

## Subjective Well-Being and Physical Health

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### Abstract:

In this chapter, we review the literature on the connections between various facets of the broad construct of subjective well-being (SWB) and physical health. We aim to highlight which variables have been explored most, which need more research, and to examine possible overlap or similarities among these variables. We divide these positive psychological constructs into six separate categories: hedonic constructs, eudaimonic constructs, well-being practices, social well-being, motivation and efficacy, and future-oriented constructs. Each construct will be defined and explored in terms of its association with various health outcomes such as morbidity and mortality, and we discuss both the strengths and weaknesses of the literature on each construct. Next, we discuss some possible pathways that may underlie the association between SWB and physical health. Finally, we end with a discussion of the literature as a whole and suggest future directions for research in this area to take.

**Keywords:** Well-being, Health, Positive affect, Optimism, Mindfulness

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To be both happy and healthy is a common goal among many individuals. However, some might not know the extent to which these variables are intricately connected. This chapter details the growing science connecting physical health to subjective well-being (SWB) and, more specifically, the various positive facets within this broad construct. Each positive psychological measure will be defined and explored in terms of its association with various health outcomes such as disease incidence, morbidity, and mortality. We then move to a discussion of possible pathways through which these connections may occur, followed by a general summary about the state of the literature as a whole. First, however, we begin by describing what we mean when we refer to SWB and physical health.

### What is Subjective Well-Being?

Happiness is dependent on a number of psychological factors, as demonstrated by an original review of the literature conducted by Wilson (1967). The study of SWB flourished in response to this initial work and has since incorporated research on evaluations of the self, indices of life satisfaction, and emotional responses to life events, among other topics (Diener, Suh, Lucas, & Smith, 1999; Kozma, Stone, & Stones, 2000; Lyubomirsky, King, & Diener, 2005). Life satisfaction and positive—rather than negative—aspects of psychology are the primary focus of SWB, although in some cases, low negative affect (NA) may be considered an indicator of SWB as well (Diener et al., 1999; Ryff, 1989).

### What is Physical Health?

While difficult to define, physical health can be broadly described as the systems of the body carrying out physiological functions properly, with “good” physical health frequently indicated in research by the lack of illness or disease (Breslow, 1972; Idler & Kasl, 1991), as opposed to the preferred World Health Organization definition that health is more than the absence of disease (World Health Organization, 1948). Objective physical health outcomes are characterized by measures that can be confirmed by medical

tests such as the presence of a disease like cancer or a disability like a traumatic brain injury. Furthermore, there are a number of health-related risk indicators, such as binge drinking or not exercising, which can be measured in order to attain an estimate of physical health. Many of these physical health outcomes, however, do not typically encompass mental health variables like depression (Howell, Kern, & Lyubomirsky, 2007). To correct for this, physical health can also be assessed subjectively and with self-report. For example, subjective health is frequently assessed by an individual's interpretation of symptoms of illness or perceptions of pain. Unlike objective health outcomes that rely on medical testing to determine classification, subjective health outcomes are classified by self-reports. In addition to objective and subjective health outcomes, studies also investigate physiological parameters such as hormone levels or blood pressure. It is important to note that while current physiological parameters may be connected with future health outcomes (Pressman & Cohen, 2005; Steptoe, Wardle, & Marmot, 2005), physiology is *not* a health outcome in its own right and should be considered separately from outcomes such as morbidity and mortality.

## Review

The goals of this chapter are to examine how different positive psychological constructs within the broad umbrella of SWB relate to physical health outcomes. We begin our review with a discussion of hedonic constructs, that is, factors that are associated with the affective component of SWB, including positive affect (PA) and life satisfaction. Next, we go over eudaimonic constructs, or constructs that are associated with the self-realization component of SWB, including autonomy, self-esteem, perceived control, and life purpose. Following this section are constructs that are well-being practices, including mindfulness, self-affirmation, and gratitude. Although some of these constructs have aspects that are dispositional, we chose to categorize them in this section because they are often studied as alterable states. We then move to constructs that are associated with social well-being, including social support and networks and social control, and constructs that are associated with motivation and efficacy, including self-efficacy, determination and grit, and hardiness. The final section of the review focuses on future-oriented constructs, including optimism and hope, and a quick discussion of under-researched positive constructs. While low NA can be considered an aspect of SWB, we focus only on positive constructs given our interest in elucidating the connections between these and physical wellness as opposed to the effects of the absence of negativity. We end our chapter with a discussion of possible pathways connecting SWB to physical health, as well as a number of suggestions for future directions in this area of research.

## Hedonic Constructs

The distinction between hedonia and eudaimonia originates from Aristotle's philosophy regarding what constitutes "the good life," and this distinction is still seen in the SWB literature today. Hedonic constructs are driven by the search for pleasure and happiness, whereas eudaimonic constructs are focused on cultivating well-being through long-term emotional processes that focus on meaningful life pursuits (Waterman, 2007; Waterman, 2008). We begin this review by focusing on hedonic constructs, and then move to eudaimonic constructs.

### Positive Affect

One of the largest literatures connecting SWB to physical health outcomes is that focusing on PA (for a review, see Pressman & Cohen, 2005). PA varies in time duration and can be assessed as a brief state (positive emotion felt "in the moment") or a dispositional trait. Although state and trait affect are highly correlated, state affect is more variable, easier to manipulate in the lab, and less likely to be tied to long-term health outcomes given the brevity of the experience. Both state and trait affect are almost exclusively measured by self-report with popular scales like the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988). Only occasional health oriented studies use other PA assessment methods such as facial coding (e.g., Abel & Kruger, 2010; Cross & Pressman, in prep) or positive emotion word usage (Danner, Snowden, & Friesen, 2001; Pressman & Cohen, 2012).

Overall, both state and trait PA have been connected with a number of physical health outcomes. The area with the most research has shown that healthy individuals with higher levels of PA live longer (see review by Chida & Steptoe, 2008). PA has also been linked to decreased mortality within a number of diseases that have longer prognoses, such as coronary heart disease and diabetes (Moskowitz, Epel, & Acree, 2008; van Domburg, Pedersen, van den Brand, & Erdman, 2001). In well-designed exposure to infectious illness studies, people high in PA are less likely to develop a cold or flu after being infected (Cohen, Alper, Doyle, Treanor, & Turner, 2006; Cohen, Doyle, Turner, Alper, & Skoner, 2003). One area in which the literature is more mixed, however, is for diseases with short-term prognoses, such as end-stage renal disease and advanced cancer, where sometimes benefits are not found or disease survival is reduced

(Cassileth, Lusk, Miller, Brown, & Miller, 1985; Devins et al., 1990), although in some cases, PA does help (e.g., Svebak, Kristoffersen, & Aasarød, 2006). One explanation for this is that high levels of PA in the face of life threatening disease may lead to not adhering to medical regimens or seeking help as frequently due to the concomitant reduced perceptions of threat or negativity. Finally, it is clear that there are many subjective benefits of high PA. Individuals with high PA report fewer symptoms of illness and less pain in chronic and experimental studies (Pettit, Kline, Gencoz, Gencoz, & Joiner, 2001; Zautra, Johnson, & Davis, 2005). However, it is not clear to what extent these differences are biological versus perceptually based.

On top of the known objective and subjective connections between PA and health, much work has been done examining plausible pathways that might be responsible for these associations. As outlined by Pressman and Cohen (2005), there are ample connections between PA and immune, endocrine, and cardiovascular function that might underlie health effects, in addition to behavioral and social pathways that might also be responsible. PA is also known to ameliorate the negative consequences of stress, which may also lead to better health (Fredrickson & Levenson, 1998; Pressman & Cohen, 2005).

More work in this area is needed to understand the precise timeline and diseases most helped by PA. While there are many mortality studies of healthy samples, research investigating morbidity (incidence of disease) and survival needs to be replicated within specific diseases. Another important aspect in this work is how NA is treated. Recent work has begun to control for NA within analyses in order to allow researchers to isolate the unique impact of PA on health (e.g., Pressman, Gallagher, & Lopez, 2013). However, in some cases, measures such as depression are also used due to high PA-NA overlap, leaving the question of what the appropriate statistical and theoretical approach might be. As alluded to above, there is also overuse of self-report as a method to assess PA, which may be a problem due to biases in self-presentation (Wojcik, Hovasapian, Graham, Motyl, & Ditto, 2015), and an overreliance on white North American and Western European samples, leaving many important directions for this area.

### **Life Satisfaction**

Life satisfaction is a measure tapping into a cognitive evaluation of one's life; all things being considered, is it satisfactory? We chose to classify life satisfaction as a hedonic construct in this chapter because of its role in overall SWB (discussed in the earlier section defining SWB), but it is important to note that the cognitive component of life satisfaction can also be considered a eudaimonic construct (Kashdan, Biswas-Diener, & King, 2008). Higher life satisfaction has been connected to better subjective outcomes such as higher levels of perceived health and reductions in self-reported pain (Einvik, Ekeberg, Klemsdal, Sandvik, & Hjerkin, 2009; Kreitler, Chaichik, Rapoport, Kreitler, & Algor, 1993; Laborde & Powers, 1985), in addition to differences in objective health outcomes (see review by Strine, Chapman, Balluz, Moriarty, & Mokdad, 2008) such as asthma prevalence in clinical populations (Huovinen, Kaprio, & Koskenvuo, 2001) and longer life span (Collins, Gleit, & Goldman, 2009; Kimm, Sull, Gombojav, Yi, & Ohrr, 2012; Lacruz, Emeny, Baumert, & Ladwig, 2011). There are, however, some inconsistencies in the literature. For example, despite relative consistency in the longevity literature, one study of Finnish participants found that life satisfaction was only protective for men (Koivumaa-Honkanen et al., 2000), and other studies found no relationship between cancer survival rate and life satisfaction, despite measurements using multi-item scales (Cassileth, Walsh, & Lusk, 1988; Lillberg et al., 2002). Two additional studies observed that life satisfaction failed to significantly predict better recovery from physical disability (Corrigan, Bogner, Mysiw, Clinchot, & Fugate, 2001; Dijkers, 1999). Further research is needed to disentangle these disparate findings. Is it the case that some measures of life satisfaction (e.g., single item assessments with poorer reliability) predict differently than more validated measures (e.g., the Satisfaction with Life Scale; Diener, Emmons, Larsen, & Griffin, 1985)? Are certain populations such as older samples or individuals with certain illnesses helped more by life satisfaction? Finally, what is the pathway by which life satisfaction could improve physical health? Do individuals with more life satisfaction feel happier, and, in turn, is it the PA-associated physiological and behavioral benefits driving these associations?

## **Eudaimonic Constructs**

### **Autonomy**

Autonomy is defined as the freedom to be self-determined and to act upon intrinsic motivations (Ryan & Deci, 1987). Health psychologists are mostly concerned about the environmental or social cues that facilitate and support autonomy. For example, the Health Care Climate Questionnaire (Williams, Grow, Freedman, Ryan, & Deci, 1996) asks (typically adult) participants to rate whether their practitioner acted in ways that supported their autonomy. Increased feelings of practitioner autonomy support can lead to better health outcomes, possibly through patients feeling personally motivated to improve their own health. Diabetic patients who reported greater levels of personal motivation and greater levels of practitioner support had improved blood glucose levels over time. Moreover, personal motivation appeared

to explain the relationship between practitioner autonomy support and health outcomes (Williams, McGregor, King, Nelson, & Glasgow, 2005). Practitioner autonomy support alone, however, does not necessarily always lead to better glucose levels across diabetic samples (e.g., Lee & Lin, 2010; Ng et al., 2012). Thus, research on autonomy must determine whether health outcomes are driven by supportive systems or by personal motivation.

Few studies have examined how parental autonomy support can influence blood glucose levels in diabetic children (Hanna & Guthrie, 2003). While results favored positive outcomes, Wysocki and colleagues (1996) note one limitation to supporting child autonomy: adolescents who were excessively responsible for their self-care reported more hospital visits, poorer blood glucose control, and worse treatment adherence compared to adolescents with parents who shared diabetes management responsibilities and adolescents with parents who were more controlling of their child's diabetes management responsibilities. Sociological factors such as cultural ideology are also important in this area. Women's autonomy exemplifies this interdisciplinary approach and is usually measured as a woman's ability to make decisions in her household or her cumulative years of education. Lower levels of this construct have been linked to higher rates of infant mortality and undernutrition in South Asia (Adhikari & Sawangdee, 2011; Shroff et al., 2011). While autonomy has succeeded in incorporating cultural and developmental considerations in its construct measures, the research examines a narrow range of objective health outcomes and should diversify its reach given the likely importance of perceptions of autonomy on any disease that requires a high level of self-management or behavioral change.

### **Self-Esteem**

Self-esteem, almost exclusively measured with the Rosenberg Self-Esteem Scale (Rosenberg, 1965), is the subjective evaluation of a person's self-worth. Despite the age of this established scale, the scope of literature examining the relationship between self-esteem and physical health is neither extensive nor consistent. Whereas higher levels of self-esteem have been connected to better self-rated health (Cott, Gignac, & Badley, 2014) and functional status (Blake, 1991; Chang & Mackenzie, 1998), self-esteem has failed to predict improvements in blood glucose levels for diabetics (Bryden et al., 2001; Johnston-Brooks, Lewis, & Garg, 2002) and has not been singularly predictive of all-cause mortality. One study found that feelings of hopelessness, among other negative psychosocial factors, appeared to confound the protective potential of self-esteem (Stamatakis et al., 2004). For example, Weaver and colleagues (1997) observed that depressed moods mediated the relationship between self-esteem and functional status for individuals with chronic obstructive pulmonary disease. Another study demonstrated that the relationship between self-esteem and the risk of mortality attenuated after adjusting for feelings of hopelessness (Stamatakis et al., 2004). To develop a clearer understanding as to how self-esteem can influence physical health, future studies should account for the influence of both positive and negative emotions and examine whether self-esteem in its own right has a health effect independent of affective pathways.

### **Perceived Control**

Perceptions of control are surprisingly important to medical outcomes. While multidimensional, control is typically assessed as either "locus of control" (i.e., do people explain events as due to internal or external reasons; Rotter, 1966) or as a perception that one has control over certain aspects of one's life. Behaviorally, control can also be assessed or manipulated in the laboratory by allowing participants to manipulate a stimulus, allowing participants to choose between alternatives (Averill, 1973), or removing the ability to control a stimulus (e.g., noise bursts; Pennebaker, Burnam, Schaeffer, & Harper, 1977).

Control has an overwhelmingly positive effect on chronic conditions. For example, lower perceptions of control are predictive of poorer reports of health (e.g., Bobak, Pikhart, Hertzman, Rose, & Marmot, 1998; Lachman & Weaver, 1998), higher incidences of cardiac-related events (Bosma, Marmot, & Hemingway, 1997; Siegrist, Peter, Junge, Cremer, & Seidel, 1990), and reduced blood glucose control in diabetics (e.g., Band & Weisz, 1990; Broadbent, Donkin, & Stroh, 2011). These benefits may be partially attributed to the effects of control on stress, given findings showing that the use or feeling of control is related to lower blood pressure and heart rate during stressful laboratory tasks (e.g., DeGood, 1975; Hokanson, DeGood, Forrest, & Brittain, 1971; Peters, Godaert, & Ballieux, 1998).

A seminal study by Rodin and Langer (1977) found that nursing home residents who were manipulated to feel more personal control were less likely to die at a one-year follow-up, a conclusion corroborated by a number of prospective longitudinal studies on control (e.g., Infurna, Gerstorf, Ram, Schupp, & Wagner, 2011; Penninx et al., 1997; Turiano, Chapman, Agrigoroaei, Infurna, & Lachman, 2014). While the presence of control is associated with a longer life, the loss of control may also have severe consequences. For example, a study of nursing home residents found that those who previously had control over the frequency and duration of visits from student volunteers were more likely to die at follow-up, when the study manipulation ended and the control was lost (Schulz & Hanusa, 1978). Altogether, the

connections between control and health have been subject to extensive research, in both naturally occurring and experimental settings. Stress reduction is likely one pathway to these benefits, although further research on the mechanisms is warranted, as is continued work on how control can benefit different types of illness and at what points in time.

### **Life Purpose**

Life purpose is defined as the ability to find life meaningful and is most frequently measured with the Purpose in Life subscale in the Psychological Scale of Wellbeing (Ryff & Keyes, 1995). Overall, a greater sense of life purpose has been positively associated with objective indicators of physiological function and physical health. For example, those with greater life purpose report better glucose control (Kim, Sun, Park, & Peterson, 2013), lower cholesterol (Ryff, Singer, & Dienberg Love, 2004), and fewer disabilities (Cohen, Bavishi, & Rozanski, 2015; Kim, Sun, Park, Kubzansky, & Peterson, 2013; Schleicher et al., 2005; Smith & Zautra, 2004). Life purpose has also been associated with increased longevity (e.g., Boyle, Barnes, Buchman, & Bennett, 2009; Cohen, Bavishi, & Rozanski, 2015), even after accounting for factors connected to life purpose such as social relationships and NA (Hill & Turiano, 2014). However, there may be important sex differences in the connections between life purpose and health. For example, elderly women with greater life purpose show lower inflammatory cytokine responses, which are related to better physical health outcomes (Friedman, Hayney, Love, Singer, & Ryff, 2007; Ryff et al., 2004), and men with greater life purpose have fewer incidences of cardiovascular-related deaths (Koizumi, Ito, Kaneko, & Motohashi, 2008). In sum, the current research on life purpose provides strong evidence that it is largely beneficial for physical health, and, if sex differences do persist, it is important to question how life purpose is unique to men and women.

## **Well-Being Practices**

### **Mindfulness**

Mindfulness is the ability to direct attention to the physical and mental processes that occur in daily life (Epstein, 1999) and can be studied as a malleable behavior or disposition. Dispositional mindfulness, an inherent ability to practice mindfulness, is measured through self-report scales such as the Five Facet Mindfulness Questionnaire (Baer, Smith, Hopkins, & Toney, 2001). The little research connecting dispositional mindfulness to physical health is unconvincing at this point due to its overreliance on non-objective self-reports (e.g., Bränström, Duncan, & Moskowitz, 2011; Tamagawa et al., 2013) and insufficient evidence in any one disease. However, there is a move towards more research on this topic, including new studies examining connections to detrimental cardiovascular events (Loucks et al., 2015) and diabetes (Loucks et al., 2016). Furthermore, measures of dispositional mindfulness have been criticized for lacking content validity. Researchers argue that without a reliable and predictable measure of mindfulness, assertions of the health benefits of mindfulness are weak (Park, Reilly-Spong, & Gross, 2013). Increased attention to objective indicators of physical health and improvements to existing mindfulness scales may remedy this issue.

In contrast, mindfulness as a learned skill is a subject of prolific research and yields a number of positive results for chronic conditions (see reviews by Bonadonna, 2003; Chiesa & Serretti, 2011; Merkes, 2010). A frequently cited mindfulness intervention program, mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1982), uses breathing and yoga exercises (partnered with mindfulness skill instruction, such as a focus on productive coping mechanisms) to engage patients. As reviewed by Grossman and colleagues (2004), there is evidence that this program benefits a wide array of psychological and physical conditions, from depression to cancer, by teaching patients proper coping skills. Impressively, studies have also demonstrated that HIV-positive individuals who complete MBSR programs show improvements in immune system functioning, including critical T-cell numbers (Creswell, Myers, Cole, & Irwin, 2009; Robinson, Mathews, & Witek-Janusek, 2003). While these outcomes are promising, future research should distinguish between the effects of psychological well-being manipulations that result from engaging in mindfulness versus the effects of engaging in the physical activities and behaviors used to facilitate mindfulness practices (e.g., yoga, muscle relaxation, breathing exercises).

### **Self-Affirmation**

When one's self concept is threatened, self-affirmation, or the affirmation of areas that emphasize one's strengths (e.g., values, beliefs, roles), can occur in order to reestablish positive self-worth, integrity, and self-concept (Sherman & Cohen, 2006). Most self-affirmation studies have participants either complete a scale such as the Allport-Vernon-Lindzey Scale (Allport, Vernon, & Lindzey, 1960) that aims to establish how highly one views their personal strengths or manipulate affirmation by having participants write an essay about a value that is important to them (McQueen & Klein, 2006). Studies that utilize scales such as

the Allport-Vernon-Lindzey Scale do so in order to determine whether participants can be categorized as having high, moderate, or low self-affirmation, while studies that employ manipulations such as essay writing aim to induce feelings of high self-affirmation.

Most studies that look at a possible relation between self-affirmation and physical health focus on the health-mediating physiological stress response and have repeatedly shown that self-affirmation alters stress trajectories (Creswell et al., 2005; Sherman, Bunyan, Creswell, & Jaremka, 2009). For example, Creswell and colleagues (2005) revealed that higher levels of self-affirmation and personal identification with values were associated with lower cortisol levels after being exposed to stress. Self-affirmation has also been used as a tool to promote behavioral change that could lead to better health. One study found that after three months, women in the self-affirmation condition weighed less, had lower body mass indexes, and had smaller waist measurements versus those in the control group (Logel & Cohen, 2012). Other studies have shown benefits of self-affirmation on smoking cessation (Harris & Epton, 2009). One possible explanation for these behavioral changes is the connection between self-affirmation and self-control, making this tool potentially relevant to many other negative health behavior change programs. However, this research area is still in its infancy and longer follow-ups are needed to determine the downstream health impact of these behavioral effects, as well as studies examining the objective impact of self-affirmation on illness and disease.

### **Gratitude**

Gratitude is a popular construct in well-being research, and while frequently studied in the context of interventions (e.g., gratitude diaries; Emmons & McCullough, 2003), it can also be conceptualized as a dispositional tendency to recognize and appreciate the benevolence of another person or being (Krause, Emmons, & Ironson, 2015; McCullough, Emmons, & Tsang, 2002). Positive associations between gratitude and physical health are disparate and largely limited to self-report data, such as single item measures of overall health (Krause & Hayward, 2014) or evaluations of physical health symptoms (Emmons & McCullough, 2003; Krause et al., 2015) and functioning (Hill, Allemand, & Roberts, 2013; Millstein et al., 2016). Furthermore, there are some mixed findings, such as one study that found no benefit for neuromuscular disorder related pain (Emmons & McCullough, 2003). Hill and colleagues (2013) suggest that gratitude may impact physical health through mediating factors, such as mental health status and participation in health-promoting behaviors (e.g., exercise and good nutrition). Indeed, past work has found connections between gratitude exercises and better sleep (Emmons & McCullough, 2003). Surprisingly, only one study to date has examined the effects of gratitude on objective physiological and physical health outcomes (i.e., inflammatory biomarkers and hospital visits), but failed to provide any conclusive evidence for the benefits of gratitude (Huffman et al., 2016), demonstrating a clear need to do more research connecting both dispositional gratitude and interventions to non self-report health outcomes.

## **Social Well-Being**

### **Social Support and Networks**

While too large a literature to review here, connections between social relationships and health are some of the strongest and most consistent psychosocial correlates of health in the medical literature. Effect sizes are large, with the negative effect of social isolation on mortality comparable to that of regular smoking (see reviews by Holt-Lunstad, Smith, & Layton, 2010; House, Landis, & Umberson, 1988; Tay, Tan, Diener, & Gonzalez, 2013). This literature also boasts a diverse range of study samples, including healthy and ill participants, minorities, and pet owners (e.g., Barth, Schneider, & von Kanel, 2010; Cohen, Kaplan, & Manuck, 1994; Ford, Tilley, & McDonald, 1998; Reblin & Uchino, 2008; Schaefer, Coyne, & Lazarus, 1981; Shumaker & Hill, 1991; Tang, Brown, Funnell, & Anderson, 2008; Uchino, 2006).

SWB definitions frequently include “good relationships” as a component of this broad construct. In the health literature, “good relationships” can be assessed in numerous ways. Social support is broadly defined as the resources provided by one’s social sphere (Cohen & Syme, 1985), such as emotional support (e.g., a shoulder to cry on) or objective resources (e.g., being lent money). This type of social wellness is most typically implicated in relation to stress and its ability to reduce the negative sequelae associated with negative experiences (Cohen & Wills, 1985; Thoits, 1982), but is also more generally related to an array of health outcomes such as cardiovascular disease, cancer, and overall mortality, as well as an array of possible physiological and behavioral mechanisms (see reviews by Barth et al., 2010; Cohen et al., 1994; Holt-Lunstad et al., 2010; Lett et al., 2005; Pinquart & Duberstein, 2010; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Structural measures of relationships have also been thoroughly connected to health (e.g., marital status, total number of relationships; Holt-Lunstad et al., 2010; House et al., 1988; Kiecolt-Glaser & Newton, 2001). To complicate things further, subjective characteristics of relationships beyond support, such as emotional feelings of love (see reviews by Green, Shellenberger, & Siegel, 1996; Traupmann &

Hatfield, 1981) or cognitive assessments of relationship satisfaction (Krause, 1987; Woloshin et al., 1997), may also matter. Thus, while it is clear that positive relationship characteristics are beneficial for us, one important remaining question is how they are related to or distinct from the effects of other positive psychological factors. PA and related positive constructs are intricately connected to social relationships (i.e., happy people have better relationships, relationships make us happy), making it somewhat difficult to disentangle the effects of these variables.

### **Social Control**

One way that relationships are good for us is via the social control inflicted on us by our relationship partners, that is, the strategies used to regulate and influence another person to adopt positive health practices (Thoits, 2011). Social control might include behaviors such as efforts to manage a specific illness, alter health behaviors, or even promote medication adherence (e.g., August & Sorkin, 2010; Berg et al., 2013). Research has indicated that attempts at social control can be related to positive health behavior outcomes such as a reduction in smoking habits and an increase in physical activity (Umberson, 1992), yet its direct influence on disease outcomes is marginal and has received mixed support (Thorpe, Lewis, & Sterba, 2008; Tucker & Anders, 2001). One critical aspect of social control is how the strategies are received. In most cases, when social control is received positively, it leads to better adherence to medical and dietary regimens (August & Sorkin, 2010; Berg et al., 2013; Stephens, Rook, Franks, Khan, & Iida, 2010). Alternatively, unwarranted social control may be perceived as criticism and hinder the development or continuation of positive health behaviors (Lewis & Rook, 1999). Future studies should consider how this aspect of relationships could directly relate to physical health outcomes, as well as variations in populations and methods that might influence when social control is helpful versus harmful for physical well-being.

## **Motivation and Efficacy**

### **Self-Efficacy**

Self-efficacy is defined as one's perceived ability to set and complete goals to achieve a specific outcome, and it has been linked to better overall health and coping in studies ranging from cancer to health promoting behaviors (see review by Strecher, McEvoy DeVellis, Becker, & Rosenstock, 1986). Beyond studying self-efficacy as a perception, a rich area of research introduces self-efficacy interventions to those who are seeking to change a health behavior (Stuart, Borland, & McMurray, 1994). For example, one study found that individuals who successfully completed a self-efficacy smoking cessation program were less likely to relapse a year after completion (O'Leary, 1985). Studies such as this have been replicated and have produced consistent results that link high self-efficacy with successful smoking cessation (Stuart et al., 1994). Self-efficacy is effective at helping individuals institute and maintain change and is also an effective tool to help individuals complete short-term and long-term health oriented goals (Strecher et al., 1986). Unfortunately, while the health promoting behavior literature is strong, much less work has taught us what self-efficacy can do for long-term health due to the focus on this construct as a coping and behavior altering mechanism (e.g., Schwarzer & Renner, 2000). Thus, there is a need for intervention studies that alter behavior with long-term follow-ups examining the downstream effects on disease as well as behavior change.

### **Determination and Grit**

Determination, or one's ability to initiate and maintain a desired behavior or outcome, is understudied in relation to health but has recently begun to attract attention due to its possible use in health behavior change (Deci & Ryan, 2008; Ryan, Patrick, Deci, & Williams, 2008). Therefore, similar to self-efficacy, studies in this area emphasize health behaviors rather than objective health outcomes (e.g., goal adherence and maintenance of health promoting behaviors; Deci & Ryan, 2008; Ryan et al., 2008; Williams, Rodin, Ryan, Grolnick & Deci, 1998). Similar to determination is the relatively new construct of grit, defined as the ability to persevere to pursue one's long-term goals in spite of challenges (Duckworth & Gross, 2014). It is not hard to imagine that these constructs will have downstream impacts on health due to their ability to increase and maintain positive health behaviors, even when willpower is low or behavior is difficult, but this area is in its infancy. Furthermore, some investigators challenge the claim that grit is a positive trait for certain underrepresented populations such as African American students because the construct ignores the toll that societal racism can take on these individuals (e.g., McGee & Stovall, 2015). Thus, future research on this topic should investigate grit within different ethnic groups in order to understand for whom it is beneficial and for whom it is not.

### **Hardiness**

Hardiness is a personality type that consists of three elements thought to aid individuals to successfully cope with stress: commitment, control, and challenge (Ouellette Kobasa, Maddi, Puccetti, &

Zola, 1985). Those high in hardiness are able to commit to a goal, feel they have control over their environment, and will likely engage in situations or activities that challenge them. Thus, this construct overlaps with other previously discussed measures such as control, determination, and efficacy. Research has confirmed that high hardiness is linked to less stress related chronic illness (e.g., cardiovascular conditions; Kobasa, Maddi, & Kahn, 1982) and less stress related acute illness (Nowack, 1989), even in studies accounting for possible alternative explanations like high social support or more exercise (Kobasa et al., 1982). Despite the clear benefits for stress and stress-related illness, little research has connected hardiness to objective disease outcomes (see Okun, Zautra, & Robinson, 1988, for an exception examining arthritis symptoms). Thus, like many other constructs in this section, for hardiness to be considered important in the medical realm, research will have to determine its impact on disease and other objective health outcomes and physiological and behavioral pathways. Due to its conceptual overlap with many other constructs, future research also needs to determine to what extent it predicts above and beyond other measures more thoroughly examined in the health arena.

## Future-Oriented Constructs

### Optimism

Many studies have sought to determine the relationship between optimism and various health conditions, ranging from cancer to chronic pain. While optimism can be specific to a given situation, what is most commonly studied in health research is dispositional optimism, or the general tendency to believe that good things happen more frequently than bad things (Scheier & Carver, 1985) as assessed by self-report (e.g., the revised Life Orientation Test; Scheier, Carver, & Bridges, 1994). This literature has previously been reviewed (Rasmussen, Scheier, & Greenhouse, 2009), and typically focuses on the effects of optimism for individuals who have already been diagnosed with a particular illness or health condition, for example, cancer or heart disease. Studies follow patients longitudinally to determine whether those with higher optimism are less likely to face complications with their disease, show better disease prognosis, and better overall health outcomes, with many studies showing positive outcomes (see review by Rasmussen et al., 2009). There are limits to the benefits of optimism, however. For example, to the best of our knowledge, no study has found optimism to aid in cancer remission (De Moor et al., 2006; Schofield et al., 2004; Schulz, Bookwala, Knapp, Scheier, & Williamson, 1996). The cardiovascular literature is perhaps more consistent, with many studies revealing faster recovery rates after surgery (e.g., fewer days in the hospital) and better disease prognosis (Conway, Magai, Springer, & Jones, 2008; Matthews, Räikkönen, Sutton-Tyrrell, & Kuller, 2004; Scheier et al., 1989). In addition to these chronic illnesses, other studies have found benefits for chronic pain patients (Costello et al., 2002), as well as patients with diabetes and carotid atherosclerosis (Fournier, de Ridder, & Bensing, 2002; Matthews et al., 2004).

Mechanisms that might lead to better health outcomes for those high in optimism overlap with some of the previously discussed pathways (e.g., alterations in immune function, behaviors). However, there are some differences. People high in optimism may be more confident that they can successfully engage in healthy behaviors, which may be why past studies have found optimistic university students to be more likely to engage in health promoting behaviors, recover more quickly from the flu, and actively attempt to prevent the flu compared to those who were pessimistic (Hamid, 1990). Optimism may also partially operate via the pathways influenced by positive emotion, and, thus, may not be entirely independent from affect (Seegerstrom, 2007). Optimism also differs from other positive constructs in an important way in that it can be harmful when unrealistic. For example, a study of law students (a high stress sample) found that immunity was either strengthened or compromised depending on the students' current outlook on their law school experience. When students were more optimistic about a period of law school where their studies were going well, their immunity improved, while when these students were experiencing difficult periods during their studies, their immunity would plummet (Seegerstrom, 2007). Few studies of positive constructs show harm, but it is important to consider how and when SWB levels may have a cost rather than a benefit in future work. In general, replication is also a problem in the study of optimism and physical health, and there is a need for more research on the same physical outcomes.

### Hope

While colloquially hope is often conflated with optimism, in positive psychology research, hope is defined by an emphasis on determination that is goal-oriented, characterized by planning and perceived controllability (Snyder, Irving, & Anderson, 1991). Hope has rarely been connected to physical health, but there are some relevant self-report studies. For example, studies have investigated the relationship between hope and cancer with the idea that high hope might enable better coping with the stress of this threatening disease. One large study of individuals with either gastrointestinal, breast, head and neck, or hematologic malignancy cancer found that those with high hope were able to successfully cope with their disease as



indicated by self-reported data collected using the Herth Hope Scale and the Jalowiec Coping Scale (Felder, 2004). This finding, while distinct from objective health outcomes, is important, as coping with a disease can result in better quality of life (Manne et al., 1994; Osowiecki & Compas, 1998; Stanton et al., 2000). Interestingly, several studies have also linked hope to faster rates of healing, for example, after spinal surgery (Elliott, Witty, Herrick, & Hoffman, 1991) and after getting burned (Barnum, Snyder, Rapoff, Mani, & Thompson, 1998). This is possibly due to better adherence to medical instruction and self-care, which is echoed in work showing the connection between hope and preventive health behaviors (e.g., doctor check-ups and medical screenings; Salovey, Rothman, Detweiler, & Steward, 2000). Together, the literature on hope is exciting but very small. Outcomes need replication, and there should be a focus on outcomes most likely to be influenced such as healthy behavior change (and diseases most likely influenced by this change). Many studies in this area use convenience samples; thus, future work should include power analyses and utilize targeted and meaningful participant samples.

## **Under-Researched Positive Constructs**

There are a number of additional positive constructs that are under-researched in the domain of physical health, including factors like courage, creativity, and passion. Researchers need to investigate the relationship between these constructs and physical health more closely, as it may be the case that not all of these constructs are beneficial for physical health. For example, obsessive passion may lead people to engage in risky behaviors at a higher rate, hence leading to negative outcomes such as injury (Vallerand et al., 2003). As we have emphasized in this chapter, it is important to research each positive psychological construct separately in its relation to physical health, as not all constructs will have the same beneficial or detrimental effects.

## **Pathways Connecting Subjective Well-Being with Health**

Throughout this chapter, we have discussed outcomes that are more appropriately described as pathways to health as opposed to health in their own right. These include factors like cardiovascular and circulatory physiology (e.g., blood pressure, cholesterol), immune function (e.g., wound healing, antibody levels), endocrine activity (e.g., cortisol), and other less studied physiological pathways. While many positive factors are known to induce change in these variables experimentally (e.g., PA inductions alter physiology; Dockray & Steptoe, 2010), any SWB measures might influence these physiological pathways via alterations in health behaviors (e.g., sleep, exercise, diet). Furthermore, SWB, by definition, includes social relationships, which can influence physiological function, health behaviors, and more. For example, as described in the social control section, relationships serve an important role in encouraging medical care and adherence.

What may also be a common mechanism for altering health in many SWB-health connections is the indirect effect of SWB on preventing downstream negative effects of stress. As described in many sections above, SWB components may have effects on stress perceptions, reactivity, or recovery. Social support has long been implicated in reducing the negative effects of stress (Cohen & Wills, 1985), and, more recently, PA has been posited to play a similar role (Fredrickson & Levenson, 1998; Pressman & Cohen, 2005). While not all SWB components may play a role here, and certainly the research is not deep in many of these areas, conceptually, many components could help with stress. For example, hope and the goal setting that goes with it may prevent future stress from occurring. Perceptions of control, efficacy, determination, and grit might enable reduced reactivity during a stressful period, as might feelings of mindfulness or social support that change stress and coping appraisals. Finally, recovery from stress is aided by positive emotions, and even a simple positive behavior like smiling has been shown to help in this context (Fredrickson & Levenson, 1998; Kraft & Pressman, 2012). Other positive facets may help as well; for example, self-affirmation or stable self-esteem might enable a person to get over the stress faster, as might the ability to focus on a positive future with dispositional optimism. Unfortunately, at this point, studies specifically testing associations between SWB components and the different components of stress are rare, as are studies that contrast different SWB measures against each other to determine their relative and possibly unique effects.

Work on possible pathways continues to progress and develop, especially with the advent of cheaper assays and easier to assess samples (e.g., saliva), new and interesting biomarkers with plausible SWB connections (e.g., telomeres), and growing interest in health relevance. Behavioral and physiological pathways are also getting easier to sample with the advent of new technologies for mobile assessments such as motion sensors, portable heart rate variability, and even facial expressions, which may also play a role in health via their influence on physiology and social relationships. Together, there is a far way to go before we have a thorough understanding of how, when, and why SWB can influence health, but with a

conscientious effort to probe this question and attention to new methods (see review by Diener, Pressman, Hunter & Delgado-Chase, 2017), this literature will grow and improve our understanding of this area as well as inform future intervention design.

## Discussion

Research on the connections between SWB and physical health has drastically increased over the past twenty years, demonstrating a surge of interest in this topic. Overwhelmingly, SWB is positively connected with physical health, revealing an impressive diversity of wellness benefits related to positive states and traits. While it is important to take an omnibus approach in some cases to document the breadth of these findings (e.g., Boehm & Kubzansky, 2012), future work will need to search for specificity. Different constructs might be related to health and physiology in unique ways and should therefore be investigated separately to inform interventions and/or provide precision in our knowledge of this area. It is also important for researchers to know the extent to which certain constructs overlap, such as PA with life satisfaction or hardiness with determination and grit. It may be the case that more specific definitions or advanced measurement tools are needed to capture the distinctness of different SWB constructs, given the high degree of overlap between many of them. To this end, one direction for future research is to determine whether overlapping constructs have separate effects on physical health. For example, the PA and social support literatures are the largest literatures connecting specific SWB constructs to physical health. It is likely, however, that these literatures are connected, since happy people tend to have more and better social relationships, and relationships confer well-being in many ways. Furthermore, studies need to focus on determining the unique versus common variance of all positive constructs as they predict physical health. However, this requires large samples and longitudinal designs, two methodological strengths that do not appear in much of the SWB and physical health literature. Investigating both the separation and overlap of positive psychological constructs will help clarify the sometimes conflicting literature involving different SWB constructs and physical health and inform targeted health intervention designs.

While making distinctions among SWB constructs, it is also important to separate state and trait constructs. Some SWB constructs, such as state PA and mindfulness, are more state-like in that they can be manipulated readily. For example, state PA can be induced in the lab through various methods like videos and writing exercises. However, other SWB constructs such as self-esteem and optimism are more trait-like and, thus, are less readily and meaningfully altered within a short experimental session. Researchers should be cognizant of how long it takes to alter the specific construct in which they are interested and plan their experiments or interventions accordingly. They should also consider that state and trait constructs influence physical health differently. While state constructs may influence quick moving physiological processes (e.g., cardiovascular reactivity and recovery), trait constructs may be more likely to influence far off health outcomes such as morbidity and mortality. This is likely due to the increased opportunity over years for lasting SWB factors to influence behaviors, relationships, and physiological systems that influence long term health. There are many experimental studies that manipulate SWB constructs and examine physiology or other health-relevant outcomes in the short term, but longitudinal studies are much more rare. There are a number of reasons for this, such as difficulty in following up with participants years later, but this does not change the fact that longitudinal studies are desperately needed to understand how and if changes in SWB influence disease processes versus whether only stable traits underlie future health.

There are a number of additional important new directions for this area of work. One key consideration is how negative constructs (e.g., NA, depression, stress) should be factored into analyses on SWB and health. Early reviews on this topic (e.g., Pressman & Cohen, 2005) highlighted the importance of adjusting for NA so that findings can be attributed to the presence of the positive rather than the absence of the negative. However, how to appropriately include negative constructs in analyses is still an open question in the field. Because of the overlap between PA and NA, many researchers opt to utilize other assessments (e.g., depression) as a covariate in their analyses, but this may not have the same meaning. Alternatively, is it appropriate to adjust for negative factors when part of the reason SWB constructs may be helpful is due to their ability to ameliorate the negative effects of these measures (e.g., the stress buffering hypothesis of PA)? Thus, how to analyze and treat negative psychosocial measures in these studies is still an important and understudied area. Another methodological issue within this literature that we have referred to within this chapter is the overreliance on self-report, sometimes with single item assessments. Questions about SWB are often thrown haphazardly into existing medical studies, and the most appropriate measures are sometimes not used. Thus, more studies should be specifically designed with the main goal of determining the effects of SWB constructs on health so that there is a rationale behind the measures that are chosen.

As this chapter has demonstrated, SWB and physical health are intimately linked. Many different

SWB constructs have been investigated in this context, but much more work within each construct is necessary. When examined as a whole, many associations between SWB and physical health are found, but a number of SWB constructs have only a handful of studies. Are there truly replicable effects of some of these measures on health outcomes? Would these effects withstand more rigorous adjustments for factors like NA or related positive constructs? To date, many of the research areas are in their infancy and, thus, replication, expansion, and a more thoughtful approach to study analyses and designs are needed. The ultimate goal of many researchers in this area is to better understand how to keep the populace healthy. While this area is clearly promising, we encourage researchers to hold a magnifying glass to the broad construct of SWB to unpack what types of well-being are most helpful for certain individuals, certain illnesses, and certain constructs.

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