SHAMANISM AS THE ORIGINAL NEUROTHEOLOGY

by Michael Winkelman

Abstract. Neurotheological approaches provide an important bridge between scientific and religious perspectives. These approaches have, however, generally neglected the implications of a primordial form of spiritual healing—shamanism. Cross-cultural studies establish the universality of shamanic practices in hunter-gatherer societies around the world and across time. These universal principles of shamanism reflect underlying neurological processes and provide a basis for an evolutionary theology. The shamanic paradigm involves basic brain processes, neurognostic structures, and innate brain modules. This approach reveals that universals of shamanism such as animism, totemism, soul flight, animal spirits, and death-and-rebirth experiences reflect fundamental brain operations and structures of consciousness. The shamanic paradigm can contribute to a reconciliation of scientific and religious perspectives by providing a universalistic biopsychosocial framework that explicates the biological underpinnings of spiritual experiences and practices and provides a basis for neurotheology and evolutionary theology approaches.

Keywords: consciousness; evolutionary theology; metatheology; mystical experience; neurotheology; shamanism.

The role of brain functions in spiritual experiences has received increasing attention (e.g., Ashbrook and Albright 1997; d'Aquili and Newberg 1999; Ramachandran and Blakeslee 1998; Rayburn and Richmond 2002; Rottschaefer 1999; Winkelman 2000), especially in the pages of this journal (see *Zygon* 26:3 [September 2001]). Neurotheological understandings of religious impulses in terms of human biology and evolutionary psychology (Peters 2001) enhance appreciation of certain aspects of spirituality but are

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often limited by biasing distortions produced by culture- or religion-specific conceptualizations (see Rottschaefer 1999; Winkelman 1990b; 1993). Such biases include defining religiosity in terms of particular experiences (see Carol Rausch Albright's [2000] critique of Ramachandran and Blakeslee 1998) or a priori assumptions (for example, Eugene d'Aquili and Andrew Newberg's [1999] focus on mystical experience and "absolute unitary being" as the primordial basis of religious experience).

Cross-cultural research on religious practices can overcome limitations from cultural, ideological, and faith-specific conceptions of religiosity. Research using systematic cross-cultural samples (Winkelman 1985; 1986a; 1990a; 1992) has revealed universal patterns of magico-religious practice that provide transcultural frameworks for neurotheological theories. Religious practices associated with hunter-gatherer societies worldwide involve a complex of specific characteristics, practices, and beliefs known as *shamanism*. Universals of shamanism have their bases in innate representational structures and processes (Winkelman 2000) that provide representation, healing, and spiritual experiences (Winkelman 2002).

This essay outlines the shamanic paradigm of neurotheology and places shamanism at the foundations of human cognitive evolution and spiritual experience. Innate representational modules and natural processes that provide the bases for shamanism are described. Shamans' ritual activities and experiences (e.g., soul flight, guardian spirit quest, death and rebirth) involve fundamental structures of cognition and consciousness and representations of psyche, self, and other. Shamanism involves social adaptations that use biological potentials provided by integrative altered states of consciousness (ASC) to facilitate community integration, personal development, and healing. Shamanic processes intensify connections between the limbic system and lower brain structures and project these synchronous integrative slow wave (theta) discharges into the frontal brain. These integrative dynamics enhance attention, self-awareness, learning, and memory and elicit mechanisms that mediate self, attachment, motives, and feelings of conviction. Shamanic ritual provides therapeutic effects through mechanisms derived from psychobiological dynamics of ASC, the relaxation response, effects upon serotonergic action and endogenous opioid release, and activation of the paleomammalian brain. Shamanism manipulates emotions, attachments, social bonding, sense of self, and identity, creating a primordial development of consciousness that constituted the earliest manifestations of culturally modern humans. Shamanic structures of consciousness are manifest in the universal use of ASC in religious healing (Winkelman 1990a; 1992), contemporary illness called spiritual emergencies (Walsh 1990), the dynamics of addiction (Winkelman 2001b), basic elements of contemporary spontaneous religious experiences (Stark 1997), and the modern resurgence of neoshamanisms. The basis of the shamanic paradigm in evolutionary psychology and the psychobiology of

consciousness explains its widespread presence in ancient and contemporary societies. This psychobiological basis makes shamanism a natural paradigm for theories of religious experience and illustrates the value of a neurophenomenological approach to religious experience (see Laughlin, McManus, and d'Aquili [1990] 1992).

A Cross-Cultural Study of Magico-religious Practitioners

Dissension exists regarding the nature of shamanism (Siikala 1978; Harner 1982; Townsend 1997). Some claim that the concept of the *shaman* should be used to refer only to practices from cultures in Siberia, where the term was derived. This reflects a limited perspective on shamanism and is not empirically grounded. Empirical studies based on worldwide samples, systematic cross-cultural research, and formal quantitative analysis (Winkelman 1985; 1986a; 1990a; 1992; Winkelman and White 1987) establish that there are universals of shamanism and that the concept of the shaman has a cross-cultural, or etic, status. Shamanism is not an arbitrary or culturally specific concept but a specific complex of characteristics found in the magico-religious practitioners of hunter-gatherer and simple pastoral and agricultural societies around the world. These empirically similar healing practitioners are not restricted to Siberia or Asia, and their worldwide distribution is not the result of diffusion of traditions, as assessed by autocorrelation analysis (Winkelman 1986a).

Shamans systematically differ from magico-religious practitioners found in more complex societies (e.g., those labeled shaman/healers, healers, and mediums; see Winkelman 1986a; 1990a; 1992). Empirically derived characteristics of shaman include

- "ecstasy," an ASC experience known as soul journey or soul flight
- the use of chanting, music, drumming, and dancing
- abilities of divination, diagnosis, and prophecy
- training through deliberately induced ASC, particularly vision quests, and involving an initiatory death-and-rebirth experience
- spirit relations as foundational to professional capacities
- disease caused by the intrusion of objects or attacks by spirits and sorcerers
- therapeutic processes focused on soul and power animal recovery
- animal relations, including control of animal spirits and transformation into animals
- charismatic group leadership
- malevolent acts involving sorcery
- hunting magic

These empirically derived characteristics include the core characteristics of Mircea Eliade's (1964) classic description of the shaman. Shamans typically engage in healing and divination activities in all-night ceremonies involving the entire local community. Shamans spend hours dancing, drumming, and chanting, often accompanied by assistants and the community. They may dramatically recount mythological histories and enact their struggles with spirits and their journey into the spirit world. Shamans' activities produce an experience of "ecstasy," an altered state of consciousness. These ASC activities provide their spiritual experiences and interaction with the spirit world involving a death-and-rebirth experience; soul journey, flight to the lower, middle, and upper worlds; and transformation into animals. Shamans' ASC emphasize soul flight, where a spiritual aspect of the shaman departs the body and travels to other places. Shamans are not, however, characterized by experiences of possession (following Bourguignon 1976), where the person is controlled by spirits.

Shamanic ASC are typically produced through drumming, chanting, and dancing until collapse (or deliberate repose). Physiological dynamics involve activation of the autonomic nervous system until exhaustion in the sympathetic division leads to collapse and a parasympathetic-dominant phase; this may also be entered directly through withdrawal, relaxation, and internal focus of attention. Activation until collapse produces a physiological response like sleep, inducing the body's relaxation response and natural recuperation processes that constitute a basic mode of consciousness. ASC experiences involve activation of ancient reptilian and paleomammalian levels of the brain, stimulating these aspects of the person to incorporate preverbal processes into experience and consciousness.

The Shamans of Prehistory

Shamanic referents in Upper Paleolithic cave art indicate its pivotal role in the transition that resulted in anatomically modern humans producing modern cultural behavior. Shamanic ritual, ASC, and cosmology have cross-modal integration characteristic of the emergent features of Paleolithic thought and facilitated adaptations to the ecological and social changes of the Upper Paleolithic. Shamanism played a role in cognitive and social evolution through production of analogical thought processes, visual symbolism, and group-bonding rituals that were central in managing the cognitive and social consequences of the Middle/Upper Paleolithic transition (Winkelman 2002).

David Lewis-Williams (1991; 1997a, b) and I (Winkelman 2002) establish these early shamanic activities by applying ethnographic analogies and neuropsychological and cross-cultural models to the interpretation of Paleolithic art. Jean Clottes and Lewis-Williams (1998) and Robert Ryan (1999) concur that neurologically based shamanic practices were central

to this cave art. Clottes and Lewis-Williams's approach, based on neuropsychology and ethnology, provides a basis for inferring Upper Paleolithic religious experiences and their social and mental context. Lewis-Williams, David Whitley (1992; 1994a, b; 1998), and others (Chippindale, Smith, and Tacon 2000) use ethnographic data to show the validity of using shamanism to interpret rock art. A neurological and etic model of shamanism enables interpretation of prehistoric artifacts and reconstruction of cultural and religious activities.

Shamanism is attested in a number of features of ancient cave art, providing a paradigm for explicating cave art representations, functions, and activities (Lewis-Williams 1997a, b; Ryan 1999). Many aspects of cave art centered on shamanic purposes, including the nature of the art, the animal and human representations, embellishment of natural cave features, and ritual use. Central features of shamanism in Early Upper Paleolithic cave art indicate that it was a well-established and central part of these cultures. The evidence includes (1) direct similarities to universals of shamanism, (2) the hominid basis for group chanting and mimetic ritual activities, and (3) the ability of shamanic practices to meet individual and group needs for shared identity and communication that occurred during the Middle/Upper Paleolithic transition (Winkelman 2002).

The Biological Bases of Shamanic Universals

The worldwide distribution of the shaman in widely separated societies is not a consequence of diffusion (Winkelman 1986a; 1992), indicating that the source of shamanism is in independent invention and human psychobiology. Uniformities in shamanism reflect a biological foundation (Winkelman 2000; 2002) involving neurognostic structures—neural networks that provide basic forms of perception and knowledge and the universal aspects of mind (Laughlin, McManus, and d'Aquili [1990] 1992). These structures also involve innate processing and representation modules that have been postulated as underlying religious thought (Laughlin, McManus, and d'Aquili [1990] 1992; Boyer 1992; Winkelman 2000).

Human cognitive evolution involved acquisition of specialized innate modules with specific functions (Mithen 1996; cf. Gardener 1983). I have proposed that innate modules for processing information relevant to self, social others, and the animal world underlie shamanic universals of animism, animal spirits, guardian spirits, and totemism (Winkel-man 2000; 2002). Animism, or the spirit world, involves the use of innate representation modules for understanding self and social others. Animal allies, guardian spirits, and totemism involve use of a "natural history intelligence," employing innate capacities for representing animal species to form metaphoric personal and social identities based in animals. Shamanic management of the capacities of these modules is exemplified in shamans'

characteristics: master of the game animals, shifts in identity provided by animal familiars and guardian spirits, and in social intelligence as a charismatic group leader.

In this article I describe the biological aspects underlying the universal aspects of shamanism. These bases are discussed in terms of

- *ecstasy*, an integrative mode of consciousness manifested in soul flight and visionary experiences and reflecting presentational symbolism and basic structures of consciousness. The section that follows outlines the biological bases of altered states of consciousness.
- *spirit relations*, including guardian spirits and animal powers, which represent aspects of the self managed by the paleomammalian brain. The section "Shamanism and Metaphoric Thought" outlines the features of analogical thought and how they are related to shamanic universals.
- *community rituals and totemism*, providing mechanisms for social coordination and eliciting the opioid and immune systems, modifying self and other identity dynamics, and providing social identification. The section "Community Relations and Opioid Mechanisms" reviews literature linking human social evolution, attachment and opioid responses, and community healing processes.

The Psychobiology of Shamanic Ecstasy: Integrative Consciousness

Shamans' ASC reflect a biologically based mode of integrative consciousness as fundamental to human nature as deep sleep, dreaming, and waking consciousness. The integrative mode of consciousness underlying shamanism is illustrated by convergent findings, including the (near) universal distribution of institutionalized ASC (Bourguignon 1976), the universality of shamanistic healers (Winkelman 1986a, b), and the fundamental similarity of the brain conditions produced by a variety of activities and agents that induce ASC (Mandell 1980; Winkelman 2000). ASC involve systematic brain discharge patterns that produce interhemispheric synchronization and coherence, an integration of brain discharges across the neuraxis of the brain that produces a synthesis of behavior, emotion, and thought. ASC experiences are elicited naturally as a consequence of nervous-system responses to injury, extreme fatigue, near starvation, or ingestion of hallucinogens or as a consequence of a wide variety of deliberate procedures such as drumming, chanting, music, fasting, sensory deprivation, or deliberate sleep (Winkelman 1997; 2000).

The physiological basis for integrative consciousness is illustrated by the wide variety of procedures and agents that evoke limbic system slow-wave discharges that synchronize the frontal cortex (Mandell 1980; Winkelman

1992; 1997; 2000). The neurobiochemical pathway involves slow-wave synchronous discharges across the hippocampal-septal-reticular raphe circuit that is manifested in high-voltage, slow-wave EEG brain wave activity (alpha, delta, and theta, especially 3–6 cycles per second). These patterns reflect linkages between the basic attentional mechanisms of the reticular formation of the lower brain and the hippocampal-septal area of the midbrain, producing ascending discharge patterns that synchronize the frontal lobes. Central to these brain discharges is activity in the hippocampal-septal region of the limbic system that receives terminal projections from the somatic and autonomic nervous systems and exteroceptive and interoceptive systems, functioning as a central processor that integrates emotion and memory.

ASC activate the limbic and paleomammalian brain structures and processes, producing limbic-frontal and interhemispheric synchronization and a parasympathetic dominant state of extreme relaxation and internal focus of attention. ASC stimulate the serotonergic nervous system, exemplified in the action of meditation and psychointegrators (hallucinogens) upon the brain (Walton and Levitsky 1994; Winkelman 2001a). The serotonin receptors, with their highest nerve concentrations in the lower brain raphe and reticular formation, the limbic system hippocampus and amygdala, and the frontal cortex's visual and auditory areas, act as a modulatory system across levels of the brain. Important effects of serotonin are the integration of emotional and motivational processes and the synthesis of information across the functional levels of the brain. The overall effect of general ASC is to integrate information from the whole organism. This specifically involves transmitting information from the emotional and behavioral preverbal brain structures into the personal and cultural systems mediated by language and the frontal cortex. These biological conditions provide a basis for experiences of enlightenment, a sense of connection and oneness, and personal integration.

Shamanic ASC Induction: Chanting, Drumming, and Dance. Shamanic ASC induction utilizes the innate capacity for music (see Wallin, Merker, and Brown 2000) and innate brain modules associated with call and vocalization systems (Molino 2000) manifested in singing and chanting. These expressive systems based in rhythm and affective dynamics predate language and evolved for communication of internal states and enhancing group cohesion, synchronization, and cooperation (Freeman 2000; Brown 2000; Merker 2000). Calls, hoots, group enactments, and chanting involve an ancient audio-vocal communication system predating speech (Oubré 1997), an expressive system that communicates emotional states, motivates others' responses, and plays a role in managing social contact, interpersonal spacing, mate attraction, pair bonding, and group cohesion (Geissmann 2000). This elicitation of a human expressive capability with

deep evolutionary roots provides information about visceral states to members of the group. Chanting and music produce theta and alpha wave patterns, reflecting information processing in the right hemisphere and subcortical areas of the brain, accessing expressive capabilities that existed prior to spoken language. Bjorn Merker (2000) reviews evidence that humans' ancient hominid ancestors engaged in synchronous group singing, as is found in chimpanzee groups, where it provides an emotional communication system that promotes social well-being, empathy, and social and cognitive integration (see Winkelman 2002).

Dancing, enactment, and play have their origins in mimetic modules that provide rhythm, affective semantics, and melody (Molino 2000; Donald 1991). Mimesis is a uniquely human ability to entrain the body to external rhythms and includes imitation, clapping, stomping, and dancing. Early human mimetic activities involved ritual dances and imitation of animals, employing bodily movement, gesture, and facial expressions for symbolic communication (Donald 1991). Shamanic practices of drumming, dancing, and ritual imitation establish group coordination through rhythmo-affective semantics that express fundamental emotions (Molino 2000). The shaman's use of dance, imitation, and drumming reflects these expressive mechanisms that emerged early in hominid evolution, providing mechanisms for expression and group coordination. These mimetic expressive capacities still provide mechanisms for social learning, manual skills, expressing interpersonal dynamics, and nonverbal communication.

The Shamanic Soul Journey. The shaman's ASC is referred to by terms such as *soul flight* and *soul journey* and has direct homologies to modern out-of-body experiences and astral projection, reflecting experiences of traveling to and encountering entities from the spiritual or supernatural world. The biological basis of these experiences is indicated by their near universality, suggesting that the core shamanic experience of soul flight is an innate psychophysiological structure reflecting basic neurognostic potentials (Winkelman 2000). Visionary experience is a natural phenomenon of the nervous system and results from disinhibition of the visual centers of the brain. Shaman's soul flight provides a "third-person perspective" on one's self. Harry Hunt (1995b) characterizes this core of the shaman's ASC as involving complex synesthesia based on presentational symbolism and self-awareness. This involves what George Herbert Mead (1934) revealed as a basic social requirement, the ability to see others' perspectives on our self. The shaman's journey involves manifestation of this self-referential capacity within the visual modality, using a nonverbal symbolic system referred to as presentational symbolism. This system, predating language, provides a medium for an externalized self-representation, creating new forms of self-awareness that permit transcendence of ordinary awareness and identity. Soul flight also symbolically represents the shaman's

transcendence—a transformation of consciousness reflected in the meaning of *ecstasy*, from the Greek *ekstasis*, meaning "to stand outside of oneself."

The body constitutes a neurological basis for human experience and knowing (Newton 1996) and a principal aspect of metaphors and analogic thinking (Friedrich 1991). Soul flight involves body image, a natural symbol system derived from neurognostic models for organizing both internal and external experiences (Laughlin 1997). This body image develops under sociocultural influences but is largely based in hard-wired programs. Universal body-based representational capacities provide a symbolic system for all levels of organization, from metabolic levels through self-representation and advanced conceptual functions (Laughlin 1997). Body images combine memory, perception, affect, and cognition in an image-based symbolic information system involving presentational symbolism. This capacity for cross-modal translation across sensory modalities is the foundation of symbolic thought (Hunt 1995b).

Visual (Presentational) Symbolism and Dream Time. Shamanism focuses on "mental imagery cultivation" (Noll 1985), developing internal visions that use the same brain substrates involved in the processing of perceptual information (Baars 1997). Imagery involves psychobiological communication processes that mediate metaphoric relations between different domains of experience and levels of information processing, integrating unconscious and psychophysiological information with affective or cognitive levels (Winkelman 2000). Images constitute a preverbal symbol system that recruits and coordinates muscle systems to achieve goals. Shamanic practices provide adaptive advantages in analysis, analogic synthesis, diagnosis, and planning through the visual symbolic medium. Shamanic practices integrate dream processes through overnight ritual activities that deliberately blend dream and waking processes, a dream incubation that reduces the barriers between these processes and conscious awareness. Dreams are the aspect of the unconscious functioning involving the closest contact of ego awareness with the operational structures of the unconscious (Laughlin, McManus, and d'Aquili [1990] 1992) and reflect an unconscious personality (Winson 1985) that shamanism manages.

Hunt (1995) proposes that shamanic experiences and their capacity for self-representation are based in the same system that underlies dreams. Dreaming involves physiological processes found throughout mammalian species, writes Jonathan Winson (1990); the ubiquity of dream sleep in mammals and the effort to recoup lost dream time reflect its biological basis. He reviews clinical and anatomical evidence that dreaming is a mammalian adaptation for learning, producing memory associations during sleep. Derek Brereton (2000) points out that the universality of dreaming in mammals indicates that dreaming constituted a preadaptation for

human consciousness. He describes dreaming as a process for representing self in emotionally salient social space. Dreaming involves processes of social and intellectual play that provide "low risk scenario building" that involves mental attribution of scenario building to others and a blending of objects and interpersonal relations. Dreaming involves virtual modeling through analogical schematization. This flexible representational system provides personal meaning through mediating internal and external worlds and the gap between perceptual input and conceptual knowledge. This analogical schematization process of translation between inner and outer models provides the basis for the construction of meaning (Shore 1996).

Dreams provide a scenario-building process for constructing "virtual scenarios" that are risk free and facilitate management of the social and emotional world through a "scanning for success" that enhances preparedness and behavioral plasticity (Brereton 2000, 393, 399). Shamanism deliberately uses this dream capacity, engaging in ASC activity during all-night rituals that inevitably intersect with the natural cycles of dreaming. Shamanic recognition of the use of dream capacity in shamanic ASC is reflected in their use of terms such as "dream time."

Shamanism and Metaphoric Thought

Shamanism utilizes the fundamental metaphoric processes discussed by Paul Friedrich (1991) in the context of the broader concept of tropes, using something to represent something else. The major macrotropes include imagistic and contiguity-based analogical processes, which are prominent in the shamanic worldview and practices.

Contiguity tropes based on the body and animals are central to shamanic ritual and thought. Meaning construction uses previously developed foundational schemata to analogically map novel information, modeling it on previous experience. The body's ability to act is the fundamental schema for analogical transfer, using the body's neurologically based body schema as a template for knowing (Newton 1996; Hunt 1995b). Body-based models are manifested in mimesis, imitation, and ritual enactment and used as metaphoric representational systems, as exemplified in the shaman's soul journey, an out-of-*body* experience. Anatomical relations provide a variety of contiguity tropes based in an analogy between body parts and other contexts to create an imaginative pattern. The projection of anatomical relations is a universal and powerful form of metaphor derived from part/whole relations. These representations are exemplified in sympathetic magic, where like influences like (Laws of Imitation and Contagion [Frazer 1929]); the out-of-body experience of soul flight; animal identity and transformation; and totemism.

Image tropes involve perceptual images that "stand for themselves," that involve an irreducible feeling of qualities that are omnipresent in language

and pervasive in mimesis. Imagery tropes are exemplified in the shaman's visionary experience. This visual-information system provides a basis for metaphoric representation across domains of experience, linking unconscious, nonvolitional, affective, and psychophysiological information (Noll 1985) to somatic, psychological, and cognitive levels of the organism through visual images and analogical processes (Winkelman 1999). Images engage unconscious control centers of muscles and arouse autonomic responses (Baars 1997). Images also interface with the modal tropes associated with expressions and combinations and interactions of moods. Modal tropes provide organizing principles based in emotions, affects, and feelings, and symbolizing the underlying matrix of emotions manipulated in shamanic healing ritual.

Animism and Analogical Processes: The Spirit World as Self and Others. Edward Tylor ([1871] 1924) postulated the source of religion in animism, the inference of spirits, and dreams as a source of experiences promoting animistic assumptions. Other innate processing modules involved in self-representation provide even more compelling sources for the universal human tendency toward animism (Guthrie 1993) that lies at the basis of shamanism. Animism, a human universal, involves the attribution of human mental, personal, and social qualities to unknown and natural phenomena. Anthropomorphism exemplifies animism, attributing humanlike characteristics to spirits and nonhuman entities (Guthrie 1993); shamanism specifically emphasizes the attribution of human qualities to animals, and vice versa. James Ashbrook and Carol Rausch Albright (1997) argue that the religious tendency is necessarily anthropocentric, imposing order on the known and unknown realms through the use of human models of the self that are embedded in humans' representational capacities. As William Rottschaefer (1999) points out, humans are not constrained solely to these representations, but the representation through projection of self is an inevitable aspect of human consciousness.

Projection of cognitive similarity involving the use of the self as a model for understanding the unknown is a manifestation of symbolic capabilities in relationship to the environment (Hunt 1995a, b). Animism is a relational epistemology that is universal because perception requires that humans be situated in their world and environment (Bird-David 1999). Animistic principles embodied in spirits are conceptualized as "super persons" that provide relationships with the environment and others that are essential for the maintenance of personhood and identity. Social intelligence, the ability to infer the mental states of others, allows for the prediction of others' behavior through an intuitive theory of mind that involves the attribution of mental states to others using one's own mental states and feelings as models for others' thoughts and behaviors.

Spirits are used in shamanism to manipulate unconscious aspects of self and personal and communal identity. Spirits' characteristics reflect the

dynamics of social and interpersonal relations, a language of intrapsychic dynamics of the self and psychosocial relations with others. Spirit beliefs constitute symbolic systems of "complexes"—organized perceptual, behavioral, and personality dynamics that operate independent of ordinary awareness and identity. Shamanistic healing practices manipulate these complexes and produce healing by restructuring and integrating the unconscious dynamics. Shamanic healing integrates visual and corporeal processes to unite unconscious information with the self-conscious mind.

Spirit Relations as Role Taking: Incorporating the Other as Guardian Spirit. Humans' innate capacity to take the perspective of others enables the incorporation of others into self-identity. The ability to use the models of others to augment and model the self provides processes for social-psychological transformation and therapeutic change. The processes of role taking are exemplified in the shaman's spirit-world interaction, where shamans enact the engagement with and personalities of the spirits, providing representations of personal and social psychodynamics. Shamanic practices involving soul recovery, animal allies, and guardian spirits reflect aspects of self-representation that involve sacred others, the intersection of the spiritual and social worlds in cultural processes that provide personal power and identity (Pandian 1997). The intersection of the sacred others with personal identity produces cultural and symbolic models for the self. Sacred others provide internalized models for mediating ritual effects upon emotions, attachments, and behaviors, enabling rituals to affect psychodynamics and produce emotional change. The dramatic enactment of interactions with spirits allows shamans to provide models for self-development and resocialization, incorporating the spirit other to produce identity modification.

Shamanism focuses on self-development, using representations from the natural-history module, specialized innate capacities for organizing knowledge about animals and recognizing "species essence." This is manifested in taxonomical classification schemas for the natural world, which provide a universal analogical system for the creation and extension of meaning. Animal spirits, allies, and helpers of shamans are social representations of self, as are the lost souls shamans recover in healing. The guardian spirit complex (Swanson 1973) represents shamans' use of the natural-history module to incorporate animal properties within identity and personal powers. Animal relationships empower shamans and patients and provide a representational system and models for self-development and self-differentiation. These allies and guardians have psychosocial functions in empowering persons in the transition to adulthood, helping to guide personal and social choices and commitments in life (Swanson 1973). Spirits provide systems for psychosocial relations and ideals that structure individual psychodynamics and social behavior, exemplifying norms for self and psy-

chosocial relations. The shamanistic sacred self provides protection from stress and anxiety through models for self and the management of emotions and attachments (Pandian 1997). Animal powers and guardians are natural modules that provide alternate forms of self-representation that facilitate social and personal differentiation.

The alternate senses of self that derive from animal powers provide psychosocial and cognitive mechanisms for problem solving and mediation of personal and social conflict. Spirit concepts of self serve as variable command-control agents for mediating conflict between the different selves and instinctive agents, enabling the operation of the social organism with respect to a hierarchy of goals and orienting problem-solving modules to nonroutine tasks and problems (Winkelman 2000). This helps mediate a hierarchy of personal and social goals. Shamanism developed these associative processes, constructing and manipulating a variety of selves for psychological and social integration. Animism, totemism, and guardian spirits, as well as soul flight and death-and-rebirth experiences, are natural symbolic systems for self-representation within which the self is internally differentiated and manipulated in relationships to others.

Death and Rebirth. Shamanic constructions of identity also are illustrated in a universal feature of shamanic development, the death-and-rebirth experience. Shamanic development includes a crisis involving illness, suffering, and attacks by spirits, leading to the experience of death and dismemberment. This is followed by a reconstruction of the victim's body with the addition of spirit allies and powers. The universality of the death-and-rebirth experience reflects neurognostic processes of self-transformation, a natural response to overwhelming stress and intrapsychic conflicts. This breakdown of ego structures is experienced in "autosymbolic images" of bodily destruction, which activate innate drives toward psychological integration (Laughlin, McManus, and d'Aquili [1990] 1992). Shamanic healing restructures ego and identity, using ritual to activate holistic imperatives to produce a new self-identity and higher levels of psychological integration.

Community Relations and Opioid Mechanisms

Eliade's classic definitions of shamanism characterized it as an ecstatic interaction with the spirit world on the part of the *community*. The community orientation of shamanic practices has important social, psychological, and psychophysiological effects. Humans' evolutionary adaptive characteristics produced a neuropsychology that required adaptation to a social world that inevitably produced the construction of personhood and made spirituality possible (Teske 2001). The human capacity for emotional self-moderation through social internalization is based in the symbiotic caregiver-child relations that derive from the mammalian attachment

dynamics that provide the basis for emotional life. The human nervous system evolved within a context that required a social interdependency that produced a canalization of individual neurological and psychological development and the coordination of personal emotional life. "Religious systems may themselves function as higher-order evolutionary units, in which social interaction and individual mental lives are embedded and in which they find meaning" (Teske 2001, 93). The brain's role in mediating social cooperation demanded symbolic processes as a basis for producing social cohesion and consensus.

Religious ritual systems produce this integration through powerful effects on personal and emotional life, producing healing through community relationships. Individual self, psychology, and psychodynamics are constituted within the social and cultural relations that provide attachment, identification, and models for internalization. Therapeutic psychosocial effects are derived from the orientation of shamanistic healing ceremonies toward personal, interpersonal, and social processes, group identity, community cohesion, and reintegration of patients into the social group. Socially and ritually produced physiological changes enable shamanic rituals to have biopsychosocial consequences.

Social Ritual. *The Spectrum of Ritual* (d'Aquili, Laughlin, and McManus 1979) provides theoretical and evidentiary frameworks for interpreting human social rituals in evolutionary perspective and identifying their adaptive functions. Humans share with other animals forms of ritual, behavior, and communication. Animal rituals, ceremonies, formalized behaviors, and displays involve stereotyped behaviors that have communication and social-signaling functions. These genetically based behaviors provide specialized forms of information that facilitate interaction between members of a species. Such movements are part of coordinating the behaviors of individuals in communicating a range of basic messages important for the species' interactions. Ritual coordinates the action of individuals into collective, socially coherent, coordinated patterns. Animal rituals are a form of communication that coordinates behavior, contributing to cooperative behaviors. Ritual's biological function involves facilitating the flow of information to synchronize individual behaviors into corporate action. This coordination requires action at the level of the individual (intraorganismic) and group (interorganismic). Ritual activates information exchange from neurological through conceptual levels and synchronizes the individual with the group.

Ritual is a fundamental mechanism through which the coordination of internal responses among members of a species is achieved. Ritual coordination of social groups constitutes a mechanism for socialization, "an evolutionary, ancient channel of communication that operates by virtue of homologous biological functions (i.e., synchronization, integration, tun-

ing, etc.) in man and other vertebrates" (d'Aquili, Laughlin, and McManus 1979, 40–41). This biological impulse was manifested in shamanic and other spiritual and religious practices (Winkelman 2002). Ritual provides healing by meeting fundamental human needs for belonging, comfort, and bonding with others. Rituals integrate people, enhancing social-support systems, group identity, and self-development. Community bonding heals through eliciting neurobiologically mediated forms of attachment. Shamanistic healing practices reinforce attachments that meet humans' fundamental needs in the mammalian biosocial behavioral system. Attachment bonds that evolved to maintain proximity between infants and caregivers create a secure basis for the self by providing feelings of comfort and protection received from a powerful figure (Kirkpatrick 1997). These attachments contribute to emotional development through the provision of relationships that influence self-adaptations and behavior toward others, enhancing altruistic behavior modeled on the role of the benevolent helping other.

Totemism. Shamanism and other group-oriented religious practices' (e.g., ancestor worship) use of animal species for social representations is manifested in the phenomena of totemism. Totemism has been a widely applied concept, leading some to doubt its usefulness. The significance of totemism for anthropological studies of cognition are exemplified in both the classic book by Claude Levi-Strauss (1962; also Friedrich 1991) and in recent work linking totemic thought to ecological relations and balance (see Bird-David 1999; Ratha and Behera 1990). Totemism involves establishing metaphoric relationships between the natural-history domain of animals and social groups, conceptualizing humans through models provided by the animal world (Levi-Strauss 1962). Totemic thought uses analogical processes, establishing a homology between animal-species differences and the differences among human groups; differences among human groups are represented through the differences among animal species. Totemism distinguishes human groups by attributing the characteristics derived from the animal world, representing group identity and intergroup difference through models provided by animal species. The use of animals for social and cognitive modeling is a fundamental aspect of metaphoric and analogical thought (Friedrich 1991), a universal human system for expression of meaning and creation of social and personal identity.

Soul Recovery as Community Reintegration. The central shamanic illness is soul loss, which Jeanne Achterberg (1985) characterizes as an injury to the core or essence of one's being. This injury to one's essence is manifested in feelings of loss of meaning in life, belonging, and connection with others. Soul loss involves despair from losing crucial aspects of self that constitute our vital essence. Part of one's self is dissociated, and reintegration of the dissociated aspect of self provides healing. Soul recovery

involves dramatic enactments of the shaman's battles with terrifying spirits to rescue the patient's soul. Psychological perspectives suggest that these terrifying spirits represent fears and dissociated aspects of the self. Shamanic ritual manages emotional and self-loss by restoring those repressed aspects and integrating self. Community participation in soul retrieval reflects the importance of social relations in healing, the power derived from others witnessing the return of the soul. Community social-support networks play vital roles in attachment relations and the reintegration of self. The dramatic engagement with the spirit world in soul recovery transforms self and alters social relationships. Through soul recovery one regains a valued sense of social self alienated through trauma. The attribution systems of shamanism establish relationships with the spiritual world which are typically subject to one's control, providing a self-empowering system.

Opioid Stimulation by Shamanic ASC Induction. A wide range of shamanistic activities induces production and release of endogenous opioids (Winkelman 1997; 2000). Shamanism produces release of endogenous opioids through exhaustive rhythmic movement (e.g., dancing and clapping); temperature extremes (cold or sweat lodges); austerities (water and food deprivation, flagellation, self-inflicted wounds); emotional manipulations (fear and positive expectations); and nighttime rituals, when endogenous opioids are naturally highest (see Prince 1982; Winkelman 1997). The release of natural opioids stimulates the immunological system and produces a sense of euphoria, certainty, and belongingness. Endogenous opioids enhance coping skills, maintenance of bodily homeostasis (Valle and Prince 1989), pain reduction, stress tolerance, environmental adaptation, and group psychobiological synchronization.

Community relationships also elicit endogenous opioid mechanisms (Frecska and Kulcsar 1989), with effects on consciousness and health, including immune-system responses. Shamanistic rituals use emotionally charged cultural symbols that have been cross-conditioned with physiological and emotional responses, the endocrine systems, and the immune systems, linking the psychic/mythological and somatic spheres (Frecska and Kulcsar 1989). Brain opioid systems provide neurochemical mediation of social bonding. Ede Frecska and Zsuanne Kulcsar suggest that shamanic healing practices utilize complex forms of opioid-mediated attachment to promote psychobiological synchrony within the group, reinforcing identification and internalization of social relations. Cortical areas (orbital frontal cortex, the temporal lobe, and the amygdala) involved in affiliative interactions are also the areas with the highest density of opioid receptors. Shamanism socially and ritually manipulates opioid mechanisms and influences "core biological functions," "neurobiologically mediated, complex forms of attachment . . . which result in deep psychobiological synchrony between adults" (Frecska and Kulcsar 1989, 76, 71). These responses re-

flect a genetically based "sickness and healing" response based on "elaborations of nonhuman primates' responses to the distress of others and reflect emotional contagion and empathy" (Fabrega 1997, 34).

The Triune Brain and Shamanic Potentials

Human evolution is characterized by a fragmentation of consciousness. Shamanistic activities manage relationships among behavioral, emotional, and cognitive processes and between physiological and mental levels of the organism, using ASC and other procedures to integrate brain systems and their functions. Paul MacLean (1990; 1993) proposes that the brain be viewed as involving three anatomically distinct systems which provide the basis for behavioral, emotional, and informational functions in evolutionary strata: the reptilian brain, the paleomammalian brain, and the neomammalian brain. MacLean proposes that these three anatomical structures of the brain provide the basis for different mental functions, which he labels *protomentation*, *emotiomentation*, and *ratiomentation*, respectively (MacLean 1993, 39). These intrapsychic communication systems and brain processes have been referred to as subsymbolic (Ashbrook 1993) and presentational (Hunt 1995a, b). Interactions among levels of the brain are primarily through not verbal language but other forms of mentation, social representation, and information processing that utilize social, affective, and (presentational) symbolic information. These meanings are construed by subcortical information processing provided by the intuitive representations, affective associations, and decisions that are constructed by the paleomammalian brain.

The brain's management of behavior, emotions, and reason is mediated physiologically and symbolically. The relationship of innate drives and needs, social bonding and attachment, and cultural representational systems constitutes the matrix for many kinds of health problems, including chronic anxiety and fears, behavioral disorders, conflicts, excessive emotionality or desires, obsessions and compulsions, dissociations, and repression. 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 human adaptation and survival. The paleomammalian brain's emotiomentation processes provide the basis for subjective evaluative influences on, and self-reference for, thoughts and behavior. It plays a vital role in integrating the interconnected heritages of the instinctual responses of the reptilian brain and the cognitive processes of the neomammalian brain. These limbic functions are "essential for a sense of personal identity and reality that have far-reaching implications for ontology and epistemology" (MacLean 1990, 248) and are responsible for memory, emotions, self-representation, social behavior, and dreaming.

Biological Bases of Shamanistic Therapies. Horacio Fabrega (1997) has discussed the evolutionary basis of sickness and healing responses and their adaptive consequences. Shamanic therapies involve several biological mechanisms for the transformation of the patient's health, enhancing placebo and other psychosomatic effects (Frank 1991). The general physiological aspects of the integrative mode of consciousness—parasympathetic dominance, interhemispheric synchronization, and limbic-frontal integration—have inherent therapeutic effects. This basic relaxation response of the organism counteracts excessive activity of the sympathetic nervous system and has preventive and therapeutic value in diseases characterized by increased sympathetic nervous system activity and a range of stress-induced and -exacerbated maladies. Therapeutic effects also can be achieved through the stress-induced parasympathetic dominant state, leading to erasure of memories and previously conditioned responses, changes in beliefs, increased suggestibility, and reversal of conditioned behavior.

Shamanistic healers address emotional distress and provide assurance, counteracting anxiety and its physiological effects. Their symbolic manipulations can intervene in stress mechanisms, altering the balance in the autonomic nervous system by changing emotional responses. Symbolic manipulations elicit emotions and community support that meets needs for belonging, comfort, and bonding with others. Shamanistic healing elicits repressed memories and restructures them, providing processes for expression of unconscious concerns and resolving intrapsychic and social conflicts. Emotional dynamics are typically manipulated by attributing these processes to external forces (spirits). The special role of spirits in healing reflects their exceptional role as coping mechanisms (Spilka, Shaver, and Kirkpatrick 1997), utilizing universal aspects of symbolic healing (Dow 1986). This involves placing the patient's circumstances within the broader context of cultural mythology and ritually manipulating these relationships to emotionally transform the patient's self and emotions. Ritual manipulations of unconscious psychological and physiological structures enable shamanistic healers to evoke cognitive and emotional responses that cause physiological changes.

Hypnosis as an Inheritable Shamanic Healing Capacity. James McClenon (2002) argues that a central factor contributing to humans' evolved psychology and their biological propensity for religious ritual and belief is an inheritable quality manifested in hypnosis. McClenon addresses the question of religious origins in the context of how ritual healing contributes to a biological capacity for religious belief. He contends that the tendency to suggestibility, which is based in hypnotic capacities, provides enhanced recovery from disease and promotes survival and reproduction. The hypnotic capacity provides advantages in enhanced innovation derived from access to the unconscious mind and its creative visions. The

association of hypnotizability with anomalous experiences—spirits and apparitions, souls, life after death, out-of-body experiences, precognitive dreams, extrasensory perception—has provided foundations for shamanism and human religious traditions.

The inherited quality of hypnotizability produces specific physiological and psychophysiological responses that facilitate shamanic healing. Hypnotizability involves focused attention with reduced peripheral awareness and critical mentation that facilitates a focus on internal imagetic representations. Such hypnotic induction enhances belief and expectation, producing placebo effects that have physiological consequences for healing. The presence of the hypnotic capacities in other primates suggest that it was an ancient primate adaptation to their physical and social environments. Hypnotic and ritual behavior among other animals identifies their biological and adaptive aspects as providing mechanisms for reducing stress and engaging the relaxation response. Rituals are found among a variety of animals because the repetitive movements facilitate hypnotic induction through producing relaxation and fixation of attention; they also facilitate reconciliation and reduce aggression. Rituals' repetitive and stereotyped behaviors produce motor, perceptual, and cognitive integration within individuals and among participants. This promotes intragroup cohesion that is experienced as "union" or "oneness," classic aspects of religious experience. This hypnotic basis for shamanic potentials suggests why they have their greatest success 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. The major mechanisms involve the effects on emotions, and consequently the psychoneuroimmunological system, where rituals elicit feelings and shape behaviors in ways that directly affect health.

McClenon views ASC as part of a general tendency towards hypnotizability, resulting from the brain's shift toward cholinergic neurotransmitter systems and their associated dreamlike mentation. Hypnosis interrupts the normal cycles of change between aminergic and cholinergic pathways. Shamanism exploits the co-occurrence of hypnotizability, dissociation, fantasy proneness, temporal-lobe lability, and thin cognitive boundaries. These share a common underlying dimension in a "transliminality factor" involving enhanced connections between the unconscious and conscious aspects of the mind. Highly hypnotizable people have thin cognitive boundaries that enable greater access to the unconscious and the flow of information from the unconscious to the conscious via anomalous perceptions. The thin cognitive boundaries reflected in hypnotizability provided survival advantages by provoking the development of creative strategies. These forms of experience, found cross-culturally, provide a basis for a

physiologically and genetically based theory of religious experience. Shamanistic rituals stimulate therapeutic states of consciousness, derived from the hominid capacity for hypnotizability that facilitates psychosomatic change and healing.

Contemporary Manifestations of Shamanic Neurognostic Structures. The neurological foundations of hunter-gatherer shamanism persist in more complex societies, including contemporary societies. The biological roots of the shamanic paradigm are manifested in (1) a universal distribution of shamanistic healers using ASC, (2) contemporary illness found in psychiatrists' diagnostic categories of "spiritual emergencies," and (3) contemporary spontaneous religious experiences.

The hunter-gatherer shamans' utilization of ASC to communicate with the spirit world on behalf of the community and for divination and healing is found in all societies. These activities in more complex societies are associated with different types of practitioners (e.g., mediums and healers). *Shamanistic healers* is a term proposed for these universally distributed practitioners who use ASC for training, healing, and divination (Winkelman 1990a). Shamanistic healers share characteristics with shamans but differ significantly in other respects (Winkelman 1992). These differences are reflected in the psychodynamic and emotional differences in soul journey, possession, and meditation (Winkelman 1999). Shamanistic healers also differ with respect to other characteristics, including illness ideologies, training procedures, the source of their powers, and their social relationships.

Shamanic roots are manifested in contemporary illness found in psychiatrists' diagnostic categories of "spiritual emergencies." These include spontaneous shamanic journeys, a death-and-rebirth experience, mystical experiences with psychotic features, and psychic abilities (Walsh 1990). The shamanic paradigm and its neurognostic framework explains why these are spontaneously manifested and why a spiritual healing approach is more successful in addressing these conditions. The shamanic paradigm provides a framework for reinterpreting what psychiatry considers acute psychosis and emotional disturbance and addressing them as natural manifestations of human consciousness and developmental opportunities (Winkelman 2000).

Contemporary religious experiences primarily involve perceptions and sensations of and contact with a supernatural agency or "divine other" (Stark 1997). This presence has volitional abilities and moral and social characteristics like ourselves. Contemporary religious experiences of interaction with the divine are: confirming (self's awareness of divine other); responsive (divine's awareness of self); ecstatic (union of self and divine other); revelatory (messages from divine other); and control of the self by the divine other (Stark 1997).

This sense of spirit other involves intense emotional experiences of reverence and awe and the essence of animism at the basis of shamanism.

Responsive experiences involving the divine other's awareness of the self is exemplified in shamans' interaction with spirit allies. The divine's intervention in the human world is exemplified in spirits' divinatory communication that provides information relevant to healing. Shamanism provides the original ecstatic experience, a deep, affective, intimate relationship with divine assistance. Shamanic practices are basically revelatory in nature, acquiring information about causes of illness and procedures for healing. Shamans' basic functions are as a messenger of the "divine other" through revelatory experiences. The divine's control of the self is manifested in a range of experiences from awareness through various forms of union of self with divine other, with its control of the self. Experiences of supernatural control have roots in shamanic initiatory crises but their fullest development in practices associated with mediums and possession.

SUMMARY: SHAMANISM AND PSYCHOINTEGRATION

Evolution of the human brain has produced a modular structure with specialized subsystems, which result in a fragmentation of consciousness. Shamanic traditions have produced an integration of consciousness through community-bonding rituals. The psychophysiological basis of shamanism involves systemic brain integration, a coordination and increased coherence of the potentials of many parts of the brain. Central to this enhanced brain integration is the forceful imposition of the paleomammalian brain's analogical processes and material of an emotional, social, and personal nature into the self-conscious processes of the frontal cortex. The diverse conditions and procedures that evoke this integrative brain condition indicate that it is a natural state of the human organism. The shaman engages transformative process through entraining the neurognostic structures that provoke a restructuring of the self at levels below conceptual and operational thought, acting upon the structures which support consciousness. All religions are not based on shamanism and ASC; however, all societies have religious practices based in shamanistic healing, the use of ASC for healing through contact with the spirit world. Human evolution selected for these potentials because they were adaptive.

Shamanism's experiences are among the most fundamental emotional feelings at the essence of religion. Shamanic initiates do suffer a dependence in the torment by the spirits during development, but this is overcome, and the shaman asserts control over spirit powers. If the emotive and natural basis of religious experience lies in dependency feelings, then shamanism constitutes humanity's first effort to overcome religious dependence and achieve control of spiritual power. The empirically derived nature of the shamanic paradigm indicates a natural epistemology of cognition and provides descriptive and explanatory resources contributing to an empirical basis that Rottschaefer (1991) called for in the naturalistic

research program into the nature, origins, development, and persistence of religious experience. Shamanism's primordial, cross-cultural, empirically derived status gives it a central role in evolutionary theology and metatheology. The shamanic paradigm extends naturalizing philosophy perspectives that apply cognitive theory to understanding religious experiences, identifying central issues in the congruence of symbolic aspects of shamanic ideology with basic elements of an evolved psychology. The shamanic approach limits the possibilities of a constructivist approach in recognition of the original and innate neurophenomenological foundations of religious conceptions.

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