REVIEW

THE TRANSCENDENT EXPERIENCE: CONCEPTUAL, THEORETICAL, AND EPIDEMIOLOGIC PERSPECTIVES

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This paper provides a conceptual, theoretical, and empirical overview of the concept of the transcendent experience. The principal goal is to formalize a scientific field around the study of dimensions, determinants, and health outcomes of transcendence. This is accomplished through posing several fundamental questions and then answering them as concisely as possible in light of current theory and existing empirical research. These include the following: "What is the transcendent experience?" "Can the transcendent experience be studied?" "What do we (and don't we) know about the transcendent experience?" "How is the transcendent experience triggered?" "How is the transcendent experience sustained?" "Are there physiological models of the transcendent experience?" "Are there health effects of the transcendent experience?" and, "How should we study the health effects of the transcendent experience?" Finally, an agenda is proposed for research on the role of the transcendent experience in health, emphasizing development of an epidemiology of the transcendent experience.

Key words: epidemiology, health, neurophysiology, psychology, religion, transcendence

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"Without going beyond his own nature, one can achieve ultimate wisdom."

Lao Tzu[1]

WHAT IS THE TRANSCENDENT EXPERIENCE?

Throughout history, across cultures and religions, and in both scriptural and secular writings, innumerable prophets, poets, philosophers, psychologists, and mystics have offered accounts of an unusual type of experience not easily attained or described. This elusive experience is portrayed, paradoxically, as desirable and potentially life-changing yet also as being indicative of spiritual distress and even psychopathology.[2] Many names have been proposed for this experience or class of experiences. Although these names are not necessarily interchangeable and may not designate precisely the same experience, each refers in some way to an experience of a state of consciousness characterized by altered or expanded awareness (Table 1).

This experience typically evokes a perception that human reality extends beyond the physical body and its psychosocial boundaries. A principal characteristic of this experience involves transcendence of one's personal identity and dissolution of a primary conscious focus on or grounding in one's ego. Another frequently described element of this experience is the perception of merging or identification with the source of being–whether known as God or Higher Self or the Absolute or Eternal. Accordingly, this experience is most commonly described as both transpersonal and transcendent. A key feature of transcendence, as described by many experiencers, is that it is "beyond perception and beyond human understanding."[3(p362)] For others, it is more immediate, more present, more real than other experiences–a quality of authenticity that puts it beyond doubt and "in some crucial sense, higher than . . . the reality of everyday experience."[4(p397)]

The transcendent experience may be the ultimate expression of subjective awareness. Not surprisingly, it is difficult to describe and to characterize. Its variety of labels suggests that it is not perceived in exactly the same way by everyone. Across religious traditions, especially, considerable diversity in characterizations of transcendent and mystical experiences is apparent. Theologian Howard Thurman,[5] for one, has contrasted the transcendent states of believers in a personal God (eg, Catholic monastics) with those mystics whose spirituality is conceived of in relation to an impersonal Infinite (eg, Taoists), a Light Within or Divine Spark (eg, Meister Eckhart), or pursuit of an initiatory path (eg, spiritual adepts).

In reading descriptions and research reports of transcendent experiences, two broad subtypes of transcendent experience can be identified. These may be referred to as a "green type" and a "mature type" of transcendent experience, raising the possibility of a developmental continuum between the two.

The *green* type of transcendent experience is typically characterized as transitory and involving a profound experience of pleasure, oftentimes described as ecstatic. This may occur abruptly, in response to an event or specific physical or spiritual practice. It may be experienced in varying degrees of intensity. In some instances, it may be accompanied by unusual affective or perceptual phenomena. Furthermore, this type of experience may occur repeatedly throughout one's life, depending on circumstances. Maslow's "peak-experience"[6] and many experiences described as "mystical" would fit into this category.

The *mature* type of transcendent experience, by contrast, is usually characterized as long lasting. The feeling associated with

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Table 1. Some Alternate Names for the Transcendent Experience

Clear Light[92]
Cosmic Consciousness[93]
Deautomatization[94]
Fana[95]
Flow Experience[96]
God Experience[46]
Intensity Experience[97]
Inward Light[98]
Living Flame of Love[99]
Love-Fire[100]
Mystic Experience[11]
The Numinous[101]
Objective Consciousness[102]
The Peace of God, which Passeth All Understanding[103]
Peak-Experience[6]
Samādhi[104]
Satori[105,106]
Shamanic Ecstasy[107]
The Silence Beyond Sound[108]
Subliminal Consciousness[109-111]

the mature transpersonal experience is a more enduring serenity and equanimity. It is not so much about transient mystical feelings or phenomena as about entering into a new state of awareness. It is more likely to be experienced as a self-transformational shift in one's consciousness or spiritual perception. The yogic *samādhis*, and other similar states, seem to fit into this category.

Both types of transcendent experiences manifest not only through a sense of transcendence but of sacred union. For the religious, this may be conceived of as union with God or the Divine. Western religious tradition, decidedly monotheistic, usually conceives of a divine power or creator that is at least partly separate from its created beings and has dominion over them. Eastern religious traditions, by contrast, more typically identify divinity as an aspect of all living things, which are instilled with properties of vitality and meaning. For individuals who are not formally religious, sacred union may manifest as being one with the universe or all life or with the experience of beauty, love, or nature.

Mystics and scholars have ascribed an ineffable quality to the transcendent experience. Nevertheless, much has been written about transcendence throughout the centuries. This includes work by those who have experienced moments of transcendence and by those who have studied it. Accounts come from East and West, from psychologists and mythologists, and from secular and sacred writing. Contemporary scholars, too, continue to produce useful taxonomies[7] and empirically derived typologies[8] of transcendent states and experiences.

A well-known and perhaps universally recognized example of the transcendent experience, at least in the West, can be found in the Gospel of John. Jesus is often considered to have been a mystic. Indication of this is recorded in his description of the ultimate form of transcendence, from a Christian perspective:

> The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh, and whither it goeth: so is every one that is born of the Spirit.[9]

This ineffability is also characteristic of Eastern forms of transcendence. William James, in his classic *The Varieties of Religious Experience*,[10] offered his perspectives on *samādhi*, the final stage of *rāja yoga*. This experience, to James, is paradoxically arational yet a source of transformative wisdom. In the ancient vedic tradition, its natural context, the experience of *samādhi* allows us to "come face to face with facts which no instinct or reason can ever know."[10(p307)] Those who have had this experience are "illumined,"[10(p308)] and profoundly changed.

James also described the more universal experience in which an individual perceives a connection with "the divine."[10(p42)] According to James, these experiences are rooted in mystical states of consciousness that involve transcendence of normal reality. He describes four defining characteristics of this state—ineffability, a noetic quality, transience, and passivity—each of which is typically present.

Evelyn Underhill, in another classic work, *The Essentials of Mysticism,*[11] described the mystic state as occurring in three stages. The first is the desire "sufficiently strong to overcome our natural sloth, our primitive horror of change."[11(p12)] The second involves an experience of "illumination"—a "deep sense of a divine companionship"[11(p17)] that is transitory. The third stage is "the true goal of mystic experience, the intuitive contact with that ultimate reality that theologians mean by the term Godhead and philosophers by the term Absolute. . . . There is little we can say of it because there is little we know, save that the vision or experience is always the vision or experience of a Unity that reconciles all opposites and fulfills all man's highest intuitions of reality."[11(pp20-21)] This third stage exemplifies what has been termed the mature transcendent experience.

Csikszentmihalyi[12] describes a less intense transcendent experience, which he refers to as "flow" or "optimal" experience. This state is identified by artists and athletes who report being "in the zone"—that is, immersed in or engulfed by their work. Deep concentration on the activity at hand allows the individual to lose self-awareness. He states that, in its most extreme form, the flow experience can be described as "a *transcendence* of self, caused by the unusually high involvement with a system of action so much more complex than what one usually encounters in everyday life."[12(p33)] Such an experience may be intrinsically rewarding and not sought simply for the achievement of an eventual aim. As he notes, the mountaineer does not climb the mountain to reach the top; he reaches the top to climb. Csikszentmihalyi's flow exemplifies what has been termed the green transcendent experience.

Despite the heterogeneity of these classic descriptions and characterizations of the transcendent experience, similarities are apparent, as noted by Woodhouse in his book *Paradigm Wars*.[13] According to many existing perspectives, across the various types of transcendent experience—green, mature, or otherwise—it may be possible to identify a "generic core"[13(p216)] comprising a common set of characteristics. These include unity, positive moods, transcendence of space and time, noetic incorrigibility, paradoxicality, ineffability, transiency, and positive

changes in attitudes and behavior. Although "[n]o serious student of mysticism would argue that mystical experiences are everywhere the same in every respect,"[13(p216)] these common elements can be observed across cultural and religious traditions.

CAN THE TRANSCENDENT EXPERIENCE BE STUDIED?

Existing scientific literature describes mystical experiences or altered states of consciousness associated with the ingestion of mind-altering drugs and natural substances,[14] autogenic training,[15] shamanic phenomena,[16] meditation,[17] trance channeling,[18] and near-death experiences.[19] Other types of transcendent experience, such as those resulting from regular spiritual practice, have been relatively neglected by scientists. Little is known of the natural history, biobehavioral determinants, and health outcomes of either class of experiences.

Some would question the ability of scientific measurement to capture the ineffable and subjective qualities of the transcendent experience, but many investigators have attempted to do so.[20] One of the largest potential barriers for research in this area is variability in what might be termed the "case definition" of and "inclusionary criteria" for the transcendent experience. Nevertheless, numerous instruments have been developed for assessment of transpersonal constructs, in general—enough to have constituted a series of lengthy published bibliographies.[21-23]

How common is the transcendent experience? This depends on the definition. National probability data from the National Opinion Research Center's 1974 General Social Survey (GSS) revealed that 35% of Americans questioned reported having had intense religious experiences that "lifted them outside of themselves."[24] The same question posed in Great Britain yielded a 31% positive response rate.[25] This work was updated[26] using data from the 1988 GSS. Again, just under a third of respondents reported ever having had at least one such experience. This figure did not vary across four age cohorts traversing the life course. Coupled with similar rates from earlier studies, this figure of one third of respondents appears to be fairly stable. These findings may provide a rough estimate for the lifetime prevalence of what we have termed the green type of transcendent experience.

Beginning nearly 40 years ago, Gallup polls have asked Americans whether they have "ever had a religious or mystical experience—that is, a moment of sudden religious insight or awakening."[27(p489)] In 1962, 20% of those surveyed reported such an experience. Since the middle 1970s, the number of those responding positively has remained fairly stable, with between 31% and 37% reporting such an experience.[28]

Interestingly, results such as these are not limited to formally religious or self-professed spiritual respondents. In 1985, 33% of British respondents and 43% of Americans reported that they "had been aware of or influenced by a presence or a power."[25] Stratification of results revealed that this experience was also reported in about 25% of those who described themselves as agnostics or atheists. Similarly, the 1988 Gallup poll reported that 25% of the "unchurched" said they had a powerful "religious experience."[28] This echoes the results of psychometric research that identified a "general mysticism factor" described as "a sort of mysticism present in people today that does not, however, receive a primarily religious interpretation."[29(p275)]

Using more specific criteria that closely parallel James' definition of mystical experience,[10] Thomas and Cooper found that 1% of those surveyed in 1980 reported having had an experience characterized by "awesome emotions, a sense of the ineffable, feelings of oneness with God, nature, or the universe . . . [plus] changed perceptions of time and surroundings, and a feeling of 'knowing,' coupled with a reordering of life's priorities."[30(p79)] The latter part of this description is roughly consonant with what we have termed the mature type of transcendent experience; accordingly, lifetime prevalence is considerably lower than for the other experiences mentioned earlier.

WHAT DO WE (AND DON'T WE) KNOW ABOUT THE TRANSCENDENT EXPERIENCE?

Sociodemographic breakdowns do not exhaust the scope of questions that can be addressed empirically about the transcendent experience. In formalizing a research agenda around this phenomenon, several key questions can be posed. First, how is the transcendent experience *triggered*—that is, what are the determinant or antecedent factors that seem to precipitate the kinds of experiences named in Table 1? Second, how is the transcendent experience *sustained*—that is, what are the factors that determine whether a particular experience is "green" or "mature" or whether the former evolves into the latter? Third, are there *physiological models* of the transcendent experience—that is, have scientists theorized the presence of verifiable biomarkers, correlates, or sequelae for such experiences? Fourth, are there *health effects* of the transcendent experience or effects on health-related behavior—that is, do these experiences have etiologic significance or importance as mediating factors in the prevention of illness? Each of these questions will now be explored in detail.

How is the Transcendent Experience Triggered?

Does the transcendent experience just appear in the life of an individual, perhaps as a sort of gift—an expression of the grace and love of the divine? Or is the transcendent experience an achievement—something that is attained by discipline, spiritual practices, or embarking on a type of inner journey? In other words, what is the "etiology" of the transcendent experience?

Experiences that have features in common with the transcendent experience are relatively easily achieved. For example, the experience of orgasm, with its temporary sensory loss and alteration of one's ordinary reality orientation, has been likened to the transcendent state.[31] Indeed, Greeley[24] reports that orgasm frequently triggers mystical experiences. Experiences associated with the use of hallucinogenic plants and drugs also have been likened to the transcendent experience.[32,33]

In Csikszentmihalyi's[12] model for achieving the flow experience, the only two prerequirements are startlingly nonspecific: an individual must perceive that (1) there is some action that he or she must undertake, and (2) they have the capability of being successful in accomplishing it. In other words, the matchup between an action and a person's skill in performing that action produces the experience of flow. When an activity includes clear goals and provides rapid, unambiguous feedback, the results are ideal.

James writes that mystical experience may be brought on voluntarily, through ritual or physical practices described by differ-

ent traditions (eg, "fixing the attention," "certain bodily performances"[10(p293)]). Once the experience is triggered, however, its progression seems to involve a process in which the personal will of the experiencer is set aside. The vedic tradition, for example, describes the attainment of a mystical state of consciousness as a systematic process that eventually transcends the will. It prescribes a disciplined, multistage yogic practice (*rāja yoga*) for achievement of *samādhi*, or the "superconscious" state. This includes physical postures (*āsanas*), breathing exercises (*prāṇāyāma*), withdrawal of the gross senses (*pratyāhāra*), concentration of the mind (*dhāraṇā*), and meditation (*dhyāna*). Although one may stumble into the superconscious state without preliminary preparation, such an achievement is considered as less desirable, or more "impure,"[10(p308)] than the one for which one has worked. Moreover, there may be some danger, whether physically or emotionally, for accessing such a state without appropriate preparation.

The New Testament states that Jesus fasted for 40 days and nights in the desert before embarking on his life's work. A similar exercise of fasting and isolation is seen in the Lakota practice of *hanblecheyapi*, or vision quest, in which spiritual insight is sought through a mystical experience. Aside from austerities such as fasting, other types of acutely intense physical or emotional events may trigger a transcendent experience. Vaughan and Maliszewski[34] report that 73% of female respondents who had given birth in the previous 12 to 18 months admitted experiencing at least one ecstatic or mystical state during childbirth.

It also appears that people can be shocked into a transcendent experience. An acute personal crisis, chronic disease, or taste of one's mortality may provide the impetus for self-transformation in many peoples' lives. In a case-control study, Kohr found that those who had a close call with death reported a significantly higher incidence of a particular experience described as "unity and oneness with all of nature, creation, or God."[35(p176)] Other parallels have been drawn between the attributes of mystical states and the near-death experience.[19]

Other miscellaneous factors also have been identified as triggering the transcendent experience. For example, Maslow[6] states that the "peak experience" can be triggered by an apprehension of the aesthetic (see Krippner[36]). This is described as the poignant moment of hearing a moving symphony, witnessing a glorious sunset, or gazing at the expression on the face of a loved one. Nelson[37] presents empirical findings suggesting that individuals with a higher capacity for absorptive behavior are more likely to have "praeternatural" (ie, mystic, visionary, or psychic) experiences. Phenomenological research findings point to experiences with wild animals, such as dolphins and whales, as capable of triggering interludes of transcendent consciousness characterized by feelings of harmony, aliveness, connectedness, intention, and reciprocity of process.[38] Walsh and Vaughan identify "six common elements that constitute the art of transcendence"[39(p2)]: ethical training, concentration, emotional transformation, redirection of motivation, refinement of awareness, and cultivation of wisdom. Finally, a comprehensive taxonomy has outlined potential determinants of altered states of consciousness in general.[40] These include numerous "distal" or predisposing factors (eg, stress; personality and socialization; diet and nutrition; social organization; ethnopharmacology; ecological factors) and "proximal" or situational factors (eg, inversion procedures; driving procedures; pharmacological factors; group-ritual vs individualistic factors; physical and mental stress and illness; miscellaneous somatic and psychological factors).

How is the Transcendent Experience Sustained?

Once present, what becomes of the transcendent moment? Does it persist? Does it flame out? Does it step up in intensity? If of the green type, can it be transformed into the more mature type? Noted theorists have attempted to shed some light on these questions.

As described by James,[10] the transcendent experience is typically transient. It tends to last for 30 minutes or less and never more than 2 hours. Memory of the experience, however, is retained and influences the inner life of the experiencer. This is true especially of the peak experience as described by Maslow.[6]

According to some, this transience is a functionally adaptive and necessary feature of such experiences. Tart lists the following as an attribute of the condition he terms "within-state enlightenment": "Recognition that your current state of consciousness may not be very useful for handling your current life-situation."[41(p197)] Those who have reached the highest stage of experience, according to Underhill's[11] model, do not maintain themselves indefinitely in a detached, blissful state. She quotes Plotinus in saying, "We always move round the One, but we do not always fix our gaze upon It. . . . If we did not [move around It], we should dissolve and cease to exist."[11(pp23-24)]

Csikszentmihalyi[12] considers the flow experience to be a powerful evolutionary force. The discovery and execution of a given task or project produces the flow experience. The individual then desires to repeat the activity, and will continue to do so, thereby maintaining the flow experience while increasing his or her skill at performing the activity. As the person's skill level is increased, the flow experience will wane because of boredom, unless the complexity of the task is similarly increased. Herein may lie a connection between the flow experience and the evolution of consciousness.

An interesting discussion took place between participants at the Second Interdisciplinary Conference on the Voluntary Control of Internal States, held in 1970 (quoted in Krippner[36(pp112-115,119)]). Abraham Maslow, near the end of his life, described how his experience of the transpersonal had changed in recent years. He spoke of the effects of having multiple peak experiences over a lifetime and of the continuum between what we have termed green and mature transpersonal experiences:

> I found that as I got older, my peak experiences became less intense and also became less frequent. . . .
>
> As these poignant and emotional discharges died down in me, something else happened that has come into my consciousness, which is a very precious thing. . . . I can define this unitive consciousness very simply for me as the simultaneous perception of the sacred and the ordinary. . . .
>
> This type of consciousness has certain elements in common with peak experiences–awe, mystery, surprise, and esthetic shock. These elements are present but are constant rather than climactic. . . . The words I would use to describe this kind of experience would be "a high plateau."

. . .[T]hese plateau experiences are described quite well in many literatures. This is not the standard description of the acute mystical experience but the way the world looks if the mystic experience really takes. If your mystical experience changes your life, you go about your business as the great mystics did. . . .

If you've gone through this experience, you can be more in the here and now than with all the spiritual exercises that there are.

Are There Physiological Models of the Transcendent Experience?

"At any level transformation may be usefully defined as a self-induced (autogenic) movement toward greater health–physical, emotional, mental, or spiritual. . . ."

Green and Green[42(pp148-149)]

The ultimate biological analogy of the transcendent experience is provided by Maven,[43] who describes it in terms of the union of the sperm and the ovum in conception. In that biological union, "the ovum is transformed from a gamete into a zygote and the sperm ceases to exist as a separate entity but continues to exist as an integral part of the zygote."[43(p51)] He suggests that the mystical experience is in some sense a "playback"–a kind of primordial memory of that first preexperience of merging.

Numerous analogies, metaphors, and conceptual models have emerged to characterize both the intrinsic nature and operant cofactors of the transcendent experience. These models derive from a wide variety of theoretical and scientific perspectives, and each sheds considerable light on this phenomenon. These include neuropsychological, psychoanalytic, Jungian, humanistic, transpersonal, perceptual-cognitive, and contextual orientations.[4] Several of the most prominent and distinctive models are described in this section.

Higher-order self. Eastern tradition and a variety of modern metaphysic systems posit the existence of *chakras*–"etheric organs" which conduct a type of life energy referred to in different traditions by various names (eg, *prāṇa*, *qi*). These organs mediate the flow of life energy, engendering "higher" orders of consciousness.[44] According to Green and Green,[42] the human brain is itself the mediator through which one's physical body can gain access to this "higher order" self. They write that "on occasion [biofeedback] patients get in touch with the deeper (higher) levels of being by contacting in themselves what seems to be the True Self (to use the Zen expression), and then they talk of spiritual feelings and insights."[42(pp149-150)]

Does this posited role for the brain suggest that the transcendent experience is a product of neurotransmitters and endogenous opiates, or, alternatively, might the transcendent experience trigger neurophysiological events that can be identified in the body as physical effects or correlates? According to Green et al,[45] the question of causal directionality may be moot. They propose that "every change in the physiological state is accompanied by an appropriate change in the mental-emotional state, conscious or unconscious, and conversely, every change in the mental-emotional state, conscious or unconscious, is accompanied by an appropriate change in the physiological state."[45(p1300)] In other words, the connection between physiological processes and mental-emotional states, including transcendent states of consciousness or awareness, is bidirectional.

Biologically oriented investigators have claimed, nonetheless, that the transcendent experience is the result of a physiological perturbation of the central nervous system. Moreover, they believe, its occurrence has adaptive value for humans.

God in the brain. Mandell,[33] an academic psychiatrist, has proposed a "psychobiology of transcendence" characterized by the experience of "God in the brain." He concludes that the transcendent experience is a state of consciousness that results from a loss of serotonin inhibition in the hippocampus, a small organ in the midbrain. He further states that the function of the hippocampus is to integrate two complex systems of neurocircuits: one that processes information about external objects and one that processes information relative to internal conditions of the body. The integration of these two groups of information is essential to the organism, insuring appropriate reaction to stimuli and the initiation of life-sustaining actions. Under normal circumstances, this integration proceeds smoothly, allowing us, for example, to respond to a feeling of thirst with the actions of obtaining and drinking water. Under some crisis situations, however, this smooth integration is disrupted in such a way as to provide access to "God in the brain."

Mandell uses an experience reported by Pavlov in the 1930s as an example. Pavlov and his assistants were using behavioral conditioning techniques to study the effects of anxiety on hypertension and inadvertently left some of their dogs in a tank that was being filled with water. When the dogs were discovered and rescued, some were near the point of death. After they recovered, Pavlov observed that all their conditioning had been obliterated; the formerly anxious, hyperactive dogs had become calm and peaceful. Their near-death experience had transformed them in some way.

According to Mandell,[33] when the organism is first exposed to conditions of extreme stress, the "external" neural circuits are opened wide to receive the maximum amount of information possible. The organism tries to remedy its situation in every way available and conceivable. If no solution can be found and failure is inevitable, the organism responds with a new strategy: it amplifies the internal circuit to the point that it becomes the only source of information. This allows the organism to enter a state of tranquillity.

Basing his observations on animal neurochemical research, Mandell suggests that this process is mediated by the release of biogenic amines that inhibit the synthesis of serotonin, resulting in the hyperexcitability of hippocampal CA-3 cells. This produces a "loss of CA_3 cell system 'gating' of emotionally laden associative matching of internal (temporal lobe limbic) with external events, thence to hippocampal-septal synchronous discharges and the emotional flooding called ecstasy."[33(p400)] Furthermore, "Subsequent death of these pyramidal cells . . . may account for the permanent changes in personality following an episode of religious transcendence."[33(p400)]

Temporal lobe transients. Persinger, a Canadian physiological psychologist, also locates the source of "the God experience"[46(p1)] in the hippocampus area of the temporal lobe. He claims that, without the particular configuration of the temporal lobe that developed in our species, the God experience could not exist.

Electroencephalograms record theta activity, slow synchronous or slightly spiked waves with frequencies between 4 and 7 Hz, when alterations in temporal lobe function occur, such as during dreaming, after regular repetition of a *mantra* or when one hears one's name in the hypnagogic or hypnopompic periods between waking and sleeping. Persinger claims that specific patterns of electrical activity can be "learned" by the electrically unstable cells of the hippocampus.

Persinger and others have recorded small, short-lived "seizures" from the temporal lobes of meditators and have observed them to have profound effects on the affect of the meditator. He calls this short-lived theta activity a "temporal lobe transient"[46(p16)] (TLT) and considers it to be a normal occurrence in healthy individuals. In describing experiences in which humans are able to rebound from depressive states, he speculates that "[t]hese experiences should be correlated with normal, transient electrical perturbations of the human temporal lobe."[46(p416)]

TLTs have been recorded while people pray, at religious revivals, and in those experiencing the death of a loved one. Persinger says that God experiences, although not TLTs specifically, are more effective at providing meaning and structure to an apparently overwhelmingly difficult situation than is any known therapy. TLTs occur with abnormal frequency and pathological intensity in those with temporal lobe epilepsy. Those with this disorder experience a variety of intense feelings, as well as visual and auditory perceptions. Reviewing the research literature, which describes the relationship of temporal lobe seizures to "extraordinary religious experiences," Helminiak concludes that "one important factor for explaining visions, voices, trances, and the like is misfunctioning in the dominant temporal lobe."[47(p35)] Temporal lobe epilepsy, unlike other forms of this disease, is often characterized by features that include religious conversions, mystical peaks, and obsession with moral issues.[46]

It must be emphasized that Persinger does not equate the God experience with temporal lobe epileptic seizures. He considers the former to be "a normal and more organized pattern of temporal lobe activity"[46(p19)] precipitated by such factors as stress, loss, or the fear associated with death.

Persinger asserts the evolutionary need for a human capacity of God experience. Such an experience, which could balance the "fear of personal extinction,"[46(p12)] was "critical for the survival of the species."[46(p12)] Furthermore, "expectation of God"[46(p63)] is conditioned in infancy, when crying out in fear and helplessness brings relief through parental support and assistance. Nonetheless, it seems unclear just how realization that the "'self' . . . becomes united with or 'at one' with the symbolic form of all space-time,"[46(p1)] as he describes the God experience, would provide the individual with much comfort from the fear of personal extinction.

Identification of a singular biological trigger or "cause" of the transcendent experience is compelling, especially for those who are interested either in harnessing its therapeutic potential or in discrediting presently unmeasurable and potentially nonmaterial phenomena. The increasing resonance of this perspective is reflected in the spate of popular books advancing versions of this thesis that have been published just in the past few years.[48-52] There are several challenges to pose, however, concerning Persinger's assertion that the God experience is essentially an "artifact of the human brain,"[46(p16)] a view that dates to earlier research and writing in the area of "neurotheology."[53]

First, neither the frenzied conversion experiences associated with the seizures of temporal lobe epilepsy nor the extremely adverse situations that are said to precipitate Persinger's God experience are characteristic of the transcendent experience as described in the present paper. Persinger's characterizations bear little resemblance to the rapturous descriptions of ecstasy, divine bliss, and transcendental union with all creation found in the writings of mystics and contemplatives. Although TLTs have been measured in meditators and during prayer, it cannot be said that these experiences are equivalent or even similar to the transcendent experience. Persinger's assertion that mystical experiences, such as those described by James,[10] Underhill,[11] and others, are the result of aberrant theta waves from the amygdala should be considered highly speculative.

Second, simultaneity of a TLT with a subjective experience of ecstasy or transcendence during meditation does not indicate a causal sequence or directionality; that is, the subjective psychological/cognitive experience could as easily antecede measured physiological aberrations as the other way around, or, according to the old maxim familiar to social scientists and epidemiologists, "Correlation does not imply causation." Even if mystical experiences could be shown to follow experimentally induced TLTs, this would not implicate experimental stimulation of the hippocampus as a necessary condition for such experiences.

Third, nonlocal characteristics of consciousness, as described by Dossey[54] and others, call into question the tacit assumption of Persinger that structures or functions of the brain are the source of all transcendent experiences. Moreover, even if this were so, one would have to ask, "Whose brain?" Nearly 4 decades of experimental evidence suggests the reality of neural energy transfer at a distance[55]—the phenomenon whereby brain electrical activities of spatially separated human subjects are correlated,[56] despite absence of a known biophysical mechanism.

Finally, because Persinger spends so much of *Neuropsychological Bases of God Beliefs*[46] decrying the negative aspects of religion, one might also consider his interpretation of the narrowly focused data to be somewhat biased.

Hardware vs software. A different approach to understanding the transcendent experience has been grounded in operational distinctions between mind and brain. Tart, a transpersonal psychologist, distinguishes the physical organ, the brain, from the mind, or "the totality of both inferable and potentially experienceable phenomena of which awareness and consciousness are components."[57(p28)] Brain systems are neurological "hardware"—biologically controlled structures. In contrast, mind systems represent "software"—culturally and individually controlled func-

tions that enable us to think and perform tasks. Interaction between brain and mind determine one's "state of consciousness," of which there are many.

This perspective stands in stark contradistinction to more conservative views of brain-mind interaction, in which "the phenomena of consciousness must be reduced to those of brain functioning; brain functioning must be reduced to basic properties of nervous systems, which must be reduced to basic properties of live molecules per se, which must be reduced to properties of atoms, which must finally be reduced to properties of subatomic particles."[57(p246)] For Tart, this kind of reductionism is incapable of accounting for evidence that "a person's belief about the nature of reality may actually alter the reality, not just his interpretation of it."[57(p247)]

Furthermore, according to Tart,[58] a clear sense of identity is a hallmark of "ordinary" everyday states of consciousness, but is only one of the mental programs possible. It is not inherent to consciousness.

In Tart's model, the brain processes information from four sources: the external environment, the internal environment, the memory, and the subconscious. Any radical change in the processing of input would alter one's state of consciousness. A destabilization from one's ordinary state can result, for example, when awareness is strongly focused on one area, such as in extreme emotional states of grief or rage.

According to this model, in the transcendent experience, the usual distinctions between types of input become blurred. This results in "the conviction that information from the external world, information from the body, information from the memory (including other parts of the brain), and information from the subconscious are coming from the same source."[59(p114)]

Technology of the praeternatural. More recently, Nelson[60] has proposed an ambitious taxonomic model of what he calls "praeternatural" experiences. His model is put forth as an antidote to previous models, which, he notes, "have not been constructed from an empirical database nor . . . tested against empirical evidence."[60(p35)] This approach, he contends, is more capable of conceptualizing these experiences from a position of "ontological neutrality."[60(p35)]

Accordingly, Nelson posits "a three-dimensional psychophenomenological model for mapping the qualities of, processes generative of, and conditions necessary for the occurrence of spontaneous praeternatural experiences."[60(p37)] This model of the "technology of the praeternatural"[60(p37)] comprises three axes or dimensions. The "personality" dimension refers to the variety of individual attributes or characteristics that predispose or facilitate praeternatural experiences but do not necessarily cause them. These include absorption, alienation, positive and negative affect, virtues, and aggression. The "operational" dimension refers to those cognitive, affective, and behavioral activities, as well as environmental conditions, which, in conjunction with salient personality factors, serve to trigger a praeternatural experience. These include stress, absorptive activity, social closeness, induced relief, shifting activity, and control. Finally, the "phenomenological" dimension refers to the qualities of praeternatural experience as reported by the experient. These include ontological reorientation, intense affect, perceptual alterations, soteriological changes, transcendence, and apparitional appearances.

According to Nelson, this model enables investigators to differentiate among normal, perceptual, and ontic (ie, "real" or truly existing) experiences without relying on "an ontological source outside the experiential data base itself."[60(p44)] In so doing, it may provide "a more total and holistic picture"[60(p44)] of these types of experiences.

Are There Health Effects of the Transcendent Experience?

> *". . . that fact is that the approach to the numinous is the real therapy and inasmuch as you attain to the numinous experience you are released from the curse of pathology."*
>
> Jung[61(p377)]

Does the transcendent experience influence health? This question has not been programmatically studied. Research on the topic of the transcendent experience has originated largely in the field of transpersonal psychology, which has emerged over the past 30 years. Empirical investigations have tended to be small clinical studies, and most scholarly writing has been theoretical. Although this work is uniformly excellent and creative, evidence for linkages between the transcendent experience and health suffers in comparison with other psychosocial determinants explored through large-scale, population-based investigations by epidemiologists and medical social scientists. The few studies that have empirically investigated the transcendent experience have rarely evaluated markers of such experience in relation to established health status outcomes or validated indicators of well-being.[62]

In commenting on the state of research on peak experience over a generation ago, Armor noted, "The issues here are exceedingly complex and more often than not their resolutions lie outside the province of Aristotelian logic, which is to say they are of a form many psychologists would find difficult to accept under the current rubrics of their discipline."[63(p49)] Not much has changed since that time.

Empirical findings. Considerable research has investigated the effects of religious involvement on morbidity and mortality.[62,64,65] These studies for the most part have focused on the health impact of institutional or formal religious behaviors, such as church attendance and public worship activities. Studies of health effects of more esoteric religious practices, or of spiritual experiences, are far fewer. Additionally, there is a large body of literature on the physiological, psychophysiological, and health effects of meditation.[66,67] Meditators may well experience moments of transcendence in their practice, but the outcomes typically assessed in these studies (eg, blood pressure, blood chemistry, cognitive markers) and the short-term focus of these assessments do not permit an estimation of sustained changes in health status.

One study by Greeley[68] addressed the question of possible mental-health effects of the transcendent experience directly. Among those surveyed, respondents who reported having had a

set of experiences that closely resemble classical descriptions of mystical experiences ("ineffability, a new sense of life, being bathed in light") scored significantly higher on measures of psychological well-being than those who did not report such experiences.

Other evidence supports a salutogenic effect of transcendence for clinical outcomes. Richards[69] reported that terminal cancer patients who experienced drug-induced mystical experiences showed significant gains associated with psychotherapy, whereas similar patients who did not achieve mystical states showed no such gains. Anecdotal and case reports also attribute remission of pathological conditions to occurrence of spiritual or transcendent experiences (eg, Ludwig[70]). Finally, recent findings suggest positive neurophysiological outcomes of experiences occurring during meditation.[71]

There is also literature on the relationship of mystical states to psychosis and affective disorders. Allowing that some authentically numinous experiences are mislabeled as psychosis and treated as such, one must also recognize that not all subjective experiences of "divine union" are associated with desirable life changes.[72] Maslow warns against "overemphasizing the mystical aspects of religion; some people run the danger of turning away from the world and from other people to search for anything that will trigger peak experiences. This type of person represents the mystic gone wild" (quoted in Krippner[36(p107)]).

If one identifies the transcendent experience by its outcomes, then experiences that precipitate physical sickness or psychosis should be considered separately from outwardly similar experiences that precede the development of qualities of equanimity. The latter would be considered the "truly numinous" experience, whereas the former would be considered pathological experiences. Although Wilber[73] considers the task of distinguishing between the two types of experiences to be fairly straightforward, others have suggested that the similarities between the two make them more difficult to distinguish.[72]

This is more than just a conceptual concern. Without a clear-cut and agreed on way to identify and describe transcendent experiences, it will remain difficult to examine their impact on physical- and mental-health–related outcomes. If certain transcendent-like experiences are not defined as transcendent because they are associated with deleterious outcomes, and are thus excluded from consideration, then this could bias investigations against unfavorable or null findings. Likewise, if unusual-but-not-truly-transcendent experiences (eg, drug-induced psychotic episodes) are included with more familiar states of spiritual bliss, then this might mitigate against the observation of positive findings. Just as in the investigation of any clinical outcome variable, the presence of reasonable inclusion and exclusion criteria are vital for the study of health effects of transcendence.

Theoretical expectations. Notwithstanding a scarcity of empirical findings on the relationship between the transcendent experience and health and well-being, traditional and esoteric perspectives are a rich source of theoretical expectations. The *Yoga Sutras* of Patañjali[74] describe the existence of tracings or *saṁskāras* ("scars") left on individuals–physically and psychically–by experiences throughout the life course. These tracings play a central role in health and illness by influencing thought processes, physiological functioning, and behavior. In this tradition, the highest expression of yoga ("union") is the process of *samādhi*, wherein the experiencer is integrated with the universal order, and *saṁskāras* are then dissolved. The "mystic union" is the ultimate source of health because it is the ultimate realization of order and balance. Weber writes of the *samādhi* experience, "Obliterating psycho-physical lesions by its very presence and power, it seems to *overwhelm* the dysrhythmic patterns in favor of the health-giving rhythmic ones that wipe them out."[75(p35)]

According to the "holistic hypothesis,"[75] health is defined as bio-psycho-transpersonal integration with "the whole." Likewise, the primary cause of disease is "the disconnectedness from this flow and rhythm of the whole, both within the single organism and also among groups of organisms."[75(p28)] Accordingly, causes for these dysrhythmias are complex: the variety of biological, environmental, and psychosocial elements with which humans interact through their lifetime.

Many psychologists who write about the transcendent experience consider its effects on the lives of the experiencer and those around them to be overwhelmingly positive. These expectations are more typically framed in terms of overall psychological well-being, as opposed to physical health status.

For example, Green and Green refer to Aurobindo's idea of "bringing *down* the transforming power of the overmind and supermind so that the man and his environment both benefit. This is considerably different from the old yogic idea of escape into Nirvana (the Void) by lack of involvement in the world, without personal-transpersonal transformation."[44(p34)]

Maslow[6] observes that the peak experiencer becomes more loving and accepting, and so more spontaneous and honest. After such an experience, it is common to feel an "all-embracing love for everybody and for everything, leading to an impulse to do something good for the world."[6(p68)]

Underhill describes the "fruits" of the mature transcendent experience in the following way: "He grows in vigour as he draws nearer and nearer the sources of true life, and his goal is only reached when he participates in the creative energies of the Divine Nature. . . . He is called to a life more active, because more contemplative, than that of other men."[11(p23)]

According to investigators, the transpersonal awareness that seems to result from the transcendent experience appears to be beneficial ultimately because of its capacity to enhance one's perception of self in the context of a universal or divine order. It its mature form, it represents an ultimate expression of self-actualization and social integration. In this context, definitions of health, spiritual well-being, and personal development seem to intersect. If one feels "right" in his or her world–that is, if one has an understanding or, better, an experience that the universe has meaning and order and that he or she has a place in that order–then one might truly be said to be healthy. This sentiment is articulated well by Dossey[76(p11)]:

> It is possible . . . to experience health in the midst of illness. . . .

> This idea of health . . . hinges on wholeness at some essential level of our being. This wholeness permits, I feel, a transcendence of the ordinary indices of health such as lab tests, x-rays, even pain and suffering. . . . From this larger experiential perspective, our ordinary measures of health begin to seem trivial–not inconsequential, mind you, but profoundly less important.

HOW SHOULD WE STUDY THE HEALTH EFFECTS OF THE TRANSCENDENT EXPERIENCE?

In light of existing empirical and theoretical work, there is reason to believe that the transcendent experience is a salient factor in the promotion of salutary outcomes. Specifically, what we have termed the green type of transcendent experience may be a correlate of contemporaneous markers of psychological well-being, such as life satisfaction and positive affect. There is also reason to hypothesize that what we have termed the mature type of transcendent experience may be a salient protective factor for the prevention of subsequent morbidity, somatic and psychiatric. Accordingly, any salutary effects of the transcendence should be observable in studies of population health. It is thus proposed that the health effects of the transcendent experience be studied epidemiologically.

Toward an Epidemiology of the Transcendent Experience

To investigate an epidemiologically significant impact of the transcendent experience, investigators face several tasks. These tasks apply to the establishment of a program of epidemiologic research on any topic, although few areas of research in psychosocial epidemiology have followed these steps to the letter. These include (1) conceptual development of the transcendent experience, including validation of assessment instruments; (2) descriptive-epidemiologic research of patterns of the transcendent experience; (3) analytic-epidemiologic research of the transcendent experience as a determinant of health; and (4) advanced specialized studies of the transcendent experience, including neuroepidemiologic, laboratory, and clinical studies. Together, these steps outline a proposed agenda for a new area of research focusing on the epidemiology of the transcendent experience.

1. Conceptual development of the transcendent experience. As in any program of epidemiologic research, the first step in establishing an epidemiology of the transcendent experience should be the development and validation of measurement instruments for use in subsequent investigations. In an epidemiologic investigation, measurement refers to the assessment of exposures or factors that are potentially associated with greater or less risk or odds of morbidity in a population. Exposure assessment involves estimating exposure status in a cohort or sample–that is, the concentration, intensity, duration, or frequency of contact or experience with the factor under study.[77] In psychosocial epidemiology, exposures consist of personal or interpersonal states, traits, or statuses (eg, history of a transcendent experience) by way of self-administered or interviewer-administered questionnaires. Several tasks are required here, in roughly the following order.

First, conceptual models must be developed, postulating the dimensionality of the transcendent experience. Variant models, corresponding to particular theoretical perspectives (eg, as identified earlier), may posit alternate configurations, in terms of both names and numbers of dimensions. For example, according to the conceptual model presented in this paper, the transcendent experience can be conceptualized as a two-dimensional construct comprising green and mature factors. Completing this phase in the conceptual development of the transcendent experience requires a clear theoretical understanding of the nature of this construct–its origins, natural history, clinical manifestations, and sequelae. Furthermore, assessment of the transcendent experience, as for any epidemiologic variable, must also include characterization of the "dose" or amount of exposure and any time-related factors intrinsic to exposure.[78]

Second, conceptual models in place, operational definitions of the transcendent experience must be developed. This consists of defining precisely the conceptual boundaries of each named dimension, describing the relationships among respective dimensions, identifying the presence or absence of any higher-order factors, and accounting for and addressing potential measurement errors. These are highly complex tasks and require considerable training and expertise in psychometric analysis and the theory of measurement. They also require no less substantive knowledge of the transcendent experience than the previous phase of conceptual development. This phase is tedious and often neglected, yet mistakes made here can unequivocally compromise subsequent analyses and render study results dubious. For a subjectively experienced and typically ill-defined construct such as transcendence, positing meaningful operational models will require considerable attention to psychological theory, sociological context, and current trends in religious assessment.[79]

Third, conceptual and operational models readied, the final phase in the conceptual development of the transcendent experience requires validation of measurement instruments for use in subsequent empirical investigations. As in the validation of any psychosocial instrument, this involves a series of steps: developing and evaluating an item pool, determining the measurement format, drafting an instrument, pretesting the instrument, identifying a sampling frame, and collecting data on both the instrument and those other variables or scales needed to assess the various types of validity. Instrument reliability must also be assessed, and various methods are available (eg, internal consistency, split-half). These tasks, nearly universal for scale development, require a high level of psychometric expertise.[80] Competently executing this process also requires a sufficiently substantive grasp of the full scope of the transcendent experience–the breadth of its characteristics and manifestations–to insure development of a content-valid measure. An excellent overview of methodological issues arising in the introspective assessment of altered states of consciousness and anomalous experiences–and how to overcome them–is available from the American Psychological Association.[81]

2. Descriptive epidemiology of the transcendent experience. The second step in establishing a program of research on the epidemiology of the transcendent experience should be to undertake descriptive-epidemiologic study. Descriptive epidemiology, by

definition, consists of study of the distribution of particular disease outcomes or of the distribution of factors that potentially predict health or illness. Two specific tasks are required here.

First, once reliable measures of the transcendent experience have been validated, prevalence studies should be conducted. These will serve to identify patterns of transcendent experiences as they exist throughout the general population. By patterns, what is meant is the magnitude or quantity of these experiences, both at the time of study (known as point prevalence) and over the course of one's life (lifetime prevalence). Descriptive-epidemiologic investigation requires a moderate degree of expertise in social research methods, especially as they relate to sampling and survey administration. The unorthodoxy of a particular construct (eg, the transcendent experience) is no barrier to its characterization by descriptive-epidemiologic research, provided that it can be assessed reliably and validly.[82] Health outcomes as controversial as chronic fatigue syndrome[83] and Gulf War illness[84] have been successfully investigated through descriptive-epidemiologic methods, as have exposure variables tapping dimensions of religiousness.[85]

Second, once overall prevalence rates of the transcendent experience have been determined, a second phase of descriptive-epidemiologic research would be to identify patterns of prevalence across categories of person, place, and time (PPT). Epidemiologists refer to this approach as stratified analysis. Determination of potentially relevant PPT factors for stratification is a theoretical, not empirical, decision, and requires substantive knowledge of the phenomenon under study. For the transcendent experience, starting points for PPT stratification might include factors such as religious affiliation, age, gender, ethnicity, mental health history, stress, personality type, culture of origin, nationality, history of psychedelic drug use, dietary regimen, religious motivation (ie, intrinsic vs extrinsic), and having a spiritual or meditative practice. Many of these constructs have been suggested to play a salient role in some altered states of consciousness.[40] This phase of descriptive-epidemiologic research requires substantive knowledge of existing empirical findings and theoretical writing on determinants or correlates of the transcendent experience.

3. Analytic epidemiology of the transcendent experience. The third step in establishing a program of research on the epidemiology of the transcendent experience should be to conduct analytic-epidemiologic investigations. Analytic epidemiology, in contrast to descriptive epidemiology, involves analysis of the effects of potential determinants on health, illness, or rates of disease or death. As with descriptive epidemiology, the perceived unorthodoxy of a construct or construct domain—the spiritual realm included—is no inherent barrier to its analytic-epidemiologic investigation.[86] Analytic-epidemiologic study of the transcendent experience could take two different approaches.

First, following identification of patterns of transcendent experiences through descriptive-epidemiologic studies, longitudinal investigations could be conducted of their health impact over time. Prospective cohort studies, in terms of population rates of morbidity, would be most highly recommended. This class of study is best able to identify whether a given exposure (eg, the transcendent experience) exhibits a primary-preventive, or protective, effect on morbidity.[87] If costs were prohibitive, or if there were solid reason to believe that any salutary effects of the transcendent experience occurred only after a lengthy lag time, then retrospective case-control designs could be used, but this would require focusing on one particular physical or mental health outcome from the onset of study. However, without preliminary evidence to draw on, and without well-established theories that inspire confidence, initiating analytic-epidemiologic research on the transcendent experience by way of case-control studies would be ill-advised. Either way, however, some form of analytic-epidemiologic study is required for identifying possible health effects of the transcendent experience. This class of study design requires a thorough background in advanced epidemiologic methods.

Second, another type of analytic-epidemiologic approach to the transcendent experience involves methods borrowed from medical sociology and social research. This entails positing a multifactorial model of antecedents and health outcomes of the transcendent experience, examined as a system of simultaneous equations. This methodology, known as structural-equation modeling, is extremely sophisticated but quite flexible; it can be implemented either cross-sectionally or longitudinally. Moreover, it provides the opportunity to calculate precisely the magnitude of direct and indirect effects of the transcendent experience on selected physical and mental health indicators net of the effects of potentially mediating or moderating variables. These might include any of a variety of hypothetical psychosocial outcomes of transcendent or altered states, such as enhanced self-esteem, greater self-efficacy or mastery, higher level of absorption, internal locus of control, successful religious coping, and presence of loving emotions. Structural modeling is a sophisticated methodology generally unfamiliar to epidemiologists and would require consultation with social or behavioral scientists whose expertise covers advanced social research methods.[88]

4. Advanced specialized studies of the transcendent experience. The fourth step in establishing a program of research on the epidemiology of the transcendent experience should be to undertake more specialized types of investigations seeking to understand its basic sciences. Another way of putting it is as follows: The first step (conceptual development) addresses the "what" question; the second step (descriptive epidemiology) addresses the "who," "where," and "when" questions; the third step (analytic epidemiology) addresses the "how" question; and the fourth step will begin to answer the "why" question—that is, expounding on the underlying physiological (and perhaps paraphysiological) mechanisms that lie at the core of the associations identified as important in analytic-epidemiologic studies.

Examples might include advanced studies in specialty areas within epidemiology, such as neuroepidemiology, psychiatric epidemiology, and geriatric epidemiology. Investigators might also consider cognate laboratory and clinical research on psychoneuroimmunologic, psychophysiological, and functional cofactors and mediators of an association between the transcendent experience and health. A principal focus of this type of research would be the identification of explanatory mechanisms, pathways, processes, or sequences of events accounting for any

observed linkages between transcendent states and subsequent states of health or well-being. Epidemiologists typically stop after addressing "how" questions–if they get that far–and tend to avoid "why" questions altogether. This has been especially a problem for epidemiologic research into dimensions of religiousness.[62,89] A fascinating, multidisciplinary, and controversial area of investigation such as the epidemiology of the transcendent experience demands that such issues be addressed and promises considerable intellectual rewards.

Through implementing a program of research, as identified above, scientists will be able to move systematically from the current state of conceptual and theoretical discordance to a fully fleshed-out and mature body of empirical research findings on the dimensions, determinants, health outcomes, and basic sciences of the transcendent experience. This work can itself then serve as a spur to future research seeking to identify salutogenic mechanisms whereby mental, emotional, and spiritual factors other than transcendence impact on the body, on human physiology, and on health status across the natural history of disease and throughout the life course. This is consistent with both (1) recent calls to expand and broaden ongoing research efforts in the epidemiology of religion to consideration of internal psychological states and traits[90] and (2) more longstanding efforts to encourage investigators to extend research on transpersonal states of consciousness by utilizing a wide variety of methodological approaches.[91] Most of all, of course, such programmatic research will enlarge our understanding of the transcendent experience. In so doing, such investigations will go a long way toward dispelling the misconceptions, skepticism, and fear related to these poorly understood yet most compelling states of being.

REFERENCES

1. Lao Tzu. *Tao Teh King: Interpreted as Nature and Intelligence.* Bahm AJ, translator. New York, NY: Frederick Ungar Publishing Co.; 1958:46.
2. Lukoff D, Lu F, Turner, R. Toward a more culturally sensitive DSM-IV: psychoreligious and psychospiritual problems. *J Nerv Ment Dis*. 1992;180:673-682.
3. Watson D. *The Dictionary of Mind and Spirit*. New York, NY: Avon Books; 1991.
4. Wulff DM. Mystical experience. In: Cardeña E, Lynn SJ, Krippner S, eds. *Varieties of Anomalous Experience: Examining the Scientific Evidence*. Washington, DC: American Psychological Association; 2000:397-400.
5. Thurman H. *Mysticism and the Experience of Love.* Pendle Hill Pamphlet 115. Wallingford, Pa: Pendle Hill; 1961:5-6.
6. Maslow AH. *Religions, Values, and Peak-Experiences*. Columbus, OH: Ohio State University Press; 1964.
7. Jacobs JL. Religious experience among women and men: a gender perspective on mystical phenomena. *Res Soc Sci Stud Religion*. 1992; 4:261-279.
8. Spilka B, Brown GA, Cassidy SA. The structure of religious mystical experience in relation to pre- and postexperience lifestyles. *Int J Psychol Religion*. 1992;2:241-257.
9. John 3:5-8 (KJV).
10. James W. *The Varieties of Religious Experience* [1902]. New York, NY: Mentor; 1958.
11. Underhill E. The essentials of mysticism [1920]. In: *The Essentials of Mysticism and Other Essays*. New York, NY: E. P. Dutton; 1960:1-24.
12. Csikszentmihalyi M. The flow experience and its significance for human psychology. In: Csikszentmihalyi M, Csikszentmihalyi IS, eds. *Optimal Experience: Psychological Studies of Flow in Consciousness*. New York, NY: Cambridge University Press; 1988:15-35.
13. Woodhouse MB. *Paradigm Wars: Worldviews for a New Age*. Berkeley, CA: Frog, Ltd.; 1996.
14. Roberts TB. Do entheogen-induced mystical experiences boost the immune system?: psychedelics, peak experiences, and wellness. *Adv Mind-Body Med*. 1969;15:139-147.
15. Green EE, Green AM. Biofeedback and states of consciousness. In: Wolman BB, Ullman M, eds. *Handbook of States of Consciousness*. New York, NY: Van Nostrand Reinhold Company; 1986:553-589.
16. Krippner S, Welch P. *Spiritual Dimensions of Healing: From Native Shamanism to Contemporary Health Care*. New York, NY: Irvington Publishers; 1992.
17. Gifford-May D, Thompson NL. "Deep states" of meditation: phenomenological reports of experience. *J Transpersonal Psychol.* 1994; 26:117-138.
18. Hughes DJ, Melville NT. Changes in brainwave activity during trance channeling: a pilot study. *J Transpersonal Psychol.* 1990;22: 175-189.
19. Pennachio J. Near-death experience as mystical experience. *J Relig Health*. 1986;25:64-72.
20. Shear J, Jevning R. Pure consciousness: scientific exploration of meditation techniques. *J Consciousness Stud*. 1999;6(2-3):189-209.
21. MacDonald DA, LeClair L, Holland CJ, Alter A, Friedman HL. A survey of measures of transpersonal constructs. *J Transpersonal Psychol.* 1995;27:171-235.
22. MacDonald DA, Friedman HL, Kuentzel JG. A survey of measures of spiritual and transpersonal constructs: part one–research update. *J Transpersonal Psychol.* 1999;31:137-154.
23. MacDonald DA, Kuentzel JG, Friedman HL. A survey of measures of spiritual and transpersonal constructs: part two–additional instruments. *J Transpersonal Psychol.* 1999;31:155-177.
24. Greeley AM. *Ecstasy: A Way of Knowing.* Englewood Cliffs, NJ: Prentice-Hall; 1974.
25. Hay D. *Exploring Inner Space: Is God Still Possible in the Twentieth Century?* London, England: Mowbray Publishers; 1987.
26. Levin JS. Age differences in mystical experiences. *Gerontologist*. 1993;33:507-513.
27. Back K, Bourque L. Can feelings be enumerated? *Behav Sci*. 1970; 15:487-496.
28. Gallup G, Jr, Castelli J. *The People's Religion: American Faith in the 90's.* New York, NY: Macmillan Publishing Company; 1989.
29. Holm NG. Mysticism and intense experiences. *J Sci Stud Relig.* 1982;21:268-276.
30. Thomas L, Cooper PE. Incidence and psychological correlates of intense spiritual experiences. *J Transpersonal Psychol.* 1980;12:75-85.
31. Davidson JM. The psychobiology of sexual experience. In: Davidson JM, Davidson RJ, eds. *The Psychobiology of Consciousness*. New York, NY: Plenum Press; 1980:271-332.
32. Pahnke W, Richards W. Implications of LSD and experimental mysticism. *J Transpersonal Psychol.* 1969;1:69-102.
33. Mandell AJ. Toward a psychobiology of transcendence: God in the brain. In: Davidson JM, Davidson RJ, eds. *The Psychobiology of Consciousness.* New York, NY: Plenum Press; 1980:379-464.
34. Vaughan BJ, Maliszewski M. Ecstatic components of childbirth: a psychological and phenomenological investigation. *Birth Psychol J.* 1982;3:113-126.
35. Kohr RL. Near-death experiences, altered states, and psi sensitivity. *Anabiosis*. 1983;3:157-176.
36. Krippner S, ed. The plateau experience: A.H. Maslow and others [Discussion]. *J Transpersonal Psychol.* 1972;2:107-120.

37. Nelson PL. Personality factors in the frequency of reported spontaneous praeternatural experiences. *J Transpersonal Psychol*. 1989; 21:193-209.
38. DeMares R, Krycka K. Wild-animal-triggered peak experiences: transpersonal aspects. *J Transpersonal Psychol*. 1988;30:161-177.
39. Walsh R, Vaughan F. The art of transcendence: an introduction to common elements of transpersonal practices. *J Transpersonal Psychol*. 1993;25:1-9.
40. Locke RG, Kelly EF. A preliminary model for the cross-cultural analysis of altered states of consciousness. *Ethos*. 1985;13:3-56.
41. Tart CT. *Open Mind, Discriminating Mind: Reflections on Human Possibilities*. San Francisco, CA: Harper & Row; 1989.
42. Green E, Green A. Biofeedback and transformation. In: Kunz D, ed. *Spiritual Aspects of the Healing Arts*. Wheaton, IL: The Theosophical Publishing House; 1985:145-162.
43. Maven A. The mystic union: a suggested biological interpretation. *J Transpersonal Psychol*. 1969;1:51-55.
44. Green EE, Green AM. On the meaning of transpersonal: some metaphysical perspectives. *J Transpersonal Psychol*. 1971;3:27-46.
45. Green EE, Green AM, Walters ED. Self-regulation of internal states. In: Rose J, ed. *Progress of Cybernetics, Vol. III: Cybernetics and Natural Sciences; Cybernetics and the Social Sciences*; London, England: Gordon and Breach Science Publishers; 1970:1299-1317.
46. Persinger MA. *Neuropsychological Bases of God Beliefs*. New York, NY: Praeger Publishers; 1987.
47. Helminiak DA. Neurology, psychology, and extraordinary religious experiences. *J Relig Health*. 1984;23:33-45.
48. D'Aquili EG, Newberg AB. *The Mystical Mind: Probing the Biology of Religious Experience*. Minneapolis, MN: Fortress Press; 1999.
49. Albright CR, Ashbrook JB. *Where God Lives in the Human Brain*. Naperville, IL: Sourcebooks, Inc.; 2001.
50. Alper M. *The "God" Part of the Brain: A Scientific Interpretation of Human Spirituality and God*. 5th edition. Brooklyn, NY: Rogue Press; 2001.
51. Newberg A, D'Aquili E, Rause V. *Why God Won't Go Away: Brain Science and the Biology of Belief*. New York, NY: Ballantine Books; 2001.
52. Schroeder GL. *The Hidden Face of God: How Science Reveals the Ultimate Truth*. New York, NY: Free Press; 2001.
53. Ashbrook JB. Neurotheology: the working brain and the work of theology. *Zygon*. 1984;19:331-350.
54. Dossey L. How healing happens: exploring the nonlocal gap. In: Jonas WB, Schlitz M, Krucoff MW, eds. *Bridging Worlds and Filling Gaps in the Science of Healing* [Proceedings]. Alexandria, VA: Samueli Institute for Information Biology; 2001:347-376.
55. Standish LJ, Johnson LC, Kozak L, Richards T. Neural energy transfer between human subjects at a distance. In: Jonas WB, Schlitz M, Krucoff MW, eds. *Bridging Worlds and Filling Gaps in the Science of Healing* [Proceedings]. Alexandria, VA: Samueli Institute for Information Biology; 2001:281-302.
56. Wackermann J, Seiter C, Keibel H, Walach H. Correlations between brain electrical activities of two spatially separated human subjects. *Neurosci Lett*. 2003;336:60-64.
57. Tart CT. *States of Consciousness*. New York, NY: E. P. Dutton & Co.; 1975.
58. Tart CT. Consciousness, altered states, and worlds of experience. *J Transpersonal Psychol*. 1986;18:159-170.
59. Collins JE. Transcendent experience and psychological models of the brain. In: Wood RC, Collins JE, eds. *Civil Religion and Transcendent Experience: Studies in Theology and History, Psychology, and Mysticism*. Macon, GA: Mercer University Press; 1988:101-128.
60. Nelson PL. The technology of the praeternatural: an empirically based model of transpersonal experiences. *J Transpersonal Psychol*. 1990;22:35-50.
61. Jung CG. *C. G. Jung: Letters, Vol. 1: 1906-1950*. Jaffé A, ed. Hull RFC, trans. Bollingen Series XCV. Princeton, NJ: Princeton University Press; 1973.
62. Levin J. *God, Faith, and Health: Exploring the Spirituality-Healing Connection*. New York, NY: John Wiley and Sons; 2001.
63. Armor T. A note on the peak experience and a transpersonal psychology. *J Transpersonal Psychol*. 1969;1:47-50.
64. Levin JS. How religion influences morbidity and health: reflections on natural history, salutogenesis and host resistance. *Soc Sci Med*. 1996;43:849-864.
65. Levin JS, Vanderpool HY. Is frequent religious attendance *really* conducive to better health?: toward an epidemiology of religion. *Soc Sci Med*. 1987;24:589-600.
66. Funderburk J. *Science Studies Yoga: A Review of Physiological Data*. Honesdale, PA: Himalayan International Institute of Yoga Science and Philosophy; 1977.
67. Murphy M, Donovan S. *The Physical and Psychological Effects of Meditation: A Review of Contemporary Research with a Comprehensive Bibliography, 1931-1996*. 2nd edition. Taylor E, ed. Sausalito, CA: Institute of Noetic Sciences; 1999.
68. Greeley AM. *The Sociology of the Paranormal*. Beverly Hills, CA: Sage Publications; 1975.
69. Richards W. Mystical and archetypical experiences of terminal patients in DPT-assisted psychotherapy. *J Relig Health*. 1978;17: 117-126.
70. Ludwig AM. Cognitive processes associated with "spontaneous" recovery from alcoholism. *J Stud Alcohol*. 1985;46:53-58.
71. Travis F, Tecce JJ, Guttman J. Cortical plasticity, contingent negative variation, and transcendent experiences during practice of the Transcendental Meditation technique. *Biol Psychol*. 2000;55:41-55.
72. Lukoff D. The diagnosis of mystical experiences with psychotic features. *J Transpersonal Psychol*. 1985;17:155-182.
73. Wilber K. *The Holographic Paradigm and Other Paradoxes: Exploring the Leading Edge of Science*. Boulder, CO: Shambhala Publications; 1982.
74. Woods JH, trans. *The Yoga-System of Patañjali of the Ancient Hindu Doctrine of Concentration of Mind Embracing the Mnemonic Rules, Called Yoga-Sutras, of Patañjali and the Comment, Called Yoga-Bhashya, Attributed to Veda Vyasa and the Explanation, Called Tattva-Vaiçcaradi, of Vachaspati-Miçra*. Delhi, India: Motilal Banarsidass; 1914.
75. Weber R. Philosophical foundations and frameworks for healing. In: Kunz D, ed. *Spiritual Aspects of the Healing Arts*. Wheaton, IL: The Theosophical Publishing House; 1985:21-43.
76. Dossey L. The future of medicine. In: Kunz D, ed. *Spiritual Aspects of the Healing Arts*. Wheaton, IL: The Theosophical Publishing House; 1985:3-13.
77. Last JM. *A Dictionary of Epidemiology*. 3rd edition. New York, NY: Oxford University Press; 1995.
78. Armstrong BK, White E, Saracci R. *Principles of Exposure Measurement in Epidemiology*. Oxford, England: Oxford University Press; 1994:1-21.
79. Poloma MM. The sociological context of religious experience. In: Hood RW Jr, ed. *Handbook of Religious Experience*. Birmingham, AL: Religious Education Press; 1995:161-182.
80. DeVellis RF. *Scale Development: Theory and Applications*. Newbury Park, CA: Sage Publications; 1991:51-90.
81. Pekala RJ, Cardeña E. Methodological issues in the study of altered states of consciousness and anomalous experiences. In: Cardeña E, Lynn SJ, Krippner S, eds. *Varieties of Anomalous Experience: Examining the Scientific Evidence*. Washington, DC: American Psychological Association; 2000:47-82.
82. Levin JS, Glass TA, Kushi LH, Schuck JR, Steele L, Jonas WB. Quantitative methods in research on complementary and alterna-

tive medicine: a methodological manifesto. *Med Care*. 1997;35:1079-1094.
83. Steele L, Dobbins JG, Fukuda K, et al. The epidemiology of chronic fatigue in San Francisco. *Am J Med*. 1988;105:835-905.
84. Steele L. Prevalence and patterns of Gulf War illness in Kansas veterans: association of symptoms with characteristics of person, place, and time of military service. *Am J Epidemiol*. 2000;152:992-1002.
85. Levin J, Steele L. On the epidemiology of "mysterious" phenomena. *Altern Ther Health Med*. 2001;7(1):64-66.
86. Levin JS. Does religious involvement protect against morbidity and mortality? *Bridges: ISSSEEM Newsmagazine*. 1994;5(2):12-14.
87. Mausner JS, Kramer S. *Mausner & Bahn Epidemiology—An Introductory Text*. 2nd edition. Philadelphia, PA: W. B. Saunders Company; 1985:156-177.
88. Bentler PM, Stein JA. Structural equation models in medical research. *Stat Methods Med Res*. 1992;1:159-181.
89. Matthews DA, Koenig HG, Thoresen C, Friedman R. Physical health. In: Larson DB, Swyers JP, McCullough ME, eds. *Scientific Research on Spirituality and Health: A Report Based on the Scientific Progress in Spirituality Conferences*. Rockville, MD: National Institute for Healthcare Research; 1998:31-54.
90. Levin JS, Wickramasekera IE, Hirshberg C. Is religiousness a correlate of absorption?: implications for psychophysiology, coping, and morbidity. *Altern Ther Health Med*. 1998;4(6):72-76.
91. Lukoff D, Lu F. Transpersonal psychology research review. Topic: mystical experience. *J Transpersonal Psychol*. 1988;20:161-184.
92. Evans-Wentz WY, *The Tibetan Book of the Dead, or the After-Death Experiences of the* Bardo *Plane, According to Lama Kazi Dawa-Samdup's English Rendering* [1927]. London, England: Oxford University Press; 1960:89-97.
93. Bucke RM. *Cosmic Consciousness: A Study in the Evolution of the Human Mind* [1901]. New York, NY: E. P. Dutton and Company; 1969.
94. Deikman AJ. Deautomatization and the mystic experience. *Psychiatry*. 1966;29:324-338.
95. Vaughan-Lee L. *Catching the Thread: Sufism, Dreamwork & Jungian Psychology*. Inverness, CA: Golden Sufi Center; 1998:156.
96. Csikszentmihalyi M. *Flow: The Psychology of Optimal Experience*. New York, NY: Harper Collins; 1991.
97. Wilson C. *Poetry and Mysticism*. San Francisco, CA: City Lights Books; 1969:11.
98. Kelly TR. *A Testament of Devotion*. New York, NY: Harper & Brothers Publishers; 1941:29-50.
99. John of the Cross. *The Living Flame of Love: Versions A and B* [1585]. Ackerman J, trans. Binghamton, NY: Medieval and Renaissance Texts and Studies; 1995.
100. Boehme J. *The Signature of All Things, with Other Writings* [1621]. London, England: J. M. Dent & Sons; 1912:214.
101. Otto R. *The Idea of the Holy: An Inquiry into the Non-Rational Factor in the Idea of the Divine and its Relation to the Rational* [1917]. Harvey JW, trans. London, England: Oxford University Press; 1923:7.
102. Ouspensky PD. *The Fourth Way: A Record of Talks and Answers to Questions Based on the Teaching of G. I. Gurdjieff* [1957]. New York, NY: Alfred A. Knopf; 1970:150.
103. Phillipians 4:7 (KJV).
104. Zimmer H. *Philosophies of India*. Campbell J, ed. Bollingen Series XXVI. Princeton, NJ: Princeton University Press; 1951:435-440.
105. Suzuki DT. *The Training of a Zen Buddhist Monk*. Kyoto, Japan: The Eastern Buddhist Society; 1934:110.
106. Smith H. *The Religions of Man*. New York, NY: Harper & Row; 1958:149-150.
107. Eliade M. *Shamanism: Archaic Techniques of Ecstasy* [1951]. Bollingen Series LXXVI. New York, NY: Pantheon Books; 1964: 4-5.
108. Campbell J, Moyers B. *The Power of Myth*. New York, NY: Doubleday; 1988:98.
109. Myers FWH. The subliminal consciousness. *Proc Soc Psychical Res*. 1892;7:298-355.
110. Myers FWH. The subliminal consciousness. *Proc Soc Psychical Res*. 1893;8:333-404, 436-535.
111. Myers FWH. The subliminal consciousness. *Proc Soc Psychical Res*. 1894;9:3-128.