

EXAMINING THE STRUCTURE AND ROLE OF EMOTION: CONTRIBUTIONS OF NEUROBIOLOGY TO THE STUDY OF EMBODIED RELIGIOUS EXPERIENCE

by Rebecca Sachs Norris

Abstract. Certain properties of the body and emotions facilitate the transmission of religious knowledge and the development of religious states through particular qualities of perception and memory. The body, which is the ground of religious experience, can be understood as transformative: the characteristic that recalled emotion is “refelt” in the present enables emotion to be cultivated or developed. Emotions and the stimuli that evoke them are necessarily culturally specific, but the automatic nature of this process is universal. Religious traditions have made use of these processes to educate the feeling toward certain qualities and to develop religious experience, through the use of sacred images, ritual posture and gesture, and repetition of ritual acts. Neuroscience contributes to our understanding of the emotional processes that take place when emotions are evoked, refelt, and developed; the neurobiological processing of emotion parallels experience. Keeping experience central makes it possible to bring religion and neuroscience together in a nonreductive examination of spiritual experience.

Keywords: body; cognitive science; culture; embodiment; emotion; experience; gesture; identity; memory; neuroscience; nonverbal; posture; religious experience; ritual; transcendence; transmission.

How can ineffable states such as Zen mindfulness or Christian prayer of the heart be transmitted or learned? These states are understood to be nonverbal and as such cannot be described. How then can they be passed on accurately? Why are the trances of the Hamadsha Sufis of Morocco (Crapanzano 1973) and the trances of middle-class Egyptian Sufis (Waugh

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1989), both part of the dhikr ritual, so different in character? Is it the text? Clearly not, because both are based upon recitation of the Qur'an. When we study religion, we are studying not only texts but also the embodied experiences and beliefs that are informed by culture and learned through the body.

In this essay I examine how neuroscience can be used to support investigation into the development of particular types of religious states. This application of neuroscience has barely been touched upon, in part because neuroscience is a relatively new science but also because most studies that integrate neuroscience and religion focus on what parts of the brain are active *during* particular religious states (Austin 1998; d'Aquili and Newberg 1999; Pyysiäinen 2001). What I address is how certain properties or activities of the brain support the transmission of religious knowledge and the *development* of religious states.

The first point I make is that the term *body* has not been sufficiently problematized (Csordas [1994] 1996; Schepher-Hughes and Lock 1987). Against this background I show, second, that experientially based study of the body in the development of religious states points to a particular quality of emotional processing as necessary to this development: that recalled emotions are "refelt" in the present (Martin 1972, 190). The third point is that this characteristic of emotional processing enables emotions to be developed and educated; religious traditions have made use of this capacity throughout history. The final step is to elucidate how neuroscience can contribute to our understanding of the emotional processes that take place when emotions are refelt and developed.

The processes that I examine are not limited to religious emotions but underlie all emotional experience; religious emotion is a subset of emotional experience, not a special case. I focus on the importance of these processes in the context of religion. Emotion plays a central role in religion in many ways: "Emotions thus form the basis of what is known as 'religious experience' and 'religious belief'" (Pyysiäinen 2001, 88). Better understanding of these processes opens the door to a deeper appreciation of the roles of embodiment and emotion in the development of religious experience.

I need to clarify what subset of religious experience I am considering for the purposes of this essay. A long-term interest of mine has been how transcendent states such as states of prayer (mental prayer or prayer of the heart, for example) or Buddhist meditative states are learned, and it has become evident to me that, although an element of verbal cognition is necessary to recognize and contextualize these nonverbal states, they are primarily somatic states, transmitted and learned through the body (Norris 1999). These are the main types of religious experience I address here, although certainly other types of religious emotional states (such as a feeling of love for Christ or of submission to Allah, both of which may de-

velop into transcendent states) are grounded in the body and also grow and develop in the manner outlined here. I do not address ethical concerns, although they often involve strong emotions; development of religious thought, although questions of meaning have a feeling component; and social or community interests, though they can be an important aspect of religious emotional life.

To say that transcendent or religious experience is grounded in the body does not mean that logic or verbal cognition is entirely absent from the larger experiential context. Zen practitioners in the monastery consult daily with the Zen master to assess their development, and those engaging in practices such as Christian contemplative prayer have traditionally had a spiritual advisor whose role is in part to ascertain the reality and value of spiritual experience. These experiences are primarily bodily states in the sense that they cannot be learned through merely thinking, reading, or reflection. Interpretation, evaluation, and contextualization of transcendent experience are necessarily culturally specific, as are all religious/emotional states; this is part of my basic argument. One need only read stories of a few Hindu saints to realize the effect culture has in interpretation of transcendent states; many of those saints would have been institutionalized as schizophrenics had they lived in the United States.

The title under which these ideas were first presented (at the 2003 annual meeting of the American Academy of Religion), "A Silk Purse out of a Sow's Ear," considers the seeming incommensurability of neurobiology and religious studies. I say "seeming" because we *can* make a silk purse out of a sow's ear. It will be a silk purse if we can include the neurosciences in the study of religion without "the extremes of neuro-reductionism or inflexibility" (Varela 2001, 207). This is particularly difficult to do while discussing the question of transcendence and the body. The body is generally understood in Western culture as a biochemical machine; nonetheless, neuroscience and religion need not be set in opposition to each other. As Gregory Peterson notes, "The hostility between religion and science has been shown to be as much the result of misunderstanding, politics and prejudice as of any genuine conflicts in content. It is also based on the premise that the sciences leave no room for subjectivity, that they reduce the soft glow of our selves into clinking, emotionless machinery, minute cogs in a soulless, purposeless world" (Peterson 1997, 626). This seems a reasonable concern, when as influential a scholar as Joseph LeDoux states that "cognitive science was successful because it figured out how to study the mind without getting bogged down in questions about subjective experience" (2002, 205) and later expounds on the "hostile takeover of consciousness by emotion" (2002, 226). Keeping experience central (Varela 2001, 207) makes it possible to bring religion and neuroscience together in a manner that combines subjectivity and objectivity, inclusive of the values of both.

PROBLEMATIZING THE BODY

The body is the medium through which the divine is experienced, the medium for the transcendent, and the means through which religious knowledge and experience are transmitted and learned. By transcendence I mean the direct experience of the divine, however that is understood, which includes many varying degrees and types of religious and spiritual experience (Varela 2001, 207). In saying that the body is the medium through which the divine is experienced I do not mean that religious experience is reducible to organic states. The difficulty here is to understand what we mean by *body* and how the body can be a medium for the divine. Post-Enlightenment views on the body and transcendence range from those of Immanuel Kant, who says that to affirm an experience of God would be an illusion because that would be to affirm the reception of something for which the body has no receptors (Kant 1960, 163), to those of R. Joseph, who presents a more integrative view in “The Limbic System and the Soul” when he states that the right amygdala and hippocampus, through dreams, perhaps form a “neurotransmitter to God” (2001, 112). How could Kant know that the body has no receptors for the experience of God—because in an autopsy the brain and body are found to be flesh and blood and neurons? The parts do not indicate what the whole experiences: “Neurology cannot completely explain how such a thing can happen—how a non-material mind can rise from mere biological functions; how the flesh and blood machinery of the brain can suddenly become ‘aware’” (Newberg, d’Aquili, and Rause 2001, 32).

A good illustration of this is to portray the human organism as like a radio. You can take a radio apart and understand how it functions, but that does not tell you what music is or how it is experienced. Furthermore, as Tom Tweed (2003) has stated, “it is a radio, not a TV or a CD player.” In other words, the human organism is constructed to receive and transmit certain types of energy or information and not others. This organismic specificity is conceived of in different terms by different disciplines. For example, E. Thomas Lawson understands that the mind has innate functional characteristics: “Rather than being blank slates which have the information scribbled on them by the invisible hand of culture, children’s minds show evidence of evolutionary design by their complex functional organization” (Lawson 2000, 346). Neurobiologists Humberto Maturana and Francisco Varela note that the plasticity of the nervous system is taken to its highest degree in human beings (Maturana and Varela 1987, 170).

How do we understand the body—as a medicalized biochemical organism? What about the subtle body, the true or mystical body of Christ? the chakras and their role in transformation and enlightenment? the practice of yoga—that through certain disciplines and manipulations of the body the divine can be experienced? the concepts and experience of *num* during

healing trance for the !Kung? D. T. Suzuki's statement "The state of mind that exists when you sit in the right posture is, itself, enlightenment" (Suzuki 2001, 28)? In Roman Catholicism the soul is mediated through the body—the two have compatible substantiality and affect each other palpably: the soul learns through the suffering of the body. In indigenous, Sufi, or other traditions in which pain is ritualized, the body is a means for entering another state or bringing sacred energy into this world. Scholars discuss social and political bodies (LaFleur 1998; Schepher-Hughes and Lock 1987), malleable bodies (LaFleur 1998; Young 1993), and other theoretical frameworks of embodiment. Conceptions of the body are not only culturally but also historically specific (Hillman 1997, 84).

To view the body as an essential participant in the experience of the transcendent is to examine its functions and capacities in a new light that corresponds with both historical religious and contemporary scientific thought. The body is not a fixed, unchanging organism, and there is not a universal lived experience of the body. The experienced body varies according to culture, religious tradition, and personal experience; a tradition's concept of self informs the experience of self, and the cumulative lived embodied experience is thus shaped in a distinct manner: "Thus, the body in prayer is concentrated on shaping itself in conformity with its relationship to the ideality cherished by its spiritual tradition" (Levin 1985, 200). The body is not an immutable structure but is capable of a certain development. As David Levin states, adults, not just children, are in an unfinished state: "Then, it is *not* a question of imagining perfections in the bodies of beings other than, and higher than, ourselves, but is rather a question of imagining such perfections in an embodiment which *we* are capable of becoming. The body of the infant becomes the body of the child; this, in turn, becomes the body of the adult. At each stage, there are new capacities, and new perfections are possible. Is the adult body a fixed state? Is it not possible for this body, too, to continue to develop itself?" (Levin 1985, 218)

Even more significant than the possibility of development is the idea asserted by Talal Asad and others that the body *must* be educated, *must* be trained, in order to be capable of certain spiritual experiences: "The inability to 'enter into communion with God' becomes a function of untaught bodies" (Asad 1997, 48). Thus the body that can be "reshaped" through ritual (Levin 1985, 181), the body that "if properly disciplined can be a constructive helper" in the effort to develop inward attention (Ware 1997, 107), is the body that can know God directly (Ulanov 1982, 109). Spiritual development cannot take place without active participation in the evolvment of the body.

That the body can interact with the divine is a concept underlying many traditions. Often it is assumed; at other times it may be stated explicitly: "Spiritual consolation that overflows into the senses and into the body is a

phase in the growth of contemplative prayer" (Keating 1997, 78). Some traditions hold that spiritual transformation is a growth of certain capacities, others that it is a restoration (through praxis) of an original oneness of body and mind (Sheets-Johnstone 1992, 57). Their common grounding in the body is more essential than their differences.

The interaction of the physical and the divine, through the practice of prayer, is understood to have substantive, tangible results: "The monk has a body made holy . . ." (Climacus 1982, 74). This is not magic, nor is it the action of the "supernatural." The physical body and the whole psychobiological structure of a human being have been understood throughout history and in widely varying religious traditions to have "the transformative and fluid capacities . . . to pass into the divine" (Coakley 1997, 9). One use of the body in religion, then, is to refine and transform the body so as to make possible interaction with the divine. The body is thus not mere spiritless flesh as viewed through the lens of Western mind/body dualism; regardless of cultural context, the body is the medium through which the divine is experienced and known. The human capacity for direct experience of the divine lies in the transformative quality of the body: "Who shall change our vile body, that it may be fashioned like unto his glorious body" (Philippians 3:21 KJV).

RECALLED EMOTIONS ARE REFELT IN THE PRESENT

Religious states and knowledge are transmitted and learned through specific properties of the body—particular qualities of perception and memory are necessary for this process. The body and feelings have their own modes of cognition, which are immediate and polysemic.¹ Our sense organs and emotions function without verbal description or mediation from the intellect and are attuned to take in types of impressions to which they are specifically adapted. In this they display similarities to each other, but the sensory and emotional functions can be differentiated.

Consider a characteristic that is necessary for worship and ritual to be effective, which is that recalled emotions are "refelt" in the present. In this property it differs from sensory memory. The memory of a sensation, such as pain, is not experienced as it is remembered, whereas an emotion is. If you have ever had surgery or a broken bone, when you think back to that time you may wince because you remember that you were in pain, but you do not experience that pain again. In contrast, if you remember a time when you embarrassed yourself in public you cringe because you experience it again. When you listen to songs that held great meaning for you in high school, they evoke the same feelings even thirty years later. So, too, a person will reexperience a specific emotion each time he or she is in the same circumstances that evoked that emotion originally, assuming that it holds sufficient affective power.² This structure of emotion, that it can be

re-evoked and refelt, promotes developing and building on previous feelings; thus, they can be refined and cultivated intentionally through discipline and training and are capable of gradations of experience.

The development of emotion is one of the ways in which culture, particularly religious culture, is transmitted. Though the processes are universal, they take place within particular contexts, and the results are culture specific. This applies not only to the outwardly observable gestures and postures of any given ritual or tradition but also to the inner experience. Furthermore, practices handed on through ritual and tradition communicate not only the outer manifestations of a culture but also beliefs and experiences, so an individual's experience of body and self cannot be separated from enculturated concepts of human identity and relation to a deity or the transcendent.

As an illustration, in the Christian contemplative tradition there are many levels of prayer, including prayer of the heart and mental prayer. Deeper levels of prayer can be attained because of the concepts of the self and the transcendent that allow (perhaps even compel) an individual to experience different levels of the self in prayer. The concept of different levels in Christianity includes ideas of the hierarchical nature of the self. Thus, one frequently meets with the idea that there is a "real self," more essential or transcendent than the ordinary self. According to some traditions this real self is already there (eternal) and can be experienced through being "uncovered" or "discovered." For others it is "developed" by means of certain practices. The real self may also exist in opposition to a "false self" (Keating 1997, 72; Marrone 1990, 12).

The existence of different layers or levels of self within us is mirrored by the idea that there are different levels of religion. This may be defined as extrinsic versus intrinsic (Poloma and Gallup 1991, 108), mundane versus esoteric, or social-legal versus mystical-experiential religion—significant because types of prayer must correspond to beliefs about God as well as concepts of self. Contemplative prayer with the aim of union with God, for example, can exist only if there is a conceptual basis for it in the understanding of both self and God. Experience of levels of prayer in the contemplative Christian tradition is thus informed by concepts of hierarchy and levels of self and prayer constructed through millennia of Christian thought, experience, and self-examination. The process of development takes place not only at the personal level but also within the tradition: as people experienced prayer and communicated with each other about it, the hierarchy of prayer gradually developed and became a shaping force.

NONVERBAL MODES OF PROCESSING

The mode of cognition of the body³ and emotions is a nonverbal functioning of the human organism that includes kinesthetic perception and sense

impressions. Nonverbal cognition is central to religious experience, because it is not possible to experience the divine—the nameless Tao or a God beyond words—through verbal knowledge. Cognitive scientists refer to nonverbal processing, which may consist of a number of functions, in different terms. Edward Taylor refers to it as “unconscious” processing and also uses the term “implicit” memory, which he states “deals with nonconscious cognitive processing of past experience” (Taylor 2001, 219). Michael Robinson refers to the different types of processing as “automatic” (generally unconscious) and “controlled” (generally conscious), and he states that the benefits of unconscious processing are that “Unconscious processing is quicker and larger in capacity than conscious processing” (1998, 680). These, combined with what is called nondeclarative memory, are generally referred to as preattentive mechanisms. Rather than a model in which verbal, cognitive memory and processing is primary, the human organism has different modes of processing, among which the verbal may not be primary. What is of value to us is the recognition that there are modes of nonverbal cognitive processing and nonverbal memory and that they are absolutely necessary to the functioning of our organism in many ways. Conscious awareness and critical reflection are not necessary for changes in attitude, perspective, or meaning structures to take place.

Nonverbal modes of memory and processing may be experienced as an intelligence of the body, a developmental capacity of a nonconscious level. Learning to ride a bicycle or playing a musical instrument are examples of skills that cannot be accomplished through verbal processing, although that is useful at the beginning. These concepts have useful applications for understanding ritual practice. For example, from an experiential perspective, it is clear that repetition changes the practitioner’s experience during ritual. Trance, for example, is learned through ritual practice with others and is often an acquired skill. Ritual proficiency in any tradition—Hindu, Lakota Sioux, Wiccan, or Christian—entails the same type of learning. Once the attention no longer must be focused on the new skills or text, once the body has learned the activity, the mind and feelings are free to also participate in a new way. Speaking of what he calls “the phase of ritualization,” which consists of the “performance of pre-scribed postures, gestures and movements,” David Levin states that the understanding becomes clearer, “since it is an understanding which exists only by virtue of its being (increasingly) embodied” (Levin 1985, 209–10).

The speed of the different functions, such as implicit memory (Pyysiäinen 2001, 87), is in part responsible for the changes in ritual experience: “as a process becomes more automatic through practice, it becomes faster and less variable. When people perform a skill repeatedly . . . processing is based on direct retrieval from long-term memory, bypassing short-term memory altogether. Controlled processing, by contrast, requires attentional resources, is relatively slow, and is impaired under conditions of cognitive

load” (Robinson 1998, 668). In other words, the attention is free to attend more fully to other aspects of the ritual, such as feeling or meaning, once the ritual is fully embodied.

DEVELOPMENT AND CULTIVATION OF EMOTION

It is not within the scope of this essay to discuss the many and varied understandings of emotions. Catherine Lutz and Geoffrey White, in “The Anthropology of Emotions,” examined the many opposing approaches to emotion expressed up to that time, including “materialism and idealism, positivism and interpretivism, universalism and relativism, individual and culture, and romanticism and rationalism” (Lutz and White 1986, 406). Charles Lindholm (2004) analyzes anthropological research on emotion, considering the multiplicity of models in historical perspective. Ilkka Pyysiäinen notes the range of theories of emotion, with neurophysiological at one end of the spectrum and social constructivism at the other.

To begin with we should distinguish between emotions as phylogenetically ancient, informationally encapsulated, reflex-like responses that are insensitive to culture; feelings of emotions as aspects of higher cognition, which differ across cultures due to the roles culture plays in psychological development; and thirdly what Damasio calls background feelings, i.e. feelings that correspond to the body state prevailing between emotions. (Pyysiäinen 2001, 85)

Not only is there little agreement on what emotion is, but differentiating between emotions and feelings adds another dimension to the issue. Antonio Damasio conceives of emotion as bodily states and feelings as the awareness of emotion—that is, a higher-level state in which the organism knows that it feels the emotion (Damasio 1999, 81); similarly, LeDoux refers to feelings as “conscious emotions” (LeDoux 2002, 206). The terms *emotion* and *feeling* may be differentiated (Davis 1976, 3–4) or used interchangeably (Tugwell 1974, 50).

For the purposes of this essay I am considering as religious emotion a range of experiences related to religious practices or spiritual values—from shallower emotions, usually ego-directed, which are nondevelopmental (that give only a sense of self-satisfaction for sufficient piety, for example), to the possibility at the other end of the spectrum of transcendental experience, be this loss of self in Allah, union with God, or nirvana.

It is not possible, of course, to separate emotions entirely from cognitive processes, although the aims of numerous inner spiritual traditions, “to see things as they really are” or to enter a state of mystical ecstasy, for example, point toward an experiencing that is beyond verbal capacities. Yet to work toward a nondualistic understanding of the body in religion it is vital to comprehend better how verbal and nonverbal systems work together to form a whole. When an emotion arises, the cognitive capacities come into play to assess and then to integrate the emotion as part of ongoing experience. In terms of religious experience this might mean a Zen student’s

experiencing a shift to a new state, with the cognitive capacities recognizing that and remembering for a later session with his teacher. An experienced person entering trance would have a different recognition and assessment of the stages leading to that trance than an inexperienced one. Assessment necessarily calls on personal, enculturated experience and memory (Norris 2003)—even memories are constructed with reference to preexisting data (LeDoux 2002, 177). Cognitive assessment does not necessarily mean verbal categorization, although LeDoux states that “the easiest way to identify which emotion you are feeling is to label it verbally as fear, anger, love or disgust” (2002, 203–4); it is rather an ongoing interpretive process, a process that requires cognitive capacities of logic and reality checking, even when aiming for nonrational states, such as solving a koan, or (up to a point) for a state understood to be a different level of reality.

The relations between verbal and nonverbal processes are varied and complex. Information from verbal and nonverbal systems, which process different stimuli, can be integrated, allowing for abstract representation (LeDoux 2002, 176). Emotional arousal also brings “cognitive resources to bear on that state” (p. 322), and a moderate degree of arousal also enhances explicit (declarative) memory (p. 222). Ideas influence emotions, quite literally altering the neural network (p. 319). Just as emotions influence ideas, so ideas brought in through text, song lyrics, sermons, or discussion affect emotion at the neurobiological and experiential levels.

Religious emotions are often established and recalled through ritual gestures or postures and often associated with religious images. According to Charlotte Wolff, sensory impressions have the ability, although existing in the present moment, to evoke memories so strongly that the boundary between present and past becomes transparent.⁴ Taking a position with the body affects the worshipper even more strongly than receiving a visual impression, because kinesthetic consciousness is “related to the feeling of identity” (Wolff [1948] 1972, 25). Further, when taking a ritual posture the participant has the multidimensional experience of recalling the image of that posture and the emotions associated with it, visualizing the image as being taken by his or her own body, and at the same time receiving the sensory and feeling impressions associated with that position. Kneeling in prayer is one example; images of this posture abound in the Christian world and thus are part of the experience when that posture is taken. Other examples would be learning ritual dance after having seen it throughout childhood, or sitting in the same meditation position that so many images of Buddha portray, or experiencing trance in a society in which trance is characteristic.

A child initially takes a gesture or posture in imitation of others or because of being told or taught to do so. Gradually the physical and emotional dimensions of worship become embodied personal experience, and, each time a gesture is repeated, the kinesthetic and emotional memory of

that gesture is evoked, layering, compounding, and shaping present experience. Images, ideas, and emotional and physical associations (including both kinesthetic and contextual sensory experience) are all active and present in the experience of a ritual gesture or posture.

Each repetition of a posture of worship with the body not only reinforces the associations but also recalls the feeling associations. Reenactment is a reexperiencing, because memory stores not just ideas but also feeling and sensory experiences,⁵ and when an emotional memory is recalled it is experienced anew. All of the elements present in a previous arousal of an emotion need not be present for it to be refelt; it may be sufficient to have only one strong stimulus, such as taking a ritual posture.

Refeeling is progressive rather than a static unchanging reexperiencing of the same emotion; the more material has been stored in association with a given posture or gesture, the more can be refelt. Repetition thus strengthens the recalled experience of a particular image or movement. Even spiritual qualities such as endurance, ecstasy, or faith communicated directly to the body and feelings through those images become part of the reexperienced memory (Miles 1985, 143). Sacred images or perceptions come through any of the senses—sight, smell, hearing, taste, and touch—and also through kinesthesia and verbal images such as those found in the Qur'an or the Bible.

It is important to point out that the processes under examination apply not only to complex religious ritual but to simple religious acts as well (McCauley and Lawson 2002, 14). Similarly, not only ritual acts with movement but any ritual posture, such as sitting in the lotus position, potentially includes all types of nonverbal experience and cognition. These processes occur in both “flashbulb” and low-arousal emotional memory (McCauley and Lawson 2002; Whitehouse 1996) as well as in doctrinal and imagistic modes of religiosity (Whitehouse 1998). Thus, contemplative prayer or Zen meditation is as dependent on emotional recall for the development of religious states as are the practices of Mevlevi Sufis, the !Kung, or Melanesian initiates.

Clearly there is a cultural specificity to both the material that is stored and the experience that is evoked through that material. According to Eugene d'Aquili and Andrew Newberg in *The Mystical Mind*, every religious or mystical state short of what they refer to as “absolute unitary being” (AUB),⁶ the ultimately transcendent state, has a cultural component. Even extremely deep states of meditation short of AUB have a cultural component, because, although a person may feel totally focused in that state, the orientation association area of the brain (posterior superior parietal lobe) is still receiving impressions (d'Aquili and Newberg 1999, 167–68). The orientation association area is “involved in the analysis and integration of higher-order visual, auditory, and somaesthetic⁷ information” (d'Aquili and Newberg 1999, 33). It creates an image of the body in

space and performs other functions related to spatial orientation or manipulation of objects in space. During states short of AUB it is still sending messages to other parts of the brain, and thus deep states of meditation are experienced differently according to the tradition practiced: the quiescent void (nirvana) or ecstatic union with God, for example.⁸ These deep states of meditation are still culturally specific—they have been learned.

Many anthropologists have examined the degree to which emotions are biologically or culturally constructed (see Levy [1984] 1993; Rosaldo [1984] 1993; Spiro [1984] 1993). More specifically, Asad has written about the education of religious emotions and the uniqueness of those within a particular historical or cultural context. He describes the role of discipline in training the feelings as follows:

The rites that were described by that program did not simply evoke or release universal emotions, they aimed to construct and reorganize distinctive emotions—desire (*cupiditas/caritas*), humility (*humilitas*), remorse (*contritio*)—on which the central Christian virtue of obedience to God depended. This point must be stressed, because the emotions mentioned here are not universal human feelings. . . . They are historically specific emotions that are structured internally and related to each other in historically determined ways. (Asad 1993, 134)

It is not only religious emotions that are culturally and historically constructed; all emotions are contextually shaped, and being shaped implies a substance or preexisting mode of cognition that can be altered and developed in specific ways.

This is not to say that emotions are exactly the same everywhere, but it is to say that the psychological substrate out of which mixtures come is universal, though the specific colorations and intensities will differ. Clearly, different cultures produce their own blends of basic feeling states, since these states do not have hard and fast boundaries and can be mingled in specific ways. . . . But even though some cultures may separate categories of emotion that others mix and elaborate experiences that other societies do not, this does not mean there is no commonality among them. We have already cited the consensus among neurobiologists and psychologists that such a substrate exists and must include at least the four basic emotions of fear, anger, sadness and happiness and their permutations. (Lindholm 2004)

These scholars help us to understand the complexity and contextual foundation of religious practice and feelings. They do not, however, tell us *how* this takes place—that is, what the physical-cognitive underpinnings are. How does a child born in a specific historical cultural context learn those emotional responses? How does this development and deepening of feeling, that transformation of experience, take place in the brain?

CONTRIBUTIONS OF NEUROSCIENCE

That emotion can be refelt in the present when it is recalled enables religious feelings to be layered and developed, because each time a ritual ges-

ture is repeated the emotion is recalled and new emotional memories laid down in association with the old ones to be recalled the next time. This is precisely where neurobiology comes in, as it establishes that the neurobiological process of emotion parallels experience.

The tools of neuroscience help us to understand the processes that we see expressed in experience. For example, I have stated that emotional memory is a vital element in the ability of the body to learn religious states and that one quality of emotional memory necessary for the development of these states is that recalled emotions be refelt in the present. Damasio indicates in *The Feeling of What Happens* that reexperiencing an emotion means that the biochemical (humoral) and electrochemical (neural) processes⁹ that are the sources of what we experience as emotions are recurring.

The neural patterns which constitute the substrate of a feeling arise in two classes of biological changes: changes related to body state and changes related to cognitive state. The changes related to body state are achieved by one of two mechanisms. One involves what I call the "body loop." It uses both humoral signals (chemical messages conveyed via the bloodstream) and neural signals (electrochemical messages conveyed via nerve pathways). As a result of both types of signal, the body landscape is changed and is subsequently represented in somatosensory structures of the central nervous system, from the brain stem on up. The change in the representation of the body landscape can be partly achieved by another mechanism, which I call the "as if body loop." In this alternate mechanism, the representation of body-related changes is created directly in sensory body maps, under the control of other neural sites, for instance, the prefrontal cortices. It is "as if" the body had really been changed but it has not.

The changes related to cognitive state are no less interesting. They occur when the process of emotion leads to the secretion of certain chemical substances in nuclei of the basal forebrain, hypothalamus, and brain stem, and to the subsequent delivery of those substances to several other brain regions. When these nuclei release certain neuromodulators (such as monoamines) in the cerebral cortex, thalamus, and basal ganglia, they cause several significant alterations of brain function. . . .

Assuming that all the proper structures are in place, the processes reviewed above allow an organism to undergo an emotion, exhibit it, and image it, that is, feel the emotion. (Damasio 1999, 79–80)

If a given set of conditions evokes a particular response in an organism (for example, prostration in salat evoking a feeling of submission), another occurrence of that set of conditions will evoke the same biochemical and electrochemical response, that is, the same emotion. It also becomes easier to evoke that emotion because of the process by which neurons become attuned to one other so as to fire more easily, called long-term potentiation (Hogue 2003, 64; LeDoux 2002, 303; Maturana and Varela 1987, 168).

The intentional training of feeling draws on the fact that cultivation and intensification of emotions is possible precisely because of this quality of being refelt. Is this supported by neurobiological studies? In *Looking for Spinoza* Damasio explains the original triggering of emotion as follows:

The appearance of an emotion depends on a complicated chain of events. . . . The stimulus, a certain object or situation actually present or recalled from memory, comes to mind. . . . In neural terms, images related to the emotionally competent object must be represented in one or more of the brain's sensory processing systems, such as the visual or auditory regions. . . . Regardless of how fleeting the presentation, signals related to the presence of that stimulus are made available to a number of emotion-triggering sites elsewhere in the brain. You can conceive of those sites as locks that open only if the appropriate keys fit. The emotionally competent stimuli are the keys, of course. Note that they select a preexisting lock, rather than instruct the brain on how to create one. The emotion-triggering sites subsequently activate a number of emotion-execution sites elsewhere in the brain. . . . Eventually, the process can reverberate and amplify itself, or shrivel and close down. (Damasio 2003, 57–58)

This process, which moves toward amplification or contraction, underlies the development of emotion; here lies the possibility for change and deepening rather than a static, unchanging refeeling of an emotion. The contents of the mind (related stimuli) can amplify an emotional response through a parallel chain of recall (Damasio 2003, 58). Thus the emotional response has the potential to develop: each time a response takes place, not only is it an outer-directed response, it also augments and reinforces the neurological connections in associated areas of the brain. "Emotion systems learn by association—when an emotionally arousing stimulus is present, other stimuli that are also present acquire emotion-arousing qualities" (LeDoux 2002, 303). The connections between (emotionally competent) stimuli and emotional response are culturally specific; the material is laid down through such means as religious education, reading of religious texts, and performance of ritual. The experienced response is amplified because these contents exist; repeated experience increases related stimuli and amplification. The stimuli are culture specific; hearing the Qur'an will stimulate a particular religious feeling in a Muslim but not the same in a Buddhist. Differences within traditions are also evident. Hearing recitations from the Qur'an accompanied by music in dhikr will stimulate a calm, communal trance in middle-class Egyptian Sufis (Waugh 1989), but a self-mutilating amnesiac trance in the Hamadsha (Crapanzano 1973). Note that emotionally competent objects can be either actual or remembered (Damasio 2003, 57), so through association with a current emotion more stimuli can be called into action, amplifying the emotion and creating more related stimuli for the next time.

Buddhist scholars (and others) may argue that I am generalizing from a culturally specific view of emotion that is not universal. Buddhist psychology, for example, which is extremely well developed, understands emotions as mental factors. The difference in perspective can also be seen in the fact that there is no Tibetan word that translates directly as "emotion" (Dreyfus 2003). Mental factors are understood to characterize and qualify the object of awareness; some examples of mental factors are confidence, anger, drowsiness, doubt, wisdom, and spite. Clearly, some of these would

come under the heading of emotion, but not all of them would. Regardless of how they are classified in their taxonomy of experience, a Buddhist experiences the mechanical nature of emotion no differently than any other self-aware person does. This, in fact, is the basis of much Buddhist practice, one aim being freedom from just this automatic reaction of emotion (or other mental factors)—not an effort to *not* experience them but an effort to not be controlled by automatic reactions. Through meditation and other practices it is possible to see that emotions arise automatically from particular stimuli. For example, a coworker's laugh may arouse annoyance. The problem is not the laugh but the lack of inner freedom. The automatic recall and reexperiencing of emotion is an important element of Buddhist understanding and is recognized by anthropologists as well (Ekman 1977, 57). Neurobiology elucidates the physical basis for the experience of emotion as a programmed response, which is the automatic process through which emotions are evoked.

The layering of memory and experience through repetition and recall is part of the human structure that creates the possibility for lifelong development. This involves a plasticity (LeDoux 2002, 303–4; Maturana and Varela 1987, 166, 170), referred to by John Blacking as “malleability” (1977, 7), which allows us experiences of different intensities and meanings as well as giving us the ability to adapt and transform. Repetition, imitation, and the use of images in learning prayer or other rituals facilitate ever-changing and deepening experience through plasticity and the creation of new related stimuli. Sacred images depicting specific postures or gestures associated with corresponding feelings can be and have been used not only to evoke feelings but also to educate the feeling toward certain experiences. According to Margaret Miles (1985, 143), images embody spiritual qualities and have been used intentionally for this education.

Images are an essential part of ritual practice and transmission of religious knowledge. They are processed by different parts of the brain. To some extent the hippocampus is responsible, but also, just as the brain repeats internally what is heard, “there is an inbuilt tendency for the mind/brain to have a representation in the motor area of whatever movement, usually by another human, appears in the visual system” (d’Aquili and Newberg 1999, 88).¹⁰ Seeing another practitioner take a particular posture or gesture can produce a sensory representation in the viewer’s brain. As stated earlier, when that posture or gesture is then taken, many layers of experience are evoked—the emotional memory, religious associations and beliefs, kinesthesia, and more. The kinesthetic experience is specific to a given posture, and that experience is direct, unmediated by the intellect. Transmission of particular concepts and feelings is a process of internal recognition rather than external explanation, a “particular neural grouping cued to a certain frequency response” (Pearce 2002, 35). This occurs not as a conscious cognitive event but as a direct embodied experience.

CONCLUSION

I have argued that the body can be understood as transformative, that it is not merely a vehicle for the soul or self but is the medium through which religious states are learned and transmitted. This takes place through non-verbal modes of perception and the particular quality of emotion that it is refelt in the present when remembered, which characteristic enables the cultivation or development of emotion. Emotions and the stimuli that evoke them are necessarily culturally specific, but the automatic nature of this process is universal. Religious traditions have made use of these processes to educate the feeling toward certain qualities and to develop religious experience through the use of sacred images, ritual posture and gesture, and repetition of ritual acts. Neuroscience contributes to our understanding of the emotional processes that take place when emotions are evoked, refelt, and developed; the neurobiological processing of emotion parallels experience. By keeping experience central it is possible to bring religion and neuroscience together in a nonreductive examination of spiritual experience.

Pascal Boyer states, "Recall is particularly important because it is a necessary condition for cultural transmission. All else being equal, concepts that are recalled better than others have a higher potential for transmission" (2000, 199). Emotions are an intriguing system of transmission of religious culture, communicating values, spiritual experiences, and ideas that range from simple to complex and from superficial to profound. Without the benefit of neuroscience, religious traditions have made use of the communicative power of emotions for millennia, not just for practices or ideals commonly understood to be emotionally based, such as bhakti yoga, but for all types of religious experience. What I have presented here is not new knowledge but a new approach to this knowledge.

NOTE

A version of this article was presented at a panel on neuroscience and religion during the annual meeting of the American Academy of Religion, Atlanta, Georgia, 22 November 2003.

1. "The amygdala is capable of processing visual, tactile, auditory, gustatory, olfactory, and emotional stimuli simultaneously, and many single amygdaloid neurons are multimodally responsive" (Joseph 2001, 129).

2. This characteristic underlies many therapeutic techniques through which the emotion can be evoked but with the aim of gradually altering the response.

3. One could argue that the body itself does not experience or process impressions, that it is only the brain (obviously a part of the body) that does this. However, without making a claim for their exact functioning, it is interesting to note that there are neural ganglia distributed throughout the body, and in the heart—the same neural structures that perform the processing in the brain (Pearce 2002, 64), reminiscent of Vishnu's body covered with a thousand eyes—an image that exists in other traditions as well.

4. "Emotional images are the guardians at the threshold of the subjective consciousness, the doorway which leads into two spheres: into symbolic consciousness, which is a superior form of the subjective consciousness, and into oblivion, but an oblivion which is not quite complete, since small occurrences like a scent, a vague resemblance to a scene, a face, a tone of voice can

evoke long forgotten images and reproduce an emotional situation which is no longer present to the mind" (Wolff [1948] 1972, 65).

5. "These experiences made clear to me that my deepest memories and emotions were not locked . . . in my head. Rather, I had learned that deep stimulation of the muscles and viscera of my body could release memories and feelings into my conscious awareness—without my conscious intention of doing so" (Marrone 1990, xv).

6. Whether such a state actually exists is in question, what it means if it does exist is also not apparent, nor is it clear how one could prove that such a state had no cultural component at all.

7. Somaesthetic includes both sensory and kinesthetic impressions.

8. Although his processing approach is very useful for the study I have undertaken here, the fact that religious states can be states either of arousal or of quiescence (d'Aquili and Newberg 1999) leads to some question about how much of LeDoux's work on emotion is applicable to the study of religious emotion. He bases his work on the study of fear (LeDoux 1995; 2002), which is a state of arousal (although he discusses love briefly [2002, 229–34]). Even though he states that the principles he has discovered "are likely to be applicable to other systems" (p. 212), he later acknowledges that there may be differences in the way they function (p. 226).

9. These processes take place in the subcortical nuclei of the brain stem, hypothalamus, basal forebrain, and amygdala.

10. On this subject, d'Aquili and Newberg (1999, 138) note Rhawn Joseph's studies, which indicate that the brain also has a sensory representation of the whole body in the right hemisphere of the brain, apart from a representation of the whole body in the "primary receptive areas of the left and right parietal lobes." The function of the parietal lobes relates to sensation and cognition. "The parietal lobes can be divided into two functional regions. One involves sensation and perception and the other is concerned with integrating sensory input, primarily with the visual system. The first function integrates sensory information to form a single percept (cognition). The second function constructs a spatial coordinate system to represent the world around us" (Parietal Lobes, www.health.qld.gov.au).

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