

## CHAPTER FIFTEEN

### Religion and Health

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#### Depressive Symptoms and Mortality as Case Studies

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Most scholars who study the links between religion and health – whether they specialize in sociology, psychology, gerontology, epidemiology, or some other field – rely heavily on sociological foundations. As Idler and Kasl (1997) succinctly explained, Durkheim's (1897/1951) sociological study of suicide and Weber's (1922/1993) sociology of religion have described three pathways by which religion might affect human health and well-being. First, Durkheim noted that religion tends to provide, in Idler and Kasl's (1997) words, a "*regulative function*" (p. S294). Many religions provide rules that are considered by adherents to be binding not only in religious, spiritual, and ethical matters, but in the most basic human concerns, including eating, drinking, and sexual intimacy. Indeed, it seems uncanny how discoveries in biomedical science concerning the major vectors for the greatest health problems of the modern world (e.g., cardiovascular disease, cancer, diabetes, obesity, HIV/AIDS) have shown the great practicality of the prescriptions and proscriptions of many religions regarding alcohol, tobacco, food, and sex.

Idler and Kasl (1997) additionally pointed out that Durkheim supposed that religion also can have an "*integrative function*" (p. S294), providing people with meaningful and tangible connections to other people, fostering the transfer of social capital. Not only can these social connections provide people with a subjective sense of belonging to a group and the perception that they are loved and cared for by other people, they also can put people who lack specific tangible resources (e.g., food, housing, clothing, safety, money, transportation, job prospects) into contact with people who are willing and able to help them acquire these tangible resources. A more indirect but no less tangible way that religion might serve an integrative function is by promoting the creation of new institutions (e.g., hospitals, clinics, hospices, shelters, after-school programs for children) or the rehabilitation of existing ones (e.g., safer and cleaner neighborhoods and housing options) so that the environments in which people live are less dangerous and more conducive to health and well-being. It is interesting to note that insofar as religion is successful in promoting such broad improvements to people's living and working environments, and insofar as these improvements are equally available to people of all religious persuasions, these improvements should actually minimize

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health differences among people of varying degrees of religiousness or varying religious persuasions.

Finally, Idler and Kasl (1997) described Weber's (1922/1993) notion that religion can provide meaning and coherence to people's understandings of their lives and their worlds. Coherent worldviews might be especially valuable when people endure personal stress or undergo developmentally significant changes in life, such as illness, bereavement, job loss, or transition to long-term care. Specifically, religion might help to relieve emotional suffering by providing religious interpretations for people's physical or mental suffering, thereby helping them to maintain coherent life narratives. Also religion can provide consolation during such times of stress by encouraging people to look forward to ultimate and divine resolutions of their problems – either in this life or the next. As George, Larson, Koenig, and McCullough (2000) pointed out, however, religion can also lead to malevolent religious explanations for suffering, which appear to exert a negative effect on health (e.g., Pargament, Koenig, Tarakeshwar, and Hahn 2001; see also Pargament 1997).

In the decades that have passed since Durkheim's and Weber's works were published, many investigators have examined one or more aspects of the links of religion to mental and physical health, typically invoking one or more of the explanations that Durkheim or Weber offered so many years ago. Indeed, while preparing a recent handbook specifically devoted to the topic (Koenig, McCullough, and Larson 2001), we identified hundreds of studies investigating relationships between religion and health. These studies were remarkably diverse in scope, quality, and objectives, reflecting the fact that scholars have presumed that religious considerations are potentially relevant to nearly every important aspect of health and well-being. Indeed, Koenig et al. (2001) devoted individual chapters to eight specific dimensions of mental health or interpersonal functioning (well-being, depression, suicide, anxiety disorders, schizophrenia and other psychoses, alcohol/drug use, delinquency, and marital stability) and nine dimensions of physical health (heart disease, hypertension, cardiovascular disease, immunity, cancer, mortality, disability, pain, and health behaviors).

Because no single chapter could present an in-depth review of the entire body of research on religion and health, in the present chapter we focus on the relationships of religiousness to one measure of physical health – mortality – and one measure of mental health – depressive symptoms. We use our recent meta-analyses of the research regarding the association of religion with these two health issues (McCullough, Hoyt, Larson, Koenig, and Thoresen 2000; Smith, McCullough, and Poll 2002) to illustrate what modern research has revealed regarding the religion-health relationship more broadly. We then discuss some issues raised by the existing research that, we believe, deserve further attention in the years to come.

### **RELIGION AND MENTAL HEALTH: DEPRESSION AS A CASE STUDY**

Researchers have investigated the links between religion and mental health in hundreds of studies, and several major reviews have been published during the past decade (e.g., Batson, Schoenrade, and Ventis 1993; Gartner 1996; George et al. 2000; Koenig et al. 2001; Payne, Bergin, Bielema, and Jenkins 1991). Although the findings are complex and sometimes inconsistent, many empirical studies indicate that people who are religiously devout, but not extremists, tend to report greater subjective well-being and

life satisfaction, greater marital satisfaction and family cohesion, more ability to cope with stress and crises, less worry, and fewer symptoms of depression. For the purposes of this chapter, the research on religious involvement and depression provides a case study for this corpus of research.

### Studies Establishing a Relationship

Several recent studies (e.g., Braam et al. 2001; Murphy et al. 2000) indicate that certain aspects of religiousness (e.g., public religious involvement, intrinsic religious motivation) may be inversely related to depressive symptoms. Notably, Braam et al. (2001) reported that public religious involvement (viz., church attendance) was inversely related to depression among the elderly individuals from European countries who were included in the EURODEP collaboration. These results were similar at the individual and national levels, with the effects being strongest among women and Roman Catholics.

Murphy et al. (2000) found that symptoms of depression among 271 clinically depressed adults were negatively correlated with religious beliefs, even after controlling for age, race, gender, marital status, and educational level. A path model indicated that religious beliefs had both a direct effect on symptoms of depression and an indirect effect when symptoms of hopelessness were included as a mediator.

Schnittker (2001) examined the association of religious involvement with symptoms of depression using a nationally representative longitudinal data set of 2,836 adults from the general population. He found that although religious *attendance* had no significant relationship with symptoms of depression once demographic and physical health variables were controlled, there was a significant curvilinear association between religious *salience* and symptoms of depression. Specifically, individuals who did not see themselves as religious and individuals who saw themselves as extremely religious had higher symptoms of depression than those who considered themselves moderately religious. Moreover, he also found evidence that religious beliefs acted as a buffer against distress. The negative correlation between religiosity and symptoms of depression was of greater magnitude for individuals who experienced multiple life stressors compared to other individuals.

Koenig et al. (1998) reported that among eighty-seven clinically depressed older adults who were followed for one year beyond the onset of depression, intrinsic religiousness was directly proportional to the speed with which their depressive episodes abated. Specifically, Koenig et al. estimated that every ten-point increase in people's raw scores on a self-report measure of intrinsic religious motivation was associated with a 70 percent increase in the speed of remission of depressive symptoms. This association appeared to be even stronger among subjects whose physical disabilities did not improve over the follow-up period. This association persisted even after researchers controlled for several important potential confounding variables.

### Conclusions from a Meta-Analytic Review

Because so many studies have addressed the associations of religious involvement and depression, we (Smith, McCullough, and Poll 2002) recently completed a meta-analytic review of these studies. We located 150 studies (involving nearly one hundred thousand

participants total) that had addressed the cross-sectional association of one or more measures of religiousness with one or more measures of depressive symptoms. Among these studies, the mean association of religiousness and depressive symptoms was a modest  $r = -.126$ , suggesting that people with high levels of religiousness have slightly lower reports of depressive symptoms.

As is typical in meta-analyses, our main conclusions did not apply equally to people from all backgrounds. Although the religiousness-depression relationship was approximately the same size for women (mean  $r = -.126$ ) as for men (mean  $r = -.125$ ), we did find evidence that religiousness may be associated more negatively with depressive symptoms for African Americans (mean  $r = -.121$ ) than for European Americans ( $r = -.085$ ). However, our ability to detect ethnic differences was rather limited.

We also found some rather complex age trends: The religiousness-depression relationship was very small during adolescence and the college years (mean  $r$ s =  $-.06$  and  $-.13$ ), then reached a local minimum (i.e., mean  $r = -.17$ ) during early adulthood (i.e., ages twenty-five–thirty-five). The association then appeared to decrease in strength again through mid-adulthood (mean  $r = -.11$  for adults ages thirty-six–forty-five, mean  $r = -.051$  for adults ages forty-six–fifty-five, and mean  $r = -.07$  for adults ages fifty-six–sixty-five). In older adulthood, the association strengthened again to  $r = -.18$  for adults ages sixty-six–seventy-five and  $r = -.21$  for adults ages seventy-six and older. Thus, the association of religiousness and depression appeared to be most strongly negative for people in early adulthood and those beyond age sixty-five.

In addition, we found evidence for some interesting differences in the religiousness-depression relationship as a function of how religion was measured. In particular, measures of intrinsic religious motivation (i.e., the extent to which one views religion as the “master motive” in one’s life; Allport and Ross 1967) and measures of “positive” religious coping (e.g., Pargament et al. 1997) were moderately negatively related to depressive symptoms ( $r$ s =  $-.197$  and  $-.177$ , respectively), whereas extrinsic religious motivation (i.e., involvement in religion as a means to other ends) and negative forms of religious coping were related *positively* to depressive symptoms (mean  $r$ s =  $+.145$  and  $+.140$ , respectively). These findings suggest that assessment of the motivational aspects of religiousness as well as the specific ways people use religion to cope with stress may provide particularly useful windows for examining the possible impact of religious involvement on depressive symptoms.

Relatedly, we found some evidence that the association of religiousness and depression was most strongly negative in studies in which participants could be assumed to be under severe levels of life stress. We read descriptions of the participants of the study to infer the amount of life stress that the participants in each sample were likely to be experiencing (minimal, mild to moderate, or severe). Among samples of people whom we perceived to be undergoing minimal life stress, the expected association of religiousness and depressive symptoms was  $r = -.10$ . Among samples of people whom we perceived to be undergoing mild to moderate life stress, the correlation dropped to  $r = -.17$ , and among samples of people whom we perceived to be undergoing severe life stress, the correlation dropped slightly further to  $r = -.19$ . Thus, we think there is good reason to believe that the so-called protective effects of religious involvement against depressive symptoms are at their strongest when people are undergoing highly stressful life events (Cohen and Wills 1985; Schnittker 2001). Given that stress contributes to the onset and exacerbation of nearly all physical ailments, the finding of a stress-buffering

effect in the research specific to depression has potentially strong implications for the relationship between religion and physical health.

### RELIGION AND PHYSICAL HEALTH: MORTALITY AS A CASE STUDY

Recent scholarship that is increasing in both quantity and quality has indicated that religiousness can promote physical health and well-being. Religion has been found to be a factor in deterring nearly every malady, from cancer to heart disease (Koenig et al. 2001). McCullough et al. (2000) reasoned that if religiousness promotes physical health, then there should be evidence that religiousness is consistently related to the ultimate measure of physical health – length of life. Several investigators have found measures of public religious involvement, such as frequency of attendance at religious services or other forms of public religious activity, to be associated with lower mortality, both in U.S. samples (Comstock and Tonascia 1977; Seeman, Kaplan, Knudsen, Cohen, and Guralnik 1987; Goldman, Korenman, and Weinstein 1995; Hummer, Rogers, Nam, and Ellison 1999; Oman and Reed 1998; Strawbridge, Cohen, Shema, and Kaplan 1997) and elsewhere (e.g., Goldbourt, Yaari, and Medalie 1993).

#### Studies Establishing a Relationship

Strawbridge, Cohen, Shema, and Kaplan (1997) conducted a twenty-eight-year longitudinal project with data from the Alameda County study to examine the relationship between religious attendance and all-cause mortality from 1968 to 1994. They found that frequent religious attendance in 1968 was related to lower hazard of death during the ensuing twenty-eight years. Although adjustments for baseline health status accounted for some of the religious attendance-mortality relationship, the adjusted relationship was still significant, with a relative hazard = .67 (i.e., the probability of dying in any given year, given the number of respondents alive during the previous year, was only 67 percent as large for people who frequently attended religious services as it was for people who attended less frequently). Strawbridge et al. also found that people who frequently attended religious services in 1968 were less likely to smoke or drink heavily than were people who attended religious services less frequently. Religious service attenders also had more social connections than did infrequent religious service attenders.

An important finding of Strawbridge et al. was that those who attended religious services frequently were more likely to improve their health behaviors during the twenty-eight years that ensued. Even after adjusting for initial differences in health behaviors, frequent attenders were more likely than were infrequent attenders to (a) quit smoking, (b) reduce their drinking, (c) increase their frequency of exercising, (d) stay married to the same person, and (e) increase their number of social contacts. Thus religious attendance was related to *positive changes* in the study population's health behaviors, changes that might have been in part responsible for the relationship of religious attendance and mortality. It was interesting that religious people were significantly *more* likely to become obese during the twenty-eight years of the study – a finding that has been replicated by Oman and Reed (1998) and others. [Koenig et al. (2001) noted that obesity is a behavioral risk factor for which religious people have a consistently elevated risk.]

A recent prospective study of 3,968 community-dwelling older adults from the Piedmont region of North Carolina (Koenig, Hays, Larson, George, Cohen, McCullough, Meador, and Blazer 1999) yielded evidence that frequency of attendance at religious services was related to significantly reduced hazard of dying over the six-year study period. After controlling for potential sociodemographic and health-related confounds, Koenig et al. found that the relative hazard of dying for frequent attenders of religious services remained relatively low (for women,  $RH = .51$ ,  $CI = 0.43-0.59$ ; for men,  $RH = .63$ ,  $CI = 0.52-0.75$ ). After adjusting the association for explanatory variables such as social support and health behaviors (including cigarette smoking, alcohol consumption, and body mass index), the religion-mortality association became appreciably weaker (for women,  $RH = 0.65$ ,  $CI = 0.55-0.76$ ; for men,  $RH = 0.83$ ,  $CI = 0.69-1.00$ ). These results indicate that being involved in public religious activity – namely, attendance at religious services – was associated with a reduction in mortality. Part of this association was attributable to potential confounds (e.g., gender, ethnicity, education, number of health conditions, self-rated health), and part was attributable to the influence of church attendance on well-established risk factors for early death.

In what is perhaps the most far-reaching study on religion and mortality to date, Hummer, Rogers, Nam, and Ellison (1999) followed a nationally representative sample of over twenty-one thousand adults from 1987 to 1995. In 1987, respondents completed a single-item measure of frequency of attendance at religious services, along with a variety of other measures to assess demographics, socioeconomic status, health, social ties, and health behaviors. Hummer and his colleagues found that frequent religious attendance was positively related to length of life. People of both sexes who attended religious services more than once per week were estimated to live for 62.9 years beyond age twenty. For those who attended once per week, life expectancy beyond age twenty was 61.9 years. For those who attended less than once per week, life expectancy beyond age twenty was 59.7 years. Finally, for those who reported never attending religious services, the life expectancy beyond age twenty was 55.3 years. This represents a 7.6-year survival differential between the frequent attenders and the nonattenders.

After controlling for a variety of potential confounds and mediators that could explain the association of religious involvement and longevity (including age, gender, health, social status, social support, cigarette smoking, alcohol use, and body mass index), people who frequently attended religious services still appeared to survive longer than did those who did not attend. Indeed, people who reported never attending religious services had an 87 percent higher risk of dying during the follow-up period than did people who attended religious service more than once per week. People who attended religious services, but less frequently than “more than once per week” also experienced longer survival than did those who did not attend.

Because Hummer et al. (1999) worked with such a large data set, they were able to explore the association of religious involvement with death from specific causes including circulatory diseases, cancer, respiratory diseases, diabetes, infectious diseases, external causes, and all other causes. Religious attendance was associated with lower hazard of death from most causes, including circulatory diseases, respiratory diseases, diabetes, infectious diseases, and external causes. One notable exception was that religious attendance did not appear to be related to a reduced risk of dying from cancer. When demographics, health, socioeconomic status, social ties, and health behaviors were controlled, most of these survival differences became statistically nonsignificant,

although the direction of the associations still indicated that frequent attenders were living slightly longer lives than were nonattenders. The fact that religious involvement was related to reduced mortality by so many causes led Hummer and colleagues to propose that religious involvement might actually be one of the "fundamental causes" of longevity: Because each of the major causes of death has its own specific etiology, the so-called effects of religious involvement on mortality must influence mortality through a variety of casual patterns; thus controlling any single mechanism or cause of death should not cause the religion-mortality association to disappear.

Is the religion-mortality association a strictly American phenomenon? Perhaps not, although the data from other places in the world are scant and preliminary. Goldbourt, Yaari, and Medalie (1993) followed a sample of 10,059 male Israeli government workers for twenty-three years to examine the predictors of mortality. They assessed religious orthodoxy using a three-item measure consisting of (a) whether the respondent received a religious or secular education; (b) whether the respondent defined himself as "orthodox," "traditional," or "secular"; and (c) how frequently the respondent attended synagogue. Unadjusted data indicated that each standard unit increase in orthodoxy was associated with a 16 percent increase in odds of survival through the twenty-three-year follow-up period. (These data were adjusted for age, but were not adjusted for other demographic, biomedical, and psychosocial variables.)

Of course, not all investigations of the association of religious involvement and mortality have revealed favorable associations (e.g., Idler and Kasl 1992; Janoff-Bulman and Marshall 1982; LoPrinzi et al. 1994; Pargament et al. 2001; Reynolds and Nelson 1981). For example, Koenig et al. (1998) studied whether the use of religion as a source of coping was a predictor of all-cause mortality in a sample of 1,010 older adult males who were hospitalized for medical illness. These 1,010 patients were followed for an average of nine years. At the beginning of their involvement in the study, patients completed a three-item measure of the extent to which they used their religion to cope with stress. In both bivariate analyses and multivariate analyses in which the investigators statistically adjusted for demographic, social, and medical differences among the patients, those who relied heavily on religion for coping did not live any longer than did patients who did not rely heavily on religion for coping. Idler and Kasl (1992) reported similar results from analyses of a sample of basically healthy, community-dwelling older adults.

Moreover, Pargament et al. (2001) recently reported that in a sample of medically ill adults people who believed that their illnesses were signs that God had abandoned them or was punishing them, or who believed that the Devil was creating their illnesses, had *shorter* lives, even after controlling for a variety of demographic, physical health, and mental health variables.

### Conclusions from a Meta-Analytic Review

After conducting an extensive search, for published and unpublished studies relevant to the topic (using electronic databases, searches through the reference sections of relevant studies, and leads from other investigators), we retrieved forty-two independent estimates of the association, or *effect sizes*, for religious involvement and mortality, incorporating data from 125,826 people. We coded these forty-two effect sizes for a variety of qualities, including (a) how religiousness was measured; (b) percentage of males and

females in the sample; (c) number of statistical adjustments made to the association; and (d) whether the sample was composed of basically healthy community-dwelling adults or medical patients. We also determined whether each of fifteen putative confounds and mediators of the religiousness-mortality association were controlled: Race, income, education, employment status, functional health, self-rated health, clinical or biomedical measures of physical health, social support, social activities, marital status, smoking, alcohol use, obesity/body mass index, mental health or affective distress, and exercise.

Using these forty-two effect sizes (which were adjusted for a variety of covariates of religion and mortality in the studies from which we derived them), we found an association of religious involvement and mortality equivalent to an odds ratio (OR) = 1.29, indicating that religious people had, on average, a 29 percent higher chance of survival during any follow-up period than did less-religious people. Another way to describe this association is to say that religious people had, on average, only  $1/1.29 = 77.5$  percent of the odds of dying during any specified follow-up period than did less religious people.

A major concern with meta-analysis is the possibility that the studies included are a biased sample of the population of studies, and thus might fail to represent accurately the population estimate. To examine the sensitivity of our meta-analytic conclusions to this particular threat to their validity, we calculated a fail-safe  $N$  (Rosenthal 1979), which indicated that 1,418 effect sizes with a mean odds ratio of 1.0 (i.e., literally no relationship of religious involvement and mortality) would be needed to overturn the significant overall association of religious involvement and mortality (i.e., to render the resulting mean effect size nonsignificant,  $p > .05$ , one-tailed). The large number of nonsignificant results that would be needed to overturn these findings makes it extremely unlikely that our estimate of the association of religiousness and mortality was solely due to having worked with an uncharacteristically favorable set of studies in our meta-analysis, since it seems rather improbable that so many studies yielding, on average, null results could have been conducted but not published.

Nonetheless, there was a considerable amount of variability among the forty-two effect size estimates included in our meta-analysis. Through a series of subsidiary analyses, we identified several variables that helped to explain these variations in effect size.

First, studies that used measures of public religious involvement (e.g., frequency of attendance at religious services, membership in religious social groups, membership in religious kibbutzim versus secular kibbutzim) tended to yield larger effect sizes than did studies that focused on measures of private religious practice (e.g., frequency of private prayer, use of religious coping), measures that combined indicators of public and private religious activity, and measures that could not be identified due to insufficient information in the study reports. Indeed, studies that used measures of public religious involvement yielded an omnibus effect size of  $OR = 1.43$ : that is, after researchers controlled for covariates, they found that people high in public religious involvement had 43 percent higher odds of being alive at follow-up. In contrast, the association of religious involvement and mortality for effect sizes that used nonpublic measures of religious practice was nearly zero ( $OR = 1.04$ ). This finding suggests that mortality is linked to involvement in public religious activity to a much greater extent than to measures of other dimensions of religiousness.



Another important predictor of effect size was the percentage of males in the study sample. We estimated that a sample with 100 percent males would yield an effect size of  $OR = 1.33$ , whereas a sample of 100 percent females would yield an effect size of  $OR = 1.59$ . Thus, women involved in religion appear to gain considerably more protection from early death than do men involved in religion.

Finally, the degree of statistical control exerted over the religion-mortality association was negatively related to effect size. Not surprisingly, better-controlled studies (i.e., those including more covariates or copredictors) yielded smaller associations. In a final set of analyses, we estimated how strong the relationship between public religious involvement and mortality would be if researchers were to conduct a study that controlled for all fifteen of the potential covariates, mediators, and confounds that we identified. In such a study, one would expect an odds ratio of 1.23, which indicates that people highly involved in public religious activities would be expected to have 23 percent higher odds of survival than would people who are less involved in religious activities, *even after controlling for a huge array of potential confounds and mediators*. In this final set of analyses, the odds ratio of 1.23 was not statistically significant, a point that has been debated recently (McCullough, Hoyt, and Larson 2001; Sloan and Bagiella 2001). As we noted, the nonsignificance of this estimate was probably caused by the fact that we were playing into the weaknesses of multiple regression by estimating parameters for a relatively large number of highly correlated predictor variables with a relatively small number of effect sizes. Indeed, the fifteen predictor variables were so highly intercorrelated that it was mathematically impossible to arrive at a solution without throwing three of them out of the prediction equation altogether! Thus, we have argued that it is a red herring to focus very much on that particular test of statistical significance. Instead, we think the most important point from this meta-analysis is that even if much of the religion-mortality relationship can be explained in terms of other psychological or behavioral factors, it appears to be "real" and important for sociological theory and research – a point to which we now turn.

### **ASSOCIATION OF RELIGION WITH HEALTH: HOW IMPORTANT? HOW REAL?**

Based on these two meta-analyses, we have concluded that the evidence supports many researchers' perceptions that some aspects of religiousness are indeed related to better functioning on some measures of mental and physical health. It does seem to be the case that people involved in religious pursuits, on average, live slightly longer lives and experience slightly lower levels of depressive symptoms than do their less religious counterparts. However, the simple presence of a statistical relationship between two constructs does not tell us all that we need to know to put these relationships into perspective. In particular, we need to concern ourselves with at least two additional sets of questions: First, we must ask how important the associations between religious involvement and health are; second, we must ask whether these associations are "real."

#### **How Important Are the Associations of Religion and Health?**

As most social scientists acknowledge, statistical significance is but one criterion for judging the importance of a relationship between two variables (Howard, Maxwell,

and Fleming 2000). While null hypothesis significance testing has certainly been valuable in the evolution of social science (Krueger 2001), statistical significance fails to tell us anything about the practical importance of an association. However, we can gain an appreciation for the importance of the religion-health association by comparing the mean effect sizes for the association of religiousness with a given health outcome to the effect sizes gleaned from meta-analytic literature reviews that have examined other factors also thought to be predictors of the same health outcome.

One helpful way to portray the association of religious involvement and mortality is the binomial effect size display (BESD; Rosenthal 1990, 1991), a statistical simulation that can be used to portray effect sizes in terms of the difference between two groups (e.g., one hundred people high in religiousness, one hundred people low in religiousness) in the odds of dying when the base mortality rate is 50 percent. If the odds ratio of 1.23 derived from our meta-analysis (the most conservative estimate of the association of religiousness and mortality) is portrayed using the BESD (see McCullough, Hoyt, and Larson 2001), one finds that approximately forty-eight of the one hundred people in the "highly religious" group would be dead at follow-up (52:48 odds in favor of surviving), whereas approximately fifty-two of the one hundred people in the "less-religious" group would be dead at follow-up (48:52 odds against surviving). Thus among a group of one hundred "religious" people and a group of one hundred "less-religious" people, we would expect four more of the religious people to be alive at the point in time when 50 percent of the sample had died.

The BESD obtained for the association of religious involvement and mortality can be compared to the BESDs for the relationship of other psychosocial variables or medical interventions to all-cause mortality. Based on prior meta-analytic findings, McCullough (2001) estimated that hazardous alcohol use and postcardiac exercise rehabilitation programs account for ten and eight deaths per two hundred people, respectively. Saz and Dewey (2001) reported a meta-analysis in which they synthesized the existing evidence regarding the relationship between depression and mortality in the elderly. They found a mean association of Odds Ratio = 1.73. This odds ratio, when converted to a BESD, corresponds to fourteen outcomes per two hundred people accounted for by diagnoses of depression.

Strawbridge, Cohen, and Shema (2000) adopted a similar comparative approach, although they conducted their comparative analyses of the association of religious involvement and mortality with the Alameda County data set that we described previously. Using nearly three decades of longitudinal data for 5,894 adult residents of Alameda County, they compared the strength of the association of religious service attendance with mortality to the strength of the associations of four other well-known predictors of mortality – cigarette smoking, physical activity, alcohol consumption, and nonreligious social involvement. They computed these associations separately for men and women, after controlling for age, education, self-reported health, and number of chronic health conditions. For men, weekly religious service attendance was associated with reduced mortality (relative hazard = 0.84). In other words, the likelihood of death in any given year for someone who attended religious services weekly was only 84 percent of the likelihood of death for someone who never attended religious services. The relative hazards for abstaining from cigarette smoking (relative hazard = 0.49), frequent physical activity (relative hazard = 0.58), moderate versus heavy alcohol use

(relative hazard = 0.76), and individual and group social involvement versus social isolation (relative hazard = 0.58) were all considerably stronger (smaller relative hazards imply lesser probability of dying for people who possess high scores on the variable in question). Thus, for men at least, the protective effects associated with religious involvement seemed relatively modest in comparison to the protective effects associated with abstinence from smoking, frequent physical activity, moderate alcohol use, and social engagement.

For women, in contrast, weekly public religious attendance appeared to be substantially more protective (relative hazard = 0.63), which is an effect comparable to those for never smoking (relative hazard = 0.53), frequent physical activity (relative hazard = 0.68), moderate versus heavy alcohol use (relative hazard = 0.58), and individual and group social involvement vs. social isolation (relative hazard = 0.58). Thus Strawbridge et al.'s (2000) data are consistent with the findings of our meta-analytic review, linking regular religious attendance with a survival advantage that is comparable, at least for women, to the survival advantages associated with other well-established psychosocial predictors of mortality.

In light of these comparisons, we think it is fair to say that the religiousness-mortality association is probably somewhat weaker (certainly for men, perhaps less so for women) than are the associations of other important psychological variables (including depression, excessive alcohol use, and physical exercise). However, the predictive power of many of the variables that society has deemed "important" risk or protective factors against early death is of the same magnitude as the association of religiousness with mortality (most of them, including religiousness, accounting for fewer than fifteen outcomes per two hundred). Moreover, given the complex multivariate nature of the causes of such outcomes as mortality and depression, even small effects can be considered "impressive" (Prentice and Miller 1992). Thus religiousness certainly may be a factor, albeit a small one, in predicting mortality. Moreover, for women at least, the so-called protective effects of religiousness may be nearly as strong as are those for other well-established risk and protective factors.

In our meta-analysis of studies on religion and depression, the mean overall effect size was estimated as  $r = .126$ , suggesting that measures of religiousness typically account for  $(.126)^2 = 1.6$  percent of the variance in the severity of depressive symptoms in the population. Even though an association of this size is typically considered "small" (J. Cohen 1988), this small correlation need not be dismissed entirely. For comparison, one might consider that the association between gender and depressive symptoms (i.e., women tending toward more severe depressive symptoms than do men) is frequently on the order of  $r = .10$  (e.g., see Nolen-Hoeksema, Larson, and Grayson 1999, Table 1; Twenge and Nolen-Hoeksema 2001). Although the gender difference in depressive symptoms is "small" statistically, and although it belies a considerable gender difference in the odds of depressive disorders (Culbertson 1997), this gender-depression association is reliable and has considerable scientific and social importance. Moreover, the gender difference in depressive symptoms has led to theoretical advances regarding the nature of depression itself (e.g., Nolen-Hoeksema et al. 1999). With the gender differences in depressive symptoms as a benchmark for how "small" associations can be important (see also Prentice and Miller 1992), we also conclude that despite the modest statistical strength of the association between depressive symptoms and religiousness, it may have important implications.

### How "Real" Is the Religion-Health Association?

**Is the religion-health association "valid"?** Contemporary investigators of the religion-health association have worked diligently to appraise its validity (see Levin 1994, for a review). To address the first of these concerns, investigators have adopted two major strategies. The first strategy has involved conducting studies in which the association of religiousness with a given health outcome (e.g., mortality) was assessed only after controlling statistically for every other variable that might conceivably account for variance in the health outcome (e.g., age, gender, socioeconomic status, health status, social support and social activity, and other psychosocial factors). The logic behind this "subtractive" method is not to determine whether religiousness accounts for variance in a given health outcome, but rather to determine whether religiousness accounts for "new" variance in a given health outcome. The concern here, obviously, is with improving society's ability to predict, for example, who dies or who gets depressed, with the logic that a new innovation (i.e., a relatively new health factor like religiousness) should be considered important only if it *improves* society's ability to predict health outcomes. This subtractive method is indeed useful if the goal is to arrive at a maximally efficient set of risk factors and protective factors for predicting a particular health outcome. Thus, we contend, the subtractive method is used in the service of a *technological* goal (applying health-related empirical knowledge to the prediction of health and well-being in the real world).

Despite its practicality, the subtractive method is deficient from a purely scientific perspective because it focuses solely on evaluating whether religiousness exerts a so-called direct effect on a given health outcome. By doing so, the subtractive method fails to shed light on the indirect routes through which religiousness might exert influence (see Levin 1994). A better method would be to evaluate a series of hypotheses that allow for several different perspectives on the religion-health association to be considered simultaneously (a method used both by Hummer et al. 1999, and in the meta-analysis by McCullough et al. 2000). First, it is scientifically useful to know simply whether an association exists. This involves estimating the bivariate association between a measure of religiousness and a measure of health, with no other variables controlled.

Second, it is helpful to know whether the religion-health association is spurious, thus determining whether variables that cause both religiousness and the health outcome can be credited with the apparent religion-health relationship. For example, gender is a known correlate of religiousness and longevity, and because gender is causally prior to both religiousness and longevity (i.e., it cannot be influenced by religiousness or longevity), its ability to account for variance in the religion-health relationship should probably be interpreted as evidence for confounding. Such confounds should be observed and evaluated, and estimates of the religion-health association adjusted downward accordingly.

Third, variables should be identified that might serve as mediators of the religion-health relationship (e.g., factors associated with the regulative, integrative, and coherence functions of religion à la Durkheim and Weber; see Idler and Kasl 1997). Once conceptualized, these mediators should be evaluated as such, using appropriate statistical modeling. One would expect the associations of religiousness with the specified health outcomes to become smaller as more and more of the mediators through which religiousness exerts its effect are controlled statistically. By the time that all of the putative

mediators of religiousness and all potential confounds are controlled statistically, what remains is the parameter estimate that proponents of the subtractive method would want to see anyway: the net association of religiousness with the given health outcome after all other possible predictors have been controlled. Through a sequence of hypothesis tests, the goals of technology (i.e., evaluating whether religious information improves our ability to predict health outcomes in the population) and the goals of science (evaluating the religion-health association and exploring its putative causal mechanisms) can be served simultaneously.

We think another good method for determining whether the religion-health association is causal is to conduct experimental research, rather than relying exclusively on the interpretation of nonexperimental data. Although some investigators have cast serious doubts on the ability of science to manipulate religiousness experimentally for the purpose of experimental research, we believe that investigators who are motivated to think creatively about this problem may arrive at feasible and ethical means for modifying dimensions of people's religiousness, at least in the short term, to examine whether specific dimensions of health improve in response.

**Is the religion-health association generalizable?** A second way of asking whether the religion-health relationship is "real" is to ask questions about the limits on its generalizability. If the religion-health association is a "human" phenomenon, rather than a phenomenon that is specific to a single era in history, a specific culture, or a specific gender, then we might make more of its significance than if it appears to be simply a local phenomenon. The meta-analytic approach is extremely useful in this regard because meta-analysis allows investigators to search explicitly for the facets (i.e., elements of study design, characteristics of samples) that create heterogeneity in the results that investigators have obtained over the years. From our own work, we know that the religion-mortality relationship is stronger for men than for women, for example, and that the religion-depression relationship is stronger for African Americans than for European Americans. Other creative approaches to meta-analysis (e.g., Mullen, Muellerleile, and Bryant 2001) would allow for the investigation of whether an apparent association between religiousness and health is stable across time. The facets of generalizability can be explored by any researcher working with primary data, however, by simply examining whether any apparent associations generalize across the major categories of human variation (e.g., at a minimum, gender, age group, and ethnicity).

#### **UNIFYING MODELS OF RELIGION AND HEALTH: FROM GENERAL TO SPECIFIC**

Many scholars have articulated general models for explaining how and why religiousness might be related to health. (For a meta-theoretical overview, see Levin and Chatters 1998.) The elegance, scope, and apparent explanatory power of the mechanisms for the religion-health association that Durkheim and Weber introduced so many years ago (i.e., religion's regulatory, integrative, and coherence functions) may have contributed to this tendency for grand theorizing in the literature on religion and health. Efforts at grand explanatory systems are no doubt useful from a pedagogical perspective, and they may be useful to investigators in designing analytic strategies for examining

religion-health relationships in specific data sets. We wonder, however, whether they are the best approach to fundamental insights about religion and health that can unify multiple levels of scientific explanation. In particular, we doubt that a single model – no matter how grand – could account for all of the religion-health relationships in a way that unifies sociological, psychological, and biomedical perspectives on the etiology of health and disease. The number of causal factors involved in creating health and illness are enormous and, of course, vary across different types of disease. The etiology of alcoholism is completely different from the etiology of chronic obstructive pulmonary disease, or of colon cancer, or of suicide. Is it really scientifically useful to define a single theoretical model to address the associations of religion with health outcomes as diverse as these? Attempts to explain all of these associations in a single model that integrates sociological, psychological, and biological insights would likely be bland recipes indeed.

However, it may be possible to design powerful scientific models on a smaller scale that can integrate such insights from other relevant sciences. Elsewhere, it has been suggested that “lack of specialization leads to bland generalizations” (McCullough and Larson 1998: 97). For the field to progress toward unifying the scientific study of religion with the scientific study of health and illness, we believe that theorists and researchers must dedicate themselves to uncovering the links of religion with specific diseases: Depression, heart disease, lung cancer, or alcoholism, to name a few. The next generation of theories, in our opinion, will be most fertile if social scientists join hands with specialists in the medical sciences, life sciences, and perhaps even natural sciences to develop models that address the etiology of particular diseases in ways that unify these many possible levels of explanation. Such an approach would allow investigators to make the most of sociological, psychological, and biomedical insights, taking the etiology of particular diseases, their interactions with the life course, and the sociocultural contexts in which they manifest themselves into account. Models with such scope and specificity would be, in our opinion, grand models indeed.

## SUMMARY

The existing evidence, which has been accumulating over the course of decades, leads us to the conclusion that religious involvement is associated with some measures of health. These findings suggest that religious involvement may indeed promote some aspects of health and deter some forms of disease – probably through a multiplicity of routes that are specific to particular dimensions of health and particular types of disease. It seems unlikely that religion is salutary vis-à-vis all measures of health and disease, and many questions remain. If the literatures on depression and mortality are any clue as to what future studies will reveal, we can predict that the associations of religion with various health outcomes will be, on average, small in magnitude, but they may be practically and theoretically important nonetheless.

Many of the insights one might gain from the existing research on religion and health are consistent with the grand theoretical insights of sociologists such as Durkheim and Weber. Much more work remains, however, to integrate these insights into coherent theoretical frameworks that make the most of what sociology, as well as the other social sciences and the life sciences, can offer in understanding how religion might influence health and disease.

In this chapter, we have focused on a very thin slice of the religion-health field – the possible causal associations between measures of religiousness and measures of health. However, investigators have been asking a variety of other interesting questions for many years, including questions about how religious holidays may postpone death for days or even weeks, how religiousness may moderate the effects of testosterone upon the initiation of coitus in adolescent females, and how approaching death may influence people's religious beliefs and behaviors, to name but a few. To readers who have enjoyed the modest sampling of the religion-health literature that we have offered in the present chapter, we might also recommend a broader sampling from the full menu.