Chapter 21
The Scientific Study of Positive Psychology, Religion/Spirituality, and Physical Health

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Humans have long been interested in relations among religion/spirituality (R/S), positive psychological constructs, and physical health. Furthermore, many religions attempt to influence behavior through health-related prescriptions about food choices, sexual activity, substance use, and resting. Similarly, positive psychological constructs have been discussed in light of their presumed benefits on both mental and physical health (Ryff & Singer, 1998). However, R/S and positive psychological constructs have only recently become objects of scientific investigation of their associations with physical health.

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Positive Psychology and Physical Health

Broadly speaking, *positive psychological constructs* refer to the thoughts, feelings, behaviors, and characteristics that enhance well-being across time, situations, and cultures (Boehm & Kubzansky, 2012). They encompass a variety of states and traits, including happiness, purpose in life, and optimism. In the current chapter, we highlight four positive psychological constructs whose relationships with physical health and mortality have been investigated most frequently, as evidenced by systematic reviews and meta-analyses: life satisfaction (evaluating one's life favorably; Pavot & Diener, 2008), trait positive affect (experiencing frequent positive emotions; Pressman et al., 2019), purpose in life (having valued goals and activities in one's life; McKnight & Kashdan, 2009), and trait optimism (expecting favorable outcomes in the future; Carver et al., 2010). Although the associations between these constructs and physical health have usually been examined independently, these four constructs tend to be moderately related (Kashdan et al., 2008). Moreover, there is considerable debate about how to assess these and related constructs in health-related studies (Ryff et al., 2020; VanderWeele et al., 2020). This nonsystematic, narrative review introduces readers to the most studied positive psychological constructs in relation to physical health.

In this chapter, we review how each of these four constructs is associated with objective health outcomes like morbidity (which refers to all physical symptoms, diseases, and medical conditions) and mortality. Given how hard it is to conduct experimental investigations of large cohorts across long periods, we will focus on evidence from prospective longitudinal studies with initially healthy cohorts. These studies provide evidence suggesting whether positive psychological constructs are causally related to physical health. Similar studies have been conducted among people with chronic disease at baseline, to see whether positive psychological constructs are associated with reduced risk of secondary disease (e.g., Boehm & Kubzansky, 2012). However, once disease processes are underway, the impact of positive psychological constructs on physical health may be attenuated (Boehm & Kubzansky, 2012).

Life Satisfaction

Life satisfaction is associated with healthier and longer lives. Most reviews include life satisfaction in combination with positive affect and purpose in life (e.g., Steptoe, 2019), which makes it difficult to identify the unique health effects of life satisfaction. However, prospective longitudinal studies of initially healthy cohorts have found that higher levels of life satisfaction are associated with reduced risk of coronary heart disease (Boehm et al., 2011), other chronic diseases, and mortality (Feller et al., 2013; Rosella et al., 2019). For example, in a population-based study of over 70,000 Canadians, individuals who were very dissatisfied with their lives had the

highest risk of chronic conditions and mortality across approximately 5 years, compared to those who were satisfied (Rosella et al., 2019). This finding is consistent with meta-analytic evidence that greater life satisfaction is associated with 12% reduced risk of mortality in initially healthy individuals (hazard ratio = 0.88; Martín-María et al., 2017).

Positive Affect

Several systematic reviews and meta-analyses demonstrate that higher levels of trait positive affect are associated with better health outcomes (e.g., Diener & Chan, 2011; Pressman et al., 2019). The available evidence indicates positive affect not only has main effect associations with both morbidity and mortality, but it also buffers the association between stress and poor health. The existing evidence also suggests positive affect is associated with reduced risk of mortality, especially in older adults; however, this finding may be due to lower event rates in younger adults (Steptoe, 2019). Yet whether positive affect is associated with mortality independent of subjective health is unclear (Barger et al., 2020; Liu et al., 2016), given that some adjectives used to assess positive affect (e.g., *energetic*, *vigorous*) may themselves be indicators of health status. Diener and Chan (2011) report that effect sizes are small to moderate in size (0.1 to 0.2 standard deviation differences both in morbidity and mortality outcomes, when comparing low vs. high positive affect). Going forward, the scientific study of positive affect and physical health will be advanced by increased scholarly attention to: (a) utilizing high-quality measures, including measuring both low- (e.g., calm) and high-arousal (e.g., alert) positive affective states and using non-self-report measures (e.g., quantifying emotional-language use), (b) differentiating the temporal focus of assessment (e.g., state vs. trait affect), and (c) exploring and accounting for cultural differences in the value and utility of positive affect (Yoo & Miyamoto, 2018).

Purpose in Life

Several prospective studies indicate that higher purpose in life is associated with lower mortality risk (Alimujiang et al., 2019), fewer cardiovascular events, less physician-reported chronic disease (Steptoe & Fancourt, 2019), less Alzheimer's disease and mild cognitive impairment (Boyle et al., 2012), and lower risk of metabolic syndrome (Boylan & Ryff, 2015). Effect sizes are typically small (e.g., hazard ratio for mortality = 2.43 for lowest vs. highest purpose in life; Alimujiang et al., 2019) but comparable to traditional biomedical risk factors, such as body mass index (Boylan et al., 2017). Cohen et al. (2016) reviewed 10 prospective studies (combined $N > 135{,}000$) and found that measures of purpose, meaning, life engagement, and *ikigai* (i.e., having a reason for being) were associated with a 17% reduced

risk for all-cause mortality and cardiovascular events. Kim et al. (2019) updated Cohen's review, replicating the results and noting important future research directions: (a) addressing methodological limitations related to reverse causality (i.e., does being in good health cause higher purpose in life) and appropriate control of confounders, (b) empirically testing behavioral and biological mechanisms underlying the relationship, and (c) testing whether associations between purpose in life and health are consistent across sociodemographic groups.

Optimism

Optimism is commonly assessed with single items or the multi-item Life Orientation Test (LOT; Scheier et al., 1994). A recent meta-analysis of more than 60 studies examined whether optimism, assessed by the LOT, was associated with physical health outcomes, including biomarkers, disease, hospitalizations, and mortality (Scheier et al., 2021). They found that optimism is modestly associated with better physical health ($r = 0.03$) when aggregated across outcomes and accounting for a range of covariates (e.g., sociodemographics, psychosocial confounders). However, some argue the LOT assesses two separate factors—the absence of pessimism and the presence of optimism. Both the absence of pessimism and presence of optimism showed small associations with physical health (rs = 0.03 and 0.01, respectively; Scheier et al., 2021). Although effects appear small, they reflect associations adjusted for confounding factors, including the shared variance between optimism and pessimism and related psychosocial variables. Furthermore, small effect sizes are common when investigating associations between psychosocial factors and physical health. Moreover, small effects at the individual level have outsized impacts at the population level. Scheier et al. (2021) aptly noted (p. 543): "A one-point change in the pessimism direction of the pessimism subscale corresponds to an increase of 97,014 deaths from all causes (95% CI [32,540, 162,641])" (p. 543).

When optimism is assessed with measures other than the LOT, associations with health and longevity remain. A meta-analysis of 15 studies demonstrated that optimism was associated with reduced risk of first-time cardiovascular events and all-cause mortality (Rozanski et al., 2019). Results were similar for men and women, as well as when adjusted for depression, socioeconomic status, and physical activity. Thus, optimism appears to be related to better health, but it is unclear if the active mechanism is optimism, the absence of pessimism, or both.

Religion/Spirituality and Health

Religion and spirituality (R/S) are considered overlapping constructs with distinct qualities. According to Yeary et al. (2020), "spirituality will be defined as one's experiences with the sacred, whereas religion refers to one's involvement in an

organized system of beliefs and behaviors related to one's experience with the sacred" (p. 196). R/S constructs are multifaceted and encompass a variety of markers, such as religious service attendance, prayer, and religious/spiritual coping. For example, different types of religious/spiritual coping predict different health outcomes (Ai et al., 2007). To date, self-report measures are widely used when studying R/S and health, and much of the research focuses on religious service attendance. In this section, we consider four R/S indicators whose relation to physical health has been examined frequently: religious service attendance, religious/spiritual coping, religious orientation, and prayer. (See Table 18.S2 and Table 25.S2 in this volume for a summary of longitudinal studies of R/S and various mental and physical health outcomes.) As before, this section consists of a nonsystematic, narrative review of important R/S constructs.

Religious Service Attendance

Consistent evidence suggests that frequency of religious service attendance is associated with longevity and all-cause mortality (VanderWeele et al., 2017a). In a review of longitudinal studies of this association, Powell et al. (2003) found the strength of the relationship represented a 30% reduction in mortality, on average, after adjustment for demographic, socioeconomic, and health-related confounds. More recent high-quality, longitudinal prospective studies (e.g., Idler et al., 2017; Li et al., 2016; Wen et al., 2019) also support the association between service attendance and all-cause mortality. Comparing several meta-analytic studies, Lucchetti et al. (2011) found that effect sizes of attendance with all-cause mortality were similar in magnitude to those for recognized health behaviors such as mammography screening and consumption of fruits and vegetables (i.e., 25% reduction in mortality for service attendance vs. 26% reduction in mortality for mammography screening and fruit/vegetable consumption).

Service attendance may also predict cause-specific mortality, such as mortality due to cardiovascular disease (Chida et al., 2009; Shattuck & Muehlenbein, 2020) or cancer (Li et al., 2016; Wen et al., 2019). However, after adjusting for health risk and demographic variables, not all high-quality studies find an association between attendance and cause-specific mortality (Hummer et al., 1999). Overall, there is strong evidence that attendance is associated with lower all-cause mortality and some evidence that it is also associated with cause-specific mortality.

Religious/Spiritual Coping

Religious/spiritual coping assesses how individuals use R/S to cope with distressing life events or stressors. The most widely used measures of religious/spiritual coping are the RCOPE (Pargament et al., 2000) and Brief RCOPE (Pargament et al., 2011).

Both versions operationalize religious/spiritual coping into two types. Pargament et al. (2011) explain: "positive religious coping reflects a secure relationship with a transcendent force, a spiritual connectedness with others, and a benevolent world view [whereas] negative religious coping reflects underlying spiritual tensions and struggles within oneself, with others, and with the divine" (p. 51).

There are limited data on religious/spiritual coping and mortality. Using data from the Black Women's Health Study, Vander Weele and Yu et al. (2017b) found that positive religious/spiritual coping led to reduced mortality, but effects were lessened after accounting for other religious/spiritual factors (religious service attendance, prayer, religious/spiritual orientation). There are also limited data on the association between religious/spiritual coping and health, although some studies point to a relationship. For example, positive religious/spiritual coping predicted beneficial outcomes among those with cardiovascular disease (Ai et al., 2007) and was associated with reduced incident hypertension in a large prospective study (Cozier et al., 2018). Negative religious/spiritual coping often predicts adverse outcomes in people diagnosed with cardiovascular conditions (e.g., Ai et al., 2007).

Religious Orientation

Religious orientation (Allport & Ross, 1967; Gorsuch, 1994) may have associations with health as well. Extrinsic orientation (i.e., an orientation to religious engagement for social, psychological, material, and physical benefits) is associated with higher levels of depressive symptoms (Smith et al., 2003), and depression is in turn linked to worse physical health outcomes. Extrinsic orientation has also been found to be associated with exaggerated blood pressure reactivity to psychological stressors (Masters et al., 2004). In a majority Christian sample, proreligious orientation (i.e., motivation to engage in religion both for its own sake and for its social, psychological, material, and physical benefits) was associated with worse physical functioning, role limitations, and fatigue, compared to intrinsic, extrinsic, and nonreligious orientations (Hunter & Merrill, 2013). However, in this same study, religious orientation and self-rated health were unassociated.

In other research, intrinsically religious adults (i.e., those motivated to engage in religion for its own sake) had healthier physical responses to stressors (Masters et al., 2004). In another adult sample, intrinsic religious beliefs were also associated with fewer medical complications and shorter hospital stays (Contrada et al., 2004). In a community-dwelling sample, intrinsically oriented and nonreligious people reported the best-perceived health and lowest body mass (Masters & Knestel, 2011). People with intrinsic and proreligious orientations were least likely to smoke tobacco or drink alcohol. In a study of cancer patients, there was a positive association between intrinsic religiousness and physical, functional, and social well-being (Pérez & Rex Smith, 2015). In sum, intrinsic religious orientation is consistently associated with better health.

Prayer

Prayer frequency is associated positively with pain and illness coping, but its relations with markers of disease are somewhat dependent on several research design considerations (e.g., the population studied and methodology used). In a review, Moreira-Almeida and Koenig (2008) found evidence for cross-sectional associations between petitionary prayer (i.e., making a request of God) and higher physical pain, which the authors suggest is because people use prayer to ask for help when pain increases. Although prayer has been found to be associated with a higher likelihood of hypertension among adults in Chicago (Buck et al., 2009), prayer has also been found to be associated with better long-term postoperative adjustment in patients undergoing open-heart surgery (Ai et al., 2010). Prayer was also associated with reduced risk of cognitive decline among midlife Arabic women (Inzelberg et al., 2013). Finally, prayer was associated with better prognosis among patients with advanced cancer (Paiva et al., 2014).

Using experimental designs, prayer has been associated with reduced pain and healthier cardiovascular responses to stress. For instance, in a randomized clinical trial of the effects of prayer on migraine headaches among Muslim patients, pain was significantly lower in the group who received pharmacological treatment plus prayer for 2 months than the group who received only pharmacological treatment for 2 months (Tajadini et al., 2017). Similarly, in a meditation study of migraine sufferers, compared to three other groups (internally focused secular meditation, externally focused secular meditation, and progressive muscle relaxation), those who practiced spiritual meditation had greater decreases in the frequency of migraine headaches, anxiety, and negative affect, as well as greater increases in pain tolerance, headache-related self-efficacy, daily spiritual experiences, and existential well-being (Wachholtz & Pargament, 2008). In a lab study of African American women recalling an incident of racism, prayer was associated with lower stress and diastolic blood pressure (Cooper et al., 2014). Likewise, in a randomized trial of Christians, devotional prayer led to lower blood pressure reactivity to an interpersonal challenge, relative to people in the secular meditation or control group (Masters et al., 2020).

In sum, prayer appears to be associated with reduced stress, lower cardiovascular reactivity to stress, and better management of pain. Prayer is thought to encourage proximity-seeking to perceived sacred beings that can provide comfort in times of distress (Granqvist, 2020). But relationships between prayer and health are complex because individuals are more likely to pray when their health is in decline. The literature would benefit from additional studies with experimental designs, as well prospective studies analyzing the function of prayer for health prior to and after disease onset. Analyzing the circumstances in which people pray, the meaning of prayer for them, and study methodology (e.g., cross-sectional vs. longitudinal) are important.

Possible Mechanisms and Pathways

Given that R/S and positive psychological constructs have relationships with mortality and morbidity, what accounts for these relationships? What are plausible pathways that link R/S and positive psychological constructs with health outcomes, and might these relationships be causal? (See Chap. 18, this volume, for a theory explaining the links between R/S and health.)

There are at least three plausible and empirically supported pathways linking R/S or positive psychological constructs with health. The most well-established is the behavioral pathway. To the extent R/S and positive psychological constructs influence (non)engagement in behaviors that have probabilistic relationships with health outcomes, these constructs may be situated along a behavioral pathway affecting health. In the R/S and health literature, there are several studies demonstrating relationships of R/S with beneficial healthy behaviors (e.g., flu vaccination, cholesterol screening, breast self-exams) and lower likelihood of unhealthy behaviors (e.g., cigarette smoking, excessive alcohol use; Shattuck & Muehlenbein, 2020; Yeary et al. 2020). Similarly, salubrious associations between positive psychological constructs and health behaviors have been found, including lower smoking rates, greater use of preventative measures (e.g., cancer screenings), better sleep quality, healthier diet, and higher physical activity (Boehm & Kubzansky, 2012; Boehm et al., 2018; Kim et al., 2014; Steptoe, 2019).

A second pathway routes through social support. There is a well-established relationship between social support and health outcomes (Holt-Lunstad & Uchino, 2015; Uchino et al., 2018). If R/S and positive psychological constructs lead to broader and higher-quality social support, they would plausibly influence health via this pathway as well. For instance, one way religious attendance may influence health is through social support. In fact, studies that include social support as a predictor find it explains significant variance in the relationship between service attendance and health, although attendance remains a significant predictor (George et al., 2002; Kim & VanderWeele, 2019). These studies suggest service attendance may enhance physical health partly by enhancing social support. Moreover, positive psychological constructs are closely linked with social integration and with having relationships with close others who provide support during challenging times (Diener et al., 2018). These social connections may provide support for engaging in preventive behaviors, help buffer the physiological consequences of stress, and protect physical health. Other evidence suggests positive emotions may be associated with healthier outcomes because happier people perceive more favorable social connections, which fosters an upward spiral that contributes to better health (Ramsey & Gentzler, 2015; see Van Cappellen et al., Chap. 20, this volume).

The third pathway examines influences on physiology via psychological processes that are independent of social support. For example, in their meta-analysis, Shattuck and Muehlenbein (2020) found that prayer and meditation demonstrated several relationships with immune function parameters. Similarly, in a randomized experimental design, Masters et al. (2020) found dampened cardiovascular stress

reactivity among participants who engaged in Christian devotional prayer, compared to people in the secular meditation and control groups. Previously, Masters et al. (2004) found that intrinsic religious orientation predicted dampened blood pressure reactivity among older adults. Various positive psychological constructs are also directly associated with cardiovascular, metabolic, and immune functioning (Boehm & Kubzansky, 2012; Pressman et al., 2019; Steptoe, 2019). For example, one review found that positive affect was associated with indices of healthy immune functioning, including lower chronic inflammation and more robust vaccination responses (Marsland et al., 2007).

To what extent might these mechanisms and pathways be causal? Causality, in the domain of these constructs, is a complex and problematic topic. First, experimental research, which provides the strongest causal evidence, is difficult to conduct. Although some aspects of these topics (e.g., religious behaviors and practices, state affect) can be studied experimentally, others cannot (e.g., religious beliefs; personal dispositions). Health is also difficult to study in experimental designs, both for practical and ethical reasons. Often, health-related outcomes in experiments are measures of processes that have a relationship with health variables (e.g., cardiovascular reactivity to stress), but they are not themselves indicators of health per se.

Prospective longitudinal studies are the next-best methodological option for investigating causality. Yet there are many challenges in conducting longitudinal studies of health, including recruitment, retention, need for repeated measurement, length of time, measurement of potential confounds, and measurement of health variables. Even with exquisitely constructed prospective longitudinal designs, this method of research remains observational and thorny to disentangle from a causal perspective. For example, it is difficult to determine whether life satisfaction predicts better health outcomes or whether better health outcomes predict life satisfaction. Temporal analysis helps but does not eliminate the problem. Epidemiologists encounter these issues and apply the Bradford Hill criteria (1965) when making judgments regarding cause and effect. Those criteria are useful for investigators conducting prospective longitudinal studies of R/S, positive psychological constructs, and health. For further recommendations, see VanderWeele et al. (2016), VanderWeele (2017), and Tsang et al. (Chap. 8, this volume).

Conclusions and Future Research Directions

Several conclusions emerge regarding the evidence linking positive psychological constructs to health. First, life satisfaction, positive affect, purpose/meaning in life, and optimism are each associated with better physical health. Although these associations may appear relatively modest, they are comparable to that of other psychological characteristics (Friedman & Booth-Kewley, 1987). Moreover, physical health outcomes are typically determined by multiple interacting factors (e.g., genetics, environment, behaviors), and statistical adjustments for these many

factors can make the effect of any one factor appear small. However, at the population level, small individual effects can have a meaningful impact. In addition, the effect of positive psychological constructs may accumulate over the lifespan (Friedman & Booth-Kewley, 1987; Kim et al., 2017). That said, theoretically informed research that integrates multiple positive psychological constructs is necessary to discern which constructs are most strongly related to physical health and in which contexts. Some posit that constructs most closely tied to regulatory processes, such as optimism and purpose in life, may be more relevant for health outcomes (Boehm & Kubzansky, 2012). But a meta-analysis found that effect sizes of links with mortality were comparable across several positive psychological constructs (Martín-María et al., 2017).

Similarly, when considering the relationship between R/S and health, several key points emerged. The most robustly studied aspect of R/S in relation to mortality is religious service attendance, which is robustly positively related to mortality (see Chap. 25, this volume). The existing studies of religious/spiritual coping and mortality suggest that positive religious/spiritual coping methods are associated with better physical health, whereas negative religious/spiritual coping methods are associated with worse adjustment and physical health. Intrinsic religious orientation is consistently associated with indices of better health. Finally, prayer is associated with benefits for coping with pain, as well as with reduced stress and cardiovascular reactivity; however, individuals may be more likely to pray when they are in poor health.

An interesting question regarding health outcomes and physiological processes is whether the effects of R/S on physiological processes can be accounted for by their relationships with positive psychological constructs. For example, religious/spiritual belief is often viewed as a source of meaning in life, and meaning or purpose in life is predictive of decreased mortality and certain favorable biomarkers for health processes (see Park & Van Tongeren, Chap. 6, this volume). Does meaning or purpose that is based on religious/spiritual perspectives differ in its relationships with health variables? To what extent does R/S account for meaning's documented associations? These and many other important questions await empirical investigation.

Research on physical health in relation to positive psychological constructs and R/S has increased greatly in recent decades. Nevertheless, expanding this empirical investigation into worldwide populations and greater inclusion of different religious/spiritual perspectives or faiths will add significantly to both the depth and breadth of these areas of study. Whether the findings reported in this chapter will be found in future studies of more diverse populations remains to be seen, but future research will add significant nuance and complexity to these expanding fields.

Conflict of Interest The authors have no known conflicts of interest to disclose.

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[1] See the supplemental material (Appendix 21.S1) for a complete reference list that includes dois.

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