transformation by using spirits for personal and social identity;
- Healing practices that engage a variety of social and symbolic processes that produce psychological well-being through expansion of placebo and hypnotic responses;
- Management of death fears through the use of altered state self-representations as evidence of soul and afterlife; and
- Creating integrative forms of thought based in analogical representation systems produced by altered states and through integration of innate modules in bodily and visual modalities (Winkelman and Baker 2008).

Hubbard (2002) pointed out that shamanism exploits a number of generic structures and processes of human thought reflected in contemporary cognitive science views of the world. Current connectionist models of semantic memory reflect the shamanic "web of life" model that emphasizes the interconnectedness and interdependence of all life forms and interrelations among species. Self-awareness and psychological integration are enhanced by this view of complex linkages among all aspects of the natural world, including humans and the personal self. Contact with nature enhances this view of interconnectedness with nature, and with input from the environment forming the structures of the neural networks of memory, this makes the structures of the natural world fundamental to and isomorphic with the representations of vision and spatial perception. Hubbard discussed this interconnectedness as a shamanic awareness of the web of life, a principle that also reflects the connectivity underlying the operations of the brain and memory formation.

Shamanic cognition emphasizes special attributes of human consciousness involving the extension of meaning and intentionality to objects and the natural world (Hubbard 2003). Humans tend to assume something is a rational agent with mental states, beliefs, and desires when lacking adequate knowledge about the properties of its design to explain its behavior. The "intentional stance," the attribution of mental states, desires, and beliefs to something else, goes beyond a "physical stance" of attributing expectations regarding behavior by an object. This extension includes understanding phenomena of the natural world in terms of the dynamics of people and their interpretations and interactions. Hubbard notes that shamanism's extension of intentionality into the natural world results in an expansion of the "in-group," considering the unknown others of nature to be basically like self. This creates a greater sense of connection with the world, and by extension, with others who participate in shamanic practices. Religions also generally have a moral dimension that encourages social evaluation and "coalition thinking" that separates the world into "us" versus "them." This exploits the social cognitive orientation involving a tendency to attribute meaning and perceive random events as constituting meaningful wholes.

There is also the basic principle of psychointegration, an enhanced functioning of the brain that makes us more aware of systemic interconnectedness. These connections are enhanced by the psychointegrative properties of psychedelics, which reinforce the experience of the correctness of perceptions that emerge from the unconscious structures of the world and brain into consciousness by virtue of their iconic similarity. In visionary experiences, these images have implicit coding of information retrieved from the unconscious and transferred to awareness. The access to natural world structures provides a basis for information not ordinarily available to consciousness, and may also produce a general heightened awareness by increased access to various channels of physical information normally excluded because of habituation. Image-based natural world structures provide access to evolutionarily earlier structures of the brain and their learning and memory processes.

Perhaps we find the most significant adaptive capacity integrated into the shamanic complex in the shaman's renowned function as a visionary and a prophet. This ancient visionary engagement with knowledge of the world has been conceptualized in contemporary psychology as mental time travel. Berntsen and Jacobsen (2009) found that spontaneous mental time travel to possible future events is as common as autobiographical recollection (memories of the personal past), but differing in involving more positive features. The finding of Arzy et al. that this mental time travel capacity is more related to projection of the self into future events (rather than the past) indicates that our "time travel" capacity primarily reflects selection for mental processing of future predictions and rapid decision making regarding anticipated behaviors. This mental time travel appears to be a uniquely human capacity based on its heavy dependence on episodic memory, with "obvious implications for problem solving, self understanding and maintenance of social bonds" (Berntsen and Jacobsen, 1103). This mental time travel ability is linked to synesthesias and is a widespread rather than rare phenomenon (Mann, Korzenko, Carriere, and Dixon 2009). These phenomena

characterized by the ability to fuse spatial and temporal sources provide an adaptive advantage, as those with greater synesthesias had greater abilities in manipulating time-based information. Thus synaesthesia provides benefits in mental time travel, looking forward to possible future events, a capacity which underlies and expands on the ability to plan.

One of the exceptional features of the modern human brain is the ability to detach its abstract functions and enter into all sorts of alternative worlds—past, present, future, or totally imaginary. And while we enter into this dislocated universes through mental time travel, our bodies are capable of maintaining involuntary organic and behavioral functions, even allowing us to walk, run, and in a moment, reorient and respond to immediate danger. A linkage between of imaginative capacities our brain and what we need to stay alive reflects the power of consciousness of our ancient brains.

The idea that shamanism derives from or reflects some mental or psychological dysfunction has been expressed across the centuries. The hypotheses are numerous, and most do not deserve the consideration they have been given. Whitley (2009) reviews persistent evidence of a manic-depressive tendency in shamanic initiates, as well as developed shamans. He further notes that shamans while shamans are nonetheless often well ajusted, there is reason to think that they may suffer from these conditions associated with dopamine and serotonin deficiencies. Since shamanic activities and practices have the effect of elevating these neurotransmitter levels, we can continue to reject the pathologizations of shamanism. In contrast, we can understand the responses of shamanism as health oriented, the outcome of an integrative impulse, manifested in mirror neurons, alterations of consciousness, and the ritual and visionary integration of a diversified self. These capacities are manifested in and driven by mimesis, a central feature of human cognitive evolution that was exploited in shamanism. Mimesis is an ancient driver of multiple integrative mechanisms still epitomized in core shamanistic drumming and dancing today.

Previc's (2009) analyses of the interaction of our dopaminergic system and executive intelligence in evolution illustrate the central role of shamanic practices in general human cognitive evolution. Many shamanic activities, from psychedelics to behavioral activities, enhance the dopamine system. The dopamine system facilitates operations of goal-directed motor programming and motivation and associations making reward predictions, processes that are specifically adaptive in acquiring distant reward objects. These distant rewards require operations that take place in extrapersonal space rather than in relationship to the objects of our immediate peripersonal space. Our strategic intellectual skills and capacities are associated with an internal locus-of-control, a sense of being in control of one's own fate. This dopaminergically-mediated behavior requires a cognitive inhibition of extraneous thoughts, sympathetic emotional responses, and the immediate presence of the physical body; these inhibitions are based on a parasympathetic action, which is caused by dopamine, and who's effects produce major features of ASC. The dopaminergic-induced effects engage a human ability to produce abstract representations found in the shamanic out-of-body and time-travel, as well as distant conceptualizations such as spirit worlds, heavens

and hells, and the eternity of the soul. These spirit world-conceptions represent agent concepts that operate with an expanded human brain and cognitive capacity that enhanced our ability to explore distant regions of physical space (Previc 2009). They also provide mechanism through which we explored the intimate spaces of our mental capacities and our personal and social identities.

CONCLUSIONS

The shamanic capacity far exceeds the ritualized behaviors of chimpanzees, but the substantial homologies between ape displays and humans' shamanic rituals indicate their evolutionary origins in the behaviors shared with our hominid ancestors. The hominid baselines of altruism were expanded over hominin evolution to provide healing practices derived from the enhanced effects of symbols and meaning, building on susceptibility to hypnotic engagement, suggestibility, and placebo responses. Shamanism integrated these and other qualities of a mammalian caring heritage into community ritual practices that provided healing and enhanced survival through a variety of mechanisms. These included

- eliciting the visionary experiences as representations of the outcome of unconscious mental processes;
- bonding together different groups in alliances for food and protection;
- expanding the psychosomatic capacities for healing;
- social therapies involving community participation and social symbol systems engaging self development and the mammalian attachment dynamics;
- psychological and self-therapies engaging spirits as psychocultural systems and representations of innate psychological dynamics of the self represented in animal spirits; and
- symbolic-psychophysiological dynamics from ritual manipulation of emotions, self-structures, and the nervous system.

Among other features that have contributed to humans' evolved capacity for religiosity are the effects of enhanced opioid-mediated bonding; the environmental influences of psilocybin-containing mushrooms; and the side-effects of bipedalism, specifically long-distance running. Notably, none of these features were selected for because of intrinsically religious qualities. Consequently, it appears that our religious experiences began as side-effects of adaptive processes. The religious behaviors such as ritual healing practices nonetheless involved adaptations. The interpretations of the experiential reality of altered consciousness in spirit concepts also enabled a new level of symbolic adaptation for molding the self and society. Shamanism is an adaptive framework for ritual management of many aspects of human consciousness. The central role of shamanic principles in the ritual activities of the cultural explosion of the Middle/Upper Paleolithic transition indicates that shamanism both preceded and contributed to the development of our modern symbolic capacity.

The idea that shamanic practices reflect cultural selection and, hence, are no more than a complex by-product of cultural forces, faces the challenge of the

cross-cultural similarities in manifestations of shamanism. If they were the consequences of cultural selection, rather than an interaction between biology and the environment, shamanism would not have been found in such remarkably similar forms across societies in the premodern world. The cross-cultural manifestations directly contradict the hypothesis of cultural selection; instead, we have in shamanism an ecologically specific adaptation of hunter-gatherer societies to innate potentials that reflect exaptations of an ancient primate capacity for ritual.

The collective effects of shamanic ritual practices imply an effect of group selection in our ancient past. Those groups capable of exapting the ancient hominid bases of collective rituals for more effective group solidarity would have been more effective in acquiring social support to survive and reproduce. The net effect was an ancient hominin population in which the capacity for ritual enhancement of well-being was a common feature of humanity. It is at our individual and collective peril that we ignore these health-enhancing aspects of our biological, social and psychological nature.

NOTE

1. For example, see Alcorta and Sosis (2005); Atran (2002); Boyer (2001); Bulbulia, Sosis, Harris, Genet, Genet, and Wyman (2008); Hinde (1999); Irons (2001); Johnson and Bering (2006); Kirkpatrick (2005); McNamara (2006); Sosis (2004, 2006); Wilson (2002).

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About the Author

MICHAEL WINKELMAN earned his B.A. at Rice University, an M.P.H. at the University of Arizona, and a Ph.D. in the School of Social Sciences at the University of California-Irvine. Winkelman spent most of his career studying the biological bases for traditional healing practices, especially shamanism. His research has focused principally on the cross-cultural patterns of shamanism (e.g., *Shamans, Priests and Witches* [1992]) and identifying the biological bases of shamanic universals and associated altered states of consciousness. His studies of shamanic practices led him to a reconceptualization of the so-called hallucinogens as "psychointegrators," reflecting their effects of integrating normally unconscious processes into consciousness. He coedited the two-volume *Psychedelic Medicine* (2007), which examines the applications of shamanism and psychointegrators to contemporary health problems, especially addictions. Winkelman examined the evolutionary origins of religion in his coauthored *Supernatural as Natural: A Biocultural Theory of Religion* (with John Baker, 2008) and addressed the applications of shamanistic and anthropological principles in medicine, nursing, and public health in *Culture and Health: Applying Medical Anthropology* (2008). Winkelman served as president of the Anthropology of Consciousness section of the American Anthropological Association and was the founding president of its Anthropology of Religion section. He retired from the School of Human Evolution and Social Change at Arizona State University in 2009 and moved to the central highlands of Brazil, where he is establishing intentional communities based on principles of conservation, permaculture, and natural healing. His Web site is at www.michaelwinkelman.com.