HYPOTHESIS

SPIRITUAL DETERMINANTS OF HEALTH AND HEALING: AN EPIDEMIOLOGIC PERSPECTIVE ON SALUTOGENIC MECHANISMS

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This article provides an overview of both empirical research and conceptual and theoretical approaches bearing on the connection between spirituality and health. Special emphasis is placed on key epidemiologic concepts that are typically overlooked or misinterpreted in discussions of religious and spiritual factors in health and healing. These include the natural history of disease, the epidemiologic triangle, the levels of prevention, risk factors, protection, salutogenesis, and host resistance. After reviewing research evidence of both a protective factor for health and therapeutic factor in healing attributed to religiousness, faith, or spirituality, a typology is proposed which classifies potentially salutogenic mechanisms underlying such effects. This model differentiates among biological, psychosocial, bioenergy-based, nonlocal, and supernatural pathways. Finally, the clinical and scientific implications of this work is described.

This article provides an overview of theory and research addressing potential linkages and interconnections between the spiritual domain of human life and the prevention of disease, the promotion of health, and the process of healing or recovering from illness. While not widely recognized within mainstream Western medicine and biomedical science, considerable empirical research has addressed this topic over the past century.[1] Further, in the past decade especially, both programmatic research and conceptual and theoretical writing, which have begun to integrate findings into biobehavioral and psychosocial theories of health and healing, have appeared.[2] Research by medical sociologists, social and health psychologists, gerontologists, psychiatrists, and social and behavioral epidemiologists has been instrumental in building a scientific field that has come to be known as the "epidemiology of religion."[3] Significantly, the role of the spiritual in health and healing that is coming to be documented in this body of research is consonant with the more expansive worldviews of many complementary and alternative medical systems and therapies which conceive of each human being as a system or nexus of body, mind, and spirit—not simply the fleshly sack of jangling bones and swishing chemicals implicit in the materialistic, mechanistic perspective of allopathic biomedicine.[4]

In this article, an overview is provided of evidence suggestive of a role for religious or spiritual involvement in health and healing. Material is presented in 5 sections providing the conceptual, empirical, and theoretical bases for these relationships.

First, several key epidemiologic concepts are defined in some detail. These concepts are instrumental in the discussion that follows, and are often overlooked or misinterpreted in writing on this theme.[5] This section describes the natural history of disease; the epidemiologic triangle; the levels of prevention; risk factors; protection; salutogenesis; and host resistance, in order to provide a framework for understanding how psychosocial factors, in general, and a potentially protective and/or therapeutic spiritual or religious factor, in particular, might be associated with health and healing. This framework is referred to as a natural history of health.

Second, empirical evidence supportive of a protective effect of religious involvement for health is presented. This includes a review of epidemiologic evidence that aspects or types of religious involvement or affiliation seem to act as psychosocial protective factors; a summary of epidemiologic evidence supportive of a valid and causal association between religion and health; and an outline of possible salutogenic pathways by which characteristics, functions, expressions, or manifestations of being religious or practicing religion may influence health status by preventing morbidity and mortality in well populations.

Third, empirical evidence supportive of a therapeutic effect of spiritual interventions, such as prayer, on healing is presented. This includes a review of findings from a scientific literature entirely distinct from epidemiologic studies of religious involvement—namely, those experimental and quasi-experimental research studies and trials that have identified healing effects of prayer and other spiritually-oriented interventions in clinical samples. This section notes how published reports of these interventions and their apparent effects often rely on terminology drawn from the field of parapsychology, and, thus, may attribute significant findings to processes whose origin and/or operation transcends mainstream conceptions of body and mind.

Fourth, based on the above evidence, a model is proposed of possible religious and spiritual influences on health and healing. This model comprises 5 hypothesized classes of pathways or mechanisms by which the spiritual domain of life may influence health and healing. A note on terminology: use here of the term "mechanism" is not necessarily meant to imply a physical or mechanical process; rather the word is to be taken as it is used by social scientists and epidemiologists: to signify a mediating factor or construct, or perhaps a characteristic of an exposure variable, that explains or accounts for variance in a health outcome. In this model, such mechanisms are proposed to help account for statistically significant findings suggestive of a "religion-health connection."[6] These include biological, psychosocial, bioenergy-based, nonlocal, and supernatural pathways of healing. A few comments are also offered regarding the possible limits of the research methods of naturalistic science.

Finally, some reflections are offered as to the relevance and importance of the spiritual domain of life to a truer understanding of the determinants of health and healing, and the potential dangers in neglecting this dimension for both clinicians and researchers. In addition, a call is made for the integration of this body of work with existing biological and psychosocial knowledge into a multidimensional and multifactorial theoretical model of the salutogenic process. A clearer picture of the interplay of aspects of body, mind, and spirit and their interactive role in both healing and population health promises to be a principal basic-science contribution of complementary and alternative medicine.

CONCEPTUAL OVERVIEW

In their classic discussion of the concept of prevention, Leavell and Clark[7] describe how diseases occur in human populations over a natural history that contains several stages or periods. In the first stage of this *natural history of disease*, known as prepathogenesis, various characteristics of human hosts, their environments, and specific disease agents all interact in some fashion to produce noxious disease-causing stimuli in otherwise normal, healthy populations. This confluence of hosts, environments, and agents in the production of disease is known as the *epidemiologic triangle*. Host characteristics may include factors such as heredity, behavior, and personality; the environment may encompass the physical as well as cultural, social, economic, and family environments; and agents include viruses, bacteria, and other pathogens.

The second stage of the natural history of disease, according to Leavell and Clark, is pathogenesis. In their words, this covers the

> . . . course of a disorder in man from the first interaction with disease-provoking stimuli to the changes in form and function which result, or until equilibrium is reached or recovery, defect, disability, or death ensues.[7(p17)]

Within this stage there is a "clinical horizon"—a dividing line between presymptomatic and symptomatic disease. Depending upon where a person or population is at along the continuum, respective preventive or therapeutic strategies are indicated. These varying types of medical or public-health response are known as the *levels of prevention*.

For example, during prepathogenesis, primary prevention is indicated. In the language of epidemiology and public health, this encompasses either health promotion efforts to help normal, healthy populations attain a state of high-level wellness, or specific protection for people who happen to be especially at risk for a particular illness. Throughout pathogenesis, various secondary and tertiary intervention strategies may be indicated. For example, during the asymptomatic phase, early diagnosis is possible through screening. Once symptoms have appeared, prompt treatment can lead to a cure. If tissue changes have occurred, then measures to ensure limitation of disability are appropriate. These are examples of secondary prevention. Once harmful anatomic and physiological changes have been stabilized, then rehabilitation can begin. This is an example of tertiary prevention.

The concept of the natural history of disease thus describes the "career" of disease in individual people and human populations. It is a conceptual map of the stages of pathogenesis, or the process of becoming ill. It depicts the evolution of the disruption of a person's health, beginning with a disease-free state of equilibrium to a presymptomatic pathogenic state to a symptomatic state to recovery or stabilization or death. Because of the dominance of this model, medical research thus nearly always involves the search for factors that increase the risk or odds of entering into a pathogenic state. Those factors that do so are called *risk factors*. For example, we know that tobacco smoking is a risk factor for coronary heart disease and lung cancer. Likewise, obesity and a high-salt diet are risk factors for hypertension.

The flipside of risk, in the language of epidemiology, is *protection*. For a given exposure or independent variable (eg, smoking status, weight, dietary intake), one category may represent a risk-enhancing effect (smoker, overweight, high-salt diet) and the opposite category or categories may signify the protective or preventive effect (nonsmoker, normal weight, low-salt diet). The typical way to describe the effects of a protective factor are to say that it protects against or prevents morbidity or mortality. This implies that such a factor serves to "hold back" the tide of pathogenesis. This is the standard approach to conceptualizing protection and protective factors within the context of the natural history of disease.

Alternatively, a protective effect also could be conceived of as an active factor that reverses the course of the pathogenic process and "moves" an individual or population from illness "back" to the prepathogenic stage of normal health. Whichever type of protection is being considered—prevention of subsequent illness or reversal of illness and return to health—a different approach to studying health and illness may be required. A focus on protection and prevention—instead of risk—demands that we consider redefining the natural history of disease as a *natural history of health*.

The first requirement of a natural history of health would be a framework or model to conceptualize—to define and describe—the pathways or mechanisms by which a potentially protective factor (eg, religious involvement, spirituality) enhances the likelihood or probability of health. In simpler terms, we would need a way to envision how certain factors could prevent pathogenesis or undo its effects. The late Israeli medical sociologist Dr Aaron Antonovsky developed just such a model. His concept of *salutogenesis* is, in his

words, "not just the other side of the coin from the pathogenic orientation, but, rather, is radically different."[8(p2)] For one, its assumptions are completely different. I described these "salutogenic assumptions" of Dr Antonovsky in a paper published in 1996 in *Social Science and Medicine*:[8]

> . . . (1) there is a dynamic "health ease/dis-ease continuum" along which all living people fall, not a simple dichotomy of healthy vs diseased, and thus all people are to some extent healthy; (2) epidemiologic research should focus on people's "story" and not their disease in order to identify those factors that help to maintain the health they possess or to move them in the healthy direction; (3) factors that initiate and enable salutogenesis are often not just the "opposite" categories of respective risk factors for pathogenesis, but rather entirely different factors altogether; (4) "stressors" are ubiquitous and just as likely salutary as pathological, in that they can make demands on an organism which can lead eventually to positive health consequences; (5) epidemiologic research should focus on factors that facilitate adaptation, rather than on factors that are etiologic and can be diagnosed and targeted with magic bullets; and (6) studies should examine the "deviant" cases—the smokers who do not develop lung cancer, the Type A persons who do not develop coronary heart disease, the African Americans who do not develop hypertension—rather than ignoring them to focus on pathogenic cases.[2(p857)]

Dr Antonovsky summarized the importance of his concept of salutogenesis by stating,

> Thinking salutogenically not only opens the way for, but compels us to devote our energies to, the formulation and advance of a theory of coping.[8(p13)]

Central to his own theory of coping was his concept of the "sense of coherence."[9] This concept, he stated, contained 3 component elements, which he called comprehensibility, manageability, and meaningfulness. Comprehensibility he defined as the extent to which both internal or psychological stimuli and external or environmental stimuli appear to make sense. Manageability he defined as the extent to which available resources are adequate. Meaningfulness he defined as the extent to which challenging events are seen as worthy of being engaged emotionally. Translated out of the highly technical language of social scientists, Dr Antonovsky's sense of coherence refers, simply, to the degree to which the challenging things that happen to people are able to be dealt with successfully. This best occurs if a person understands what is happening, is able to do something about it, and sees the value in doing so. In the language of epidemiology, this sense of coherence thus is a source of *host resistance*—the capability of individual human beings or human populations to successfully resist the pathogenic changes that would be wrought by a particular combination of agent and environment in hosts with weaker constitutions.

Dr Antonovsky specifically urged that research on salutogenesis begin by identifying the pathways or mechanisms enabling people to cope with stresses and challenges, and thus build up host resistance. Successful coping should assist in the maintenance or restoration of equilibrium or the strengthening of one's resistance to stress or to the ill effects of stress. Ideally, this in turn should lead to faster or more complete recovery from disease, the primary prevention of illness, and the promotion of health.

Can dimensions of religiousness and spirituality provide a sense of coherence, and thus enable the successful coping needed for salutogenesis? Consider the views of several notable scientists.

According to an insightful analysis by sociologist Dr Christopher G. Ellison, religious involvement can enable coping directly in several ways that serve to prevent illness and promote well-being:

> . . . (1) by reducing the risk of certain major and chronic and acute stressors, (2) by providing cognitive and institutional frameworks that make certain stressors seem less threatening to an individual than they might otherwise appear, (3) by generating relatively high levels of objective and subjective social resources, and (4) by enhancing valuable psychological resources, particularly positive self-perceptions.[10(p79)]

Social epidemiologist Dr Berton H. Kaplan[11] has added that religious rituals, beliefs, and values also can serve a supportive role in offering means of coping with stress and thus preventing illness. But, he emphasizes, solid research is needed to confirm this supposition.

> The function of religion to help silence or reduce anxiety has been noted for some time in the sociological, psychiatric and anthropological literature, but there are remarkably few hard empirical studies of this subject.[11(p6.3)]

Dr Antonovsky himself strongly affirmed that religious commitment represents a "concrete expression of the sense of coherence." In a letter to me and my colleague Dr Harold Y. Vanderpool, he told us of his conviction that empirical findings pertinent to what we had termed the epidemiology of religion would someday fit into an all-encompassing "theoretical model of the relationship between Weltanschauung [worldview] and health." Just what are these empirical findings, and how convincing are they?

EMPIRICAL EVIDENCE OF A PROTECTIVE FACTOR FOR HEALTH

In 1987, two literature reviews appeared that summarized findings from a large collection of heretofore unreviewed studies linking religious involvement to lower rates of morbidity and mortality.[12,13] These reviews found that over the past century in excess of 200 empirical reports published in medical and epidemiologic journals had appeared in which quantified measures of religiousness, variously defined (eg, denominational affiliation, attendance at worship services), had been examined in relation to a wide variety of health outcome measures. These include studies of morbidity or mortality due to cardiovascular disease, hypertension, stroke, cancer (overall and of dozens of sites, notably the uterus and

cervix), and gastrointestinal disease, among other disease entities, as well as studies of religious effects on overall ratings of health status and symptomatology and on all-causes mortality.[2,14] Alongside these studies of physical health outcomes are similarly large empirical literatures linking measures of religious involvement to mental health[15,16] and psychological well-being in the elderly,[17,18] including studies published in major psychiatric journals.[19] A more recent summary has revealed a literature that by now has grown to over 1,200 published studies.[20]

These studies have tended to investigate a possible religion-health association in one of two ways. One group of studies, by far the largest, has compared rates of cause-specific or all-causes morbidity or mortality across categories of religious affiliation. These include studies which compare members of particular religions (eg, Protestants vs. Jews vs. Catholics), denominations (eg, Baptists vs. Methodists), or established sects (eg, Mormons vs. Seventh-day Adventists), as well as studies which compare particular religious groups (eg, Jews, Parsis, Mormons, Buddhists) to "all-others" categories of the general population.[12] The second group of studies has examined specific measures of religious involvement, most notably the frequency of attendance at religious services, investigating their associations with indices of health status or morbidity.[3]

In general, the results of these studies point to a mostly protective or salutary effect of religiousness. Interestingly, this finding seems to have manifested regardless of the health outcome being studied or the religious measure used, as well as regardless of the age, sex, race, ethnicity, or nationality of study respondents, or of the research design (ie, cohort, case-control, cross-sectional) or time period (1920 through the 1980s) of the study.[14] On the basis of the consistency of this overall finding, further research on the epidemiology of religion clearly represents a cutting-edge field for social epidemiologists. The potential importance of these findings not only for researchers but for the practice of medicine has been discussed in sources as disparate as *JAMA*[21] and the National Institute of Health's Chantilly Report on alternative medicine.[22]

Over the past decade, this body of research has been analyzed, synthesized, and critiqued in every imaginable way. One review[14] put these studies to the test by asking 3 questions vital to any epidemiologic assessment of a potential new protective or risk factor: is there an association, is it valid, and is it causal? On the basis of the hundreds of positive findings noted above, the answer to the first question was deemed to be a guarded "yes." The second question concerned validity, a concept which to an epidemiologist concerns the ability to rule out 3 potential threats: chance, bias, and confounding. On the basis of findings from observational epidemiologic studies alone (ie, prospective cohort, retrospective case-control, and cross-sectional prevalence designs), it is impossible to rule out bias and confounding. Without experimental evidence, which would seem implausible to obtain for a religion-health association, it is thus not possible to answer the second question with a definitive affirmation. On the basis of the weight of evidence reviewed, however, it was concluded that the answer was "probably." Finally, the third question, causation, was evaluated in terms of Hill's[23] well-known 9 features of a causal epidemiologic association (strength, consistency, specificity, temporality, biological gradient, plausibility, coherence, experiment, and analogy). For certain of these features, the literature supported causality, for others there was insufficient evidence, and still other features did not seem to apply. In light of this mostly positive evaluation, but coupled with the perspective of epidemiologists of the falsificationist school who assert that causality can never be proven in epidemiologic research, the most prudent answer seemed to be a "maybe."[2]

Over the past few years, the most pressing issue for scientists involved in this field has been the "why" question. Researchers have recognized that it is not enough simply to keep accumulating scores of descriptive findings such as those that already have appeared. Theoretical work is needed to identity just what it is about religious involvement that is or should be promotive of health and preventive of illness and death. Operationally, this has involved identifying just what it is about the spiritual domain of life that might conceivably serve a primary-preventive or protective role. Put a different way, epidemiologists have begun to identify those characteristics, expressions, functions, or manifestations of being spiritual or religious or practicing religion that engender salutogenic effects.[2]

Successful efforts have been made to identify behavioral and psychosocial factors that, as sequelae of religious or spiritual identity, belief, practice, or experience, may serve as mediating variables in religion-health associations. These factors are known through prior research both to be correlates or outcomes of religiousness and to be determinants of outcomes related to physical and mental health and well-being.[2] Two of the earliest attempts to identify psychosocial mediators of salutary religious effects were in respective sociologically- and psychologically-oriented reviews by Idler[24] and McIntosh and Spilka.[25] Idler[24] proposed that such effects may be due to religion's providing (a) socially supportive resources which buffer the impact of stress, (b) a context of meaning for coping with suffering, (c) cognitive perceptions which serve to reduce uncertainty, and (d) discouragement of unhealthy behaviors. McIntosh and Spilka[25] attributed positive health effects of religion to the internal locus of control fostered in some believers, which motivates health-promoting behavior, as well as a perception that faith in God will be rewarded.

More recently, an ongoing effort has been made to formulate a comprehensive social-epidemiologic model of possible explanations for a salutary effect of religious involvement.[2,26] This model links respective dimensions or aspects of religious or spiritual expression with better health through associated psychosocial or behavioral pathways which serve as mediating factors activating specific known salutogenic mechanisms. Specifically, religious commitment and identification (eg, affiliation with a particular denomination or belief-based system) benefits health by promoting *health-related behaviors* related to smoking, drinking, diet, etc, a factor which is known to lower disease risk and enhance well-being. Religious fellowship (eg, attendance at worship services) benefits health through providing *social support* by way of facilitating integration into social and helping networks, a factor which is known to enhance coping and buffer the deleterious effects of stressful life events. Religious worship activities such as prayer influence health through the beneficial psychodynamics of ritual, whereby *positive emotions* are engendered (eg, contentment, catharsis, love), a factor

that is known to be associated with psychophysiological and psychoneuroimmunologic responses. Religious and theological beliefs and worldviews influence health through their consonance with *salutary health beliefs and personality styles*, factors known to influence health-related behavior, patterns of health care utilization, and health status. Finally, religious faith, in and of itself, impacts on health through promoting *positive thoughts or cognitions* such as optimism and hopeful expectations, factors which through something akin to a placebo effect have been found to have physiological effects. This model has been described in greater detail in the recent book, *God, Faith, and Health*.[1]

EMPIRICAL EVIDENCE OF A THERAPEUTIC FACTOR IN HEALING

The discussion of empirical evidence has to now focused on religious characteristics of individual people or host populations as epidemiologically protective factors for health. There is an additional and much more provocative body of evidence linking the spiritual domain not just to health but to healing—to recovery from illness, or even sudden or unexpected cure, among groups of people already in the pathogenic stage of the natural history of disease. This evidence comes from experimental and quasi-experimental research on clinical populations, and focuses not on religious characteristics of people as protective factors studied in relation to population rates of morbidity or mortality, but on spiritual interventions (eg, petitionary prayer, hands-on or faith healing) as therapeutic factors studied in relation to medical outcomes. These fundamental distinctions are typically overlooked and these 2 bodies of research left undifferentiated by the popular media and by debunkers, as well as in the work of religious writers wishing to offer "proof" that God heals or that religion is "good" for people. The former is not something that any scientific study can determine,[27] and the latter is not a question that either epidemiology or the clinical trials methodology, or experimental science in general, is equipped to answer. Each of these literatures, in their own way, however, contributes to an understanding of how aspects of spiritual life can help to influence how health is maintained or recovered.

Several recent reviews, principally the comprehensive work of psychiatrist Dr Daniel J. Benor,[28] have uncovered a previously uncollated body of over 190 experimental and quasi-experimental trials and analyses, many of which provide empirical evidence of physical healing subsequent to particular spiritual interventions such as prayer. About two thirds of these analyses resulted in statistically significant effects. These studies report significant therapeutic effects of spiritually-based procedures which operate either proximally to (eg, various types of "touch" healing and laying-on-of-hands, as well as non-contact healing) or at a distance from (eg, absent healing and distant prayer) the human patient or target. Interestingly, additional studies have found similarly positive effects of spiritual interventions on non-human biological systems, such as animals, plants, bacteria, yeasts, fungi, enzymes, and single-celled organisms. Outcomes included indicators of health, growth, and longevity.[28]

The most famous of the human studies is Byrd's[29] double-blind, randomized, controlled clinical trial of distant, intercessory prayer for hospitalized heart patients published in the *Southern Medical Journal*. Prayed-for patients—who were not aware that they were being prayed for by Christian prayer groups outside the hospital—subsequently had significantly lower rates of various deleterious medical outcomes, including congestive heart failure, use of diuretics, cardiopulmonary arrest, pneumonia, antibiotic prescription, intubation/ventilation, and a rating scale of postentry hospital course. Although findings such as these may seem incredible, they exist and have been replicated. For example, two recent studies, by Sicher and associates published in the prestigious *Western Journal of Medicine*[30] and by Harris and associates published in *Archives of Internal Medicine*,[31] also identified therapeutic effects of distant prayer through randomized controlled clinical trials. The scientific literature on spiritual healing is summarized in greater detail in Benor's comprehensive multivolume *Spiritual Healing*.[28]

Among physician writers, besides Benor, Dr Larry Dossey, has taken the lead in interpreting this body of research. In *Healing Words*,[32] he developed a theoretical model which differentiates between intrapersonal and interpersonal effects of prayer or directed spiritual intentionality in studies in which healer and healee are proximally related, and between both of these types of effects and transpersonal effects which apparently operate nonlocally or at a distance, such as in the Byrd,[29] Sicher,[30] and Harris[31] studies. In a follow-up work, *Be Careful What You Pray For . . . You Just Might Get It*,[33] Dossey breaks new ground by summarizing evidence of a *deleterious* effect of prayer on medical outcomes—not just that prayer may at times fail to exhibit a therapeutic effect on clinical cases or in diseased populations, but that it may actively promote pathogenesis in well people, reverse the course of recovery, or even lead to mortality. Clearly, research is needed to differentiate the context, circumstances, and host (ie, prayee) and agent (ie, prayer content) characteristics that result in therapeutic and pathogenic outcomes of prayer.

In a recent article, Dossey[34] notes the difficulty in even defining what one means by the word prayer, or in identifying what is or is not a spiritual intervention. In some spiritual traditions, he notes, "prayer is more a matter of being than doing."[34(p9)] In many studies, an experimental design is used to evaluate the therapeutic effect of an intervention that is clearly prayer-like or spiritual in context or nature, yet researchers have described their intervention using an alternative, more secular language: distant intentionality, concentration, mental effort, mental healing, psi healing, and the like.[31] Moreover, speculation as to the nature of or explanation for a therapeutic effect due to these activities has elicited numerous, equally secular descriptors: paraphysical, energetic, magnetic, extended mind, morphic field, nonlocal mind, nonsensory mediated, psi, subtle energy, information, consciousness, and many more.[27] Perhaps because of this re-languaging (and de-spiritualizing) of prayer and its apparent therapeutic effects, much of this research has found a home in peer-reviewed journals in the field of parapsychology. This has done little to foster the diffusion of these findings to wider audiences in clinical medicine and biomedical science, and has possibly hampered their mainstream acceptance.[34]

The implications of a more liberal conceptualization of prayer and what constitutes a spiritual intervention are borne out in spec-

tacular fashion in a lengthy monograph entitled, *Spontaneous Remission: An Annotated Bibliography*.[35] Published by the Institute of Noetic Sciences, the California-based think-tank, this volume summarizes 1,385 case reports or case series published in the mainstream clinical and biomedical literature in which cancer or other diseases simply vanished without treatment known to be sufficient to produce a cure, remission, or regression of disease. According to the authors of the monograph, O'Regan and Hirshberg, some of these remissions were "miraculous" or "associated with spiritual cures,"[35(p3)] such as those documented by the International Medical Commission at Lourdes in France. Other remissions were not due to any sort of spiritual-like intervention at all, but followed periods of doing precisely nothing. These the authors called examples of "pure remission."[35(p3)]

Is "doing nothing" a spiritual practice? In Buddhism, there is a well-known emphasis on nonattachment to the transient and unreal phenomena that seem to exist within space and time, even the ego. The "way of the Boddhisattva," according to Zimmer,[36(p538)] requires "a continuous abdication—or, rather, nonexperience—of ego. . . . The nonexistence of all phenomenal values on the transcendental plane must be unremittingly anticipated in both thought and conduct . . . ." In the Western faith traditions, doing nothing is likewise given a spiritual sanction, although this is less widely known. In the Book of Psalms, the Almighty instructs humans to "Be still, and know that I am God" (Psalms 46:11 [KT]). It is little wonder that O'Regan and Hirshberg refer to remission as "an epidemiological unknown."[35(p7)] Not only does the outcome occur with unknown frequency, but the intervention—possibly, nothing—is not something that scientists have learned how (or ever tried) to assess. The authors refer to this research challenge inherent in studying miraculous and pure remissions as "making the unknown known."[35(p7)] This parallels the work of those sociologists and psychologists seeking to develop meaningful conceptual boundaries between religiousness and spirituality, an equally daunting challenge that has been characterized as "unfuzzying the fuzzy."[37]

A PROPOSED MODEL OF SPIRITUAL INFLUENCES ON HEALTH AND HEALING

The presence of statistically significant epidemiologic findings linking aspects of religious involvement to the prevention of illness and the promotion of health and well-being and the existence of experimental evidence for spiritual interventions as factors in healing together suggest a salient, if not yet entirely understood role for the spiritual domain in health and medicine. In an earlier section, an outline was provided of possible psychosocial and behavioral pathways linking religious involvement to health status. This set of mechanisms is just a subset of a more general set of potential mechanisms which may account for spiritual influences on health and healing. These have been gathered together in a proposed model of five broad classes of explanations for such effects (Table 1). This model seeks to provide answers to an even larger "why" question than the one described earlier. This question, in simple terms, asks what it is about the spiritual domain that is salutary and how and why this is so. In the language of sociology and epidemiology, answering this question entails identifying those constructs or

TABLE 1 Five Types of Salutogenic Mechanisms by Which the Spiritual Domain May Influence Health and Healing

Type 1. Biological Pathways
Type 2. Psychosocial Pathways
Type 3. Bioenergy-Based Pathways
Type 4. Nonlocal Pathways
Type 5. Supernatural Pathways

mechanisms that may mediate the influence of the spiritual on the physical—that is, serve as intervening or explanatory factors in a causal chain or sequence of effects connecting these two human domains.

An important issue to consider here is the factorial complexity of disease occurrence in human populations. The *parameters of occurrence*, according to Miettinen, such as the rates of manifestation (eg, incidence) of particular illness experiences,

> are not constants of nature. Rather, their magnitudes generally depend on—are functions of—a variety of characteristics of individuals—constitutional, behavioral, and/or environmental.[38(p5)]

These characteristics, of individuals and of host populations, once operationalized, are the potential "factors"—protective or risk—that epidemiologists study observationally in relation to subsequent rates of morbidity and mortality in well populations and that clinical researchers study experimentally in relation to medical outcomes in clinical populations. If found to be statistically significant—in other words, to exhibit an *occurrence relation*—these factors are referred to as *determinants*.[38] For most clinically defined disease entities and most illness experiences, many such determinants have been identified as protective against disease occurrence or pathogenic forward progress and/or promotive of recovery or cure.

Restated in clinical rather than epidemiologic terms, we know that the production of disease, and the production of health, is hardly ever a simple unifactorial processes—the result of a single cause that acts directly and instantly. Rather, illness tends to be *multifactorial*—to develop over time, through the effects of multiple factors acting together or in sequence. So, too, are the prevention of disease, the promotion of health, and the recovery from or cure of disease multifactorial; there is no one, single determinant (ie, behavior, trait, emotion, medication) that instantaneously will cause people to be perfectly healthy, prevent all subsequent illness, or completely cure all cases of disease. There is, instead, a synergetic mix of multiple determinants representing a soup of necessary and sufficient conditions,[39] or, alternatively, a web or cascade of determinants providing a medley of direct and indirect linkages from "cause" to "effect."[40] In the latter scenario, the intervening factors are known as mediators—variables which result from the presence or operation of one or more antecedent factors and which themselves result in additional such factors or in the occurrence of (or prevention of or recovery from) disease. One way to look at these mediating factors is as "links in a chain"[1] between an initial pathogenic stressor or stimulus and

subsequent disease, or between an initial health-promoting factor and well-being or recovery.

As suggested by the empirical findings reviewed in this chapter, particular aspects or dimensions or expressions of our spiritual lives exhibit observable benefits or otherwise significant effects on health and healing. This raises an obvious question: how can we understand these effects? Or, in analytic terms, what are the known or hypothesized mechanisms by which these effects manifest on respective health-related or physiologically significant outcomes? These mechanisms provide the "pathways" through which the spiritual is connected ultimately to health. These pathways are defined by classes of mediating factors or theoretical constructs associated with respective antecedent aspects of human spiritual life and, at the same time, known or believed to be salient for health and/or healing through respective salutogenic mechanisms. In the simplest terms, the following model proposes several types or classes of mechanisms that mediate the connection between the spiritual and the physical.

Type 1. Biological Pathways

A large portion of the epidemiologic findings reviewed above consist of observations that rates of morbidity or mortality are lower for certain diseases or conditions in particular religions or religious denominations and higher for certain illnesses in other religious groups.[12] These findings, which are consistent across numerous studies, point to respective salutogenic or pathogenic consequences of religious group affiliation. Such findings are also eminently plausible and understandable solely in terms of known human biological mechanisms, and do not require reference to behavioral or psychosocial processes engendered by religious practice.

Because some religious groups, or, more correctly, religio-ethnic groups, preserve interfamilial patterns of heredity through intramarriage, such groups may be predisposed to certain diseases or, alternatively, to longer and healthier lives.[26] Examples of this include lower overall mortality rates among Mormons and Seventh-day Adventists, lower rates of cancer incidence in Hutterites, higher rates of familial hypercholesterolemia in Dutch Reformed Afrikaaners, and greater risk for circulatory diseases, colitis and enteritis, and Tay-Sachs disease among Ashkenazi Jews.[12] Another example is the Parsis in India, who are at greater risk for some cancers (breast), but at lower risk of morbidity and mortality at nearly all other cancer sites.[12]

These findings are religious in origin in that they can be attributed to genetic characteristics of religious group membership, yet, clearly, they are not due to, say, religious differences in polity or worship or theology.[34] In these studies, reported protection or risk is best understood in terms of those geographic, biological, and ethnic characteristics of people which vary and are preserved by religious group membership. Through a sanction of intramarriage, as well as of dietary practices (eg, as in Seventh-day Adventists and Mormons) and normative age at marriage and reproduction (eg, as in Parsis), religious affiliation and thus identification can come to represent a proxy for a certain phenotype. Religious groups thus may become "to some extent biologically distinct."[41(p53)] Once genetic advantages or abnormalities develop, strictly enforced taboos against intermarriage can then perpetuate them within the interrelated group.[26]

Type 2. Psychosocial Pathways

The potentially salutogenic role of cognitive, emotional, and behavioral sequelae of religious involvement and spirituality were detailed earlier in this article. This discussion suggested that aspects or dimensions of human spiritual life engendered or encouraged health-related behaviors; social support; positive emotions; salutary health beliefs and personality styles; and positive thoughts or cognitions. Because these psychosocial constructs are known or believed to exert salutary effects, the apparently protective effects of religiousness or spirituality for health status, as observed in epidemiologic studies of well populations, are plausible and can be explained. Can these same mechanisms also help us to understand the therapeutic effects of spiritual interventions—effects stimulating recovery or healing, not just the primary prevention of illness—as observed in experimental studies of clinical populations? The answer appears to be yes.[27,42]

First, the physical preparations for a session or course of directed prayer, laying-on-of-hands, or psychic or spiritual healing may include specific health-related behaviors. In order to "enhance a real or perceived sense of receptivity or worthiness,"[27(p68)] seekers of healing may prepare by fasting or altering their diet, abstaining from alcohol or cigarettes, refraining from other harmful practices, or engaging in meditation or relaxation exercises. These behaviors, in turn, are widely known to be promotive of health and general well-being.[43] In addition, they may "produce heightened cleansing reactions, relief of symptoms, improved self-perceptions of health, and even mitigation of clinical disease through residual benefits to the immune and lymphatic systems."[27(p68)] The behavioral preparations for spiritual healing thus may enhance (or even account for) the therapeutic efficacy of such interventions.

Second, experiencing the presence or visible concern of a healer or healers (or a pray-er or pray-ers)—whether proximal or distant—may foster "a sense of belonging or being cared for or supported."[27(p68)] The health-promotive and disease-preventive effects of supportive social relationships—both in terms of quantity and quality—are a centerpiece of social epidemiology.[44] The capability of social support to bolster the host resistance of individuals[45] may identify a salutogenic mechanism that, like health-related behavior, can serve to enhance one's receptivity to spiritual interventions, or perhaps account fully or in part for their effects on healing.

Third, knowing that one is being prayed for or is the object of touch healing or some other ritualized activity, either proximal or distant, "may stimulate the immune and/or endocrine systems in such ways as to alleviate symptomatology or even produce a remission of disease."[27(p68)] In other words, knowledge of such intervention and the positive emotions that this evokes—happiness, thankfulness, grace, inner peace, a sense of being loved—may exert beneficial physiological effects, mobilizing the body to respond in ways that promote recovery or healing. Such a mechanism for healing is consistent with research in the fields of psychophysiology and psychoneuroimmunology,[46] and thus identifies a biologically plausible mind-body link that may enhance or account for the effectiveness of spiritual healing interventions.

Fourth, an expectation of healing—regardless of the true efficacy of the healer or pray-er or of the intervention in and of itself—

may be enough to render observable physiological changes in ill people. In *Meaning and Medicine*,[47] Dossey describes numerous clinical cases in which a patient's cognitive framing of a particular disease, hospital experience, or patient-physician interaction provides a meaning or context that seems to result in gross changes in disease status or physical functioning, irrespective of the actions taken or not taken by medical care personnel. Such phenomena may seem amazing on the surface, but actually are quite consistent with our knowledge of the salutogenic effects of placebos in clinical settings[48] and of constructs such as optimism[49] and "positive illusions,"[50] as described by health psychologists.

Type 3. Bioenergy-Based Pathways

When a spiritual intervention, such as prayer, is conducted at a distance from the target person or persons, who are also blinded to their receipt or non-receipt of help, then the above types of mechanisms are inadequate as explanations for salutogenic effects which result in recovery or healing. The following postulated mechanisms—if real—may, by definition, be capable of explaining or accounting for therapeutic results of spiritual intentionality. The first of these types of mechanisms involves a hypothetical life force or subtle bioenergy which may be tapped by or directed through spiritual practices and which is believed in many cultures to promote physical healing. Such a theorized force or energy goes by scores of names throughout diverse cultures, spiritual traditions, and schools of healing (eg, *prana*, orgone, *qi*, odyle, *huna*, ether, *wakan*, munia, *baraka*, vis medacatrix naturae).

The possibility of such a force or energy is not typically considered by life scientists or physicians in the West, and its existence and operation remains controversial even among new-paradigm thinkers in medicine. Yet such an energy is present as a vital component of the anatomical, physiological, and pathophysiological systems of a variety of complementary and alternative schools of healing developed in the East, such as Ayurveda and traditional Chinese medicine. Various traditions speak of the human physical body or "vehicle" as being interpenetrated by multiple and successively more subtle bodies (i.e., "etheric," "astral," "mental," and "causal") consisting of a subtle bioenergetic substance (ie, *prana*, *qi*, etc.) which travels along a vascular-like system of subtle channels (ie, *nadis*, meridians) and is modulated by major and minor energy centers (ie, *chakras*) which line up along spine within the subtle bodies. The term "superempirical" has been used by Levin and Vanderpool[26] to denote such a hypothetical energy and its concomitant bodies, channels, and centers precisely because it emphasizes that

> the existence and functioning of such energies have not yet been empirically verified to the consensus satisfaction of mainstream science. This term implies no judgment as to the existence or nonexistence of such energies—just that such energies, if verified to be consistent with their descriptions in numerous writings, are ultimately naturalistic in origin and operation, even if such a "nature" is somewhat too subtle for most current instrumentation.[27(p639)]

For similar reasons, the phrase "subtle energy" also has been used to describe such a conceivably present but hard to measure latent life force that can be used for purposes of healing.[51] In recent years, clinical applications and technologies have grown up around this concept; the phrases "vibrational medicine"[52] and "energy medicine"[53] have been used as umbrella names for all of the various therapies that purport to make use of a healing bioenergy. In the last decade, a professional scientific membership society was formed to promote basic-science and clinical research in this field. The International Society for Subtle Energies and Energy Medicine (ISSSEEM), a professional membership society based in Colorado, holds an annual scientific meeting and publishes a peer-reviewed scientific journal, *Subtle Energies and Energy Medicine*.

In operational terms, the efficacious results of spiritual healing interventions may be attributable to a subtle bioenergy or superempirical force which is invoked—intentionally or not—and which then travels to the targeted person, works its magic, and shuts down or reverses the tide of pathogenesis or decline. Such an energy, unleashed by prayer or other type of spiritual focus, would by definition be naturalistic—that is, a phenomenon of the natural world, operating in obedience to the natural laws of the physical universe, even if such natural laws have not been uncovered or articulated to the consensus satisfaction of mainstream Western science.[27] If such an energy exists, then it might provide a parsimonious, if still somewhat mysterious, explanation for how paranormal or psi phenomena impact on the physical body.

Type 4. Nonlocal Pathways

While the operation of a healing bioenergy may well account for therapeutic interventions in which the pray-er or spiritual healer is in proximity to the patient or object of therapy, it is not clear that such a mechanism can really explain cases of distant prayer or absent healing. According to Dossey,[54-56] the subtle energy metaphor is inadequate for making sense of healing that occurs under those circumstances; no such energy has ever been found to exist which verifiably operates in such a nonlocal fashion. By "nonlocal," Dossey[57(p183)] refers to a defining characteristic of mind or consciousness whereby one being "is linked to all else . . . to all other moments and places and persons," *regardless of space and time*. Accordingly, anomalous events—absent healing resulting from blinded, distant prayer, as in the Byrd,[29] Sicher,[30] and Harris[31] studies, for example—

> are not fully explainable by the local universe believed in by most Western scientists and physicians, but instead require a nonlocal universe in which events or observations, regardless of their spatial separation, can be "correlated," or influence each other instantaneously.[27(p639)]

Nonlocal healing events, while seemingly impossible, therefore may "violate the tenets of prevailing biomedical conceptions of physical law,"[27(p639)] but this is more due to biomedicine's misconceptions of physical law than to any real transcendence of nature. The physics of the universe, since early developments in the so-called "new physics" (eg, Bell's Theorem, the Copenhagen perspective of Bohr, the Aspect experiment, Schrödinger's single mind), is actually much more unusual than most physicians realize, and biomedicine simply has failed to

keep pace and update its own theories accordingly. In other words, nonlocality or nonlocal mind as an explanation for spiritual healing at a distance, although challenging and even downright strange, is—if true—as much a naturalistic "mechanism" as subtle energy. It thus requires no reference to God or the supernatural, even if healing by such means seems impossible or miraculous.

Type 5. Supernatural Pathways

The final hypothetical pathway linking spiritual practices or interventions to physical health or healing is what is popularly termed the "supernatural"—those actions of God or a "divine" Being who exists partly or fully in a realm which transcends or is beyond or "outside" of a natural universe of Its creation.[27] While not a universal conception of the deity, such a perspective is a cornerstone of many of the world's faith traditions. Indeed, the possibility that there is a Creator-God who volitionally chooses to answer or not answer petitionary prayers by means which entirely transcend any naturalistic mechanism may be the most commonly held belief of people who use prayer or spiritual interventions for friends or loved ones who are ill. Such a conception does not exclude the possibility that this same God also heals *through* the natural laws of the universe—be they expressed in the biological and psychosocial functioning of the human body, in a potentially healing bioenergy, or in physical phenomena which exhibit nonlocal characteristics.

The idea that there is such a Being as this who exists and operates outside of the natural universe—locally, nonlocally, or however—may be a challenging notion to rational scientists and physicians. Moreover, if such supernatural healing does occur, it cannot be "proved" by studies grounded in the research methods of naturalistic science; it must be taken on faith.[27] The best that a double-blind, randomized, controlled clinical trial can do here is in the realm of the descriptive: to demonstrate that distant prayer antecedes statistically significant clinical changes and thus appears to engender a therapeutic effect. Conclusive attribution of such an effect to a supernatural mechanism is simply impossible; scientific methods based on observation of natural phenomena cannot be used to verify processes that are purported to exist, in principle, outside of nature.[27] In the case of studies like those of Byrd,[29] Sicher,[30] and Harris,[31] whether this therapeutic effect is truly supernatural, is instead due to some sort of nonlocal feature of human consciousness, or is due to a healing energy currently too subtle to assess to most scientists' satisfaction cannot be determined.

In the future, it may be possible to distinguish between subtle-energetic and nonlocal pathways, especially if assessment of a human bioenergy becomes reliable and valid. Proving, or ruling out, the supernatural, however, remains impossible. Nevertheless, our inability to state with assurance that such a mechanism has been operating in a particular study or case report or patient does not mean that supernatural avenues of healing do not exist. This perspective was nicely articulated by physicist and religious scholar Ravi Ravindra in *Science and Spirit*:

> . . . it is still more important to realize that even with a radically altered science that could take account of extrasensory perceptions and other miraculous happenings, we cannot come to the end of all there is. All there is far exceeds the realm of nature, the domain of causality and materiality, however subtle our descriptions. To say that we do not yet know certain levels of nature is not to say that nature is all that there is to know or that can be.[58(p115)]

CLINICAL AND SCIENTIFIC IMPLICATIONS

This article has made the case for dimensions of human spiritual life as salient factors in health and healing. First, a conceptual framework has been provided to describe how religiousness can serve to promote health and prevent illness and how spiritual interventions can result in recovery from or healing of disease. Second, empirical evidence has been reviewed supporting the realm of the spiritual as both a protective factor for health in well populations and a therapeutic factor in healing in clinical populations. Third, a theoretical model has been developed to account for these protective and therapeutic effects, explaining them in terms of known or hypothesized biological, psychosocial, bioenergy-based, nonlocal, and supernatural mechanisms.

Through these conceptual, empirical, and theoretical discussions, this article has sought to legitimize the inclusion of the spiritual domain in epidemiologic discourse on the determinants of health and healing. It also has sought to broaden physicians' and scientists' growing awareness of body-mind interactions to a consideration of connections among body, mind, and spirit. By excluding matters of spirit from clinical research and practice, physicians run the risk of leaving out a large piece of what it means to be a human being. If physicians sincerely wish to treat the whole person, they first will have to see their patients as more than just a body and a personality, or, worse, a collection of isolated organ systems. By accepting that there is a vital third "component" to personhood—at least in the worldviews of many patients—physicians will be better equipped to mobilize resources that may serve as allies in facilitating healing and recovery.[21]

For example, clinical history-taking ought to include assessment of the patient's religious and spiritual history and current practices. Inventories and assessment tools exist in growing number for use by both primary care physicians and psychiatrists; with healthy patients and both medically and psychiatrically ill patients; and for assessment of normative practices and beliefs and experiences, religious or spiritual problems, and a history of spiritual interventions such as faith healing.[59-61] Among geriatric patients, discontinuities in life-long patterns of religious involvement and spiritual practice can have devastating effects on health and well-being,[62] but they cannot be rectified if they are not identified.

Clinicians also can make timely referrals, where appropriate, to professionals trained in pastoral counseling or psychology. There is also a growing Christian psychiatry movement. The availability of these avenues for spiritually-sensitive care raises the hope of establishing more frequent and appropriate linkages between "the couch and the cloth."[63] Many congregations also provide specialized programs for the sick or shut-in,[64] thus facilitating access to needed services and serving to maintain continuity in congregants' spiritual life.

For scientists, evidence of connections among body, mind, and spirit offers a challenge: how to integrate these findings with existing

biological and psychosocial knowledge into a more complete theory of physical healing. A principal barrier to this happening is the extremely limited, unidimensional definition of healing used by Western biomedicine—wound healing—coupled with monofactorial views of healing as stimulated or engendered principally by hygiene around the site of the lesion. These narrow conceptualizations hardly allow room for healing to be conceived of as a salutogenic process that occurs simultaneously or in sequence at many levels—molecular, cellular, systemic, mental, emotional, spiritual—and that is influenced by a vast array of determinants, such as characteristics of the social and physical environment and of human hosts—from heredity to psyche to behavior to spiritual life. Biomedical science needs to expand its conception of healing beyond changes in a focal lesion—whether a flesh or organ wound or even something more metaphoric. Disequilibrium and dis-integration of the entire person—across all "levels"—can also require healing and restoration.

The development of a new field of study grounded in a truly multidimensional and multifactorial perspective on healing would be a tremendous legacy of those scientists who have pioneered epidemiologic research on religion and spirituality and experimental research on prayer. A science of salutogenesis rooted in a broad model of human health and of the healing process as functions of physical, emotional, mental, and spiritual determinants is the most promising basic-science contribution that could result from the continued mainstreaming of complementary and alternative therapies. Many such therapies, especially those imported from the East, already possess a much more integrated view of human life and the healing process. The findings reviewed in the empirical literatures on the interface of religion, spirituality, health, and healing would likely come as little surprise to experienced practitioners of these systems. Just as diverse clinical modalities are now being bridged and forged into an "integrated medicine," it may not be long before molecular biology and the epidemiology of religion are widely recognized as two poles of a continuum of scientific disciplines that need to be bridged and integrated as well.

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