

# 'Does Religion Cause Health?': Differing Interpretations and Diverse Meanings

DOUG OMAN

*University of California, Berkeley, USA*

CARL E. THORESEN

*Stanford University, USA*

DOUG OMAN, PhD, is Lecturer in the School of Public Health, University of California, Berkeley, USA. His research interests include the influence of psychosocial and spiritual factors upon health, as well as psychosocially and spiritually based interventions and tools for health education and training of health professionals.

CARL E. THORESEN, PhD, is Professor of Education, Psychology and Psychiatry/Behavioral Sciences at Stanford University, USA (Emeritus). His interests include the science of spirituality and health, including spiritually focused interventions, forgiveness and health, and structured small group interventions in health.

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ADDRESS. Correspondence should be directed to:  
DOUG OMAN, School of Public Health, 140 Warren Hall #7360,  
University of California, Berkeley, CA 94720-7360, USA. [email:  
dougoman@post.harvard.edu]

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## Abstract

The question, 'Does religion (or spirituality) cause physical health benefits?' may be given at least four diverging interpretations in terms of causal path diagrams. In common usage, the question may be interpreted to indicate that religion causally influences health by: (1) any mechanism, including well-established factors such as social support and improved health behaviors; (2) additional mechanisms, such as enhanced positive psychological states (e.g. faith, hope, inner peace) acting through psychoneuroimmunologic or psychoneuroendocrinologic pathways; (3) offering psychological strength for acquiring or maintaining positive health behaviors; or (4) causally influencing health by distant healing or intercessory prayer. We review historical confusion between these interpretations, arguing that disentangling them is important for collaborative health care, promotion and research.

## Keywords

*health behavior, prayer, psychoneuroimmunology, religion, social support, spirituality*

## Introduction

RELATIONSHIPS BETWEEN RELIGION, spirituality and health have drawn increasing numbers of publications in major biomedical, public health, psychology, and other social science journals over the past decade (Ellison & Levin, 1998; Levin, 1996b; Thoresen, 1999). In the USA, the National Institutes of Health (Office of Behavioral and Social Sciences Research) will be publishing a panel report on the topic as a special issue of *American Psychologist* (Miller & Thoresen, in press), and have requested funding applications for studies of spirituality and alcohol abuse (RFA AA-00-002). Special issues of other empirically focused journals have appeared on the topic (e.g. *Annals of Behavioral Medicine*, 2002; *Health Education and Behavior*, 1998; *Journal of Health Psychology*, 1999), and invited symposia at major scientific meetings have occurred or been scheduled (e.g. Society of Psychosomatic Medicine, Society of Behavioral Medicine). The latest revision of the widely used *Diagnostic and statistical manual of mental disorders* (1994) for the first time acknowledges religious and spiritual issues as normal and important rather than pathogenic factors in diagnosis (American Psychiatric Association, 1994; Lukoff, Turner, & Lu, 1992), and the Association of American Medical Colleges has been sponsoring an annual conference on Spirituality in Medical Education.

Interest in the effects of religion, and indirectly in spirituality, is surging, in part, because of a small but growing body of high-quality and well-controlled studies, especially in epidemiology (Chatters, 2000; Koenig, McCullough, & Larson, 2001; Plante & Sherman, 2001; Powell, Shahabi & Thoresen, in press). Most striking are over two dozen studies associating attendance at religious services with lower all-cause mortality (McCullough, Hoyt, Larson, Koenig, & Thoresen, 2000; Oman & Reed, 1998; Strawbridge, Cohen, Shema, & Kaplan, 1997). One of the most thorough of these studies, an eight-year follow-up of more than 20,000 adults representative of the US population, found a life expectancy gap of over seven years between persons never attending services and those attending more than once weekly, 'similar to the female-male and white-black gaps in US life expectancy' (Hummer, Rogers, Nam, & Ellison,

1999, p. 277). Among African Americans, the life expectancy gap associated with religious attendance was nearly 14 years. After adjusting for demographics, socioeconomic status, health status, health behaviors and social ties, mortality risk continued to be associated with nonattendance (50 percent elevation, i.e. relative hazard [RH]=1.50) nearly as strongly as with heavy smoking (63 percent elevation, RH=1.63). Similarly, a recent meta-analysis of over 40 independent samples found that that religious involvement was significantly positively associated with longevity (McCullough et al., 2000). A critical review by the National Institutes of Health concluded that the evidence that frequent religious attendance (i.e. once weekly or more) predicts longevity—independently from other well-established risk factors—is now 'persuasive' (Powell et al., in press).

In other well-controlled studies, religious involvement has been assessed primarily as religious service attendance, private devotional activity, or religious experiences (e.g. perceived strength and comfort from religion), and found to be associated with a wide range of health outcomes, including lower mortality due to a wide spectrum of specific causes (Hummer et al., 1999; Oman, Kurata, Strawbridge, & Cohen, 2002), lower blood pressure, lower incidence of physical disability (Idler & Kasl, 1997), lower depressive symptomatology, greater well-being, less spousal abuse (Ellison & Anderson, 2001), better health practices among adolescents (Wallace & Forman, 1998), reduced alcohol and substance abuse (Gorsuch, 1995; Miller, 1998), and greater adoption and maintenance of positive health behaviors such as exercising and not smoking (Strawbridge et al., 1997; Strawbridge, Shema, Cohen, & Kaplan, 2001) (for reviews see Koenig et al., 2001). Other studies have found that religious involvement mitigates the effects of unemployment (Shams & Jackson, 1993) and is associated with reduced racial self-stigmatization (Brega & Coleman, 1999) and reduced dependence upon physical self-concepts (Idler, 1995). Several reviews have found strong evidence that 'religion, in a broad sense, represents a protective factor that offers a small but significant primary-preventive effect against morbidity in populations' (Ellison & Levin, 1998, p. 701; see also Matthews, McCullough, Larson, Koenig, Swyers & Milano, 1998).

While many observers welcome the increasing attention to religion (Krause, 1997), others express profound discomfort and some emphasize potential dangers of current trends, such as that physicians might impose their religious beliefs or practices upon their patients (Sloan, Bagiella, & Powell, 1999; Sloan, Bagiella, Vandecreek, Hover, Casalone, Hirsch, Hasan, Kreger, & Poulos, 2000). Others note that scientists might seriously misrepresent the phenomena of religion and spirituality (Levin, 1996a; Thomson, 1996). In view of such controversy, it seems natural to wonder whether people all mean the same thing when they ask, 'Does religion (or spirituality) cause health benefit?'. We argue that the answer is no, and that some of the current controversy arises from confusion among at least four natural but strikingly different interpretations—discussed below in detail—that are commonly given to the question, 'Does religion cause (i.e. causally influence) health?'

- Does religious involvement causally reduce morbidity or mortality in any way?
- Does religious involvement reduce morbidity or mortality through psychobiological (mind/body) pathways?
- Does religious involvement reduce morbidity or mortality through supernatural or other unconventional pathways?
- Does religious involvement improve health behaviors (e.g. by helping a person quit smoking or avoid heavy drinking)?

Such divergence in interpretation is perhaps not surprising since religion and spirituality each represent multidimensional constructs with latent features (Miller & Thoresen, 1999; Pargament, 1997; Thoresen, 1999). That is, some dimensions of religion, such as attending services or reading religious literature, can be readily observed (and assessed) while other dimensions (e.g. faith or transcendental experiences) are not readily observable by others nor easily described by many. But divergent meanings of 'Does religion cause health benefits?' are perhaps better understood against the background of a *web of causality* (Greenland, Pearl, & Robins, 1999; Krieger, 1994), i.e. the interrelations among a set of hypothesized mechanisms or processes by which religion (or spirituality)

might 'cause' benefits to health in more or less direct ways.

Using the notion of a causal web, the present article seeks to clarify the meaning and importance of diverse interpretations of the question, 'Does religion causally influence health?' As we demonstrate below, widespread public and professional interpretations of the religion causing health question do not map simply and cleanly, in a one-to-one fashion, onto causal pathways hypothesized by experts in the field (Levin, 1996b). But because much is at stake for ordinary citizens and for a wide range of professional groups, we develop and explicate in detail these widespread interpretations and corresponding causal pathways. As research on religion, spirituality and health draws increasing attention, clear explication of underlying questions assumes increasing importance for facilitating smooth communication and collaboration among diverse professional and lay groups. Ideas previously of greatest interest to experts and specialists must be made clear to diverse audiences who are personally or professionally affected by this emerging field, but who lack the time for novel or extensive technical study. By disentangling scientific issues from related social and ethical issues, a more broadly understandable framing of the scientific questions could reduce the danger of a constricting medicalization or 'public healthification' of health issues related to religion and spirituality (Meyer & Schwartz, 2000).

In the first of the three sections that follow, we review hypothesized causal mechanisms, illustrating how different interpretations of 'Does religion causally influence health?' lead to different propositions in a causal web. Section two provides a historical perspective. The final section summarizes, arguing that diverse interpretations of 'Does religion cause health benefit?' will not soon give way to a single dominant interpretation.

## The causal web

### *Major pathways*

To account for the better health observed among religiously and spiritually involved persons, reviews commonly identify at least four major categories of mechanisms (Ellison & Levin, 1998; Levin, 1996b). Partially overlapping rather

than competing, many or all of these mechanisms may operate simultaneously.

1. *Health behaviors.* Behaviorally strict religious groups, such as Mormons or Seventh-Day Adventists, may discourage smoking and drinking of alcohol or encourage good diets (Troyer, 1988); more broadly, many denominations may encourage good health behaviors out of respect for the body as an instrument of God's service (Dull & Skokan, 1995; Strawbridge et al., 1997).
2. *Social support.* Religious or spiritually involved persons may experience social contact with co-religionists, which could lead to larger and stronger social networks and a greater availability of social support, a well-established salutary factor (House, Landis, & Umberson, 1988). Like religion and spirituality, social support is multidimensional (Wine-miller, Mitchell, Sutliff, & Cline, 1993), with social support sometimes construed to include largely psychological concepts, such as perceived emotional support. Social support also may covary with health-related behaviors and psychological states (Umberson, 1987).
3. *Psychological states.* Religiously or spiritually involved persons may experience better mental health and more positive psychological states, such as joy, hope and compassion, perhaps from using religious coping methods to buffer stress (Koenig et al., 2001; Pargament, 1997), or from adhering to spiritually related goals and 'personal strivings' learned in part from family, community or historical exemplars (Emmons, 1999; Oman & Thoresen, in press). Such states may also include reduced negative emotional states (e.g. fear, sadness, anger), as well as expectancy-related positive states such as optimism and faith (Frank, 1975), and other well-studied or potentially health-relevant states such as meaning, conscientiousness or perceptions of primary or secondary control (Cole & Pargament, 1999; Friedman, Tucker, Schwartz, Martin, Tomlinson-Keasey, Wingard, & Criqui, 1995; Hill, 2001; Park & Folkman, 1997). Positive emotional states may lead to improved physical health through reduced 'allostatic load' (McEwen, 1998), reduced cardiovascular reactivity (Fredrickson & Levenson, 1998) and enhanced immune and endocrine function (Dull & Skokan, 1995; Kiecolt-Glaser & Glaser, 1995; Ursin, 1998). Mental health and positive psychological states derived from spiritual or religious coping may also assist people in overcoming internal barriers to adopting positive health behaviors or forming supportive social connections (Campbell, 1999; Flinders, Gershwin, & Flinders, 1994; Gorsuch, 1995; Miller, 1998).
4. *'Superempirical' and/or 'psi' influences.* Certain religious practices, such as intercessory prayer (Targ, 1997), may act partially through natural laws—laws perhaps governing 'subtle energies' (Levin, 1996a; Targ, 1997)—that are beyond current modern scientific understanding. Such laws and the phenomena they seek to explain, commonly called 'psi' phenomena in psychology (Bem & Honorton, 1994), may be amenable in time to being comprehended by science. (For completeness, authors such as Levin (1996b) distinguish 'superempirical' influences which are naturalistic, law-governed and potentially knowable by science from possible 'supernatural' influences, such as intervention by the Judeo-Christian God. In a question that may remain hypothetical, Levin and Schiller ask, 'if it were possible to control for every confounding, intervening, and effect-modifying variable ostensibly related to religion, and a "religious factor" still remained, what would be the nature of this factor? Would it be some outcome of . . . supernatural influence?' (1987, p. 23).)

The first three categories (excluding psi influences) correspond, more or less, to major causal mechanisms generally recognized by researchers in a wide variety of fields within biomedicine and the social and behavioral sciences. As noted above, these major pathways are commonly explicitly or implicitly situated within a causal web, a dominant conceptual framework within epidemiology (Greenland et al., 1999; Krieger, 1994) and increasingly in the social sciences (Davis, 1985; Tremblay & Gardner, 1996). A causal web is often represented as a path diagram (e.g. Figure 1) which incorporates assumptions derived from prior conceptual and

empirical investigation of how the world is likely to work. In empirical studies, the conceptual web of causation guides the conduct of statistical analyses for estimating the strength of pathways within the causal web, and especially for estimating whether or not a particular pathway's strength is different from zero, implying that the pathway 'exists'. Selecting appropriate research designs and statistical methods can be exceedingly challenging (Davis, 1985; Greenland et al., 1999; Miller, 1997), and discussion of these tasks is beyond the scope of the present article. Rather, our focus is upon the conceptual steps that *precede* the statistical analysis, i.e. upon how health researchers have (explicitly or implicitly) interpreted the question, 'Does religion cause health benefit?' in terms of webs of causality.

Causal path diagrams have been included in many published commentaries and studies of associations between religion and physical health or mental health (see, for example, Bahr, Maughan, Marcos, & Li, 1998; Dull & Skokan, 1995; Hathaway & Pargament, 1990; Koenig et al., 2001; Poloma & Gallup, 1991). Due to differences in focus and available variables, these causal models vary widely in how they compose and elaborate different parts of the causal web.

Figure 1 offers a possible causal web that might be used to study the preventive effects of religious variables on a range of physical health outcomes (the Figure acknowledges possible confounders, but focuses upon how religion might lead to physical health outcomes). Like all presumed causal models (Davis, 1985; Greenland et al., 1999), the network represented in Figure 1 is clearly debatable, incomplete and imperfectly elaborated. For example, Figure 1 ignores: (1) multidimensionality of religion and spirituality (Fetzer Institute/National Institute on Aging Working Group, 1999; Miller & Thoresen, 1999); (2) multidimensionality of mental health (Koenig et al., 2001); (3) multidimensionality and differences in 'quality' of social support received from various sources (Ellison & Levin, 1998; Winemiller et al., 1993); (4) negative health effects from religion (Ellison & Levin, 1998) or social support (Krause, 1995); and (5) variation between diseases, and by stage of pathogenesis, of the importance of specific mediating factors (Rozanski, Blumenthal, & Kaplan, 1999). However, these imperfections do not detract from the usefulness of the model in

Figure 1 for showing how alternative interpretations of 'Does religion cause health benefit?' can manifest as entirely different questions about causal path coefficients.

Note that we are conceptualizing the effects of religion and spirituality on health as primarily *indirect*, since they are often mediated by the factors noted earlier, through pathways that we have labeled 'HB' (health behaviors), 'SS' (social support), and 'P' (psychological states). Causal indirectness—which, after all, is relative to the level of detail represented in a particular causal model (Davis, 1985; Greenland et al., 1999)—in no way lessens the potential importance of religion and spirituality for health. Any deficiencies in the immediacy of the impact of religion and spirituality upon health may well be compensated, for example, by the breadth of their influence through a variety of pathways upon a variety of health outcomes (e.g. Figure 1). Indeed, investigations of religion, spirituality and health are part of a wider recent trend toward renewed epidemiologic study of important distal variables, such as socioeconomic status, gender socialization and social support (Krieger, 1994; McMichael, 1999).

Remarkably in view of current controversies about religion and health, most biomedical researchers and a majority of the general public seem to have a long-standing acceptance that certain types of religious practice—such as Mormonism and Seventh-Day Adventism—do, in fact, *causally* benefit physical health by fostering specific positive health behaviors. That is, once smoking and high-fat diets were identified as risk factors, a general acceptance seemed to emerge in the biomedical research community that adhering to Mormonism or certain other behaviorally strict religious faiths does very likely provide health benefits (via improved health behaviors, the first causal pathway described above).

Nevertheless, claims that religious involvements cause health benefits remain highly controversial if not confused (Kurtz, 1999; Thoresen, 1999). For example, a recent commentary in the *Lancet* argued that 'evidence of an association between religion, spirituality, and health is weak and inconsistent' (Sloan et al., 1999, p. 667), despite the authors' paradoxical concession (Rabin, 1999) of causal benefits to health from 'adherence to codes of conduct that

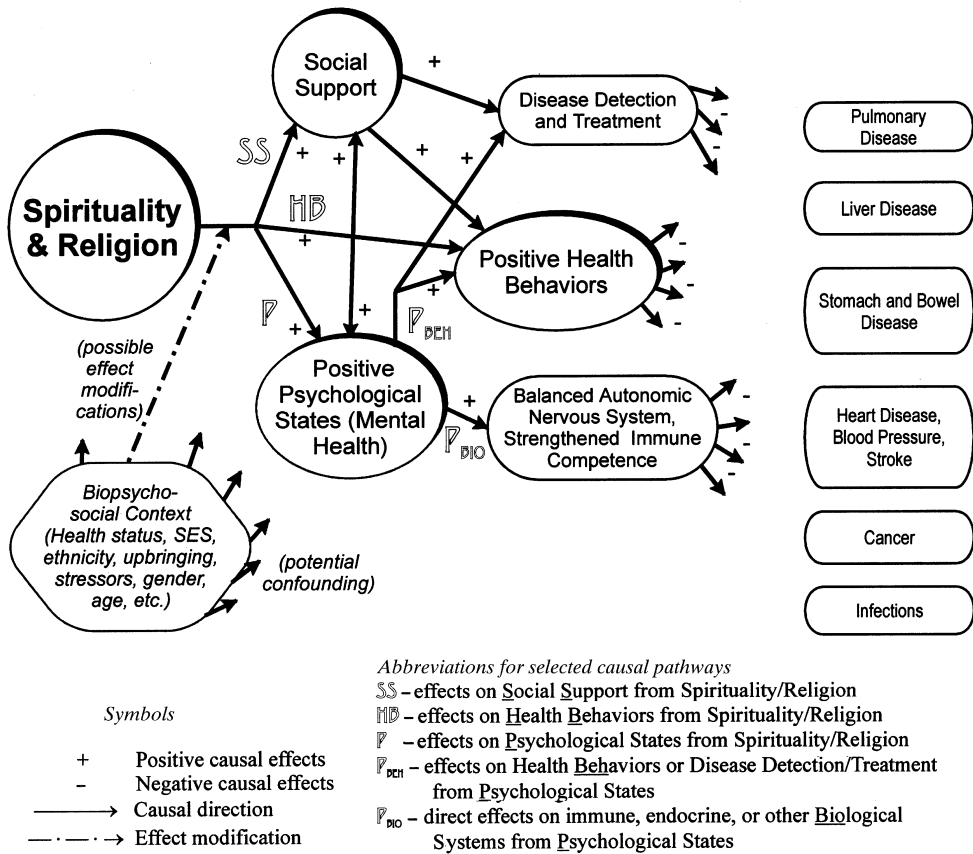


Figure 1. Prevention model: depicting possible causal effects of religion and spirituality on health.

proscribe behaviors associated with risk’ (Sloan et al., 1999, p. 665) by Mormon priests, Trappist and Benedictine monks and Roman Catholic priests and nuns.

*Diverse interpretations of a common question*

If health benefits due to following strict religious practices are commonly acknowledged, then why is there controversy? Apart from the historically based broader controversy of ‘science versus religion’—which includes epistemological disagreement over what constitutes evidence for making causal claims (Gould, 1999)—part of the controversy derives apparently from confusion among the four major interpretations, noted above, commonly given

to the question, ‘Does religion cause health benefits?’. These diverging interpretations arise *prior* to examining empirical data, not from disagreements over data or over statistical analyses. Rather, people’s diverse personal curiosities and professional interests give rise to diverging approaches to operationalizing the religion and health question as a *proposition about the causal web* connecting religion to health. Recognized as such, these terminological and operational differences can be clarified. Unrecognized, these terminological differences can absurdly masquerade as fundamental differences in ideology or scientific judgment.

Little confusion would emerge if everyone’s attention was captivated by the simplest and most basic of the possible interpretations, which we call the ‘any pathway’ interpretation.

1. *The 'any pathway' interpretation/question.* Does religion (or spirituality) cause health benefits through *any* causal pathway—including: (i) health behaviors; (ii) social support; (iii) psychological states or characteristics; or (iv) superempirical pathways (e.g. are pathways 'HB', 'SS' or 'P' positive in Figure 1)?

Yet for many persons, both researchers and members of the lay public, the possibility that religious involvement may facilitate better health behaviors or expanded social networks is commonly viewed as uninteresting. Instead, such persons seem inclined toward interpreting 'Does religion cause health benefit?' in a way that emphasizes a more novel set of pathways.

2. *The 'psychobiological' interpretation/question.* Does religion (or spirituality) cause health benefits through specifically and uniquely psychologically mediated pathways, i.e. through psychoneuroimmunological or psychoneuroendocrinological pathways, *above and beyond* any benefits that religion may confer through improved health behaviors and expanded social support (e.g. are pathways 'P' and 'P<sub>BIO</sub>' positive in Figure 1)? These pathways correspond respectively to the propositions that: (i) religious involvement causes positive psychological states; and (ii) positive psychological states directly benefit the body.

Still other persons may regard psychoneuroimmunological and psychoneuroendocrinological pathways as less interesting than psi pathways, and focus upon a third interpretation.

3. *The 'superempirical' or 'psi' interpretation/question.* Does religion (or spirituality) cause health benefits through superempirical pathways, *above and beyond* any benefits that it may confer through improved health behaviors, social support and psychological states (e.g. do independent effects of religion on health remain after controlling for pathways 'HB', 'SS' and 'P' in Figure 1)?

Finally, for some persons—especially those professionally or personally combating substance abuse, perhaps using Twelve-Step Programs (Miller, 1998)—a natural interpretation of 'Does religion cause health benefit?' emphasizes

the added psychological resources that religion may contribute for improving health behaviors.

4. *The 'psychobehavioral' interpretation/question.* Does religion (or spirituality) cause health benefits by fostering psychological conditions—e.g. character (McCullough & Snyder, 2000), will-power (Campbell, 1999), self-efficacy (Bandura, 1997; Oman, Hedberg, Downs, & Parsons, in press), focused attention (Matthews & Wells, 1996) or enhanced motivation (Dull & Skokan, 1995; Gorsuch, 1995; Levin, 1996b)—that facilitate improved health behaviors as well as disease detection and compliance with treatment, *above and beyond* any benefits that religion may confer through expanded social networks and social support (e.g. are pathways 'P' and 'P<sub>BEH</sub>' positive in Figure 1)?

While each of the four questions/interpretations described above is concerned with distinguishing causal relationships from noncausal associations due to confounding, the questions differ radically regarding which causal pathways merit special attention. The questions differ also regarding which pathways are *dismissed* as being of lesser interest, perhaps too obvious even to spend time discussing. Disentangling such clashing foci of interest can help clarify some of the debates regarding religion and health. Viewed in the light of this analysis, for example, the aforementioned commentary in the *Lancet* (Sloan et al., 1999) clearly did *not* use the most straightforward 'any pathway' interpretation, because it in effect dismissed the health behavior pathway as of little interest. But neither did the commentary offer readers an alternative interpretation. Each reader was forced to read in his or her own interpretation of what type of causal benefit was under review, and less attentive readers might mistakenly conclude that the review systematically evaluated all causal pathways (for other criticism see Koenig, Idler, Kasl, Hays, George, Musick, Larson, Collins, & Benson, 1999).

Similarly, diverging interpretations of 'Does religion cause health benefit?' can create confusion when trying to interpret individual studies. An often cited study at Duke University examined the relationship between religion and immune function (Koenig, Cohen, George, Hays, Larson, & Blazer, 1997). A reader might

naturally assume that this study would address the second (psychobiological) question, which focuses directly upon psychoneuroimmunology. However, because the study failed to include (and adjust for) measures of health behaviors and nonreligious social support, it seems more prudent to classify the study as addressing the first ('any pathway') question. Unexplored in the Duke study was whether the association of religious attendance with immune function might be 'explained' by greater social support available to frequent attenders, or by a combination of support with advantageous health behaviors (e.g. less smoking, more exercise). Enhanced social support or improved health behaviors were thus plausible but uncontrolled predictors, that might confound or mediate the relationship of religious involvement with immune function.

On the other hand, empirical studies that report the results of fitting several different models involving different sets of adjustment variables (Hummer et al., 1999; Oman et al., 2002; Strawbridge et al., 1997) may offer evidence bearing upon answers to more than one interpretation of the religion and health question. For example, Strawbridge and colleagues (1997) found 'somewhat stronger evidence' (p. 960) for treating health behavior and social support as mediating rather than as confounding variables. Consequently, their report that religious attendance predicted lower all-cause mortality after adjustments for demographics and health status can be interpreted as supporting a 'yes' answer to the 'any pathway' question. Their report that further adjustments for health behaviors and social support reduced but did not eliminate the association of religion with reduced mortality supports a 'yes' answer to the psychobiology question. Finally, their report that religious individuals were more likely to improve their health behaviors over time suggests a 'yes' answer to the psychobehavioral question. As these authors emphasize, a crucial issue in analysis of data regarding religion and health is to find ways to distinguish between confounding and mediating variables. Yet such distinctions cannot substitute for having clearly articulated, theoretically informed research questions.

Confusion among diverse interpretations of 'Does religion cause health benefits?' would

perhaps be tolerable if the only result was occasional misunderstanding by researchers. But, as noted above, the stakes are much higher. Ambiguity about how to interpret 'the effects of religion (or spirituality)' undermines the ability of the empirical literature to inform public and professional discussion of the justifiable and ethical roles of religion in medicine and other health professions, preventing optimal collaboration between or among:

- physicians, nurses and patients (Barnard, Dayringer, & Cassel, 1995; Post, Puchalski, & Larson, 2000);
- public health professionals and faith communities (Ribisl & Humphreys, 1998; Tuggle, 2000); and
- interdisciplinary teams of researchers (Cook, 1985) or health professionals, in which 'practitioners of each discipline tend to interpret settings in terms of their own primary language' (Dombeck, 1998, p. 365).

To help contextualize the diverse current views of religion and health, we briefly sketch a history of recent empirical research on religion and health. Since this history is recounted elsewhere (Levin, 1996b), the following section emphasizes how different historical periods have acknowledged or emphasized varying interpretations, identified above, of the question, 'Does religion causally influence health?'

## Historical background

The pressing need to disentangle varying interpretations of 'Does religion causally influence health' is a relatively recent phenomenon. Before the 1990s, confusion about the religion causing health question seldom arose, perhaps because few studies focused directly upon religion (or spirituality) itself. Rather, 'in most of these studies, religion was only tangentially related to the matter at hand—just another variable to "crunch" ' (Levin & Schiller, 1987, p. 22).

### *Religion as proxy*

The relatively few early studies that treated religion as a primary variable tended to focus on group distinctions, such as between Jews and Gentiles (Hendershot, 1983) or between other groups and behaviorally strict religious denominations or orders, such as Mormons,

Seventh-Day Adventists, Benedictines or Trappists (Barrow, Quinlan, Cooper, Whitner, & Goodloe, 1960; Duckro, Magaletta, & Wolf, 1997; Troyer, 1988). Most of these studies used religious group (denomination or order) as a proxy for health behaviors, implicitly interpreting 'the effects of religion on health' as 'the effects of religious groups on health through health behaviors'. In effect, such studies used a variant of the 'psychobehavioral' interpretation described above, assuming that group differences relating to other pathways besides health behaviors were unimportant. Occasionally studies of religion included other measures, such as self-rated religiosity (Zuckerman, Kasl, & Ostfeld, 1984) or feelings of closeness to God (Yates, Chalmer, St James, Follansbee, & McKegney, 1981).

As early as the 1960s, however, increasing theoretical attention to social relationships, stress and health resulted in the inclusion of measures of frequency of religious attendance into many large epidemiologic studies. These studies used population samples that were primarily composed of adherents to mainstream religious denominations rather than to behaviorally strict groups (Berkman & Breslow, 1983; Cassel, 1976). Studies based on such data became fairly common in the 1980s, but seldom focused upon religion per se. Instead, religion variables were again treated primarily as proxies—this time for components of the social environment—and in subsequent data analyses were often lumped together with other social environmental variables into summary indices (e.g. part of social support, as by Berkman and Syme, 1979). Some studies that drew upon such data sets allowed religious involvement to remain as a separate predictor variable, thereby providing incidental but valid if not intriguing multivariate analyses of the effects of religion on health (House, Robbins, & Metzner, 1982; Schoenbach, Kaplan, Friedman, & Kleinbaum, 1986). Still, these findings were often implicitly interpreted as 'the effects of religion on health through social support', a variant of what we call the 'any pathway' interpretation (Levin & Markides, 1986).

### *Religion as psychological resource*

Only in the late 1980s did religion start to be conceptualized in a manner sophisticated enough to

permit confusion. In 1987 and 1989 two reviews were published that systematically described possible underlying mechanisms that included health behaviors and social support, as well as other candidates, such as positive psychological states, stress buffering, 'superempirical' or psi effects and supernatural influences (Jarvis & Northcott, 1987; Levin & Vanderpool, 1989). A third review article in this period summarized empirical studies explicitly linking religious attendance to morbidity and mortality (Levin & Vanderpool, 1987), while a fourth examined over 200 studies containing data relating religion with health, and explicitly hypothesized the existence of psychological causal pathways, asking if 'religious faith might reduce fear and provide comfort when stress occurs' (Levin & Schiller, 1987, p. 22).

Soon afterwards, sociologists reminded health researchers of theoretical bases going back at least to Durkheim for believing that the effects from religion are different than from other forms of social support (Idler & Kasl, 1992). Observational studies attempting to disentangle psychological effects of religion from social support effects began to emerge in the 1990s (Oman & Reed, 1998; Oxman, Freeman, & Manheimer, 1995). Psychologists began to offer increasingly sophisticated accounts of how religious cognitions, practices and goals might operate to buffer stress (Pargament, 1997), promote relaxation (Smith, 1986), and foster well-being and personality integration (Emmons, 1999). Interestingly, these accounts often reflected the seminal but largely forgotten contributions on psychology and religion by William James (James, 1961 [1902]), who used the term religion to include what currently is often labeled spirituality (Pargament, 1997; Thoresen, 1999).

These developments, building upon mainstream concepts from social epidemiology, sociology and social, cognitive and personality psychology, have set the stage for the current confusion about claims that religion causes health. Some observers seem to claim that promotion of strict health habits or social support via network size and quality fully accounts for a religion/health connection (implying a 'yes' answer only to the 'any pathway' interpretation). Others claim that other pathways are also involved, for example, that religious or

spiritual involvement causes health benefits by promoting inner peace or hope (Koenig et al., 2001; Levin, 1996b), implying 'yes' answers to psychobiological or psychobehavioral questions, above and beyond the 'any pathway' question. While many of the proposed psychosocial mechanisms have long been recognized as important to health by some researchers (Dubos, 1959), their importance has not been reflected adequately in how research is actually done (Levin, 1996b). This omission of a sound psychologically based perspective, informed by consideration of what Thoresen and Harris (in press) recently termed the key 'missing in action' factor in research on spirituality/religion and health, has contributed greatly to the current confusion and controversy.

### *Religion and psi pathways*

An additional source of confusion, if not perhaps heated controversy, arises from recent studies that are largely irrelevant to the 'any pathway', psychobiological or psychobehavioral interpretations. Instead they bear upon the 'psi' interpretation of 'Does religion cause health benefit?' These studies have used experimental rather than observational approaches, focusing upon interventions based on a single component of religion: intercessory prayer (Astin, Harkness, & Ernst, 2000; Byrd, 1988; Harris, Gowda, Kolb, Strychacz, Vacek, Jones, Forker, O'Keefe, & McCallister, 1999; Sicher, Targ, Moore, & Smith, 1998; Targ, 1997). In 1988, Byrd reported a groundbreaking, double-blind clinical trial that involved randomizing coronary hospital patients recovering from myocardial infarction ( $n = 393$ ) into two groups: those receiving the usual care condition, and those who were also 'treated' by having interdenominational groups of Christians pray for each patient's recovery. Byrd (1988) found that patients in the prayed-for group exhibited significantly better recovery than controls in several areas (e.g. less intubation/ventilation, less antibiotics), when analyzed in a univariate fashion. Furthermore, the prayed-for group had significantly better overall improvement scores than the control group when assessed using multivariate adjusted analyses. A recent modified replication by Harris, Gowda and colleagues (1999) also found that a prayed-for group of coronary patients ( $n = 466$ ) experienced better coronary care unit

course (i.e. significantly lower medically related events score while hospitalized) than a randomized usual care control group ( $n = 524$ ). A third smaller recent study by Sicher et al. (1998) using a slightly more complex design also reported benefits from intercessory prayer. However, the attribution that intercessory prayer caused fewer medical events may have been weakened by the lack of adequately controlling for smoking and other risk factors that could have explained the results.

Targ (1997) has argued that results of these intercessory prayer studies converge with a large body of evidence supporting the causal effects from what has been termed nonlocal or 'distant intentionality'. This perspective explains petitionary prayer's putative effects independently of prayer's overtly theological self-concept; rather, a 'purely mental effort' is seen as acting non-locally but naturalistically to catalyze other salutary processes, such as mind-body effects, patient expectation or medical intervention. Others suggest that confounding from (conventionally explainable) response expectations of participants may account for positive results of some intercessory prayer studies (Conti, 1999). Note however that Harris, Gowda and colleagues (1999) presented results in which all participants and physicians involved were completely blind ('triple-blinded' design) to the fact that a study was being conducted. Additional studies of similar design are currently underway to investigate the replicability of findings regarding intercessory prayer and health status (Roush, 1997).

Both methodologically and conceptually, such studies of intercessory prayer and other forms of 'distant healing' are much more akin to clinical trials of alternative or complementary health care practices (e.g. mindfulness training and acupuncture) than they are to most other prominent studies of religion and health, which rely on methods from mainstream psychosocial epidemiology. In contrast to long-studied risk factors and concepts typically used to explain findings in epidemiologic studies of religion, 'distant healing' or intercessory prayer studies lack a developed epidemiological base. The issue here is not concerned with research designs nor analyses—indeed, use of controlled experimental designs represents a much needed improvement over exclusive reliance upon descriptive studies, even if prospective in

design—but with how to conceptualize and assess distant healing processes. Mainstream biomedicine (and indeed mainstream modern science) has difficulty in formulating *any* plausible naturalistic mechanism by which distant intercessory prayer might 'get into the body' of its intended beneficiary (interestingly, however, we note that psychoneuroimmunology, now well accepted, met with strong skepticism only two decades ago about 'how it gets into the body'—see Melnechuck, 1985; McEwen, 1998). Furthermore, measurement difficulties make it unclear how studies of religion and spirituality within a population-based approach can incorporate 'distant healing' as a possible explanatory covariate or adjustment variable (*cf.* Galton, 1872, extracted in Roland, 1970). For example, how can one assess the level of 'exposure' that study participants experience by virtue of being prayed for by all other persons? On average across populations, do more numerous or more fervent prayers plead for the health of religious men, women and children than for the health of their nonbelieving brothers and sisters? Might some religious persons, like Christian 'good shepherds' who 'leave the ninety and nine in the wilderness, and go after that which is lost' (Luke 15:4), actually offer *more prayers* for nonbelievers? These topics have apparently never been addressed empirically, although such simple questions regarding exposure distribution are essential to an untruncated *epidemiologic* approach to intercessory prayer and health.

Nevertheless, controlled studies of intercessory prayer, focused on health, are within the topic of religion and health. If well-controlled future trials continue to provide positive evidence for the efficacy of intercessory prayer/distant healing for health, then this pathway clearly deserves to be considered along with others discussed above. (For discussion of historical rejection of therapies that lacked a contemporarily accepted theoretical basis, but are now recognized as efficacious, see Goodwin and Goodwin, 1984.)

### **From confusion to clarity in diversity**

The foregoing conceptual analysis and history demonstrate that, even as connections between

religion and health draw increasing attention in published empirical research, the core question—'Does religion (or spirituality) improve or cause health benefit?'—elicits various interpretations that diverge along several important dimensions:

- the degree to which the question can be answered affirmatively by collective scientific expertise and existing research methods;
- the degree to which religion or spirituality are conceptualized as different from or reducible to other forms of social and psychological activity (e.g. social support);
- the possible need to grant the existence of novel physical or psychosocial laws, processes or mechanisms;
- the strength and nature of supporting empirical evidence that is available from: (i) population-based epidemiological studies; versus (ii) experimentally designed trials that reduce the confounding of correlation or association with causation.

Given this complexity, dare we hope that smooth and productive collaboration will be possible across diverse lay and professional groups who possess widely varying intellectual, ideological and spiritual predispositions?

We believe that the diverse meanings embedded in the question, 'Does religion cause health benefit?' are here to stay, not only in popular culture but also among health professionals. The 'any pathway' interpretation, the 'psychobiology' interpretation, the 'psychobehavioral' interpretation and the 'psi' interpretation are each likely to remain common. Each of these four questions has continuing importance for specific groups of researchers and primary care professionals. Different researchers are likely to focus upon different questions, in part because religious and spiritual involvement seem likely to have much greater impacts on some health outcomes (e.g. cardiovascular diseases) than on other health outcomes (e.g. expression of certain genetic diseases; however, see Boomsma, de Geus, van Baal, & Koopmans, 1999).

Researchers who study outcomes with well-established psychosocial predictors may find it most relevant to investigate whether, for example, specific types of religious social involvements provide more effective stress-buffering than specific types of secular social involvements.

In doing so, they might be seen as asking versions of the psychobiological or psychobehavioral questions. In contrast, researchers who study outcomes with fewer established psychosocial predictors (e.g. genetic diseases) may find it more worthwhile to explore whether religious involvement has any causal effect whatsoever—i.e. the ‘any pathway’ question. And like human groups everywhere, these two groups of researchers are likely to develop their own vernacular speech habits that reflect their own ongoing concerns, and employ different interpretations of ‘Does religion causally influence health?’ We believe that such linguistic diversity is inevitable, and that efforts to impose a strictly standardized vocabulary are unlikely to succeed.

Instead, to foster successful and necessary collaboration (Dombeck, 1998; Schmitt, 1994), we contend that all persons concerned about the relationship of religion and spirituality with health should familiarize themselves with the range of meanings of ‘Does religion cause health benefit?’, not only the four interpretations we describe above, but also any additional interpretations that may emerge. Uniformity of terms and methods is a hallmark of a mature science and has its place, but if imposed prematurely, it can stifle inquiry and retard understanding, especially in terms of creating more sensitive assessments and more comprehensive models.

Indeed, much successful collaborative effort will be needed in order to thoroughly answer the four causal questions that we disentangled above. For historical reasons already noted, published epidemiologic studies have relied almost exclusively upon very brief, broad and external measures of religious involvement, such as single-item questionnaires to assess affiliation and attendance. Almost completely neglected are other factors, such as psychological and emotional states (Levin, 2001; Thoresen, 1999), and multiple dimensions of religion, such as specific beliefs, behaviors, motivations and experiences (Fetzer Institute/National Institute on Aging Working Group, 1999; Miller & Thoresen, 1999), especially individual variables as opposed to institutionalized dimensions of religion, and ‘intrinsic’ versus ‘extrinsic’ motivational goals for those involved in a religious or spiritual group or organization (Allport & Ross, 1967; Levin & Schiller, 1987). Studies employing a

variety of research designs with multiple measures assessed over multiple occasions may be crucial for elucidating underlying mechanisms. Approaches could range from long-term, multi-wave cohort studies (Strawbridge et al., 1997), to sociosomatic studies (anthropologically oriented studies of mind/body interactions—see Kleinman and Becker, 1998) to studies that combine quantitative and qualitative assessment (Richards, Acree, & Folkman, 1999; Thoresen, 1999).

We have distinguished four interpretations of the question ‘Does religion causally influence health?’, and argued that these interpretations are easily confused and that such confusion is detrimental to collaborative efforts that commonly underlie successful clinical and public health practice. We argue such diversity is inevitable, urging health researchers and practitioners to distinguish between divergent interpretations of the question ‘Do religion and spirituality cause health benefits?’ Greater awareness of this spectrum of interpretations will allow health professionals to communicate and collaborate more effectively with each other as well as with religious organizations and individuals, spiritual persons not affiliated with organized religion and other persons and groups in the general population. Such collaboration may be essential for maximally reducing disease and promoting the fullest public health in the 21st century.

## References

- Allport, G. W., & Ross, M. J. (1967). Personal religious orientation and prejudice. *Journal of Personality and Social Psychology*, 5(4), 432–443.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders: DSM-IV*, 4th edn. Washington, DC: American Psychiatric Association.
- Astin, J. A., Harkness, E., & Ernst, E. (2000). The efficacy of ‘distant healing’: A systematic review of randomized trials. *Annals of Internal Medicine*, 132(11), 903–910.
- Bahr, S. J., Maughan, S. L., Marcos, A. C., & Li, B. (1998). Family, religiosity, and the risk of adolescent drug use. *Journal of Marriage and the Family*, 60(4), 979–992.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.
- Barnard, D., Dayringer, R., & Cassel, C. K. (1995).

- Toward a person-centered medicine: Religious studies in the medical curriculum. *Academic Medicine*, 70(9), 806–813.
- Barrow, J. G., Quinlan, C. B., Cooper, G. R., Whitner, V. S., & Goodloe, M. H. R. (1960). Studies in atherosclerosis. III. An epidemiologic study of atherosclerosis in Trappist and Benedictine monks: A preliminary report. *Annals of Internal Medicine*, 52, 368–377.
- Bem, D. J., & Honorton, C. (1994). Does psi exist? Replicable evidence for an anomalous process of information transfer. *Psychological Bulletin*, 115(1), 4–18.
- Berkman, L. F., & Breslow, L. (1983). *Health and ways of living: The Alameda County Study*. New York: Oxford University Press.
- Berkman, L. F., & Syme, S. L. (1979). Social networks, host resistance, and mortality: A nine-year follow-up study of Alameda county residents. *American Journal of Epidemiology*, 109(2), 186–204.
- Boomsma, D. I., de Geus, E. J., van Baal, G. C., & Koopmans, J. R. (1999). A religious upbringing reduces the influence of genetic factors on disinhibition: Evidence for interaction between genotype and environment on personality. *Twin Research*, 2(2), 115–125.
- Brega, A. G., & Coleman, L. M. (1999). Effects of religiosity and racial socialization on subjective stigmatization in African-American adolescents. *Journal of Adolescence*, 22(2), 223–242.
- Byrd, R. C. (1988). Positive therapeutic effects of intercessory prayer in a coronary care unit population. *Southern Medical Journal*, 81(7), 826–829.
- Campbell, C. (1999). Action as will-power. *Sociological Review*, 47(1), 48–61.
- Cassel, J. (1976). The contribution of the social environment to host resistance: The fourth Wade Hampton Frost lecture. *American Journal of Epidemiology*, 104(2), 107–123.
- Chatters, L. M. (2000). Religion and health: Public health research and practice. *Annual Review of Public Health*, 21, 335–367.
- Cole, B. S., & Pargament, K. I. (1999). Spiritual surrender: A paradoxical path to control. In W. R. Miller (Ed.), *Integrating spirituality into treatment* (pp. 179–198). Washington, DC: American Psychological Association.
- Conti, J. M. (1999). The effects of intercessory prayer and transpersonal positive visualization on a hemodialysis population. PhD dissertation, University of Massachusetts.
- Davis, J. A. (1985). *The logic of causal order*. Newbury Park, CA: Sage.
- Dombeck, M. T. (1998). The spiritual and pastoral dimensions of care in interprofessional contexts. *Journal of Interprofessional Care*, 12(4), 361–372.
- Dubos, R. J. (1959). *Mirage of health: Utopias, progress, and biological change*, 1st edn. New York: Harper.
- Duckro, P. N., Magaletta, P., & Wolf, A. (1997). Health behavior in religious communities. In S. G. David (Ed.), *Handbook of health behavior research, vol. 3: Demography, development, and diversity* (pp. 305–322). New York: Plenum.
- Dull, V. T., & Skokan, L. A. (1995). A cognitive model of religion's influence on health. *Journal of Social Issues*, 51(2), 49–64.
- Ellison, C. G., & Anderson, K. L. (2001). Religious involvement and domestic violence among US couples. *Journal for the Scientific Study of Religion*, 40(2), 269–286.
- Ellison, C. G., & Levin, J. S. (1998). The religion–health connection: Evidence, theory, and future directions. *Health Education and Behavior*, 25(6), 700–720.
- Emmons, R. A. (1999). *The psychology of ultimate concerns: Motivation and spirituality in personality*. New York: Guilford.
- Fetzer Institute/National Institute on Aging Working Group. (1999). *Multidimensional measurement of religiousness/spirituality for use in health research*. Kalamazoo, MI: Fetzer Institute.
- Flinders, T., Gershwin, M., & Flinders, R. (1994). *The RISE response: Illness, wellness, and spirituality*. New York: Crossroads.
- Frank, J. (1975). The faith that heals. *Johns Hopkins Medical Journal*, 137(3), 127–131.
- Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition and Emotion*, 12(2), 191–220.
- Friedman, H. S., Tucker, J. S., Schwartz, J. E., Martin, L. R., Tomlinson-Keasey, C., Wingard, D. L., & Criqui, M. H. (1995). Childhood conscientiousness and longevity: Health behaviors and cause of death. *Journal of Personality and Social Psychology*, 68(4), 696–703.
- Galton, F. (1872). Statistical inquiries into the efficacy of prayer. *Fortnightly Review*, 18, 125–135.
- Goodwin, J. S., & Goodwin, J. M. (1984). The tomato effect. Rejection of highly efficacious therapies. *Journal of the American Medical Association*, 251(18), 2387–2390.
- Gorsuch, R. L. (1995). Religious aspects of substance abuse and recovery. *Journal of Social Issues*, 51(2), 65–83.
- Gould, S. J. (1999). Non-overlapping magisteria (reprinted from Leonardo's Mountain of clams and the diet of worms, 1998). *Skeptical Inquirer*, 23(4), 55–61.
- Greenland, S., Pearl, J., & Robins, J. M. (1999). Causal diagrams for epidemiologic research. *Epidemiology*, 10(1), 37–48.

- Harris, W. S., Gowda, M., Kolb, J. W., Strychacz, C. P., Vacek, J. L., Jones, P. G., Forker, A., O'Keefe, J. H., & McCallister, B. D. (1999). A randomized, controlled trial of the effects of remote, intercessory prayer on outcomes in patients admitted to the coronary care unit. *Archives of Internal Medicine, 159*(19), 2273-2278.
- Hathaway, W. L., & Pargament, K. I. (1990). Intrinsic religiousness, religious coping, and psychosocial competence: A covariance structure analysis. *Journal for the Scientific Study of Religion, 29*(4), 423-441.
- Hendershot, G. E. (1983). Coitus-related cervical cancer risk factors: Trends and differentials in racial and religious groups. *American Journal of Public Health, 73*(3), 299-301.
- Hill, P. C. (2001). *Spiritual transformation: Forming the habitual center of personal energy*. Presidential Address to Division 36 (Psychology of Religion) of the American Psychological Association, 26 August 2001, San Francisco, CA.
- House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science, 241*(4865), 540-545.
- House, J. S., Robbins, C., & Metzner, H. L. (1982). The association of social relationships and activities with mortality: Prospective evidence from the Tecumseh Community Health Study. *American Journal of Epidemiology, 116*(1), 123-140.
- Hummer, R. A., Rogers, R. G., Nam, C. B., & Ellison, C. G. (1999). Religious involvement and US Adult mortality. *Demography, 36*(2), 273-285.
- Idler, E. L. (1995). Religion, health, and nonphysical senses of self. *Social Forces, 74*(2), 683-704.
- Idler, E. L., & Kasl, S. V. (1992). Religion, disability, depression, and the timing of death. *American Journal of Sociology, 97*(4), 1052-1079.
- Idler, E. L., & Kasl, S. V. (1997). Religion among disabled and nondisabled persons. II. Attendance at religious services as a predictor of the course of disability. *Journals of Gerontology. Series B, Psychological Sciences and Social Sciences, 52*(6), S306-S316.
- James, W. (1961 [1902]). *The varieties of religious experience: A study in human nature*. New York: Collier.
- Jarvis, G. K., & Northcott, H. C. (1987). Religion and differences in morbidity and mortality. *Social Science and Medicine, 25*(7), 813-824.
- Kiecolt-Glaser, J. K., & Glaser, R. (1995). Psycho-neuroimmunology and health consequences: Data and shared mechanisms. *Psychosomatic Medicine, 57*(3), 269-274.
- Kleinman, A., & Becker, A. E. (1998). 'Sociosomatics': The contributions of anthropology to psychosomatic medicine. *Psychosomatic Medicine, 60*(4), 389-393.
- Koenig, H. G., Cohen, H. J., George, L. K., Hays, J. C., Larson, D. B., & Blazer, D. G. (1997). Attendance at religious services, interleukin-6, and other biological parameters of immune function in older adults. *International Journal for Psychiatry in Medicine, 27*(3), 233-250.
- Koenig, H. G., Idler, E., Kasl, S., Hays, J. C., George, L. K., Musick, M., Larson, D. B., Collins, T. R., & Benson, H. (1999). Religion, spirituality, and medicine: A rebuttal to skeptics. *International Journal for Psychiatry in Medicine, 29*, 123-131.
- Koenig, H. G., McCullough, M. E., & Larson, D. B. (2001). *Handbook of religion and health*. New York: Oxford University Press.
- Krause, N. (1995). Assessing stress-buffering effects: A cautionary note. *Psychology and Aging, 10*(4), 518-526.
- Krause, N. (1997). Religion, aging, and health: Current status and future prospects. *Journals of Gerontology. Series B, Psychological Sciences and Social Sciences, 52*(6), S291-S293.
- Krieger, N. (1994). Epidemiology and the web of causation: Has anyone seen the spider? *Social Science and Medicine, 39*(7), 887-903.
- Kurtz, P. (1999). Shall skeptical inquiry be applied to religion? *Skeptical Inquirer, 23*(4), 24-28.
- Levin, J. S. (1996a). How prayer heals: A theoretical model. *Alternative Therapies in Health and Medicine, 2*(1), 66-73.
- Levin, J. S. (1996b). How religion influences morbidity and health: Reflections on natural history, salutogenesis and host resistance. *Social Science and Medicine, 43*(5), 849-864.
- Levin, J. (2001). God, love, and health: Findings from a clinical study. *Review of Religious Research, 42*(3), 277-293.
- Levin, J. S., & Markides, K. S. (1986). Religious attendance and subjective health. *Journal for the Scientific Study of Religion, 25*(1), 31-40.
- Levin, J. S., & Schiller, P. L. (1987). Is there a religious factor in health? *Journal of Religion & Health, 26*(1), 9-36.
- Levin, J. S., & Vanderpool, H. Y. (1987). Is frequent religious attendance really conducive to better health? Toward an epidemiology of religion. *Social Science and Medicine, 24*(7), 589-600.
- Levin, J. S., & Vanderpool, H. Y. (1989). Is religion therapeutically significant for hypertension? *Social Science and Medicine, 29*(1), 69-78.
- Lukoff, D., Turner, R., & Lu, F. (1992). Transpersonal psychology research review: Psychoreligious dimensions of healing. *Journal of Transpersonal Psychology, 24*(1), 41-60.
- Matthews, D. A., McCullough, M. E., Larson, D. B., Koenig, H. G., Swyers, J. P., & Milano, M. G. (1998). Religious commitment and health status: A review of the research and implications for family medicine. *Archives of Family Medicine, 7*(2), 118-124.

- Matthews, G., & Wells, A. (1996). Attentional processes, dysfunctional coping, and clinical intervention. In M. Zeidner & N. S. Endler (Eds.), *Handbook of coping: Theory, research, applications* (pp. 573–601). New York: Wiley.
- McCullough, M. E., Hoyt, W. T., Larson, D. B., Koenig, H. G., & Thoresen, C. (2000). Religious involvement and mortality: A meta-analytic review. *Health Psychology, 19*(3), 211–222.
- McCullough, M. E., & Snyder, C. R. (2000). Classical source of human strength: Revisiting an old home and building a new one. *Journal of Social & Clinical Psychology, 19*(1), 1–10.
- McEwen, B. S. (1998). Protective and damaging effects of stress mediators. *New England Journal of Medicine, 338*(3), 171–179.
- McMichael, A. J. (1999). Prisoners of the proximate: Loosening the constraints on epidemiology in an age of change. *American Journal of Epidemiology, 149*(10), 887–897.
- Melnechuk, T. (1985). Why has psychoneuroimmunology been controversial? Proponents and skeptics at a scientific conference. *Advances in Mind-Body Medicine, 2*(4), 22–38.
- Meyer, I. H., & Schwartz, S. (2000). Social issues as public health: Promise and peril. *American Journal of Public Health, 90*(8), 1189–1191.
- Miller, T. Q. (1997). Statistical methods for describing temporal order in longitudinal research. *Journal of Clinical Epidemiology, 50*(10), 1155–1168.
- Miller, W. R. (1998). Researching the spiritual dimensions of alcohol and other drug problems. *Addiction, 93*(7), 979–990.
- Miller, W. R., & Thoresen, C. E. (1999). Spirituality and health. In W. R. Miller (Ed.), *Integrating spirituality into treatment: Resources for practitioners* (pp. 3–18). Washington, DC: American Psychological Association.
- Miller, W., & Thoresen, C. E. (in press). Spirituality and health: An emerging research field. *American Psychologist*.
- Oman, D., Hedberg, J., Downs, D., & Parsons, D. (in press). A transcultural spiritually-based program to enhance professional caregiving self-efficacy. *Complementary Health Practice Review*.
- Oman, D., Kurata, J. H., Strawbridge, W. J., & Cohen, R. D. (2002). Religious attendance and cause of death over 31 years. *International Journal for Psychiatry in Medicine, 32*(1), 69–89.
- Oman, D., & Reed, D. (1998). Religion and mortality among the community-dwelling elderly. *American Journal of Public Health, 88*(10), 1469–1475.
- Oman, D., & Thoresen, C. E. (in press). Spiritual modeling: A key to spiritual and religious growth? *The International Journal for the Psychology of Religion*.
- Oxman, T. E., Freeman, D. H. Jr, & Manheimer, E. D. (1995). Lack of social participation or religious strength and comfort as risk factors for death after cardiac surgery in the elderly. *Psychosomatic Medicine, 57*(1), 5–15.
- Pargament, K. I. (1997). *The psychology of religion and coping: Theory, research, practice*. New York: Guilford.
- Park, C. L., & Folkman, S. (1997). Meaning in the context of stress and coping. *Review of General Psychology, 1*(2), 115–144.
- Plante, T. G., & Sherman, A. C. (Eds.) (2001). *Faith and health: Psychological perspectives*. New York: Guilford.
- Poloma, M. M., & Gallup, G. H. (1991). Unless you forgive others: Prayer and forgiveness. In *Varieties of prayer* (pp. 85–106). Philadelphia, PA: Trinity.
- Post, S. G., Puchalski, C. M., & Larson, D. B. (2000). Physicians and patient spirituality: Professional boundaries, competency, and ethics. *Annals of Internal Medicine, 132*(7), 578–583.
- Powell, L. H., Shahabi, L., & Thoresen, C. E. (in press). Religion/spirituality: Linkages to physical health. *American Psychologist*.
- Rabin, B. S. (1999). Religion in medicine [letter]. *Lancet, 353*(9166), 1803–1804.
- Ribisl, K. M., & Humphreys, K. (1998). Collaboration between professionals and mediating structures in the community: Toward a 'third way' in health promotion. In S. A. Shumaker & E. B. Schron (Eds.), *The handbook of health behavior change*, 2nd edn (pp. 535–554). New York: Springer.
- Richards, T. A., Acree, M., & Folkman, S. (1999). Spiritual aspects of loss among partners of men with AIDS: Postbereavement follow-up. *Death Studies, 23*(2), 105–127.
- Roland, C. G. (1970). Does prayer preserve? *Archives of Internal Medicine, 125*(4), 580–581 passim.
- Roush, W. (1997). Herbert Benson: Mind-body maverick pushes the envelope [news]. *Science, 276*(5311), 357–359.
- Rozanski, A., Blumenthal, J. A., & Kaplan, J. (1999). Impact of psychological factors on the pathogenesis of cardiovascular disease and implications for therapy. *Circulation, 99*(16), 2192–2217.
- Schmitt, M. (1994). USA: Focus on interprofessional practice, education, and research. *Journal of Interprofessional Care, 8*(1), 9–18.
- Schoenbach, V. J., Kaplan, B. H., Friedman, L., & Kleinbaum, D. G. (1986). Social ties and mortality in Evans County, Georgia. *American Journal of Epidemiology, 123*(4), 577–591.
- Shams, M., & Jackson, P. R. (1993). Religiosity as a predictor of well-being and moderator of the psychological impact of unemployment. *British Journal of Medical Psychology, 66*(4), 341–352.
- Sicher, F., Targ, E., Moore, D. II, & Smith, H. S. (1998). A randomized double-blind study of the effect of

- distant healing in a population with advanced AIDS. Report of a small scale study. *Western Journal of Medicine*, 169(6), 356-363.
- Sloan, R. P., Bagiella, E., & Powell, T. (1999). Religion, spirituality, and medicine. *Lancet*, 353(9153), 664-667.
- Sloan, R. P., Bagiella, E., VandeCreek, L., Hover, M., Casalone, C., Hirsch, T. J., Hasan, Y., Kreger, R., & Poulos, P. (2000). Should physicians prescribe religious activities? *New England Journal of Medicine*, 342(25), 1913-1916.
- Smith, J. C. (1986). Meditation, biofeedback, and the relaxation controversy: A cognitive-behavioral perspective. *American Psychologist*, 41(9), 1007-1009.
- Strawbridge, W. J., Cohen, R. D., Shema, S. J., & Kaplan, G. A. (1997). Frequent attendance at religious services and mortality over 28 years. *American Journal of Public Health*, 87(6), 957-961.
- Strawbridge, W. J., Shema, S. J., Cohen, R. D., & Kaplan, G. A. (2001). Religious attendance increases survival by improving and maintaining good health practices, mental health, and stable marriages. *Annals of Behavioral Medicine*, 23(1), 68-74.
- Targ, E. (1997). Evaluating distant healing: A research review. *Alternative Therapies in Health and Medicine*, 3(6), 74-78.
- Thomson, K. S. (1996). The revival of experiments on prayer. *American Scientist*, 84, 532-534.
- Thoresen, C. E. (1999). Spirituality and health: Is there a relationship? [Special issue on spirituality and health.] *Journal of Health Psychology*, 4(3), 293-300.
- Thoresen, C. E., & Harris, A. H. S. (in press). Spirituality and health: What's known and what's needed? *Annals of Behavioral Medicine*.
- Tremblay, P. F., & Gardner, R. C. (1996). On the growth of structural equation modeling in psychological journals. *Structural Equation Modeling*, 3(2), 93-104.
- Troyer, H. (1988). Review of cancer among 4 religious sects: Evidence that life-styles are distinctive sets of risk factors. *Social Science and Medicine*, 26(10), 1007-1017.
- Tuggle, M. B. (2000). *It is well with my soul: Churches and institutions collaborating for public health*. Washington, DC: American Public Health Association.
- Umberson, D. (1987). Family status and health behaviors: Social control as a dimension of social integration. *Journal of Health and Social Behavior*, 28(3), 306-319.
- Ursin, H. (1998). The psychology in psychoneuroendocrinology. *Psychoneuroendocrinology*, 23(6), 555-570.
- Wallace, J. M. Jr, & Forman, T. A. (1998). Religion's role in promoting health and reducing risk among American youth. *Health Education and Behavior*, 25(6), 721-741.
- Winemiller, D. R., Mitchell, M. E., Sutliff, J., & Cline, D. J. (1993). Measurement strategies in social support: A descriptive review of the literature. *Journal of Clinical Psychology*, 49(5), 638-648.
- Yates, J. W., Chalmer, B. J., St James, P., Follansbee, M., & McKegey, F. P. (1981). Religion in patients with advanced cancer. *Medical and Pediatric Oncology*, 9(2), 121-128.
- Zuckerman, D. M., Kasl, S. V., & Ostfeld, A. M. (1984). Psychosocial predictors of mortality among the elderly poor. The role of religion, well-being, and social contacts. *American Journal of Epidemiology*, 119(3), 410-423.