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Differing Pathways between Religiousness, Spirituality, and Health:

A Self-Regulation Perspective

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ABSTRACT

The literature on religiousness, spirituality (R/S), and health has increased dramatically in the past decade, but suffers from a lack of integrative theoretical models and well-defined constructs. Drawing on self-regulation theory, we hypothesized that the effects of *religiousness* (e.g., affiliation, service attendance) on health affects *behavioral* self-regulation of health habits; in contrast, the effects of *spirituality* (e.g., meditation, self-transcendence) on health are thought to be mediated primarily via the effects of *emotion* regulation on the inflammatory processes underlying chronic illnesses such as cardiovascular disease and cancer. The adverse effects of religious alienation are thought to be mediated by both pathways. We conducted database searches to identify current models of R/S and health as well as the empirical literature linking specific aspects of R/S and physical health. We then reviewed the extent to which the literature supports this model. Our review largely supported the proposed model. Religiousness was strongly associated with better health behavior habits, including lower smoking and alcohol consumption and greater likelihood of medical screenings, but only weakly related to inflammatory biomarkers. Measures of spirituality were more strongly linked to biomarkers, including blood pressure, cardiac reactivity, immune factors, and disease progression. Religious alienation had adverse effects on both pathways. This distinction between religiousness and spirituality and the better delineation of health behavior and biomarker pathways can inform and improve clinical applications and interventions.

KEY WORDS: Religiousness, Spirituality, Health, Self-Regulation, Inflammatory Processes

Differing Pathways between Religiousness, Spirituality, and Health:

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Spirituality and religion are central in the lives of many people. General population studies demonstrate the high prevalence of religious beliefs and behaviors in the United States. For example, a recent poll of a nationally representative sample of Americans found that 92% believe in God or a universal spirit, 90% pray, 85% say religion is very or fairly important to them, and 41% attend religious services weekly or more often (PEW Forum, 2008). Although a growing number of individuals claim no religious affiliation – one fifth of all Americans and a third of those under the age of 30 (Pew Research Center, 2012) -- two-thirds of this unaffiliated group still believe in God, and one-third describe themselves as spiritual but not religious. Thus, understanding the difference between religiousness and spirituality, and whether they have differential effects on health, is growing in both conceptual and methodological importance. In studies of the effects of religiousness, spirituality and health, religiousness is often assessed through simple measures of affiliation or service attendance, while spirituality is generally assessed as feelings of closeness to God and self-transcendence and/or as engagement in practices such as meditation or mindfulness (Fetzer/National Institute on Aging Working Group, 1999). In truth the differentiation between the two, on both a conceptual and a methodological level, is a matter of some debate, as we discuss later in this review.

That religiousness and spirituality are associated with both mental and physical health is firmly established within the scientific literature (see Koenig, 2008; Levin, Chatters, & Joseph, 2011). In general, the effects tend to be positive, including lower levels of psychological distress and depressive symptoms, better health-related quality of life, and decreased morbidity and

mortality (Masters & Hooker, 2013; Park & Slattery, 2013). However, there is some suggestion that religiousness and spirituality may have more positive effects when people are healthy than after they become ill (Chida, Steptoe, & Powell, 2009), and the findings for all-cause mortality have been more robust than evidence for disease-specific incidence or mortality (Powell, Shahabi, & Thoresen, 2005). Further, one aspect of religiousness, negative religious coping, also known as religious alienation or distress, has consistently been related to poorer psychological and physical well-being, especially among individuals who are already ill (Exline & Rose, 2013; Pargament, Koenig, Tarakeshwar, & Hahn, 2001). Thus, it may be important to differentiate between the prevention aspects of religion and spirituality, and their possible ability to influence the course of illness.

However, the reasons that religiousness and spirituality are related to physical health have not been well-established. A number of models have been proposed that specify a variety of mediators, but, as we shall see, the underlying theory of why and how religious and spiritual factors affect health is fairly undeveloped, and there have been repeated calls in the literature for more developed theoretical models (Krause, 2011; Levin et al., 2011).

The purpose of this paper is to propose a theoretical model that integrates theories and findings on religiousness, spirituality, and health with self-regulation models, which are assuming a central role within various subdisciplines in psychology (see Eisenberg & Zhou, 2000; Gross & Thompson, 2007; McCullough & Willoughby, 2009; Watts, 2007). Sapolsky (2004) has argued that there are two pathways through which psychosocial factors affect health outcomes: health behaviors and direct physiological effects. These pathways reflect two different aspects of self-regulation, behavioral and emotional. We propose that the effects of religiousness (such as that assessed through religious attendance and affiliation) on health reflect

behavioral regulation of health habits. In contrast, the effects of spirituality (e.g., feelings of closeness to God or self-transcendence) on health are primarily mediated via the effect of *emotion regulation* on physiological processes, including the hypothalamic–pituitary–adrenal (HPA) and sympathetic adrenal medullary (SAM) axes, and their influence on inflammatory processes (Levenson & Aldwin, 2013).

Thus, in this article, we first review and critique current models of religiousness, spirituality, and health, focusing on those that try to address possible pathways through which these factors affect health. We then review arguments for the conceptual distinctiveness of religiousness and spirituality and describe the potential linkages between religiousness, spirituality, and self-regulation. Next, we present our theoretical model and review the health outcomes literature to examine how well our model fits current findings. Specifically, we examine the evidence that the effect of religiousness on health is mediated through behavioral self-regulation of health habits, whereas the effects of spirituality on health are mediated via the effect of emotion regulation on physiological processes (Levenson & Aldwin, 2013). The adverse effect of religious alienation is expected to be mediated by both pathways.

Several excellent reviews have been published regarding relationship between religious and spirituality and physiological processes, including cortisol and immune factors (Koenig, 2002; Koenig, McCullough, & Larson, 2012; Seeman, 2003), as well as cardiovascular factors (Masters, 2008). In this paper, we focus on the physiological pathways of inflammatory processes. Inflammatory processes can be seen as “downstream” effects, as they are influenced by a host of immune, cardiovascular, neuroendocrine, and cellular-level factors. Further, inflammatory processes are thought to underlie a host of diseases, including heart disease, cancer, and Alzheimer’s disease, and may be a major source of many age-related processes (see

Finch, 2011). Thus, focusing on inflammatory processes rather than specific predictors (such as HPA activation) may provide a broader understanding of the relationship between religiousness, spirituality, and health.

To conclude the article, we identify gaps in the literature, examine the clinical implications of our model, and make recommendations for future research.

CURRENT MODELS OF RELIGIOUSNESS, SPIRITUALITY, AND HEALTH

Researchers have developed many models of the relationship between religiousness, spirituality, and health. Our review here is illustrative rather than comprehensive, showcasing the prevailing thinking in this area. Further, we focus on those models that specify how religiousness and spirituality relate to physical health (as opposed to mental health and well-being). As we shall see, most of the theoretical models are what Levin et al. (2011) would call “Tense IV” models, in that they specify mediators between religiousness/spirituality and health outcomes, but often without sound theoretical grounding in broader, mid-range theoretical models that might provide insight into the processes through which psychosocial factors affect physical health (see McFadden, 2005).

Descriptive Models

Koenig (2008) presented what he termed the “classical model” of the relationships among religiousness, spirituality, and health outcomes (see Figure 1). In this model, spirituality comprises the small, inner core of religiosity, and mental health is the mediator.

[Figure 1 about here]

Religiousness/spirituality (R/S) increases positive outcomes, including meaning, connectedness, and well-being, and decreases negative psychological states, including depression, anxiety, suicidality, and addictions. These, in turn, affect

psychoneuroimmunological (PNI) factors, resulting in lower levels of cardiovascular disease, cancer, and mortality. Koenig presented several alternative models, including the “modern” one, in which the relationship between spirituality and religiousness are swapped, with spirituality being the larger construct, of which religiousness is now the smaller core. He also provides cogent criticism of models that conflate spirituality with well-being and those that include agnostics and atheists within the spiritual model. This is an eminently reasonable model that specifies that the impact of R/S is through psychological health, which in turn affects PNI factors, and thus health outcomes. Indeed, this model either explicitly or implicitly guides much of the research on R/S and health outcomes.

A similar model, but applied to adolescents, was developed by Cotton, Zebracki, Rosenthal, Tsevat, and Drotar (2006) based upon work by Pargament (1997). Similar to Koenig’s model, Cotton et al. put both religiousness and spirituality in the same circle, but, following Pargament, suggested that religiousness, as indexed by religious participation (e.g., attendance, self-rated religiousness) is a distal variable, whereas spirituality is a proximal variable. Spirituality includes meaning, positive and negative religious coping, and church support. In this model, spirituality is the mediator between religious and health outcomes.

Masters (2008) took a more comprehensive approach to the mediators between R/S and health (see Figure 2). He specified three pathways: social support, behavior, and psychological factors. From this general model, he provided an example of how specific factors within each category can affect health. For example, intrinsic religious orientation leads to less stress and depression, which in turn is related to decreased cardiovascular reactivity, which in turn can result in lower levels of hypertension.

[Figure 2 about here]

However, in all of these models, the relative inclusivity of religiousness and spirituality does not differentially affect the fundamental mediating pathways (such as PNI factors), nor is there any differentiation of separate pathways between these two constructs and health outcomes, although Masters' empirical work suggests that extrinsic religiousness has different effects than does intrinsic religiousness (Masters, Hill, Kircher, Benson, & Fallon, 2004).

In many models, there is little or no acknowledgement of the possible negative effects of religious alienation or distress (but see Cotton et al., 2006). Further, the assumption that PNI factors are the penultimate mediators to health outcomes such as cancer and cardiovascular disease is reasonable, but difficult as yet to demonstrate empirically (Cohen, Miller, & Rabin, 2001).

In contrast, Levin (1996) provided a very detailed specification of different aspects of R/S, specific pathways, and mediating variables between these aspects and salutogenic health outcomes (see Table 1). Levin identified eight different aspects of religiousness that could affect health, ranging from religious commitment, identity, involvement, practice, and obedience to beliefs, faith, and experiences. Each of these was thought to have different pathways, mediators, and salutogenic effects. For example, the pathway between religious commitment and health outcome is thought to be health behavior habits, with specific mediators being avoidance of smoking, drinking, drugs, unprotected sex, and so on. The salutogenic mechanism is thus decreased risk of disease and enhanced well-being. Further, the pathway for participation in ritual and prayer was the psychodynamics of ritual, the mediating variables for which were relaxation and various forms of positive cognitions (e.g., hope) and affect. These in turn were thought to affect PNI factors. In contrast, the pathway for spiritual experience was through

superempirical effects, such as the mediators of bioenergy activation and altered states, resulting in the salutogenic pathway of naturalistic energy and non-local effects.

[Table 1 about here]

In many ways Levin's is the most comprehensive and novel of the models, painstakingly differentiating facets of religiousness and spirituality and specifying the mediational pathways to health outcomes. By including superempirical effects, he reflected the indigenous theories within contemplative psychologies about their own practices (e.g., bioenergy manipulation). However, it is not always clear why the links are specified in that particular manner. Nor is it clear whether the measures of religiousness and spirituality that we have are sufficiently detailed to tap these different facets and pathways. Thus, this model has yet to be empirically tested.

[Figure 3 about here]

Park (2012) took an approach intermediate between the global approach of Koenig and the very detailed approach of Levin (see Figure 3). She identified three global aspects of R/S, including general influences, specific beliefs and interpretations, and influences under crisis situations. Similar to Koenig, in Park's model, general R/S influences are thought to create better health behavior habits and social support and to support religious practices such as prayer, which in turn may lead to relaxation and attention diversion. However, Park goes beyond Koenig in including constructs currently in favor in positive psychology. Thus, specific beliefs and interpretations may lead to more positive reappraisals and more positive affect as well as better access to health promotion resources. However, she also acknowledges that specific beliefs may lead to religious alienation or distress, in which people may feel that God or their religious community has abandoned or betrayed them.

Finally, Park isolated the influence of R/S in times of crisis and illnesses, focusing on three mediating pathways: religious meaning, forgiveness, and treatment adherence. Park comprehensively reviewed the literature linking each of these pathways to various mental and physical health outcomes, but there was not attempt to systematize the different health outcomes, and there is clearly a fair amount of overlap between the different pathways and health outcomes.

Nelson's (2009) model of religiousness and health drew more heavily on the stress and coping literature. He argued that much of the impact of R/S on health was through its relationship with stress. He distinguished between moderator, suppressor, and indirect effects of R/S on stress. Briefly, both moderator and suppressor mechanisms involve buffering the negative effects of stress on health. "In the moderator model, religiousness has a greater impact when the stress levels are high, although stress does not affect the actual level of religious practice. In the suppressor model, increases in problems lead to greater levels of practice that suppress the effects of stress" (Nelson, 2009, p. 316). In contrast, in the mediating model, there is an indirect effect: R/S leads to better coping strategies, which in turn reduces (or buffers) the negative effects of stress.

An important component of the stress-buffering effect of R/S is social support. Nelson identified three different types of support: direct support (social resources and integration), indirect support (more stability of marital relationships), and spiritual support from God or other sacred sources. (The first two are considered "horizontal," whereas the third is considered "vertical.") Nelson went on to identify five other important mediators of the relationship between R/S and health: promoting better health behavior habits, supporting positive beliefs, providing resources and skills for coping, regulating emotions during prayer and ritual, and encouraging transcendence experiences through religious practice.

Krause (2011) took a radically different approach to how R/S influences health. He developed a needs-based approach, reminiscent of Maslow. Krause argued that religiousness satisfies five basic needs: the need for the search for self-transcendence; the need for church attendance and the accompanying need for sociality; the need for control; and the need for meaning (see Figure 4). All of these can have both direct and mediated effects on health outcomes, with the need for meaning being most proximal.

Comparison of the Models

The similarities among and differences between these models are illustrative of the “dishevelment” (Krause, 2011) in the literature bemoaned by many luminaries in the field, including most of those whose proposed models we have reviewed. Two important points of divergence emerge from this review. First, the models reviewed here differ on whether R/S has global or specific effects, with four (Koenig, Krause, Masters, and Cotton) focusing on global effects, and three (Levin et al., Park, and Nelson) hypothesizing that different aspects of religiousness have specific effects on health. A variety of mediating, moderating, and indirect pathways have been specified, with fairly little agreement between the models as to which pathways are important, although most acknowledge the beneficial effects of R/S on health behavior habits.

We believe that a more parsimonious model of the relationship between R/S and physical health can be developed, based on Sapolsky’s (2004) model, in which he suggested that there are two basic pathways through which psychosocial factors affect health: health behavior habits and direct physiological effects. We posit that these effects can be described as primarily mediated through self-regulation, hypothesizing that many of the mediators identified by the models reviewed earlier can be seen as aspects of self-regulation. Further, we agree with many

researchers in the field that it may be necessary to distinguish between the effects of religiousness and spirituality (Levin, 2010; Park, 2012). We propose that religiousness may have effects primarily on behavior regulation (e.g., health behavior habits and adherence), whereas spirituality may have effects primarily through emotion regulation. Before presenting our model, we provide a more in-depth discussion of how we differentiate the constructs of religiousness and spirituality and review evidence linking them to these different aspects of self-regulation.

RELIGIOUSNESS, SPIRITUALITY, AND SELF-REGULATION

In this section, we review the various attempts to differentiate religiousness and spirituality. Then we briefly review select theories of self-regulation and their relevance to this distinction.

Distinguishing between Religiousness and Spirituality

Developing satisfactory definitions of “religiousness” and “spirituality” has been the goal of a multitude of theorists and researchers over the past few decades (Oman, 2013). In spite of these efforts, the goal remains elusive, as any definitions of religiousness and spirituality (and any distinctions drawn between them) generate dissension and lead others to try once again. In this article, we follow the lead of a recent proposal by Pargament and his colleagues in their introduction to *Handbook of the Psychology of Religiousness and Spirituality* (Pargament, Exline, Jones, & Mahoney, 2013). They defined spirituality as “*the search for the sacred,*” with sacred referring not only to God/higher powers, but also to “other aspects of life that are perceived to be manifestations of the divine or imbued with divine-like qualities, such as transcendence, immanence, boundlessness and ultimacy” (p. 7). In contrast, they defined religion as “*the search for significance that occurs within the context of established institutions that are designed to facilitate spirituality,*” with significance referring to a multiplicity of goals

that may be “psychological (e.g., anxiety reduction, meaning, impulse control), social (e.g., belonging, identity, dominance), and physical (e.g., longevity, evolutionary adaptation, death), as well as those that are spiritual” (p. 7).

Pargament et al. (2013, p. 9) noted that

“[R]eligion occurs within the larger context of established institutions and traditions and is directed toward the pursuit of a broader array of destinations or significant goals than spirituality. Although religion serves the important function of facilitating spirituality itself, it serves other functions as well. In contrast, spirituality focuses on the search for one particular significant destination, the sacred. It is important to reiterate that spirituality is not restricted to an individual’s relationship with the sacred understood traditionally as God or a higher power. Seemingly secular functions – psychological, social and physical – can also be imbued with sacred status. In contrast, although spirituality can be a vital part of traditional religious life, it can also be embedded in nontraditional contexts.”

Similarly Oman (2013, pp. 8-9) stated: “Towards the close of the 20th century, a new, more restricted meaning of religion emerged. In this new usage, which is increasingly common but far from universal, “religion” connotes especially the organized and institutional components of faith traditions, as opposed to the more inward and personal sides, often now referred to as “spirituality.” Note that there are both complementary and polarizing distinctions between religion and spirituality (Zinnbauer & Pargament, 2005); in this paper we take the more complementary perspective, with religion and spirituality overlapping (but not identical) constructs. For heuristic purposes of this model, we focus on religion as “the organized and institutional components of faith traditions,” whereas spirituality addresses one’s relationship

with and search for the sacred that involves self-transcendence. We agree with Pargament (2005) that spirituality often occurs in the context of religion, but it also can occur outside of traditional religious boundaries.

Measures of religion assess constructs such as integration into a religious community (e.g., denomination affiliation, religious identity, public religious practice such as attendance and group prayer) and specific beliefs in religious tenets such as beliefs in God or specific afterlife characteristics. In contrast, spirituality indicators include self-transcendence, closeness to God or the sacred (numinosity), meaning in life, and personal spiritual practices, including meditation and contemplative prayer (e.g., Cloninger, Svrakic, & Przybeck, 1993; Levenson, Jennings, Aldwin, & Shiraishi, 2005; Piedmont, 1999; Reed, 1991). These various assessment approaches are described by the Fetzer/National Institute on Aging Working Group (1999) and listed on the widely used Brief Multidimensional Measure of Religiousness/Spirituality developed in that report.

Note that, without an idea of the underlying motivation for the behavior, it is difficult to accurately classify behavior as religious or spiritual. For example, group prayer such as *zhikr* among some Muslim sects may be for spiritual purposes, while individual prayer may be more petitionary and thus for religious purposes. However, our measures do not allow for this fine a differentiation, and thus we use public/private as a rough indicator only.

Clearly, religiousness and spirituality are overlapping constructs, but are nonetheless distinct. To build upon Pargament's (1999) use of Venn diagrams to describe relations between religiousness and spirituality, we further suggest that there are individual differences in the degree to which religiousness and spirituality overlap. For example, among contemplative nuns, there may be a complete overlap in their religious and spiritual avocations, but for others,

religiousness may be more important than and separate from spirituality and vice versa. Further, it is likely that the relationship may fluctuate over time within individuals. Interestingly, some preliminary work suggests that having high levels of religiousness and spirituality is more strongly related to better health and well-being than having high levels of either alone. Further, having high levels of religiousness in the absence of spirituality may be related to *poorer* well-being (e.g., Yanez et al., 2009). However, others have shown that spirituality (but not religiousness) is related to survival (e.g., in patients with kidney failure; Spinale et al., 2008).

Finally, there is a third dimension of R/S which has variously been called negative religious coping (Pargament, Koenig, & Perez, 2000), or religious struggle (Exline & Rose, 2013). Pargament and colleagues (Pargament et al., 2000) developed a scale that included items that indexed feelings of religious despair and of being neglected or punished by God. While he termed this scale “negative religious coping,” this term does not accurately describe this important R/S dimension, as most of the items do not, in fact, tap coping efforts (which are classically defined as strategies directed at managing the problem or the attendant emotions – see Aldwin, 2007). Although Exline and Rose (2013) term this construct “struggle,” this term has been used widely in religious literature to refer to contemplatives’ attempts to draw nearer to God, and references their efforts to remove the veils between themselves and the sacred (cf. Durà-Vilà, Dein, Littlewood, & Leavey, 2010). Thus, we prefer the term “religious alienation” to describe the state in which one feels disaffected from one’s church and/or abandoned by one’s God – in other words, that one’s previous understanding and faith may have been badly misplaced.

The distinctions between these three dimensions of R/S are important as they have different implications for various aspects of self-regulation. Before we explicate these differences, we provide a brief overview of current theories of self-regulation.

Self-Regulation

Self-regulation refers to individuals' efforts to manage or alter their responses and impulses (Luszczyńska, Diehl, Gutiérrez-Doña, Kuusinen, & Schwarzer, 2004; Zell & Baumeister, 2013) especially in (but not limited to) stressful situations (Eisenberg & Zhou, 2000). Baumeister and Vohs (2007) defined self-regulation as "the way that a person controls his or her own responses so as to pursue or maintain goals and live up to standards" (p. 500) and as "the exercise of control over oneself, especially with regard to bringing the self into line with preferred (thus, regular) standards." Zell and Baumeister (2013) used the terms self-regulation and self-control interchangeably to refer to "the capacity to override one incipient response, thereby permitting an (often unspecified) alternative." Zell and Baumeister described four main elements in the operation of self-control: standards, monitoring, willpower, and motivation.

Note that self-regulation can be directed to behaviors (e.g., resisting temptation, overriding impulses), called behavioral self-regulation. Emotional self-regulation refers to the management of emotions and inner states (e.g., altering moods, cultivating calmness), as well as cognitive functions (e.g., directing attention, refocusing awareness). Eisenberg and Zhou (2000) have argued that the regulation of cognitive functions is the primary way of internally regulating emotions.

Many researchers consider self-regulation to be a conscious, effortful process (e.g., Carver & Scheier, 1998). However, other researchers have noted a parallel process of unconscious self-regulation (Bargh & Williams, 2007). This regulatory system, recently

described as implicit self-regulation (Koole, McCullough, Kuhl, & Roelofsma, 2010), involves regulating one's actions in harmony with the totality of one's inner needs, motives, and autobiographical experiences. Implicit self-regulation is thought to be mediated not by explicit intentions but by integrated feelings or intuitions about appropriate courses of action (Koole et al., 2010). According to these researchers, implicit self-regulation is a process by which the implicit self coordinates the person's functioning by integrating a variety of subsystems and processes to support the selected plan of action. While controversy remains over the extent to which self-regulation is implicit or explicit, our framework proposes that R/S can operate on both levels.

Accumulating research suggests that religiousness can facilitate self-regulation. A recent review of this issue provided diverse evidence that religiousness is associated with self-regulation (McCullough & Willoughby, 2009). For example, religious people tend to score higher on measures of self-control and to have children who are more self-controlled. McCullough and Willoughby proposed that religiousness aids self-regulation through many pathways, including influencing people's goals (e.g., goal selection, goal sanctification), fostering self-monitoring (e.g., perceived interaction with and monitoring by supernatural entities, interactions with religious communities, as moralistic audiences, religious rituals that activate self-monitoring), and building self-regulatory strength (e.g., via involvement in religious communities, prescribing and promoting mastery with specifically religious outputs for self-change). They presented an extensive array of evidence linking different aspects of religiousness with each of these self-regulatory pathways. Their last proposition was that "Religion affects health, well-being, and social behavior through self-regulation and self-control" (p. 71).

McCullough and Willoughby noted that there was currently scant literature supporting this proposition, having located only five studies directly testing it.

Along the same lines, Zell and Baumeister (2013) described how religiousness can influence each of the four main elements of self-regulation (standards, monitoring, willpower, and motivation). Similarly, Masters' (2008) review of the linkages between implicit self-regulation and religiousness proposed a framework through which religiosity may facilitate an implicit self-regulatory mode that is integrative, embodied, and oriented toward the well-being of the whole person. Certainly much of the impact of religiousness on health operates through adherence and health behaviors. For example, Park, Moehl, Fenster, Sureh, & Bliss (2008) found that measures of religious participation, including commitment and social support, were linked to adherence to the rather rigorous behavioral regimen required in the management of congestive heart failure.

Self-regulation, health, and inflammatory processes. Much of the literature on self-regulation and health occurs in the context of how individuals manage chronic illnesses (e.g., Rasmussen, Wrosch, Scheier, & Carver, 2006). However, we propose that self-regulation may also have implications for health via inflammatory processes. The logic is that a major subset of self-regulation processes includes how individuals cope with stress in order to solve problems and decrease emotional distress (e.g., Carver & Scheier, 1998). Inflammatory processes consist of physiological defenses ranging from biochemical and cellular processes to ones at the systems levels (Finch, 2011). These include anti-oxidant activation at the subcellular level and immune processes (e.g., T and B cell activation through interleukins and other cytokines) that are thought to underlie many chronic illnesses, such as cancer and heart disease. Thus, chronic inflammation may make an organ more susceptible to cancer, and atherosclerosis may also reflect

inflammatory processes. Finch argued that inflammation is a primary mechanism that regulates the aging process and the development and progression of chronic illnesses. To the extent that coping (i.e., self-regulation under stress) affects inflammatory physiological outcomes such as immune parameters, cholesterol, and other cardiovascular disease biomarkers (for reviews, see Aldwin, Yancura, & Boeninger, 2007; Penley, Tomaka, & Wiebe, 2002), it is logical to propose that self-regulation may be related to inflammatory processes.

Summary. Self-regulation is a major construct in the developmental and health psychology literatures and holds the promise of integrating much of the literature on coping and health outcomes. However, self-regulation perspectives have only recently been discussed in the context of R/S (Koole et al., 2010; McCullough & Willoughby, 2009), and been only minimally applied to the links among religiousness, spirituality, and physical health. Thus, the remainder of this article is devoted to integrating self-regulation into a proposed model of the differential relationships between religiousness and spirituality with health outcomes.

Proposed Model of Religiousness, Spirituality, Self-Regulation, and Health

Our proposed model is presented in Figure 5. With respect to religiousness and spirituality, our model makes two assumptions. First, that religiousness and spirituality, while related (as indicated by the dashed arrow in Figure 5), nonetheless have different pathways to health outcomes, and second, that these effects are mediated by different aspects of self-regulation. We hypothesize that religiousness, understood in its institutional sense, has its primary impact on health through behavioral self-regulation, whereas spirituality has its impact on health outcomes through emotional self-regulation. Specifically, we posit that formal religious participation encourages behavioral self-regulation which generally leads to positive health behavior habits (e.g., less smoking, alcohol consumption, and risky sexual behaviors),

which in turn decreases the risk for morbidity and thus mortality. Of course, there are ways through which religiousness may also be related to poorer health. For example, some sects may proscribe participation in some types of health behavior habits such immunization or even basic health care, although the majority of religions generally promote positive health behavior habits (e.g., Benjamins, Trinitapoli, & Ellison, 2006).

[Figure 5 about here]

Spirituality, concerned with the more personal path of transcendence, facilitates emotional self-regulation (Watts, 2007) by helping individuals reduce their negative arousal (e.g., cardiac reactivity), leading to lower inflammatory processes and thus reducing morbidity. Emotional self-regulation may also lead to improved behavioral self-regulation (hence the dashed line in Figure 5). Developmental psychologists have long understood that adequate emotional control is necessary for effective coping strategies directed at the problem (Eisenberg & Zhou, 2000). Further, Aldwin (2007) argued that poor health behavior habits (e.g., smoking, drinking, and drug use) are often behavioral attempts at emotion regulation that are used when more internal (e.g., cognitive) strategies fail. Thus, better emotion regulation should also promote more positive health behaviors, thus favorably influencing morbidity and mortality.

Following the third pathway in Figure 5, we hypothesize that religious alienation will have deleterious effects on health mediated by both the behavioral and emotion regulation pathways, as it is assumed that the amount of distress will increase both emotional dysregulation and the likelihood of using external regulatory substances (e.g., alcohol, nicotine). That is, religious alienation is expected to lead to substantial existential distress, which taxes individuals' abilities to regulate their emotions and may lead to more efforts to regulate them in maladaptive ways (e.g., through alcohol or drug use). However, religious alienation may have adverse effects

on inflammatory processes even in the absence of substance use (Pargament et al., 2001; Park, Wortmann, & Edmondson, 2011).

Social support is an important factor in this model. Nelson's (2009) suggestions of the three types of social support are highly relevant. In particular, direct support (social resources and integration) would be part of the pathway between religiosity and health, and spiritual support from God or other sacred sources would fit nicely in the spirituality and health pathway. However, other types of support, like Nelson's "indirect support" (better marital stability) are not so easily classified. Our review of the literature showed that most assessments of social support and R/S were very general and could not be readily classified in this manner. Thus, we included social support in this model. However, at this point in time the empirical literature has not made fine enough distinctions in different types of support and thus we will not further discuss it.

Evidence for the Proposed Model

Given the recent focus on religiousness, spirituality, and self-regulation (McCullough & Willoughby, 2009), it is somewhat surprising that so little research has distinguished the effects of specific types of religiousness and spirituality on self-regulation. In fact, McCullough and Willoughby (2009) noted the wide diversity of religious constructs and measures used in the studies cited in support of their self-regulation framework, and considered the convergence of findings an indicator of the robust nature of the relationships. However, we propose that religiousness and spirituality may affect different aspects of self-regulation, and these linkages may have differential effects on health.

Given that many studies do not adequately distinguish between religiousness and spirituality, the following review is illustrative rather than comprehensive. We focus on studies in which there are clear measures of religiousness (e.g., church attendance, public religious

practices) and/or spirituality (e.g., self-transcendence, closeness to God, private prayer, meditation). Even fewer studies specifically compare the differential effect of religiousness and spirituality on health outcomes.

Religiousness, spirituality, and health behaviors. There is a large literature linking religiousness and health behaviors. Both cross-sectional and longitudinal studies have demonstrated relationships between religious service attendance and less cigarette smoking. For example, several cross-sectional studies showed that frequency of religious attendance was related to lower smoking rates among post-menopausal women in the US (Salmoriage-Blotcher et al., 2011) and a nationally representative sample of US adults from National Health and Nutrition Examination Survey III (NHANES; Gillum, 2005). The latter findings were confirmed using cotinine. Longitudinal analyses of the Coronary Artery Risk Development in Young Adults (CARDIA) study found that frequency of religious attendance was associated with lower concurrent levels of smoking as well as predicted lower future smoking levels, although the results varied by subgroup (Whooley, Boyd, Gardin, & Williams, 2002).

Many studies have also found that religious attendance is associated with decreased alcohol consumption (e.g., Salmoirago-Blotcher et al., 2011). However, previous literature has failed to report consistent findings regarding the relationship of alcohol consumption either with other dimensions of religiosity (e.g. importance of religion) or spirituality. Among adolescents, high levels of religiosity, measured by frequency of religious service attendance and importance of religion, are associated with lower alcohol consumption and less heavy drinking (e.g., Bahr & Hoffmann, 2010). Similarly, in the National Alcohol Survey, collected in 1999 through 2001, religiosity, measured by the importance of religion and the belief that religion discourages drinking, decreased the odds of drinking among those aged 18 or older (Michalak, Trocki, &

Bondl, 2007). The same study also reported that, among drinkers, these religiosity variables were related to a lower probability of being heavy drinkers compared to moderate drinkers. Similarly, attendance at religious attendance had a positive association in a sample of approximately 34,000 adults from NHANES III (Gillum, Livingston, Obisesan, & Trulear, 2007). One study of those between 18 and 20 years old found that religious commitment was a protective factor against problem drinking, but self-transcendence was a risk factor (Burris, Sauer, & Carlson, 2010). In contrast, another study of adolescents found that religious attendance was associated with lower odds of alcohol consumption, but neither personal religiousness nor spirituality were associated with alcohol consumption (Bazargan, Sherkat, & Bazargan, 2004). Yet another study of college students found that an insecure attachment to God (perhaps a precursor of religious alienation) was related to more alcohol use and other risky health behaviors, but only for men (Horton, Ellison, Loukas, Downey, & Barrett, 2010).

Finally, there is some support for a positive relationship between religious service attendance and a wide variety of health-promoting behaviors, such as cholesterol and cancer screenings as well as getting flu shots and other health maintenance activities (e.g., Benjamins, Ellison, Krause, & Marcum, 2011). One study found that religious attendance and a belief that health is related to spirituality (i.e., body as temple) were related to getting mammograms (Benjamins et al., 2006). On the other hand, religious service attendance was unrelated to health behaviors in a sample of cancer survivors, but spirituality (daily spiritual experiences) was related to better diet and exercise as well as treatment adherence (Park, Edmondson, Hale-Smith, & Blank, 2009). These survivors reported high levels of spiritual growth following their cancer experience, which may have accounted for the links between their spiritual lives and their health behaviors.

There is some evidence for the role of religious alienation in dysregulation. In the Park et al. (2009) study, religious alienation was related to poorer adherence and more alcohol use. Additional evidence suggests that religious alienation is related to increased substance abuse (e.g., Harris, Fallot, & Berley, 2005).

Thus, there is some support for our hypothesis of differential effects of religiousness and spirituality, although few studies have examined religiousness and spirituality in the same study. Further, not all findings are consistent. Thus, future research should directly compare the proposed different pathways of religion and spirituality on health behaviors.

Religiousness, spirituality, and cardiovascular biomarkers. Seeman, Dubin, and Seeman (2003) summarized the literature on the biological pathways linking religiosity/spirituality to health outcomes. Church attendance and religious commitment were only weakly associated with lower blood pressure, low density lipoprotein (LDLs) and triglycerides. In other words, religiousness *per se* is only modestly inversely associated with blood pressure (Koenig et al., 2012). Masters et al. (2004) found that this weak association was primarily for extrinsic religiousness; intrinsic religiousness (spirituality) was more strongly related to blood pressure. The same pattern held true for cardiovascular reactivity. A study of older adults found that frequency of meditation and private prayer was related to lower blood pressure (Koenig et al., 1998). Further, a 32-year study comparing nuns and lay women found that blood pressure in nuns was essentially stable among nuns but increased steadily in lay women (Timio et al., 2001). In addition, the salutary effects of meditation on cardiovascular functioning such as blood pressure has been increasingly recognized (e.g., Anderson, Liu, & Kryscio, 2008).

In their review, Seeman et al. (2003) found some evidence for an association between meditation and lower levels of cholesterol. However, much more work is needed. Many of the

R/S and meditation studies examining cholesterol included dietary changes, so it is difficult to assess the independent contribution of religiousness and spirituality. To our knowledge, there are no studies contrasting the relative effects of religiousness and spirituality on cholesterol levels.

Taken together, these studies suggest that measures that focus on the more spiritual aspects of R/S may have more of an association with BP and perhaps other cardiovascular biomarkers as well.

Religiousness, spirituality, and immune factors. Even fewer studies have examined the differential effects of religion and spirituality on immune factors. Seeman et al.'s (2003) review also found moderately strong evidence for the association between spirituality and immune function, both in older patients and in women with metastatic breast cancer. Most of the studies we found focused on IL-6, an interleukin associated with inflammatory processes that has been linked to cardiovascular disease (Ai, Seymour, Tice, Kronfol, & Bolling, 2009). One study showed that that religious attendance is negatively associated with IL-6 (Koenig et al., 1997), which is contrary to our hypothesis, but three intervention studies on meditation training showed decreased IL-6 (Pace et al., 2009; Zautra et al., 2008; Zgierska et al., 2008). Ironson et al. (2002) showed that HIV patients who had much higher scores on various measures of spirituality as well as religious behavior showed longer survival times. A follow-up study showed that those with a positive view of God had better preservation of T4 cells and longer survival times, whereas those with a view of God as harsh or punishing had a more rapid disease progression (Ironson et al., 2011).

There is also some evidence that religious alienation is associated with poorer health outcomes. Ai et al. (2009) found a positive relationship between religious alienation and IL-6

levels, indicating greater inflammation. Religious alienation has been related to poorer physical health in a variety of patient populations, including cancer (Sherman, Plante, Simonton, Latif, & Anaissie, 2009) and HIV and HIV progression (Ironson et al., 2002; Trevino et al., 2010) as well as increased mortality in elderly medically ill inpatients (Pargament et al., 2001).

Summary

Thus, there is a fair amount of evidence supporting the idea that religiousness and spirituality have different effects on health, and that these effects are mediated primarily by health behaviors and by inflammation-related biomarkers, respectively. It is not surprising that the results are not always consistent, given the overlap between religiousness and spirituality, and very few studies have contrasted these two pathways. It is likely that not all effects of religiousness and spirituality are mediated through self-regulatory pathways. For example, religious social support can be very instrumental, and there is also increasing evidence that social support may have also have direct physiological effects, such as through touch (Field, 2010). Further, it is also possible that some of the religiousness and spirituality measures may be confounded with their health and well-being outcomes, and future research should focus on more clearly delineating religious and spirituality constructs.

FUTURE RESEARCH AND CLINICAL IMPLICATIONS

Understanding the influences of religiousness and spirituality on health through the perspective of self-regulation theory opens the door to many new research directions. Much work is occurring in areas of behavioral regulation, emotion regulation, and cognitive regulation (see Gross & Thompson, 2007), all of which have important implications for studying how religiousness and spirituality affect health. Our model also suggests that distinguishing between religiousness and spirituality and examining the differential pathways through which they may

exert effects on health will greatly improve our understanding of these effects; in future work, carefully distinguishing these constructs will be essential. Such refined measurements will allow researchers to examine questions regarding how very specific aspects of religiousness and spirituality such as specific theological beliefs relate to health outcomes.

Conceptualizing the phenomenon that has variously been described as negative religious coping or spiritual struggle as religious alienation also paves the way for more nuanced research, not only in the health psychology but in broader studies of the role of religion and spirituality in mental health and social integration. For example, religious alienation may include feelings of abandonment and betrayal by religious institutions and by one's deity, but a more nuanced assessment might differentiate between these two.

In terms of clinical applications, the field is ripe for well-designed interventions that capitalize on individuals' existing religious and spiritual characteristics. Many interventions are being implemented to increase mindfulness, which may be seen as efforts to increase spirituality. Nevertheless, few advocate efforts to alter individuals' levels of religiousness, perhaps due to ethical constraints (Park, 2012). However, given that most Americans already have fairly strong religious lives, these self-regulatory resources may be usefully drawn upon to help improve their physical health and well-being and eventually to have a salutary impact on healthcare costs and public health outcomes.

Our model and the findings supporting it are too preliminary to venture far into clinical suggestions. We may speculate that interventions attempting to improve health habits, such as quitting smoking or exercising more frequently, may have improved success if people are encouraged to draw upon their religious lives, such as religious social support and beliefs in the necessity of adhering to the prescriptions and proscriptions of their religious faith. Only a few

such interventions have been implemented and tested to date (e.g., Pargament, 2007). In addition, health behavior interventions administered through a religious organization, such as church-based mammography screenings, have been successfully used to promote the practice of health behaviors (see Lee & Newberg, 2005).

Interventions to enhance physiological health may benefit by focusing on helping individuals cultivate a richer spiritual life. Approaches towards this end, such as meditation and yoga, have been shown to have salutary effects on cardiovascular reactivity, immune functioning, and other physiological indices (e.g., Anderson et al., 2008; Zautra et al., 2008) and have recently been embraced by behavioral medicine. Secondly, people may be encouraged to draw upon their spirituality to find additional motivation to make and maintain healthy behaviors. This latter approach has not been systematically implemented or evaluated.

The strong links demonstrated in many studies between religious alienation and poorer health provides a promising target of interventions promoting health. However, again, while some approaches toward substance abuse rely on spiritual approaches and may include focusing on religious alienation, efforts to systematically implement and evaluate health-related interventions targeting religious alienation have not been made.

Although we have presented research from a variety of sources that supports our model, it is clear that much remains to be learned. One potentially important link that has, as far as we can tell, gone virtually unexamined, is that between religiousness, conscientiousness, and health. Further, our conceptions of social support in the R/S context need to be better nuanced, in terms of whether it is structural or spiritual (Nelson, 2009). As is true of all of the models we have reviewed, there have been no tests of the complete model, only of particular links. In addition, even models that have tested multiple links in the same study have rarely used sophisticated

designs or measures. Thus, we hope that this model will bring order to this “disheveled” literature (Krause, 2011) and provide a sound theoretical basis, both to organize existing research and to guide future research and clinical interventions.

REFERENCES

- Ai, A. L., Seymour, E. M., Tice, T. N., Kronfol, Z., & Bolling, S. F. (2009). Spiritual struggle related to plasma interleukin-6 prior to cardiac surgery. *Psychology of Religion and Spirituality, 1*, 112-128. doi:10.1037/a0015775.
- Aldwin, C. M. (2007). *Stress, coping, and development: An integrative approach* (2nd ed.). New York: Guilford.
- Aldwin, C. M., Yancura, L. A., & Boeninger, D. K. (2007). Coping, health, and aging. In C. M. Aldwin, C. L. Park, & A. Spiro III (Eds.), *Handbook of Health Psychology & Aging* (pp. 210-226). New York: Guilford.
- Anderson, J. W., Liu, C., & Kryscio, R. J. (2008). Blood pressure response to Transcendental Meditation: A meta-analysis. *American Journal of Hypertension, 21*, 310-316. doi:10.1038/ajh.2007.65.
- Bahr, S. J., & Hoffmann, J. P. (2010). Parenting style, religiosity, peers, and adolescent heavy drinking. *Journal of Studies on Alcohol, 71*, 539-543.
- Bargh, J. A., & Williams, L. E. (2007). On the nonconscious regulation of emotion. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 429-445). New York: Guilford.
- Baumeister, R. F., & Vohs, K. D. (2007). Self-regulation, ego depletion, and motivation. *Social and Personality Psychology Compass, 1*, 115-128. doi:10.1111/j.1751-9004.2007.00001.x
- Bazargan, S., Sherkat, D. E., & Bazargan, M. (2004). Religion and alcohol use among African-American and Hispanic inner-city emergency care patients. *Journal for the Scientific Study of Religion, 43*, 419-428. Retrieved from <http://dx.doi.org/10.1111/j.1468-5906.2004.00244.x>.
- Benjamins, M. R., Ellison, C. G., Krause, N. M., & Marcum, J. P. (2011). Religion and preventive service use: Do congregational support and religious beliefs explain the

- relationship between attendance and utilization? *Journal of Behavioral Medicine*, *34*, 462-476. doi:10.1007/s10865-011-9318-8.
- Benjamins, M. R., Trinitapoli, J., & Ellison, C. G. (2006). Religious attendance, health maintenance beliefs, and mammography utilization: Findings from a nationwide survey of Presbyterian women. *Journal for the Scientific Study of Religion*, *45*, 597-607. doi:10.1111/j.1468-5906.2006.00330.x.
- Burris, J. L., Sauer, S. E., & Carlson, C. R. (2011). A test of religious commitment and spiritual transcendence as independent predictors of underage alcohol use and alcohol-related problems. *Psychology of Religion and Spirituality*, *3*(3), 231–240. doi:10.1037/a0022204
- Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.
- Chida, Y., Steptoe, A., & Powell, L. H. (2009). Religiosity/spirituality and mortality. A systematic quantitative review. *Psychotherapy and Psychosomatics*, *78*, 81-90. doi:10.1159/000190791.
- Cloninger, C. R., Svrakic, D. M., & Przybeck, T. R. (1993). A psychobiological model of temperament and character. *Archives of General Psychiatry*, *50*, 975-990.
- Cohen, S., Miller, G. E., & Rabin, B. S. (2001). Psychological stress and antibody response to immunization: A critical review of the human literature. *Psychosomatic Medicine*, *63*, 7-18.
- Cotton, S., Zebracki, K., Rosenthal, S. L., Tsevat, J., & Drotar, D. (2006). Religion/spirituality and adolescent health outcomes: A review. *Journal of Adolescent Health*, *38*(4), 472-480.
- Durà-Vilà, G., Dein, S., Littlewood, R., & Leavey, G. (2010). The dark night of the soul: Causes and resolution of emotional distress among contemplative nuns. *Transcultural Psychiatry*, *47*, 548-570. doi: 10.1177/1363461510374899.

- Eisenberg, N., & Zhou, Q. (2000). Regulation from a developmental perspective. *Psychological Inquiry, 11*(3), 166-171.
- Exline, J. J., & Rose, E. D. (2013). Religious and spiritual struggles. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality* (2nd ed., pp. 380-398). New York: Guilford.
- Fetzer Institute/National Institute on Aging Working Group (1999). Multidimensional measurement of religiousness, spirituality for use in health research: A report of a National Working Group. Retrieved from <http://www.fetzer.org/images/stories/pdf/MultidimensionalBooklet.pdf?phpMyAdmin=TvbZCEboAyGV01GE7vRVA3-esL8&phpMyAdmin=d7XgXWSZ0EXUtskBxtZG4fhGNqa>.
- Field, T. (2010). Touch for socioemotional and physical well-being: A review. *Developmental Review, 30*, 367-383. doi: 10.1016/j.dr.2011.01.001
- Finch, C. E. (2011). Inflammation in aging processes: An integrative and ecological perspective. In E. J. Masoro & S. N. Anstad (Eds.), *Handbook of the biology of aging* (7th ed., pp. 275-295). San Diego, CA: Academic Press.
- Gillum, R. F., Livingston, I. L., Obisesan, T. O., Trulear, H.D (2007). Changes with aging of the association of religiosity and current alcohol use in Americans to age 90 in a national survey. *The Internet Journal of Geriatrics and Gerontology, 3*. Retrieved from Academic Onefile, http://go.galegroup.com.ezproxy.proxy.library.oregonstate.edu/ps/retrieve.do?sgHitCountType=None&sort=RELEVANCE&inPS=true&prodId=AONE&userGroupName=s8405248&tabID=T002&searchId=R2&resultListType=RESULT_LIST&contentSegment=&searchType=BasicSearchForm¤tPosition=1&contentSet=GALE%7CA179391298&&docId=GALE/A179391298&docType=GALE&role=

- Gillum, R. F. (2005). Frequency of attendance at religious services and cigarette smoking in American women and men: The Third National Health and Nutrition Examination Survey. *Preventive Medicine, 41*, 607-613. doi:10.1016/j.ypmed.2004.12.006.
- Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: Conceptual foundations. In J. J. Gross (Ed). *Handbook of emotion regulation* (pp. 3-24). New York: Guilford.
- Hank, K., & Schaan, B. (2008). Cross-national variations in the correlation between frequency of prayer and health among older Europeans. *Research on Aging, 30*, 36-54.
doi:10.1177/0164027507307923.
- Harris, M., Fallot, R. D., & Berley, R. W. (2005). Qualitative interviews on substance abuse relapse and prevention among female trauma survivors. *Psychiatric Services, 56*, 1292-1296.
doi:10.1176/appi.ps.56.10.1292.
- Horton, K. D., Ellison, C. G., Loukas, A., Downey, D. L., & Barrett, J. B. (2010). Examining attachment to God and health risk-taking behaviors in college students. *Journal of Religion and Health, 51*, 552-66. doi:10.1007/s10943-010-9380-5.
- Ironson, G., Solomon, G., & Balbin, E. (2002). The Ironson-Woods Spirituality/Religiousness Index is associated with long survival, health behaviors, less distress, and low cortisol in people with HIV/AIDS. *Annals of Behavioral, 24*(1), 34-48.
- Ironson, G., Stuetzle, R., Ironson, D., Balbin, E., Kremer, H., George, A., Schneiderman, N., & Fletcher, M.A. (2011). View of God as benevolent and forgiving or punishing and judgmental predicts HIV disease progression. *Journal of Behavioral Medicine, 34*, 414-425.
doi:10.1007/s10865-011-9314-z.
- Koenig, H. G. (2008). Concerns about measuring “spirituality” in research. *Journal of Nervous and Mental Disease, 196*, 349-355. doi:10.1097/NMD.0b013e31816ff796.

- Koenig, H. G. (2002). The connection between psychoneuroendocrinology and religions. In H. G. Koenig & H. J. Cohen (Eds.), *The link between religion and health: psychoneuroimmunology and the faith factor* (pp. 11-30). New York, NY: Oxford University Press.
- Koenig, H. G. (2008). Concerns about measuring “spirituality” in research. *Journal of Nervous and Mental Disease, 196*, 349-355. doi:10.1097/NMD.0b013e31816ff796.
- 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 of Psychiatry in Medicine, 27*, 233-250. doi:10.2190/40NF-Q9Y2-0GG7-4WH6.
- Koenig, H. G., George, L. K., Hays, J. C., Larson, D. B., Cohen, H. J., & Blazer, D. G. (1998). The relationship between religious activities and blood pressure in older adults. *International Journal of Psychiatry in Medicine, 28*, 189-213. doi:10.2190/75JM-J234-5JKN-4DQD.
- Koenig, H. G., McCullough, M. E., & Larson, D. B. (2012). *Handbook of religion and health* (2nd ed). New York: Oxford University Press.
- Koole, S. L., McCullough, M. E., Kuhl, J., & Roelofsma, P. H. M. P. (2010). Why religion’s burdens are light: From religiosity to implicit self-regulation. *Personality and Social Psychology Review, 14*, 95-107. doi:10.1177/1088868309351109.
- Krause, N. (2011). Religion and health: making sense of a disheveled literature. *Journal of Religion and Health, 50*, 20-35. doi:10.1007/s10943-010-9373-4.

- Lee, B. Y., & Newberg, A. B. (2005). Religion and Health: a Review and Critical Analysis. *Zygon: Journal of Religion and Science*, 40, 443-468. doi:10.1111/j.1467-9744.2005.00674.x
- Levenson, M. R., & Aldwin, C. M. (2013). Mindfulness as religious practice. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality* (2nd ed., pp. 580-594). New York: Guilford.
- Levenson, M. R., Jennings, P. A., Aldwin, C. M., & Shiraishi, R. W. (2005). Self-transcendence: conceptualization and measurement. *International Journal of Aging & Human Development*, 60, 127-143. doi: [10.2190/XRXM-FYRA-7U0X-GRC0](https://doi.org/10.2190/XRXM-FYRA-7U0X-GRC0).
- Levin, J. S. (1996). How religion influences morbidity and health: Reflections on natural history, salutogenesis and host resistance. *Social Science & Medicine*, 43, 849-864. doi:10.1016/0277-9536(96)00150-5.
- Levin, J., Chatters, L. M., & Joseph, R. (2011). Theory in religion, aging, and health: An overview. *Journal of Religion and Health*, 50, 389-406. doi: 10.1007/s10943-009-9319-x.
- Luszczynska, A., Diehl, M., Gutiérrez-Doña, B., Kuusinen, P., & Schwarzer, R. (2004). Measuring one component of dispositional self-regulation: Attention control in goal pursuit. *Personality and Individual Differences*, 37, 555-566. doi:10.1016/j.paid.2003.09.026.
- Masters, K. S. (2008). Mechanisms in the relation between religion and health with emphasis on cardiovascular reactivity to stress. *Research in the Social Scientific Study of Religion*, 19, 91-116. doi: 101163/ej.9789004166462.i-299.
- Masters, K. S., & Hooker, S. A. (2013). Religion, spirituality, and health. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality* (2nd ed., pp. 519-539). New York: Guilford.

- Masters, K. S., Hill, R. D., Kircher, J. C., Benson, T. L. L., & Fallon, J. A. (2004). Religious orientation, aging, and blood pressure reactivity to interpersonal and cognitive stressors. *Annals of Behavioral Medicine, 28*, 171-178. doi: 10.1207/s15324796abm2803_5.
- McFadden, S. H. (2005). Points of connection: Gerontology and the psychology of religion. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality* (pp. 162-176). New York: Guilford.
- McCullough, M. E., & Willoughby, B. L. B. (2009). Religion, self-regulation, and self-control: Associations, explanations, and implications. *Psychological Bulletin, 135*, 69-93. doi:10.1037/0033-2909.
- Michalak, L., Trocki, K., & Bond, J. (2007). Religion and alcohol in the U.S. National Alcohol Survey: How important is religion for abstention and drinking? *Drug and Alcohol Dependence, 87*(2-3), 268-280. doi:[10.1016/j.drugalcdep.2006.07.013](https://doi.org/10.1016/j.drugalcdep.2006.07.013) .
- Nelson. (2009). Psychology, religion, and spirituality. In J. M. Nelson (Ed.), *Psychology, religion, and spirituality* (pp. 311-345). New York: Springer.
- Oman, D. (2013). Religious and spirituality: Evolving meanings. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality* (2nd ed., pp. 23-47). New York: Guilford.
- Pace, T. W. W., Negi, L. T., Adame, D. D., Cole, S. P., Sivilli, T. I., Brown, T. D., Issa, M. J., et al. (2009). Effect of compassion meditation on neuroendocrine, innate immune and behavioral responses to psychosocial stress. *Psychoneuroendocrinology, 34*, 87-98. doi:10.1016/j.psyneuen.2008.08.011.
- Pargament, K. I. (1997). *The psychology of religion and coping: Theory, research, practice*. New York: Guilford.

- Pargament, K. I. (1999). The psychology of religion and spirituality? Yes and no. *International Journal for the Psychology of Religion*, 9, 3-16. doi:10.1207/s15327582ijpr0901_2.
- Pargament, K. I., Koenig, H. G., & Perez, L. M. (2000). The many methods of religious coping: Development and initial validation of the RCOPE. *Journal of Clinical Psychology*, 56, 519-543.
- Pargament, K. I., Koenig, H. G., Tarakeshwar, N., & Hahn, J. (2001). Religious struggle as a predictor of mortality among medically ill elderly patients: A 2-year longitudinal study. *Archives of Internal Medicine*, 161, 1881-1885.
- Pargament, K. I., Mahoney, A., Exline, J. J., Jones, J., & Shafranske, E. (2013). Envisioning an integrative paradigm for the psychology of religion and spirituality: An introduction to the APA handbook of psychology, religion and spirituality. In K. I. Pargament (Ed.), *APA handbook of psychology, religion, and spirituality* (Vol. 1, pp. 1-xxx). Washington, DC: American Psychological Association.
- Park, C. L. (2012). Meaning, spirituality, and growth: Protective and resilience factors in health and illness. In A. S. Baum, T. A., Revenson, & J. E. Singer (Eds.), *Handbook of Health Psychology*, (2nd ed., pp. 405-430). New York: Taylor & Francis.
- Park, C. L., Edmondson, D., Hale-Smith, A., & Blank, T. O. (2009). Religiousness/spirituality and health behaviors in younger adult cancer survivors: Does faith promote a healthier lifestyle? *Journal of Behavioral Medicine*, 32, 582-591. doi:10.1007/s10865-009-9223-6.
- Park, C. L., Moehl, B., Fenster, J. R., Suresh, D. P., & Bliss, D. (2008). Religiousness and treatment adherence in congestive heart failure patients. *Journal of Religion, Spirituality, & Aging*, 20, 249-266. doi:10.1080/15528030802232270

- Park, C. L., & Slattery, J. (2013). Religiousness/spirituality and mental health. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality* (2nd ed., pp. 540-559). New York: Guilford.
- Park, C. L., Wortmann, J. H., & Edmondson, D. (2011). Religious struggle as a predictor of subsequent mental and physical well-being in heart failure patients. *Journal of Behavioral Medicine, 6*, 426-436. doi:10.1007/s10865-011-9315-y
- Penley, J. A., Tomaka, J., & Wiebe, J. S. (2002). The association of coping to physical and psychological health outcomes: A meta-analytic review. *Journal of Behavioral Medicine, 25*, 551-603. doi: 10.1023/A:1020641400589
- PEW Forum (2008). *U.S. Religious Landscapes Survey*. Retrieved from <http://religions.pewforum.org/pdf/report-religious-landscape-study-full.pdf>
- PEW Forum (2012). "Nones" on the rise: One-in-five adults have no religious affiliation. Retrieved from <http://www.pewforum.org/Unaffiliated/nones-on-the-rise.aspx>
- Piedmont, Ralph. L. (1999). Does spirituality represent the sixth factor of personality? Spiritual transcendence and the five-factor model. *Journal of Personality, 67*, 985-1013.
- Powell L. H, Shahabi, L., Thoresen, C.E. (2005). Religion and spirituality: Linkages to physical health. *American Psychologist, 58*, 36-52. doi: 10.1037/0003-066X.58.1.36.
- Rasmussen, H. N., Wrosch, C., Scheier, M. F., & Carver, C. S. (2006). Self-regulation processes and health: The importance of optimism and goal adjustment. *Journal of Personality, 74*, 1721-1747. doi:10.1111/j.1467-6494.2006.00426.x
- Reed, P. G. (1991). Self-transcendence and mental health in oldest-old adults. *Nursing Research, 40*, 5-11. doi:10.1097/00006199-199101000-00002 .

- Salmoirago-Blotcher, E., Fitchett, G., Ockene, J., Schnall, E., Crawford, S., Granek, I., Manson, J., et al. (2011). Religion and healthy lifestyle behaviors among postmenopausal women: The Women's Health Initiative. *Journal of Behavioral Medicine, 34*, 360-371. doi:10.1007/s10865-011-9322-z.
- Sapolsky, R. (2004). *Why don't zebras get ulcers* (3rd ed.). New York: Henry Holt & Company.
- Seeman, T. E., Dubin, L. F., & Seeman, M. (2003). Religiosity/spirituality and health: A critical review of the evidence for biological pathways. *American Psychologist, 58*, 53-63. doi:10.1037/0003-066X.58.1.53.
- Sherman, A. C., Plante, T. G., Simonton, S., Latif, U., & Anaissie, E. J. (2009). Prospective study of religious coping among patients undergoing autologous stem cell transplantation. *Journal of Behavioral Medicine, 32*, 118-128. doi:10.1007/s10865-008-9179-y.
- Spinale, J., Cohen, S. D., Khetpal, P., Peterson, R. A., Clougherty, B., Puchalski, C. M., Patel, S. S., et al. (2008). Spirituality, social support, and survival in hemodialysis patients. *Clinical Journal of the American Society of Nephrology, 3*, 1620-1627. doi:10.2215/CJN.01790408.
- Timio, M., Saronio, P., Verdura, C., Schiaroli, M., Timio, F., & Monarca, C. (2001). A link between psychosocial factors and blood pressure trend in women. *Physiology & Behavior, 73*, 359-363. doi:10.1016/S0031-9384(01)00489-9.
- Trevino, K. M., Pargament, Kenneth I, Cotton, S., Leonard, A. C., Hahn, J., Caprini-Faigin, C. A., & Tsevat, J. (2010). Religious coping and physiological, psychological, social, and spiritual outcomes in patients with HIV/AIDS: Cross-sectional and longitudinal findings. *AIDS and Behavior, 14*, 379-389. doi:10.1007/s10461-007-9332-6.
- Watts, F. (2007). Emotion regulation and religion. In James J. Gross (Ed.), *Handbook of emotion regulation* (pp. 504-520). New York: Guilford.

- Whooley, M. A., Boyd, A. L., Gardin, J. M., & Williams, D. R. (2002). Religious involvement and cigarette smoking in young adults: The CARDIA Study. *Archives of Internal Medicine*, *162*, 1604-1610.
- Yanez, B., Edmondson, D., Stanton, A. L., Park, C. L., Kwan, L., Ganz, P. A., & Blank, T. O. (2009). Facets of spirituality as predictors of adjustment to cancer: Relative contributions of having faith and finding meaning. *Journal of Consulting and Clinical Psychology*, *77*, 730-741. doi:10.1037/a0015820.
- Zautra, A. J., Davis, M. C., Reich, J. W., Nicassario, P., Tennen, H., Finan, P., et al. (2008). Comparison of cognitive behavioral and mindfulness meditation interventions on adaptation to rheumatoid arthritis for patients with and without history of recurrent depression. *Journal of Consulting and Clinical Psychology*, *76*, 408-421. doi:10.1037/0022-006X.76.3.408.
- Zell, A., & Baumeister, R. F. (2013). How religion can support self-control and moral behavior? In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality* (2nd ed., pp. 498-518). New York: Guilford.
- Zgierska, A., Rabago, D., Zuelsdorff, M., Coe, C., Miller, M., & Fleming, M. (2008). Mindfulness meditation for alcohol relapse prevention: A feasibility pilot study. *Journal of Addiction Medicine*, *2*, 165-173. doi:10.1097/ADM.0b013e31816f8546.
- Zinnbauer, B. J., & Pargament, K. I. (2005). Religiousness and spirituality. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality* (pp. 121-142). New York: Guilford.

Table 1. Hypothesized pathways by which dimensions of religious involvement influence health

Religious Dimensions	Pathways	Mediating Factors	Salutogenic Mechanisms
Religious commitment	Health-related behavior and lifestyles	Avoidance of smoking, drinking, drug use, poor diet, unprotected sex, etc	Lower disease risk and enhanced well-being
Religio-ethnic identity	Hereditiy	Phenotype	Hereditary transmission
Religious involvement and fellowship	Social support	Social relations, supportive networks, and friends and family	Stress-buffering, coping and adaptation
Religious worship and prayer	Psychodynamics of ritual	Relaxation, hope, forgiveness, catharsis, empowerment, love, contentment, and positive emotions	Psychoneuroimmunology, psychoneuroendocrinology and psychophysiology
Religious and theological beliefs and worldviews	Psychodynamics of belief	Salutary health beliefs, personality styles and behavioral patterns	Consonance between religious and health-related cognitions
Religious faith	Psychodynamics of faith	Optimism and positive expectation	Placebo effect
Religious, spiritual mystical or numinous experience	Superempirical effects	Activation or invocation of healing bioenergy or a life force and experience of altered states of consciousness	Naturalistic subtle energy and nonlocal effects
Religious obedience (via faith, behavior, worship or prayer)	Supernatural effects	Divine blessing	Supernatural intercession

Source: Levin, J. S. (1996). How religion influences morbidity and health: Reflections on natural history, salutogenesis, and host resistance. *Social Science & Medicine*, 43, p.858.

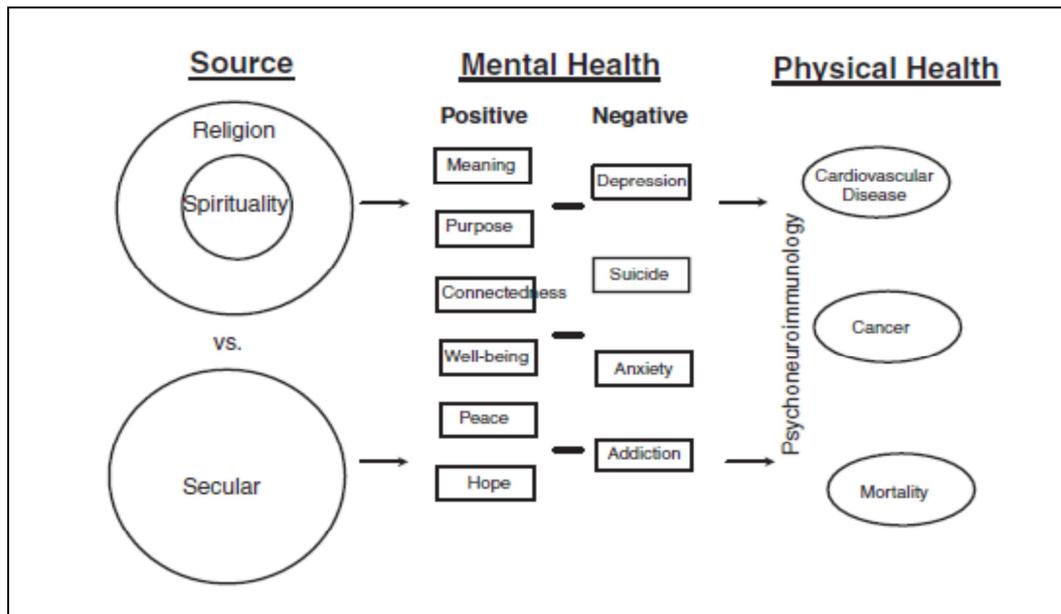


Figure 1. Classical Model of Religion, Spirituality, & Health. *Source:* Koenig, H. J. (2008). Concerns about measuring spirituality in research. *Journal of Nervous & Mental Disorders*, 196, 349-355, p.350.

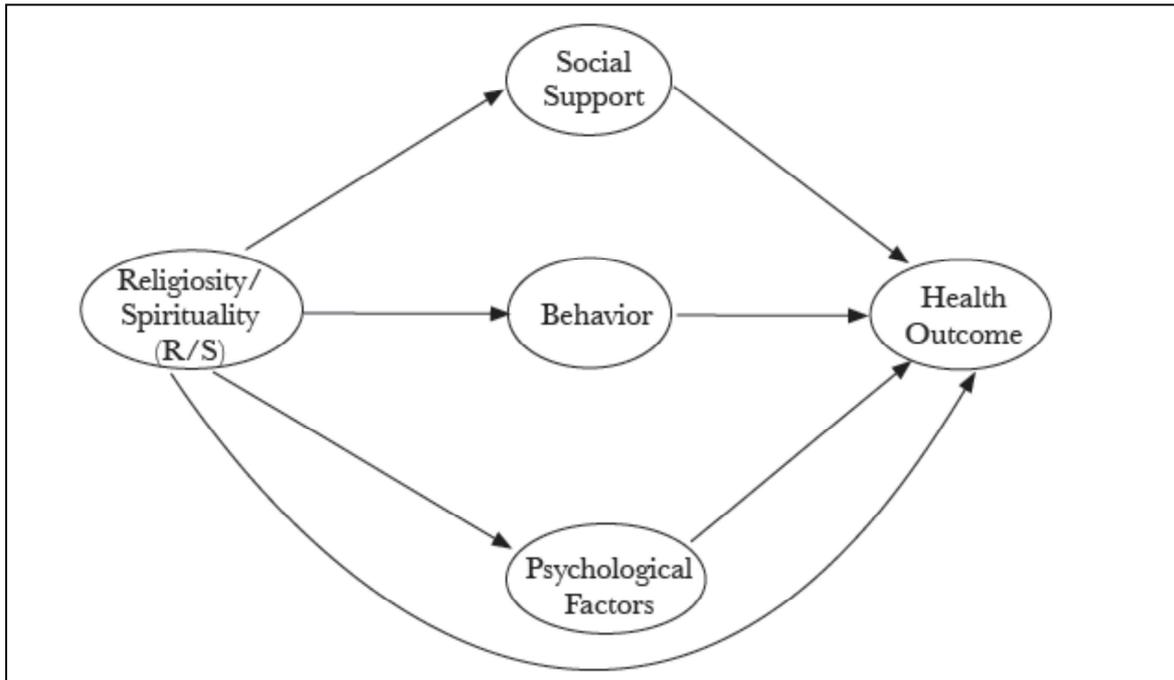


Figure 2. Master's Model of Religion and Health. *Source:* Masters, K. S. (2008). Mechanisms in the relation between religion and health with emphasis on cardiovascular reactivity to stress. *Research in the Scientific Study of Religion*, 19, 91-115.

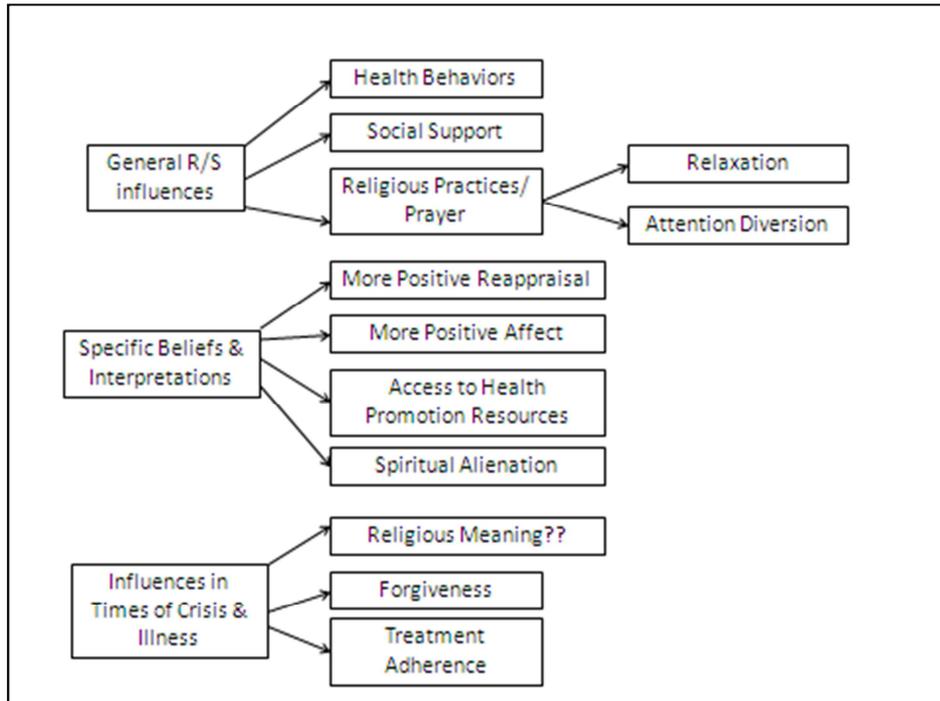


Figure 3. Pathways through which Three Dimensions of R/S can Affect Health Outcomes.

Based on: Park, C. (2012). Meaning, spirituality, and growth: Protective and resilience factors in health and illness. In A. S. Baum, T. A., Revenson, & J. E. Singer (Eds.), *Handbook of Health Psychology*, (2nd ed., pp. 405-430). New York: Taylor & Francis.

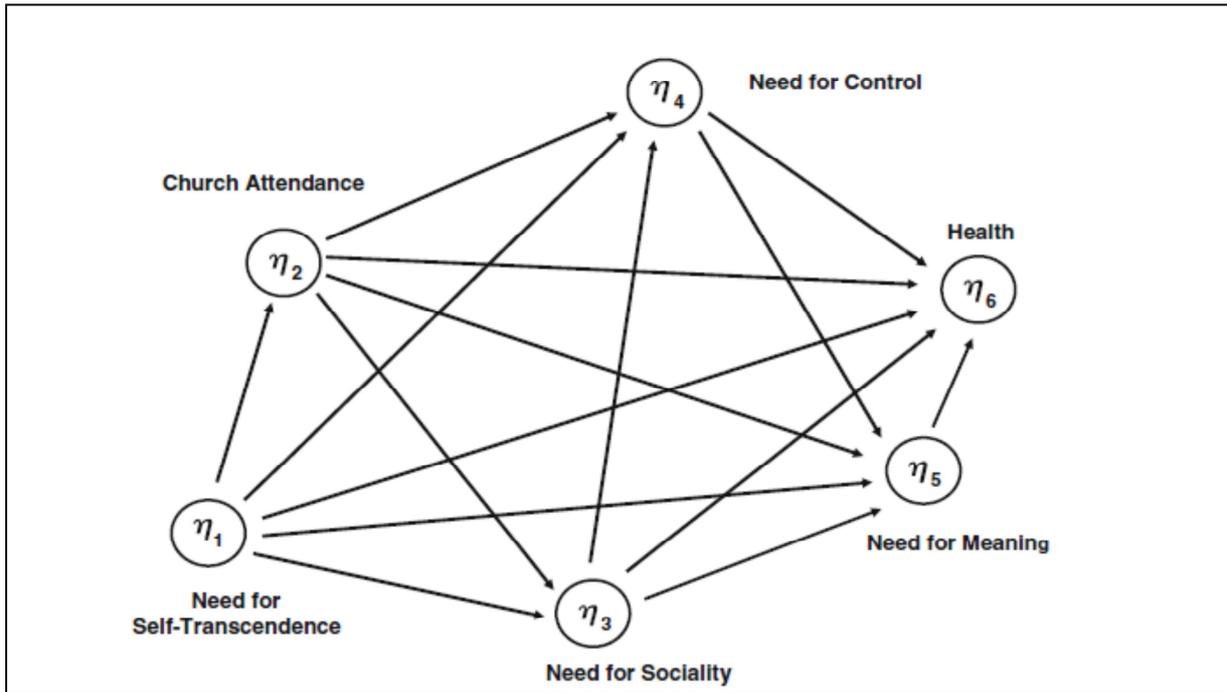


Figure 4: Modeling the needs that are satisfied by religion. *Source:* Krause, N. (2011).

Religion and health: Making sense of a disheveled literature. *Journal of Religion and Health*, 50, 20-35.

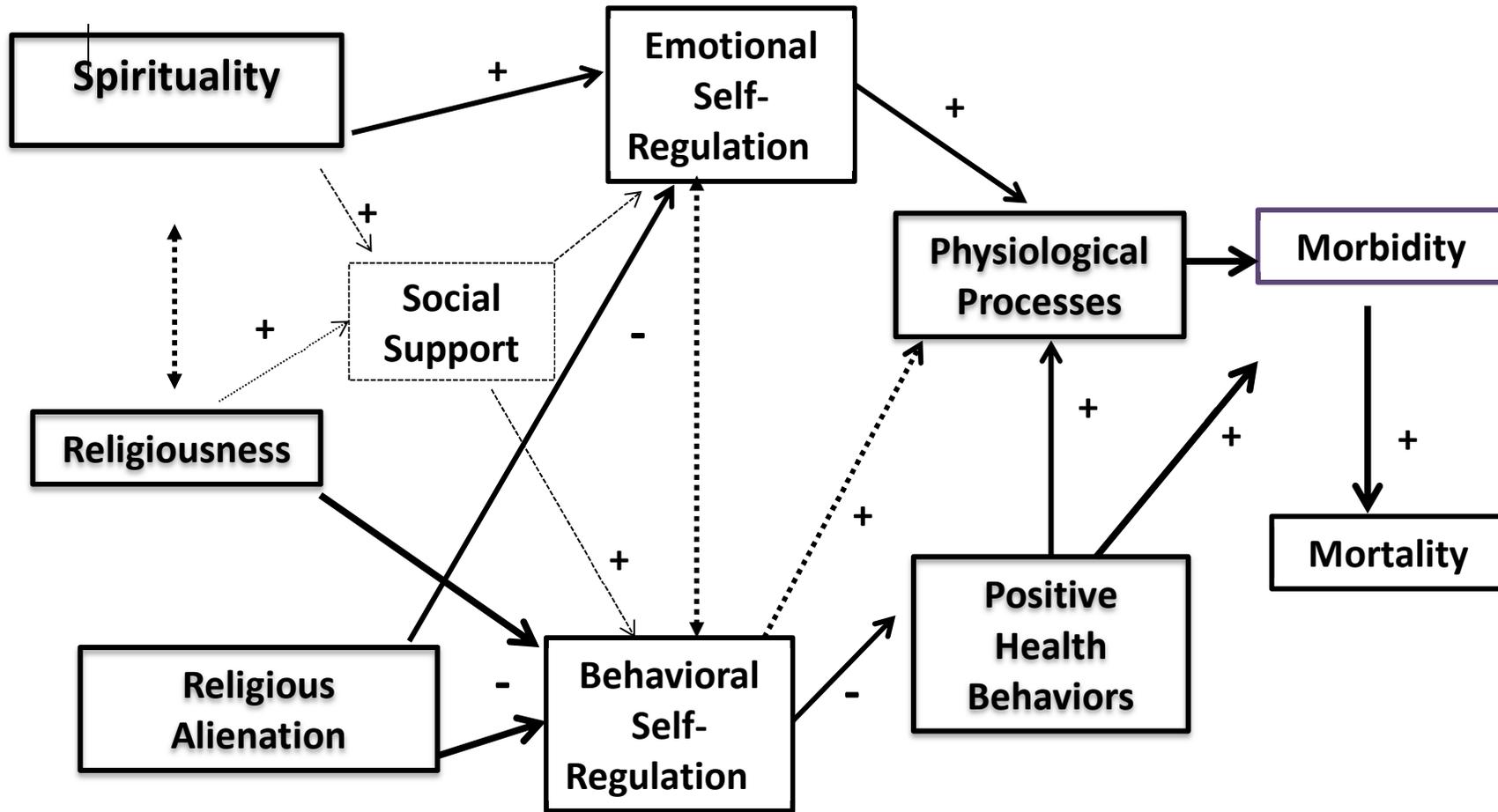


Figure 5. Proposed Model of the Differential Impact of Religiousness and Spirituality on Pathways to Morbidity & Mortality.