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Advancing our understanding of religion and spirituality in the context of behavioral medicine

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Abstract

Recognizing and understanding the potentially powerful roles that religiousness and spirituality (RS) may serve in the prevention and amelioration of disease, as well as symptom management and health related quality of life, significantly enhances research and clinical efforts across many areas of behavioral medicine. This article examines the knowledge established to date and suggests advances that remain to be made. We begin with a brief summary of the current knowledge regarding RS as related to three exemplary health conditions: (a) cardiovascular disease; (b) cancer; and, (c) substance abuse. We then focus on particular concerns for future investigations, emphasizing conceptual issues, possible mediators and moderators of relationships or effects, and methodology. Our discussion is framed by a conceptual model that may serve to guide and organize future investigations. This model highlights a number of important issues regarding the study of links between RS and health: (a) RS comprise many diverse constructs, (b) the mechanisms through which RS may influence health outcomes are quite diverse, and (c) a range of different types of health and health relevant outcomes may be influenced by RS. The multidimensional nature of RS and the complexity of related associations with different types of

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Compliance with ethical standards

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Human and animal rights and Informed consent All procedures followed were in accordance with ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study.

health relevant outcomes present formidable challenges to empirical study in behavioral medicine. These issues are referred to throughout our review and we suggest several solutions to the presented challenges in our summary. We end with a presentation of barriers to be overcome, along with strategies for doing so, and concluding thoughts.

Keywords

Religion; Spirituality; Cardiovascular disease; Cancer; Substance use

Introduction

Approximately 80 % of people worldwide identify with a religious group, and many who do not identify with a particular faith still hold some religious or spiritual beliefs: among the unaffiliated, 7 % of Chinese, 30 % of French, and 68 % of US adults share a belief in God or a higher power (Hackett et al., 2012). About 60 % of American adults regularly report to feel a deep sense of ‘spiritual peace and well-being’ (Pew Research Center, 2014). Nevertheless, social scientists have historically distanced themselves from religious and spiritual matters in the context of clinical research and practice (Delaney et al., 2007). This limited attention may be because academic scientists, on average, are less religious than the general population (Ecklund & Scheitle, 2007) and may therefore be less comfortable with this area of inquiry.

The daunting methodological challenges inherent in this field of study may also deter research. Foremost among these challenges is the question of defining the core constructs (i.e., religiousness and spirituality). Over recent decades, many theorists and researchers have endeavored to develop satisfactory definitions of “religiousness” and “spirituality” (Oman, 2013). In spite of these efforts, the achievement of this goal remains elusive. The history of this issue reveals that defining the terms ‘religiousness’ and ‘spirituality’ (and any distinctions drawn between them) generates disagreement, leading to alternative proposed definitions, in a continuing cycle. Further complicating the matter, as Miller and Thoresen (2003) wisely noted “We suspect that any scientific operational definition of spirituality is likely to differ from what a believer means when speaking of the spiritual” (p. 27). Thus, a discussion of the many competing perspectives regarding unique and overlapping aspects of RS is beyond the scope of this article, but interested readers are urged to consult reviews of efforts to define these constructs (e.g., Oman, 2013; Miller & Thoresen, 2003).

Given that this article provides an overview of the current state of the field, we are limited in our review to the usage of terms chosen by the authors of the original studies. Thus, we have elected to use the term “RS” to allow a broad scope. As a consequence, our review reflects this heterogeneity. In our conceptual model, we make the point that RS comprise many specific components and we suggest that future studies should carefully define the aspects of RS on which they intend to focus. RS collectively represents a constellation of important affective, behavioral, and cognitive variables that may affect the feelings, actions, and thoughts of people in ways that influence important health-related outcomes.

In the context of behavioral medicine, RS have shown possible influences on many important outcomes, including lower mortality (Powell et al., 2003). RS are associated with mental health variables (Koenig, 2012) as well as salutary health behaviors (Benjamins, 2006; Salmoirago-Blotcher et al., 2011) and are linked to a number of improved health and health-relevant outcomes among individuals with a variety of conditions such as cardiovascular disease (Chida et al., 2009), cancer (Laubmeier et al., 2004), and substance abuse (Geppert et al., 2007). Although characterized as “controversial” (Blumenthal et al., 2007; p. 506), peer-reviewed research appears to indicate a magnitude of associations between RS and health outcomes ranging from “small” to “large” (Hwang et al., 2011). These findings have important implications for a better understanding of how RS and health-relevant variables and outcomes may be related.

Recognizing and understanding the powerful role that RS may serve in the prevention and amelioration of disease as well as symptom management will advance many areas of behavioral medicine. This article examines: (a) the knowledge to date; and, (b) what remains to be done. To orient readers who may not be familiar with this research we begin with a brief summary and critical review of the current evidence regarding RS in relation to (a) cardiovascular disease; (b) cancer; and, (c) substance abuse. These conditions represent important health concerns, and the most significant research involving important RS constructs has been conducted in these areas. Those seeking a more comprehensive review of the literature in these and related areas are encouraged to consult the citations on which our review is based as well as sources that provide more comprehensive reviews (e.g., Ellison & Hummer, 2010; Koenig et al., 2001, 2012). We then focus on future investigations, emphasizing conceptual issues, possible mediators and moderators, and methodological challenges. We end with barriers, strategies for overcoming them, and concluding thoughts.

Our discussion is framed by a general conceptual model that may be a useful guide in future efforts to study the complex relationships among RS and health outcomes (Fig. 1). This model is derived from, and similar to, a number of proposed models (e.g., Fitchett & Canada, 2010; Lee & Newberg, 2005; Levin & Vanderpool, 1989; Masters, 2008; Oman & Thoresen, 2005; see Aldwin et al., 2014, for an overview of models). The present model illustrates important issues regarding links between RS and health: (a) RS comprise many diverse and varied constructs, (b) the mechanisms through which RS may influence health-related outcomes are likewise varied, and (c) a range of health-relevant outcomes may be influenced by RS. We note here that we include some of the many dimensions of RS recognized as potentially important in the context of health (Fetzer/NIA, 1999). In some cases, some of these dimensions, such as RS coping, may function as mediators of the effects of other aspects of RS on downstream behavior or health (Aldwin et al., 2014). The multidimensional nature of RS and the complexity of its associations with different types of health endpoints present formidable challenges to empirical study.

RS and health research: current findings and critique

RS and cardiovascular disease

Cardiovascular disease (CVD) is the leading cause of death worldwide and accounts for one out of three deaths in the US (Mozaffarian et al., 2016). In the past two decades the

importance of psychosocial factors in the pathogenesis, prevention, and treatment of CVD has received increasing attention (Rozanski, 2014), including studies that have extensively investigated physiological changes relevant to CVD and associated with several RS dimensions. These studies documented multiple beneficial effects associated with certain RS dimensions (e.g., private spiritual practices and intrinsic religiosity), such as higher levels of cardiac autonomic control (Berntson et al., 2008) and lower blood pressure reactivity to stressors (Masters et al., 2004). Based on this evidence, we might expect to find a consistent protective association between RS and CVD outcomes at the population level. Instead, the current epidemiological evidence suggests a more complex picture.

Much research examining associations between RS and cardiovascular outcomes has focused on the association between RS and cardiovascular *mortality*. The evidence from rigorously designed population studies and from a seminal meta-analysis suggested the existence of an independent association between organizational religiosity (i.e., religious service attendance) and CVD mortality (Chida et al., 2009; Hummer et al., 1999; Oman et al., 2002). In addition, adherence to orthodox practices has been associated with reduced cardiovascular mortality and morbidity in Jewish populations (Friedlander et al., 1986; Goldbourt et al., 1993). In both of these studies, associations were independent of important confounding/mediating variables (such as coronary risk factors). Other studies, however, (e.g., Hummer et al., 1999; Oman et al., 2002) did not adjust for important coronary risk factors (i.e., diabetes, hypertension, and dyslipidemia).

More recent studies published after the meta-analysis by Chida et al. (2009) offer a different picture. Two longitudinal analyses conducted in a large cohort of healthy, older women enrolled in the Women's Health Initiative (WHI) did not find a protective association between religious affiliation, organizational religiosity, religious coping (Schnall et al., 2010) or private religious practice (Salmoirago-Blotcher et al., 2013) and CVD mortality. Similar findings were reported in a prospective cohort study involving 5000 healthy men and women enrolled in the Multi-Ethnic Study of Atherosclerosis (MESA) (Feinstein et al., 2010). In both the WHI and MESA cohorts, point estimates actually showed a higher risk of CVD among the more religiously involved.

Among studies that focused on relations between RS and cardiovascular *morbidity* (i.e., *non-fatal cardiovascular events*), Colantonio et al. (1992) did not find significant associations between organizational religiosity and risk of stroke among older non-institutionalized individuals. A prospective study conducted among a select group of myocardial infarction (MI) survivors who were at risk for a second MI due to their high rates of depression and social isolation did not show associations between organizational religiosity, private religious practice, or spiritual experiences and all-cause mortality or risk of recurrent MI (Blumenthal et al., 2007).

Overall, positive associations between RS and CVD were found in studies conducted among younger healthy individuals (Chida et al., 2009; Friedlander et al., 1986; Goldbourt et al., 1993; Hummer et al., 1999; Oman et al., 2002). We note that studies with null or negative findings extensively adjusted for coronary risk factors as well as a wealth of confounding and mediating variables that were not considered or available in earlier studies.

Taken together, the above findings indicate that despite the earlier meta-analytical finding of an independent association between RS and CVD outcomes (Chida et al., 2009), the current evidence linking RS and cardiovascular mortality and morbidity remains inconclusive, and more research is needed examining, for example, whether associations are consistent across different subgroups (healthy vs. unhealthy individuals, age and gender subgroups), and different follow-up durations.

RS and cancer

Cancer is the second leading cause of death in the US, accounting for 23 % of total deaths in 2013 (Centers for Disease Control and Prevention, 2013). After a cancer diagnosis, many patients report that RS are important to their adjustment (Asgeirsdottir et al., 2013). Religious coping is one component of RS that has been studied in cancer patients (see Lavery & O’Hea, 2010; Thune-Boyle et al., 2006 for reviews). Approximately 66 % of cancer patients report using prayer to cope with their illness (Ross et al., 2008) and 84 % of advanced cancer patients report relying on their religious beliefs to cope (Vallurupalli et al., 2012). Positive religious coping (PRC) includes a sense of love, compassion, secure partnership with the divine, and a spiritual connection to others (Pargament et al., 2011). Negative religious coping (NRC), or spiritual struggle, is characterized by spiritual conflicts, a strained relationship with the divine, and doubt in one’s religious beliefs (Pargament et al., 2011).

PRC is much more prevalent than NRC (Hebert et al., 2009) but has shown mixed relationships with various types of psychological well-being in cancer patients (Gall et al., 2011). Many studies suggest that PRC is associated with better emotional, interpersonal, and global functioning (Agarwal et al., 2010; Gall, 2004), better overall quality of life (Tarakeshwar et al., 2006), and greater growth (Urcuyo et al., 2005). However, PRC has also been associated with greater transplant concerns in multiple myeloma patients (Sherman et al., 2009) and more physical symptoms in advanced cancer patients (Tarakeshwar et al., 2006). These findings may reflect a religious coping mobilization effect in which religious resources are specifically accessed in the context of life stress (Cummings & Pargament, 2010).

However, religious coping has also demonstrated a negative relationship with mental health in cancer patients. Though endorsed at far lower rates than PRC, NRC is consistently associated with greater psychological distress, including higher levels of depression and lower levels of life satisfaction and quality of life (Hebert et al., 2009), higher levels of anxiety and poorer physical health (Sherman et al., 2009), and worse mental health (Pérez & Smith, 2015) and adjustment to illness (Exline et al., 2011). These findings highlight the importance of considering the potential for both positive and negative outcomes of religious coping in this population.

Recent meta-analyses of 1341 effects drawn from over 44,000 patients with cancer demonstrated an overall positive relationship between RS and self-reported measures of health outcomes (Park et al., 2015) but the strength of that relationship varied as a function of both the RS dimension and the physical (Jim et al., 2015), mental (Salsman et al., 2015), and social (Sherman et al., 2015) outcomes assessed. The strongest relationships were found

between affective dimensions of RS (e.g., sense of meaning, purpose, or connection to a source larger than oneself) and mental health outcomes, whereas behavioral RS constructs (e.g., service attendance, prayer and meditation) showed few significant associations with health, except for a modest positive relationship with social health outcomes. These meta-analyses represent the most comprehensive summary and synthesis of the role of RS for patients and survivors managing the experience of cancer. However, more than 90 % of the studies were cross-sectional and more than 50 % failed to account for relevant covariates or confounds.

Additional research is needed to clarify the nature of relationships between RS and patient well-being (see Schreiber & Brockopp, 2012; Visser et al., 2010 for reviews). Though many studies control for demographic (e.g., Tarakeshwar et al., 2006), disease (e.g., Hebert et al., 2009), and other RS constructs (e.g., Gall et al., 2011), analysis of mediators and moderators will provide a more nuanced understanding of the relationships between RS and outcomes in cancer patients.

Additional research is also needed to advance the understanding of the relationship between RS and disease-related outcomes such as morbidity, mortality, or disease progression and to determine if RS interventions can play a role in changing the trajectory of mental and physical health of cancer patients (Kaplar et al., 2004). In systematic reviews of RS and cancer mortality or progression, there are consistent failures to support the hypotheses that RS slows cancer progression, and inadequate evidence to support the hypothesis that RS protects against cancer mortality (Powell et al., 2003). A review of 18 studies examining the risk for cancer in Christian and non-Christian samples concluded that lifestyle factors explained the reduced risk for cancer associated with a Christian affiliation (Hoff et al., 2008). This finding is consistent with research indicating that RS beliefs and practices are associated with health behaviors associated with reduced cancer risk such as lower levels of smoking and alcohol use (Rew & Wong, 2006), greater use of preventive health services and cancer screening (Benjamins & Brown, 2004), and greater adherence to health behaviors (Park et al., 2008). Such findings suggest that RS may be part of a profile associated with reduced risk for cancer.

RS and substance abuse

Globally, 240 million people suffer from alcohol use disorder, one billion smoke tobacco products, and 15 million inject drugs (Gowing et al., 2015). Substance abuse is a systemic problem, directly affecting the health and well-being of the abusing individuals and their families, and indirectly reaching into society through crime and violence, work absenteeism and unemployment, child abuse and neglect, motor vehicle accidents, and homelessness, all of which impact physical health (Office of National Drug Control Policy, 2000; SAMHSA, 2008). Many theoretical arguments for why RS “should” be related to lower levels of substance abuse have been advanced. A smaller but respectable literature empirically supports the notion that RS provide protection against substance abuse, especially RS beliefs established during childhood (Porche et al., 2015). These studies identify differences in risk for substance abuse and confirm indirect relationships between RS and substance abuse. A

few experimental studies even demonstrate a possible causal relationship between RS and changes in substance use (e.g., DeWall et al., 2014).

There is overwhelming consensus that *religiosity*, particularly *attendance* and often *spirituality*, are negatively related to alcohol, tobacco, and illicit substance use across the U.S. and other countries (El Ansari et al., 2014; Hatta, 2010; Hayatbakhsh et al., 2014; Kovaks et al., 2011; Rasic et al., 2011; Wang et al., 2015). Recent comprehensive reviews concluded that RS consistently negatively predicted substance use, possibly due in part to prohibitions against alcohol and other substance use inherent in some religions (Geppert et al., 2007; Kub & Solari-Twadell, 2013; Walton-Moss et al., 2013; Yeung et al., 2009); however, many cited studies did not control for possible confounds such as income or education. Findings were less clear for spirituality (Geppert et al., 2007; Walton-Moss et al., 2013). Very few cited studies found nonsignificant relationships between RS and substance abuse, and none reported a positive relationship, but many were cross-sectional in design, and their definitions and measurements of RS varied widely.

Some of the stronger study designs include twin studies, longitudinal studies, and experimental studies. In twin studies, Kendler and Myers (2009) found that the inverse relationship between religious service attendance and both alcohol and tobacco use became stronger over time; however, Button et al. (2010) showed that religiosity moderated the relationship between genetic factors and alcohol use only in adolescent twins—reduced genetic variance for problem alcohol use with increasing levels of religiosity for both males and females—but religiosity did not moderate alcohol use for either gender in early adulthood. Other longitudinal findings demonstrated that *religious coping* (Brechting & Giancola, 2007), *church attendance* (Jessor et al., 2006), *high religiosity* (White et al., 2006), and *high or increasing RS* in an inpatient population (Conner et al., 2009) predict lower or decreasing substance use rates.

There is intriguing evidence of a causal relationship between RS and substance use whereby increases in RS predict decreased substance abuse. Perhaps the strongest evidence for effects of RS on substance use includes a series of studies that methodically progressed from cross-sectional through longitudinal to experimental designs (DeWall et al., 2014), in which the amount of prayer in which participants engaged was experimentally increased and predicted both an increase in overall religiosity and a decrease in alcohol use.

In summary, there is strong evidence for an inverse relationship between RS and substance abuse and accumulating evidence for causal effects of RS on substance use and abuse in that increases in RS have predicted reduced substance use in controlled experimental studies. Much research on substance use has separated religiosity and spirituality. Generally, there appears to be less evidence for a protective relationship for spirituality.

Future directions, anticipated barriers, and research recommendations

The findings from cardiovascular disease, cancer, and substance abuse are provocative and suggest a potential benefit of RS on multiple physical health and health-relevant outcomes. However, these data are complex and thus greater understanding is needed in a number of

areas. More precise identification and understanding of the mediators through which RS may impact physical health and the conditions under which these relationships may be strengthened or attenuated is needed. Additionally, more methodologically rigorous studies are essential to reduce the potency and frequency of alternative explanations for significant results such as bias, confound, or chance. Studies that include prospective designs as well as experimental (RCT) approaches, strong sampling methods, adequate control for established protective factors, psychometrically robust measures of RS and health outcomes, and appropriate statistical analyses with adequate power for moderator analyses, are needed to advance this field (Rosmarin et al., 2011). Finally, the field would benefit from the use of stronger organizing frameworks or models.

Conceptualizations

Too often, researchers fail to clearly operationalize RS constructs and use RS measures that are confounded with their outcomes of interest or have poor psychometrics. Although a number of conceptualizations of RS have been advanced, surprisingly few studies that use RS variables explicitly use these conceptualizations (Rosmarin et al., 2011). We advocate for more consistency, both across and within studies, careful conceptualization of RS variables, and greater consideration of the theoretical models within which they are embedded.

Initially, researchers tended to conceptualize RS as separate constructs. However, starting in the 2000's, conceptualization of the domains moved toward seeing R and S as interrelated (Hill et al., 2000). This helped formulate many of the models being tested in research (Aldwin et al., 2014). In adolescent health, Cotton et al. (2006) built on Pargament's model for adults (Pargament et al., 2001), that separates the distal and proximal aspects of religion. This conceptualization identified that distal "behaviors" (e.g., church attendance) often used to describe the concept of "religion" in research should be separated from the "functions" of religion (e.g., the provision of meaning and peace) that identify the role of "spirituality." The separation of behavior from function allows researchers to identify individual domains without completely separating the concepts of religion and spirituality (Hill & Pargament, 2008). Conceptualizations of religion developed by health psychology researchers may have implications for links between RS and health. These conceptualizations include concepts of meaning making (Park, 2012), reappraisal (Dezutter et al., 2011), sense of community (LaPierre, 1994), sense of reverence (Ai et al., 2011), and relief of existential distress (Magyar-Russell et al., 2014).

Sophistication in measurement has advanced over the past 20 years, but a concerning trend has emerged. Rather than using a simple single item measure (e.g., service attendance frequency), more studies have moved to using a single survey measure to assess RS, a positive development. However, authors often provide no rationale for their selection of a particular RS measure. In many papers, RS variables are not fully conceptualized, operationalized, or thoroughly integrated in a model of the study, and study outcomes may be related to RS, but RS variables are often not formally integrated into the conceptual framework.

Within the area of RS measurement, progress is occurring. A recent and broadly accepted self-correction occurred with the updating of the domains of a widely used instrument, the

FACIT-Sp. This instrument initially conceptualized RS as a two factor model: meaning/peace and faith (Peterman et al., 2002). However, further study of the two factor structure indicated that the meaning/peace component was too closely related to anxiety and that separating this instrument into three domains—meaning, peace, and faith—provides more informative constructs and better psychometric properties (Peterman et al., 2014). In addition to moving away from a two factor model of the FACIT-Sp, care should be taken to avoid using the measure as a predictor of well-being outcomes—a common misuse which confounds predictor and outcome variables (Park et al., 2015).

Mechanisms

Researchers should draw on theory to clearly delineate the processes and mechanisms through which different aspects of RS might influence health. Many pathways have been proposed to explain *how* religion and spirituality may exert salutary influences on well-being (Clements & Ermakova, 2012; Fitchett & Canada, 2010; Lee & Newberg, 2005; Levin & Vanderpool, 1989; Masters, 2008; Oman & Thoresen, 2005; Park, 2007; see Aldwin et al., 2014, for a review). As Fig. 1 illustrates, these pathways are diverse, and different aspects of RS may affect different aspects of health by influencing the practice of health behaviors, through direct influences on physiological processes, or through the provision of social support.

RS appear to promote a healthier lifestyle. Large-scale epidemiological studies have demonstrated that health behaviors partially mediate the effects of service attendance on physical health, including mortality (e.g., Koenig & Vaillant, 2009). RS have been linked to lower levels of cigarette smoking (e.g., Whooley et al., 2002) and higher levels of preventive health behaviors [e.g., flu shots, cholesterol screening, breast self-exams, mammograms, pap smears, and prostate screening (Benjamins & Brown, 2004)]. Preventive health behaviors have also been linked to RS in many other samples, including a nationally representative sample of Presbyterian women (Benjamins et al., 2006), a large national population of community-dwelling women (Salmoirago-Blotcher et al., 2011), a state-wide representative study of Texas residents (Hill et al., 2007), and a sample of disenfranchised elderly African Americans (Aaron et al., 2003). RS have been related to lower levels of risky health behaviors in diverse samples including inner-city cocaine-using methadone-maintained patients (Avants et al., 2006) and pregnant women in Appalachia (Jesse & Reed, 2006). A nationally representative sample of African Americans showed that different dimensions of RS, including religious beliefs (Debnam et al., 2012a), religious involvement (Holt et al., 2014b), and religious coping (Holt et al., 2014a) were related to health behaviors, including diet, exercise, and smoking.

RS may also influence health through direct influences on important clinical measures and physiological processes (Hill et al., 2014). Some aspects of RS are related to cardiovascular reactivity (Masters et al., 2005), levels of cardiac autonomic control (Berntson et al., 2008), and immune functioning (Ai et al., 2010). These effects may be due to various functions of RS, including induction of relaxation response or a generally calmer demeanor, provision of coping resources when encountering stress (Clements & Ermakova, 2012), or induction of greater positive affect (Park, 2012).

Another important function of RS is the provision of social support. When studies of the service attendance-mortality link control for its influence, relations between attendance and mortality often become substantially weaker (George et al., 2002), indicating that social support mediates at least some of the relationship of RS with health. However, effects of RS-related social support are inconsistent (George et al., 2002), and it appears that although this type of social support is consistently related to mortality, it often functions as an independent predictor rather than as a mediator. Aspects of social support specific to religion appear to be qualitatively different than non-religious social support (Krause, 2008), and may have more potent effects on health (Hayward & Elliott, 2009). In a nationally representative sample of older adults, congregational social support in particular led to a sense of belongingness and satisfaction with one's health (Krause & Wulff, 2005) and in a national sample of African Americans, religious social support predicted fruit and vegetable consumption, physical activity, and alcohol use over and above general social support (Debnam et al., 2012b).

Moderators

We also advocate attending to potential moderators of the effects of RS on health outcomes. The high levels of within-group variability on health outcomes among individuals with high levels of RS suggests that moderating factors may play critical roles in these linkages, and some research has demonstrated the importance of moderator effects (e.g., Musick et al., 1998; Sternthal et al., 2012). Paying additional attention to moderators will greatly increase the power and meaning of research by identifying characteristics of individuals or groups for whom certain dimensions of RS are particularly potent and those for whom they have much less influence.

Sociodemographics have been shown to be important moderators in RS-health linkages. Not only are specific RS dimensions more prevalent in certain groups, but the associations between RS and health outcomes in these groups may be stronger. RS may be especially related to health among older adults, women, those from specific religious groups, minorities, and those with less education. A study of maternal caregivers of chronically ill children found few relations of religious salience and prayer with quality of life and health symptoms (Banthia et al., 2007). However, taking education and income into account, the relationships became statistically significant, such that prayer was associated with fewer health symptoms and better quality of life among less educated maternal care-givers, and unrelated in those with more education.

Such effects can be complicated. Analyses of a recent nationally representative sample in the US demonstrated moderated mediation such that the mediational pathway of social support linked religious involvement and beneficial health effects only among African Americans (Assari, 2013). New analytic techniques of mediated moderation and moderated mediation (e.g., Muller et al., 2005; Preacher et al., 2007) provide powerful tools for researchers to understand these relationships, but it is critical that researchers consider moderators in order to use these tools. By identifying key moderating variables, research can provide a better understanding of the specific contexts and groups for whom RS is beneficial and under what conditions that benefit occurs, yielding important information for future interventions.

Methodological considerations

The empirical study of RS is inherently difficult, fraught with problematic methodological and even philosophical issues. The discussion above highlighted a major difficulty encountered when attempting to study RS: the conceptualization(s) of RS. Given the difficulty of reaching consensus on this basic concern, it is not surprising that other challenges present at nearly every step in an investigation. Assuming that a reasonable definition for RS can be agreed upon, the problems of how to rigorously measure and operationalize RS as well as disentangle RS from other factors (i.e., culture, socio-economic status, education, personality, family, philosophical and theological views) remain. Further, since it is not possible to randomly assign individuals to particular RS beliefs or views, establishing strong causal inference becomes nearly impossible with particular variables. Finally, as we describe below, some behavioral medicine scholars take the position that even if investigators were successful in overcoming these formidable problems, the practical implications of RS research are extraordinarily limited because it is unethical to use the findings to inform treatment choices or interventions.

Although daunting, these difficulties are neither insurmountable nor unique to RS as they are common in many of the social sciences. The study of personality factors and marital relationships carry many of the same conceptual and methodological obstacles. It is our view that, these difficulties notwithstanding, the study of RS in behavioral medicine has made significant methodological progress. Some of these advances were noted earlier in our discussion of RS research in the areas of cardiovascular disease, cancer, and substance use. Figure 1 also provides a simple yet elegant approach to organizing research in this area. It is now commonly recognized that RS is multidimensional and the associations are unlikely to be the same across different RS dimensions and different dependent variables. Consequently, it makes very little sense to ask whether RS is related to health, and, fortunately, virtually no one conducting research in this area would now ask this question so broadly (though many outside the field continue to conceptualize RS in this unidimensional manner). Of much greater interest to current scientific thinking is the question of “which dimensions of RS are related to which health-relevant outcomes through what theoretical mechanisms for which groups of people?” This level of specificity for the independent, dependent, mediating, and moderating variables represents a significant advance.

Large scale longitudinal investigations have provided some of the most compelling evidence regarding relations among RS constructs and behavioral medicine variables. We encourage more work of this type. However, many of these investigations were conceptualized around other primary variables, and findings regarding RS were ancillary to the major purpose of the investigation. Stronger evidence will accrue when investigators conduct large-scale longitudinal work that features RS variables as the primary constructs of study. Such work, when done systematically, would: (a) carefully consider what covariates to measure to limit confounding, (b) measure at multiple time points, (c) include consideration of possible mediators and moderators, and, (d) include behavioral medicine variables chosen specifically for reasons related to the primary RS questions. This work, grounded in existing or developing theoretical models of dimensions of RS and with careful consideration of

relevant dependent variables including particular biomarkers, will best establish the basis for a successfully developing field of investigation.

For many years, RS research, whether cross-sectional or longitudinal, remained strictly observational. How can one randomize or manipulate RS variables? Indeed, some RS constructs defy either randomization or manipulation and must simply be measured. But others are, within certain limits, amenable to such treatments. For example, it is quite possible to study the effects of spiritual meditation, prayer, or other RS behavioral variables (e.g., scripture reading) on stress reactivity in the laboratory by: (a) including only participants willing to be randomly assigned to one of these conditions; (b) using random assignment and including specifically designed controls; and (c) exposing participants to a stressor and measuring stress responses (e.g., Wachholtz & Pargament, 2005, 2008, Wachholtz et al., 2015). Such studies, as is true of all laboratory studies, are limited in terms of many aspects of generalizability, but they do provide a method for experimentally manipulating RS variables in a controlled environment. These studies may be useful in examining mediating constructs and therefore may not only shed light on health-relevant outcomes but may also enhance understanding of the mechanisms responsible for those outcomes. In similar fashion, use of new technologies associated with ecological momentary assessment can be advantageous in ascertaining whether effects seen in the lab are found in the natural setting.

The idea of studying behavioral aspects of RS in the lab leads to consideration of an obvious corollary. Though much of RS experience is internal and best measured by self-report, behavioral manifestations of RS are worthy targets for study. Including behavioral measures of RS variables will balance the literature by providing data of a different type from other (non-self-report) sources. Observer ratings of time spent in daily scripture study, service attendance, or spiritually motivated activities (e.g., serving in a soup kitchen as the manifestation of a spiritual calling to serve the disadvantaged) can provide access to RS data that have been rarely obtained.

Finally, we encourage greater sophistication and understanding of the basic theological tenets that underlie many RS beliefs (see also the discussion of religious culture below). An enlightened understanding of these constructs, the so-called insider's point of view (Cohen & Kitayama, 2007), is likely to produce stronger theoretical lines of research that will have greater practical salience. As one example of how understanding theology may impact research, it may be presumed that individuals who believe that God is ultimately in control of their health display an external locus of health control and are characterized by passive coping strategies. This is often not the case (e.g., Masters & Wallston, 2005; Umezawa et al., 2012) because many of those who believe God is in control also believe that God has charged them with the responsibility to engage in certain behaviors, some health related. These individuals hold two apparently contradictory statements to be simultaneously true: that is, God is in control of health and individuals are responsible for healthy behavior. Although perhaps counter-intuitive to a behavioral medicine professional, such a view is quite understandable to many believers.

Implications

Cultural aspects of RS—Cohen (2009) argues that religion, itself, has the defining characteristics to be considered a culture, and that various religions differ in many ways along culturally-relevant dimensions. Hill et al. (2000) stated that religions provide their adherents with their basic view of reality, or world view, and prescribe ways to live and behave within this reality. The potential influence of religions on the lives of believers is quite encompassing and, therefore, likely to influence many relevant psychological and behavioral concepts. Yet current behavioral medicine studies in this area are characterized by a near-complete neglect of this level of understanding and analysis. Psychological and behavioral medicine studies are usually based on the assumption that RS variables can be meaningfully understood apart from their cultural (religious) underpinnings, what Geertz (1983) referred to in another context as the view from nowhere. Masters and Hooker (2013) argued that such an approach is not only limiting but likely to lead to erroneous conclusions, and offer examples to highlight this point.

RS variables need to be considered within the religious culture in which they are embedded. If this is done, a much deeper and more sophisticated and nuanced understanding of RS in relation to behavioral medicine will be gained. Religious cultures are quite foreign to many social scientists and, as is often the case when encountering unfamiliar cultures, fear and reluctance to engage the culture with an even hand and open mind may arise. It will take time to develop the systematic and sustained types of investigations that can produce the sorts of findings we envision, but this type of effort will greatly advance the entire field.

Interventions—We noted earlier the criticism that whatever successes may occur regarding theoretical or research findings, RS is not worthy of significant attention because its practical applications are severely limited. Essentially, this argument holds that because health professionals may not be able to encourage or discourage religious involvement, belief, or practice, there is no useful outcome that can be produced from the study of RS in terms of clinical practice in behavioral medicine (see Sloan & Bagiella, 2001, 2002; Sloan et al., 2000 for more complete discussion). Although we are quite sympathetic to concerns about improper use of religion or spirituality in behavioral medicine, we do not agree with those who say it has no place in health care, given the large proportions of people who consider RS as quite important to them.

Hooker et al. (2016) recently reported on a feasible and acceptable behavioral medicine intervention, in this case for patients with heart failure, that encourages patients to explore their own sense of RS and seek meaning, purpose or forgiveness within their own spiritual framework. Examples of related work can be found in that of Djuric et al. (2009) for obese African American breast cancer survivors, Holt et al. (2009a; b) addressing prostate cancer screening among church-attending African American men, and Delaney et al. (2011) for community dwelling adults with CVD. Substantial public health benefits could be gained through collaboration between the behavioral medicine community and local and national religious leaders to develop behavioral medicine interventions that are religiously sensitive and that can be delivered in the context of the religious community. RS informed

interventions are: (a) appropriate when delivered with proper sensitivity and understanding; and (b) potentially of significant public health benefit.

Funding—A final implication concerns the lack of funding for RS and behavioral medicine research. It is our distinct impression, based on reviews of projects funded by NIH and discussions with NIH staff, that there is, with few exceptions, reluctance to fund research projects that feature RS as a primary focus. This is perhaps due to concerns regarding separation of church and state, though the courts have agreed that funding research in this area is not a violation (Miller & Thoresen, 2003), or it may be due to other reasons including a perceived lack of importance of the topic by social scientists who may have received little or no training in it (Schafer et al., 2011). Given the large numbers of citizens who find RS concerns of substantial importance and whose lives are influenced by these concerns, we believe it is a significant opportunity missed when reasonable levels of funding are not available. These consequences will multiply across the academic and research generations. New faculty may be advised to append their RS measures onto studies designed to answer other questions rather than make RS a central focus of their research careers because, they are warned, they will fail to be funded and thus not progress through the tenure and review systems. We encourage funding organizations to take seriously the evidence and issues discussed in this article and consider ways to improve the funding climate in this important area.

Summary

In this brief article, we provided an overview of how RS relates to health and health-relevant outcomes by reviewing links of RS within the context of major health domains to illustrate how important RS factors are in these areas. We are hopeful that we are not “preaching to the choir” but rather reaching behavioral medicine researchers and practitioners who may or may not be particularly high in RS themselves, but who may not be aware of this large body of information on RS and health, which tends to lie outside the mainstream. RS connects with health across myriad topics, disease and health domains, and outcomes, and we desire to help build bridges with researchers in other areas who may be interested in integrating RS factors into their work. Towards that end, we described important directions for future research to follow, along with some of the challenges and barriers and a number of potential ways to surmount them. We are confident that addressing these issues in virtually any area of behavioral medicine research will yield more complete, valid, and useful findings.

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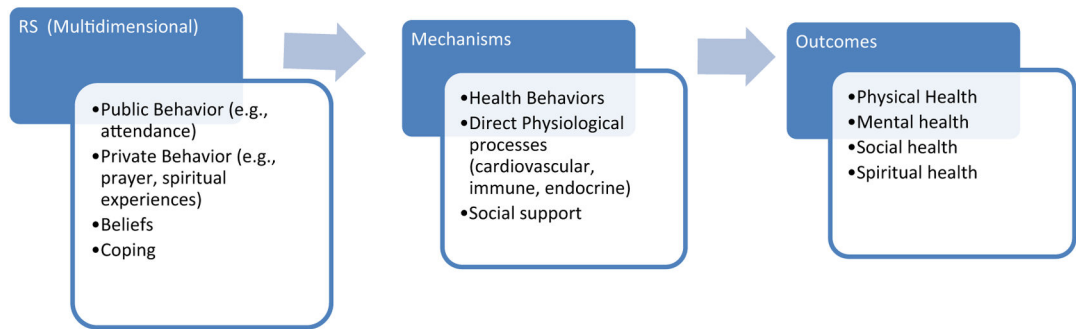


Fig. 1. Illustrations of the potential mechanisms by which religiousness and spirituality (RS) may influence health and health-related outcomes. *Note* This illustration presents examples of some of the most widely-researched RS dimensions, mechanisms and health-related outcomes rather than attempting to provide exhaustive lists