ASSOCIATIONS BETWEEN BENEFIT FINDING, DISEASE SEVERITY, POSITIVE AFFECT, AND HEALTH OUTCOMES AMONG PATIENTS IN CARDIAC REHABILITATION

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ASSOCIATIONS BETWEEN BENEFIT FINDING, DISEASE SEVERITY, POSITIVE AFFECT, AND HEALTH OUTCOMES AMONG PATIENTS IN CARDIAC REHABILITATION

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ABSTRACT

Following a stressful event, individuals may attempt to create meaning or *find benefit* from the stressor. Benefit finding (BF) may act as a buffer to minimize the effects of stress on health outcomes. The literature is mixed regarding relationships between BF and mental and physical health outcomes within a variety of illnesses, which may be partly due to missing moderator or mediator variables. Therefore, using secondary data from an ongoing study at a cardiac rehabilitation (CR) program within a safety-net hospital, it was hypothesized that the relationship between BF and health outcomes (i.e., depressive symptoms, healthy dietary behaviors, and functional capacity via six-minute walk test results) would be mediated by positive affect, which would be moderated by disease severity (operationalized here as risk stratification for disease progression). It was also hypothesized that BF would increase over time, such that BF at the end of CR (i.e., Time 2), would be significantly higher than BF at the beginning of CR (i.e., Time 1). Results showed that the hypothesis about BF increasing over time was supported, but the remaining were not supported. That is, risk stratification failed to moderate the relationship between positive affect and BF. In addition, positive affect

was unrelated to depressive symptoms and six-minute walk scores, but negatively related to healthy dietary behaviors. Study limitations and future directions are discussed.

APPROVAL PAGE

The faculty listed below, appointed by the Dean of the College of Arts and Sciences have examined a thesis titled "Associations Between Benefit Finding, Disease Severity, Positive Affect, and Health Outcomes Among Patients in Cardiac Rehabilitation," presented by Anahi Ramirez, candidate for the Master of Arts degree, and certify that in their opinion it is worthy of acceptance.

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LIST OF ABBREVIATIONS

Benefit Finding = BF

Cardiac Rehabilitation = CR

Cardiovascular Disease = CVD

Myocardial Infraction = MI

Posttraumatic Growth = PTG

Quality of Life = QoL

Safety Net Hospital = SNH

Stress-Related Growth = SRG

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CHAPTER 1 INTRODUCTION

Relation Between Stressors and Physical and Mental Health Outcomes

The long-term effects of stressors can be damaging to physical and mental health (Schneiderman et al., 2005). Almost every bodily system can be influenced by chronic stress, so when it accumulates, it suppresses the body's immune system and can manifest as illness onset or symptom exacerbation (Salleh, 2008). Colby et al. (2002) found that populations living in more stressful environments smoke more heavily and experience higher mortality rates from lung cancer and chronic obstructive pulmonary disease compared to populations living in less stressful environments. Chronic stress can lead to atherosclerosis, plaque buildup in the arteries, when combined with a high-fat diet and a sedentary lifestyle (Salleh, 2008). Additionally, emotional stress is one of the major factors that contributes to the six leading causes of death in the U.S.: cancer, coronary heart disease, accidental injuries, respiratory disorders, cirrhosis of the liver, and suicide. Therefore, exposure to stress, either in acute or chronic forms, has been associated with various indices of poor physical and mental health.

Following a stressful event, individuals may attempt to create meaning or *find benefit* from the stressor (Taylor, 1983). Benefit finding (BF) may act as a buffer to minimize the effects of stress on health outcomes (Helgeson et al., 2006), and BF may also help individuals adjust to stressful events via self-enhancement, meaning creation, and regaining control as proposed by the theory of cognitive adaptation (Taylor, 1983), which will be discussed further in the next chapter.

The literature describing the relationship between BF and mental and physical health outcomes is mixed regarding positive, negative, or null associations within a variety of illnesses (de Vries et al., 2019; Littlewood et al., 2008; Tran et al., 2011). Cross-sectional studies have reported that BF was found to be negatively related to distress in patients who are HIV+ (Littlewood et al., 2008) and in patients with a spinal cord injury (January et al., 2015). Prospective studies have also found BF to be negatively related to distress in patients with renal disease (de Vries et al., 2019), in adolescents with Type I diabetes (Tran et al., 2011), and in patients with various types of cancer (Zhu et al., 2018). In addition, prospective studies have found associations between BF and negative health outcomes, such as how Tomich and Helgeson (2004) found a relationship between BF and negative affect at baseline but not at follow-up, and Fox et al. (2014) reported that panic disorder symptoms soon after lung transplantation were positively related to posttraumatic growth (PTG; a different name for describing BF) levels at baseline but not at six to eleven years follow-up. Meta-analyses also have shown that BF was cross-sectionally unrelated to symptoms of anxiety, global distress, quality of life (QoL), and subjective physical health (Helgeson et al., 2006).

The following chapters will discuss reasons for the mixed effects of BF on mental and physical health outcomes found in the literature. In sum, the mixed results may be due to not including time since diagnosis, the severity of illness, positive affect, and/or due to using different measures or definitions of BF. The literature is also missing examinations of potential moderator and mediator variables. For example, one study showed that optimism moderated the association between perceived growth (i.e., BF) and positive adjustment following a stressful event (Park & Helgeson, 2006), and Tran et al. (2011) suggested that

positive affect may mediate the association between BF and distress. As for disease severity, Pascoe and Edvardsson (2013) argued that BF's effects on health outcomes may differ depending on the stage of illness, and Park and Helgeson (2006) proposed that the relationship between BF and mental and physical health outcomes differs depending on disease severity. Therefore, it is worth examining whether positive affect mediates the relationship between BF and patient outcomes, and in turn whether disease severity moderates those associations.

As a solution to the aforementioned problems, the current study included positive affect as a mediator variable between BF and mental and physical health outcomes, and risk stratification as a measure of disease severity moderating the interaction between BF and positive affect. In other words, it was predicted that participants' levels of BF at baseline, or Time 1, would be positively related to positive affect, which in turn would be related to mental and physical health outcomes (i.e., *depressive symptoms*, *healthy dietary behaviors*, and *functional capacity via steps taken during a 6-minute walk test* at Time 2, or about three to four months following Time 1). It was predicted that the mediation effect would be moderated by risk stratification, a measure of disease severity, so three separate moderated mediation models were estimated. Lastly, as research has found, as more time has passed, more positive cognitive outlooks have been found (Helgeson et al., 2006). Therefore, it was also hypothesized that participants' mean BF levels would increase at Time 2 compared to baseline levels of BF.

CHAPTER 2 REVIEW OF THE LITERATURE

The Theory of Cognitive Adaptation Linked to Benefit Finding

According to the theory of cognitive adaptation, successful adjustment to a stressful event consists of three themes: meaning, mastery, and self-enhancement (Taylor, 1983). Meaning is an effort to understand why the event occurred and what its effects are on one's life. Mastery is an attempt to regain control over the event and one's life in order to manage its effects and/or prevent the event from re-occurring. Mastery can be a trigger to find positive changes that may contribute to a healthy lifestyle (Janoff-Bulman, 2004). Stressful events may decrease self-esteem, so self-enhancement involves increasing self-esteem, possibly through social comparisons or by identifying positive benefits or changes resulting from the event (Taylor, 1983).

In order to test the theory of cognitive adaptation, Taylor et al. (1984) interviewed 78 women with breast cancer ranging from good to bad prognoses, and with high or low QoL. Participants were asked to describe any changes in their lives since their cancer diagnosis, then they rated those experiences as positive or negative. They found that 53% reported only positive changes, 17% reported negative changes, and 30% reported no changes. Additionally, patients rated themselves as better emotionally adjusted than before they had any signs of cancer. An example of a participant expressing meaning in her life following her breast cancer diagnosis was, "I was very happy to find out I am a very strong person. I have no time for game-playing anymore" (p. 1163). Many individuals expressed statements that having a positive attitude would keep the cancer from re-occurring, which is an example of regaining mastery over the event. One participant stated, "I believe that if you're a positive

person, your attitude has a lot to do with it. I definitely feel I will never get it again" (p. 1163). For self-enhancement, the authors found that the majority of participants used downward social comparisons in order to increase their self-esteem and possibly decrease future threats. For example, one woman stated, "Some of these women just seemed to be devastated. And with really less problems than I encountered, you know, smaller tumors" (p. 1165). These results are consistent with the theory of cognitive adaptation because participants who experienced a stressful event, a cancer diagnosis, found meaning, used self-enhancement, and regained control while adjusting to their breast cancer.

As described by Pascoe and Edvardsson (2013), Lazarus and Folkman (1984) state that when an individual believes they cannot change their environment or adversity, they may use benefit finding (BF) to discover meaning in said adversity. Creating meaning out of the stressful event may help restore a sense of mastery or control over one's situation, as described in Taylor's (1983) theory of cognitive adaptation. In her article describing PTG, Janoff-Bulman (2004) states that successful coping or recovery from potential trauma means that individuals incorporate the stressful event into their assumptions of a comfortable worldview, which is consistent with Taylor's (1983) theme of creating meaning. Taylor also states that positive illusions may be essential for cognitive coping and may even be beneficial by helping individuals gain mastery or personal control over the event, therefore predicting better psychological adjustment. Therefore, BF can reasonably be seen as a component of the theory of cognitive adaptation by assisting in adjustment to stressful events via self-enhancement, meaning creation, and regaining control.

BF and Physical and Mental Health Outcomes

How is BF Defined in the Literature?

BF is one social-cognitive response that can arise following a stressful event. Park et al. (2009) describe PTG as positive life changes that arise from coping with negative life events or serious illness. Zhu et al. (2018) use the term *benefit finding* because it appears to be the broadest term used to describe the wide range of positive changes reported by individuals. There is still no consensus in the literature regarding the meaning and differences between PTG, stress-related growth (SRG), and BF (Park et al., 2009), however, because of their conceptual overlap, I will use the terms interchangeably here. BF has been found to be correlated with physical and mental health outcomes, both positively and negatively, throughout the literature (Carver & Antoni, 2004; January et al., 2015; Llewellyn et al., 2013). The sections below will summarize findings in the area, beginning with three meta-analyses.

Meta-Analyses Examining Relationships between BF and Health Outcomes

One of the first meta-analyses on BF and mental and physical health outcomes focused on adults in Western cultures who had experienced a *stressful event* (Helgeson et al., 2006). Helgeson et al. analyzed 87 cross-sectional studies found in 77 articles up to the year 2005. They included studies that used various measures of positive growth: (1) the Posttraumatic Growth Inventory by Tedeschi and Calhoun (1996); (2) the Self-Reported Growth Scale by Park et al. (1996); (3) the Benefit Finding Scale by Mohr et al. (1999); (4) the Benefit Finding Scale by Tomich and Helgeson (2004); (5) the Perceived Benefit Scale by McMillen and Fisher (1998); and (6) any open-ended measure of BF. BF was found to be

negatively related to symptoms of depression and positively related to well-being and positive affect, but also positively related to intrusive and avoidant thoughts about the potentially traumatic event or stressor (Helgeson et al., 2006). BF was unrelated to symptoms of anxiety, global distress, QoL, and subjective physical health. They also found that women reported more BF than men, and ethnic minorities reported more BF than Whites. They infer that ethnic minorities have more experience with adversity, which leads to a stronger pattern of finding something good from the bad, but they are unsure why women reported higher levels of BF than men.

Helgeson et al. (2006) hypothesized that BF over time may be a measure of change and actual growth, and may be related to better health outcomes. However, cross-sectionally, BF may be a cognitive strategy to reduce distress, and may be related to poor health outcomes, when other health measures are included in a study. Therefore, time is potentially a moderator, such that the relationship between health outcomes and BF may depend on how much time has passed (e.g., as more time passes, more positive outcomes may be seen). This meta-analysis was limited in that effect sizes were small, and it only examined cross-sectional studies. Therefore, Helgeson et al. (2006) offered a few alternative explanations for their pattern of findings: BF could have been a response to distress, BF could have led to reduced distress, or BF could have been independent of distress. But, these alternative explanations could not be discerned due to the cross-sectional nature of the studies reviewed. The researchers explain that the inconsistent results across the studies could be due to not measuring actual changes that individuals have made following a stressful event. Results also could be due to individuals construing benefits to relieve distress without making actual

positive life changes, as Taylor's (1983) theory of cognitive adaptation describes. Based on this meta-analysis, future research should be aware of the difference between actual change and perceived change in order to better understand associations between BF and mental and physical health outcomes.

A couple of years later, Pascoe and Edvardsson (2013) did not find consistent evidence of linkages between BF and health outcomes in their meta-analysis of 10 cross-sectional and prospective studies consisting of patients with cancer published between January 1980 and June 2012. The samples consisted of $N = 29$ to 439 patients with either head and neck cancer, breast cancer, brain tumors, or mixed cancer diagnoses. The authors sought to determine which factors (e.g., social support, symptoms of depression, distress, symptoms of anxiety, and physiological stress-response biomarkers, like cortisol) led patients with cancer to use BF, along with BF's association with health outcomes. These authors only analyzed studies that used the BF instrument by Antoni et al. (2001). Optimism was the only factor found to influence the use of BF, and there was inconclusive evidence about relationships between BF and health outcomes, including depressive and anxiety symptoms.

Pascoe and Edvardsson (2013) concluded that further research is needed to find covariates, predictors, correlations, and/or clinical outcomes of BF in cancer populations. They mention that it is difficult to aggregate and analyze studies on BF that use the same instrument due to small sample sizes, homogeneous samples, different stages of cancers, and the use of various statistical analyses, so it may be even more difficult to do so for studies that use different BF instruments. They also describe how BF's effects on health outcomes can be different depending on the stage of illness trajectory (e.g., beginning, late, etc.).

Despite inconsistent results, these researchers state that optimism and BF may be correlated with reduced physiological stress-response biomarkers, but more research is needed before drawing conclusions.

In Park and Helgeson's (2006) article, they analyzed four cross-sectional or longitudinal studies based on PTG following a *potentially traumatic experience*. Their goals were to examine measurement validity, as well as the mechanisms of, and correlations with, well-being and perceived PTG following potentially traumatic life events. Outcome measures included positive affect, depressive symptoms, intrusive thoughts about a potentially traumatic event, anxiety symptoms, QoL, and subjective physical health. They describe growth as an outcome that is often an illusion of cognitive distortions, such as thinking the past was worse than it was, which may help reduce distress. However, these authors acknowledge that growth sometimes reflects actual change--positive changes that individuals have actually undergone. They state that future research of growth over time (e.g., right after potential trauma to years later) can help determine whether PTG is an outcome or a process, but they believe that it is an outcome and is often illusory rather than reflecting actual growth. Therefore, they state that it is more accurate to call it *perceived growth*, to measure it using open- and closed-ended questions, and to measure both positive and negative changes.

Results of the meta-analysis showed that the relationship between perceived growth and well-being may not be linear, or it may be moderated by other unmeasured variables (Park & Helgeson, 2006). For example, one study in their review found that in mothers of children undergoing stem-cell transplants, optimism moderated the relationship between perceived growth and positive adjustment. That is, perceived growth was positively related to

positive adjustment only among mothers who were high in optimism. Another study in their review found curvilinear relationships: those who scored high or low on perceived growth at baseline had the best psychological outcomes, whereas those in the midrange of perceived growth had the worst outcomes. Additionally, the high perceived growth group had the most adaptive coping and lowest distress. Similarly, a prospective study of adolescent girls in their review found that perceived growth predicted decreased distress for over 18 months after experiencing the most stressful event of the past year. Other studies found that those who reported both positive and negative life changes as a result of illness were the best adjusted. Overall, Park and Helgeson state that to determine actual growth from perceived growth, researchers must examine the costs and benefits of a stressful event--if growth is reported in the absence of costs, it is more likely illusory. They suggest using open- and close-ended questions and a unidimensional construct instead of individual factors, but there needs to be a new scale in order to do this.

In summary, these three meta-analyses suggest that BF may be negatively related to symptoms of depression and positively related to well-being, including optimism and positive affect (Helgeson et al., 2006), or there may not be a relationship between depressive symptoms, well-being, and BF (Park & Helgeson, 2006; Pascoe & Edvardsson, 2013). Results also suggest that the relationships between BF and mental and physical health outcomes may differ depending upon the sample composition, disease severity, and time since diagnosis, and that there may be non-linear relationships or moderator variables that need to be considered when analyzing data.

Relationships between BF and Health Outcomes in Different Patient Populations

Research has examined BF and its possible effects on mental and physical health outcomes in a variety of patient populations. The sections below will summarize those studies, organized by the type of health condition or disease.

Patients Undergoing Transplantations. BF has been longitudinally examined in the context of a positive medical intervention: a kidney transplant that is perceived as improving physical functioning, well-being, and overall QoL. In their 2019 study, de Vries et al. surveyed 319 patients with end-stage renal disease on the kidney transplant list at baseline or Time 0, which was before transplantation; at Time 1, three months post-transplant; at Time 2, six months post-transplant; and at Time 3, twelve months post-transplant. Participants completed self-report questionnaires measuring distress, optimism, and BF (e.g., the Posttraumatic Growth Inventory by Tedeschi & Calhoun, 1996). Using longitudinal multi-level modeling, they found that scoring below average in BF across all time points was associated with scoring above average in symptoms related to kidney disease at all time points. Additionally, scoring above average in BF at all time points was associated with scoring below average in distress across all time points. Therefore, BF was found to have positive associations with mental and physical health outcomes (de Vries et al., 2019).

Furthermore, symptoms and comorbidities were negatively related to BF, while optimism was positively correlated with BF following kidney transplantation. Additionally, BF was negatively related to experiencing physical problems. De Vries et al. (2019) describe how higher levels of distress before a positive medical intervention could possibly activate BF to reduce the distress following the transplant. Since distress after the transplant was

negatively correlated with BF, an increase in well-being may influence individuals to identify positive life changes that occurred due to the kidney transplant. One limitation of the study includes the self-reported nature of disease severity and comorbidities, so future research should include objective measures of health when examining BF in the context of illness.

Fox et al. (2014) examined PTG in long-term survivors of lung-transplantation, using 64 participants from a previous study conducted five to eleven years earlier. The authors described their sample as representative of the lung transplant patient population in terms of age, indication for transplant, and type of transplant. Research on lung transplantation has focused on negative effects, so they examined positive effects (i.e., PTG via the Posttraumatic Growth Inventory-Short Form; PTGI-SF; Cann et al., 2010) in long-term survivors to determine predictors of PTG. They measured perceived health, physical functioning, psychosocial status, and physical and psychological comorbidities such as PTSD related to the transplant, panic disorder, generalized anxiety disorder, major depressive disorder, respiratory symptoms, dispositional optimism, and sense of control. Some of these measures were collected in the first study and others were collected at long-term follow-up in the current study (Fox et al., 2014). Results showed that females and those with low-income and lower levels of education reported greater PTG than their counterparts. However, they did not discuss this further or provide an explanation as to why BF may be related to these demographic characteristics. Panic disorder symptoms and social support soon after transplantation were positively related to PTG, while good perceived general health was positively related to PTG at follow-up. Optimism and sense of control were not associated

with PTG, nor were several objective indicators of health, including bronchiolitis obliterans syndrome, which is usually related to QoL.

Even though objective indicators of health were not related to PTG, results imply that physicians should still examine PTG because it and subjective health are still likely related to improved psychological reactions (Fox et al., 2014). Results also suggest that PTG arises out of potentially traumatic life events and may not be dispositional, as measured by optimism and control. The authors also mentioned that because they measured PTG years after potential trauma, time may have contributed to an increase in reports of PTG; likewise, other studies have shown that as more time since potential trauma elapses, individuals are able to report more growth. A limitation of this study is that researchers enrolled less than one-half of the 178 participants from the original study, even though they stated that they did not differ from those who refused to participate. Additionally, their sample size was small and more than 95% of participants identified as White.

Patients with HIV. In their cross-sectional study, Littlewood et al. (2008) surveyed 221 individuals with HIV in order to examine the association of BF to psychosocial and health behavior adaptation, which are operationalized as maintenance of good physical and mental health, life satisfaction, positive life-and-death attitudes, high meaning and purpose in life, and a stable personality (Reker & Woo, 2011). Participants' health status and clinic attendance were obtained from medical records, while HIV-related symptoms, depressive symptoms, BF, physical activity, social support, drug/alcohol/cigarette use, and Highly Active Antiretroviral Therapy (HAART) adherence were self-reported. Results showed that women and African Americans reported more BF related to being HIV+ than men and

Whites. They also found that those who reported higher levels of BF also reported engaging in more physical activity compared to their counterparts who were lower on BF (Littlewood et al., 2008).

BF was also found to be negatively correlated with depressive symptoms and HIV-related symptoms, and positively correlated with social support. However, BF was not associated with HAART adherence, objective markers of viral load, or substance use in either direction. Since BF and depressive symptoms were partially mediated by differences in social support, Littlewood et al. (2008) hypothesize that BF may improve psychological adjustment by motivating patients to seek social support when experiencing stress. These findings partly support Taylor's (1983) theory of cognitive adaptation, which states that individuals maximize health benefits by reducing distress. However, the only measure of distress in the current study consisted of depressive symptoms, and due to the cross-sectional nature of the study it is not possible to determine temporal sequences.

Patients with Diabetes. Adolescents ($N = 252$; ages ranged from 10-14 years) with Type I diabetes were interviewed in order to see which factors (including BF) predicted diabetes management since self-management behaviors established during adolescence may carry into adulthood (Tran et al., 2011). Within this cross-sectional study, the authors also speculated that BF may work as a buffer by allowing adolescents to positively reframe the meaning of their diabetes-related distress via positive affect. Measures included HbA_{1c} levels (a diagnostic blood test that provides information about average levels of blood glucose or hemoglobin; National Institute of Diabetes and Digestive and Kidney Diseases; U.S. Department of Health and Human Services, 2018), depressive symptoms, adjustment,

positive and negative affect towards diabetes stressors, perceived coping effectiveness, and medication adherence. Cross-sectionally, BF was found to be negatively related to depressive symptoms, and positively related to perceived coping effectiveness, adherence to diabetes regimens, and positive and negative affective reactions to diabetes stress. BF was also found to interact with negative affective reactions to predict depressive symptoms and HbA_{1C} levels: participants with higher levels of BF and negative affect had lower levels of depressive symptoms and HbA_{1c}, while those with lower levels of BF and negative affect had higher levels of depressive symptoms and HbA_{1c}.

Surprisingly, BF was unrelated to gender or age (Tran et al., 2011). Researchers concluded that BF may be an effective resource for adolescents with diabetes who perceive high levels of stress and negative affective reactions to said stress. Additionally, BF may work as a buffer to minimize the effects of stress and negative emotions in adolescents with diabetes, since those with high levels of BF reported better adjustment than those who reported lower levels of BF. However, individuals who reported negative affect did not report better self-care, even among those with higher BF, so further research on this type of sample, and at more than one time point, may be necessary. One limitation includes the measurement of outcomes at only one time point, as changes in medication adherence and HbA_{1C} levels based on initial BF levels could not be examined.

Patients with Breast Cancer. In a 2004 study, Carver and Antoni sought to test whether BF has beneficial long-term effects in patients with Stage 0, I, or II breast cancer. They surveyed 230 patients with early-stage breast cancer at three, six, or 12 months post-surgery, and 96 of them again four to seven years later (these women were originally part of

a broader study). They measured BF via 17 items found in the Benefit Finding Scale (Tomich & Helgeson, 2004), symptoms of distress (e.g., depression, anxiety, and anger), and perceived QoL via questionnaires. Initial BF was related to lower education, older age, and more advanced stages of cancer diagnosis. Initial BF was also negatively related to distress, negative affect, and depressive symptoms four to seven years following diagnosis, after controlling for initial levels of these variables. They also found that BF at follow-up was positively related to QoL and positive affect. One limitation includes how they only surveyed about one-half of the original sample at follow-up, although they reported no significant differences between those who dropped out and those who remained in the study. Additionally, they did not include women with more advanced stages of cancer.

In Low et al.'s (2006) prospective randomized trial, they assigned 60 patients with breast cancer to either four sessions of writing about benefits, writing about deepest thoughts and feelings regarding cancer, or reading facts as a control group. Participants were 60 female patients with Stage I or II breast cancer in the Midwest who had completed surgery, chemotherapy, or radiotherapy in the five months before the study. The purpose of the study was to identify mediators underlying the effects of writing about benefits on patient outcomes. Outcome measures before and at the conclusion of the intervention consisted of physiological arousal; self-reported physical symptoms; self-reported mood; negative or positive thoughts, feelings, and memories about cancer; and medical visits across the three months. Results showed that BF was not related to health outcomes in participants who wrote about benefits associated with having breast cancer, but they suggest this may be due to the participants' recent cancer treatments that could still have been influencing their health,

which was also self-reported. Participants in the BF condition used more positive emotion words than did women who wrote about their deepest thoughts and feelings, although all women significantly increased their use of positive emotion words over the four sessions. Participants who wrote about their deepest thoughts and feelings used more negative emotions words than did BF participants and the control group, but they had higher heart rate habituation (a measure of arousal). There were no effects on self-reported mood in any condition.

Writing about benefits associated with cancer was not related to health outcomes, possibly because participants wrote about life-threatening cancer that had just been treated and was still influencing their health (Low et al., 2006). Surprisingly, across all groups, greater negative emotion word use was associated with lower physical symptoms across time. The researchers concluded that since emotional processing of negative words was found to be related to health improvements, exposure and habituation to negative thoughts and feelings about breast cancer may lead to health improvements. Limitations include how the computer program used to code the words for emotion may not have taken into account the context in which words were used, and they did not find the process through which BF can lead to improved physical health. Therefore, future research needs to examine alternative mechanisms through which BF may improve health. Additionally, they used a small sample size, which may have not had enough power, and they relied on self-reports for assessment of physical health. The researchers stated that an objective measure, such as cytokine, endocrine, or parasympathetic activity, would be preferable in a follow-up study.

In a similar prospective study, 364 women (93% majority White) diagnosed with Stage I, II, or III breast cancer and treated with surgery and chemotherapy were assigned to one of three conditions: (1) a group psychosocial intervention that focused on informational peer support, (2) a peer discussion intervention focused on emotional support, or (3) a control condition lacking an intervention (Tomich & Helgeson, 2004). These authors tested whether participant demographics or stage of disease were associated with BF, mental QoL, and physical QoL. Results showed that women with lower SES, ethnic minorities, and those with more severe cancer perceived more benefits at baseline. The authors explain that women who are ethnic minorities may perceive discrimination in their daily lives that prepares them to identify positive benefits from negative events. Individuals with lower SES may face more hardships throughout their lives that allow them the increased opportunity to construe positives from a negative experience. Results showed that ethnic minorities reported more BF, less negative affect, and worse physical functioning even when controlling for SES and stage of cancer, compared to their White counterparts. Neither age, marital status, nor religious affiliation were related to BF at baseline.

Surprisingly, BF was positively related to negative affect at baseline, and unrelated to physical and mental functioning or positive affect (Tomich & Helgeson, 2004). Longitudinally, advanced stage of cancer was associated with worse mental functioning at three months follow-up and more negative affect at nine months follow-up. Results also showed that intervention type did not interact with BF and QoL. Of most relevance for this study, BF at four months post-diagnosis interacted with cancer stage to predict negative affect at three- and nine-months follow-up. That is, the combination of high BF and advanced

cancer stage was positively associated with negative affect at three- and nine-months follow-up. Additionally, those diagnosed with Stage II breast cancer reported more BF than those diagnosed at Stage I. Tomich and Helgeson concluded that BF could be a sign of cognitive denial over time, which may explain why patients who used more BF at more severe stages of cancer had worse outcomes. Limitations include a small sample size consisting solely of well-educated women with Stages I to III breast cancer and no women at Stage IV, and those who refused to be randomized into a type of intervention were added to the control group, so these individuals may not be homogeneous on variables at baseline compared to individuals included in the intervention groups.

Patients in Mixed Cancer Samples or Other Cancer Types. Using a latent class growth analysis and maximum likelihood estimation, Zhu et al. (2018) examined different trajectories of BF over nine-months' time in patients with cancer receiving psychological care (e.g., individual therapy, group therapy, or other therapy) at any one of seven specialized psycho-oncology clinics in the Netherlands. Almost one-half of the participants were diagnosed with breast cancer. Baseline, or Time 1 ($N = 384$), occurred just before beginning cancer treatment, Time 2 occurred three months later ($N = 278$), and Time 3 occurred nine months after that ($N = 241$). Measures included anxiety and depression symptoms, the perceived benefits subscale of the Illness Cognition Questionnaires (Evers et al., 2001), self-reported medical information, and demographic information. Results showed there were no differences in anxiety symptoms based on the course of BF, which suggests that anxiety symptoms are probably independent of BF. However, they found that the small proportion of participants who reported large increases in BF were most likely to show decreases in

depressive symptoms over time. The group with high and stable BF maintained stable and low levels of depressive symptoms over the course of the study, while the group with stable and moderate BF had small decreases in depressive symptoms. Furthermore, those in the high and stable BF group had a favorable prognosis, while those in the low but increasing BF group had an uncertain prognosis (Zhu et al., 2018).

Zhu et al. (2018) noted that these findings suggest that large increases in BF may be reflective of a severe and threatening potential trauma that challenges beliefs and assumptions about the world. Additionally, these results supported the hypothesis that there are different courses of BF trajectories in patients with cancer based on high, moderate, or low levels of BF. Despite these findings, limitations include how causation between depressive symptoms and BF cannot be confirmed in this naturalistic study. Another limitation is that participants who dropped out of the study were less educated, more likely to be male, more likely to have a poor prognosis, and less likely to have had an operation compared to those who remained in the study, but they did not significantly differ on baseline levels of BF, depressive symptoms, or anxiety symptoms.

Llewellyn et al. (2013) examined BF in (N = 103) patients with head and neck (HNC) cancer before undergoing treatment at baseline and at six months after treatment was completed (Time 2). At the time, BF had not been studied in patients with HNC, a group which is composed mainly of men with significant physical and psychological disabilities since the disease is very aggressive and treatment is radical. These authors tested whether optimism and coping strategies, as measured by the Brief COPE (Carver, 1997), are associated with the ability to report positive outcomes or BF. Results showed that BF

remained stable at all time points, and participants who were married or cohabitating reported more BF than their non-partnered counterparts. In addition, BF was significantly related to eight of the fourteen coping subscales. More specifically, positive reappraisal and optimism were positively correlated with BF. Participants who used active coping strategies were more likely to report using BF (Llewellyn et al., 2013).

Using principle component analysis, Llewellyn et al. (2013) found four BF factors: (1) perceptions of life purpose and receiving/giving support, (2) negatively worded items, (3) emotional/spiritual growth, and (4) acceptance. The BF domain of emotional/spiritual growth was negatively related to a measure of mental health-related QoL. Results showed no relationship between BF and distress, as measured by symptoms of anxiety and depression. The researchers concluded that many years may be needed for BF to develop because of the cognitive restructuring and rumination that occur following potential trauma, so future research needs to examine BF across multiple follow-ups. Additionally, they state that positive outcomes (e.g., positive affect) are more likely to be related to BF than negative outcomes (e.g., depression and anxiety) because the ability to identify positive things may not be related to individuals experiencing distress. Limitations of the study include how they did not examine demographics, besides marital status, as covariates, and there was a 36% attrition rate at follow-up: 24% had died ($N = 23$) and eleven participants could not be located. It was also problematic that one-half of the coping subscales did not have acceptable internal consistencies, which means there was low reliability and results involving coping could be inaccurate.

Patients with Spinal Cord Injuries. January et al. (2015) cross-sectionally surveyed 161 adults with a mean age of 33 years (range 19-50) who had suffered a spinal cord injury (SCI) between six and 18 years of age. Their aim was to explore positive psychological growth, or PTG, in those who suffered an SCI in childhood as well as factors correlated with said growth, since the majority of individuals with SCI are said to be psychologically resilient and adjust well to injury. They measured PTG (via the PTGI; Tedeschi & Calhoun, 1996), types of coping used, depressive symptoms, adjustment, and perceived general happiness. They found no significant associations between PTG and injury etiology, participant gender, ethnicity, completeness of injury (e.g., a complete injury is the absence of sensory and motor function in the sacrum; Kirshblum et al., 2011), injury level (paraplegia vs tetraplegia), employment status, marital status, or having a college/professional degree. PTG was negatively correlated with age but not to age at injury or injury duration.

Results did show that PTG was positively related to behavioral coping, cognitive coping, life satisfaction, and general happiness (January et al., 2015). However, it was not related to avoidant coping, depressive symptoms, or anxiety symptoms. Those with pediatric-onset SCI reported higher PTG than those injured as adults. After controlling for age, PTG mediated the relationship between cognitive coping and general happiness. That is, cognitive coping was positively related to PTG, which in turn was positively related to general happiness. Overall, the researchers concluded that cognitive coping and PTG are useful for facilitating positive outcomes, and measures of psychological distress (e.g., symptoms of anxiety and depression) are different from PTG since they were not correlated. Limitations include that most participants were White and received care from a single hospital, so the

sample was not representative of all adults with SCI. Additionally, it was a cross-sectional study so causation cannot be inferred, nor can the timeline of variables, such as whether BF precedes perceived general happiness and/or adjustment following a spinal injury.

Summary. Overall, several studies have examined possible effects of BF on mental and physical health outcomes following a disease diagnosis. Among cross-sectional studies, BF was found to be negatively related to different forms of distress (e.g., negative affect and stress) in patients who are HIV+ (Littlewood et al., 2008) and in patients with a spinal cord injury (January et al., 2015). BF has also been shown to be negatively related to distress within prospective studies in patients with renal disease (de Vries et al., 2019), in adolescents with Type I diabetes (Tran et al., 2011), and in a mixed cancer sample (Zhu et al., 2018). Furthermore, evidence also suggests longitudinal positive associations between BF and QoL in patients with breast cancer (Carver & Antoni, 2004), perceived health in patients who received a lung-transplant (Fox et al., 2014), and optimism in patients with renal disease or HNC (de Vries et al., 2019; Llewellyn et al., 2013). Cross-sectionally, BF has positive associations with life satisfaction (January et al., 2015) and well-being and positive affect (Helgeson et al., 2006). Also, de Vries et al. (2019) found that across multiple time points BF was negatively related to symptoms of kidney disease and comorbidities, and BF was negatively related to physiological stress-response biomarkers among two prospective breast cancer samples (Pascoe & Edvardsson, 2012). Over five to eleven years' time, Fox et al. (2014) found no association between PTG and sense of mastery/control, optimism, and objective indicators of health; but they suggest that PTG may not be dispositional which is why it was unrelated to dispositional/trait-like outcomes.

However, studies also document negative effects of BF. For example, Helgeson et al. (2006) found that BF was cross-sectionally, positively related to more intrusive and avoidant thoughts about a potentially traumatic event or stressor, Tomich and Helgeson (2004) reported a positive relationship between BF and negative affect at baseline but not at follow-up, and panic disorder symptoms soon after lung transplantation were positively related to PTG levels at baseline but not at six to eleven years follow-up (Fox et al., 2014). Among meta-analyses, BF was cross-sectionally unrelated to several indicators of mental and physical health outcomes, such as symptoms of anxiety, global distress, QoL, and subjective physical health (Helgeson et al., 2006).

As the results in the literature on BF show, cross-sectionally, BF may be a cognitive strategy to reduce distress and may be associated with poor health outcomes, but longitudinally, BF may be a measure of actual change and growth, and may be associated with better health (Helgeson et al., 2006). Therefore, most of the negative outcomes associated with BF may be found within cross-sectional studies soon after a stressful event, and more positive outcomes may be found after a period of time following the event in longitudinal studies. Some of these researchers have offered possible reasons for the mixed findings in the literature. Those possible causes will be summarized next.

Potential Causes of Inconsistencies throughout the Literature

Not factoring in time since diagnosis. Tedeschi and Calhoun (2004) suggest that BF emerges when more time has passed since a potentially traumatic event because individuals have had time to process the event. As mentioned before, a meta-analysis found that the relationship between health outcomes and BF was moderated by the amount of time that

passed, so as more time passed, more positive outcomes were found (Helgeson et al., 2006). Helgeson et al. suggested that BF over time may be a measure of change or actual growth, and may be related to better health outcomes. However, cross-sectionally, BF may be a cognitive strategy to reduce distress, and is related to poor health outcomes. Examining these associations over time, or at least controlling for time, may help explain the inconsistent associations found between BF and outcomes in the literature. If the relationship between health outcomes and BF depends on how much time has passed, time is potentially a moderator. For example, in Fox et al.'s (2014) study, they measured PTG years after a stressful event (e.g., a lung transplantation) and the five- to eleven-year follow-up time period may have contributed to an increase in reports of PTG. Taking this in mind, future research should conduct longitudinal studies in order to measure BF at different time points to allow sufficient time for BF to emerge and possibly influence health outcomes.

Not factoring in the severity and/or the stage of disease. In their meta-analysis of studies that used the BF instrument by Antoni et al. (2001), Pascoe and Edvardsson (2013) discuss how BF's effects on health outcomes may differ depending on the stage of illness trajectory, such as early cancer stages versus advanced cancer stages. Therefore, they suggest further research needs to take disease stage or severity into account. For example, in Carver and Antoni's (2004) study of patients with breast cancer, baseline BF in the year post-surgery was positively related to cancer stage, such that those diagnosed with more advanced stages of cancer experienced more BF. In a similar study, BF at four months post-diagnosis, interacting with cancer stage, predicted more negative affect three and nine months later (Tomich & Helgeson, 2004). Those diagnosed with Stage II breast cancer reported more BF

than those diagnosed with Stage I. However, their sample consisted of women with stage I to III breast cancer and no women at Stage IV, so future research needs to examine more severe stages of breast cancer to determine whether the severity of cancer staging interacts with BF to influence different health outcomes.

Researchers using different measures of BF. The literature includes many ways to measure BF, with most appearing to be unidimensional. However, the related construct of PTG has multiple domains or factors. In fact, Janoff-Bulman (2004) states that PTG consists of three dimensions or models: (1) strength through suffering, (2) psychological preparedness, and (3) existential reevaluation. Strength through suffering means that individuals' personal strengths develop when they challenge themselves psychologically, just as exercising strengthens the body. Psychological preparedness means restructuring one's view of the world into one that is comfortable yet includes the potentially traumatic event. Existential reevaluation refers to an increased appreciation of life. One limitation is that Janoff-Bulman's model of PTG has not been tested, so the validity of her dimensions is unknown. Tedeschi and Calhoun's (1996) Posttraumatic Growth Inventory has five dimensions of PTG: (1) new possibilities, (2) relating to others, (3) personal strength, (4) spiritual change, and (5) appreciation of life. In Helgeson et al.'s (2006) meta-analysis, they analyzed cross-sectional studies that used various measures of positive growth (e.g., the PTGI by Tedeschi & Calhoun, 1996; the SRGS by Park et al., 1996; the Benefit Finding Scale either by Mohr et al., 1999 or Tomich & Helgeson, 2004; the Perceived Benefit Scale by McMillen & Fisher, 1998; or any open-ended measure of BF) and they found small effect sizes and inconsistent results across the various studies.

Unclear definitions of BF. Some researchers say that the inconsistent findings in the literature could be due to measuring BF either as a cognitive reappraisal coping strategy (e.g., perceived growth) or as a measure of actual change, especially since there is a bias for participants to report positive changes (Littlewood et al., 2008). For example, Tedeschi and Calhoun (2004) define PTG as major crises instead of lower level stress; actual changes instead of perceived changes; and as an outcome or an ongoing process instead of a coping mechanism. These authors note that *actual* growth may require a significant threat or the shattering of fundamental schemas, which also means it is theoretically correlated with distress. These researchers explain that the inconsistent results across the studies could be due to not measuring actual changes that individuals have made following a stressful event. Similarly, Helgeson et al.'s (2006) inconsistent results found in their meta-analysis of cross-sectional studies could be due to individuals construing benefits to relieve distress without making actual positive life changes, as Taylor's (1983) theory of cognitive adaptation describes. Based on this meta-analysis, future research should better conceptualize BF to reflect either actual change or perceived change in order to better understand associations between BF and mental and physical health outcomes.

Tennen and Affleck (2009) describe the influence of memory biases or distortions in reporting positive changes, resulting in participants thinking they have changed positively over time. For researchers, there is an implicit assumption that people will accurately report personal change over time. These authors add that even if participants can accurately report their present benefit-finding levels, most cannot accurately report their levels before the

potentially traumatic event occurred, so people cannot accurately report the degree of change between those two time points.

Examining actual versus perceived growth and reporting biases in a prospective study, Boals and Schuler (2019) tested whether their Stress-Related Growth Scale—Revised (SRGS-R) is a more valid measure of genuine PTG by administering it or the PTGI (Tedeschi & Calhoun,1996) to individuals who had experienced a distressing but definitely not a potentially traumatic event--a cracked cell phone screen. Using an online questionnaire, they surveyed 613 psychology undergraduate students who had suffered a cracked cell phone screen in the last five years (Boals & Schuler, 2019). They found that among those who had broken a cell phone screen, 12% reported moderate to high levels of PTG. Experiencing a cracked cell phone screen is not a potentially traumatic event, even though 12% of individuals reported moderate to high PTG, suggesting that PTG may be illusory. In fact, Boals and Schuler state, "actual growth represents changes that can be measured objectively and longitudinally from before [potential] trauma exposure to following [potentially] traumatic events" (p. 239).

The SRGS-R was shown to have good construct validity and lower PTG scores than the PTGI, and scores were related to better mental health, lower PTSD symptoms, and unrelated to distress (in contrast to scores on the PTGI). PTGI scores were positively related to four types of coping: emotion-, problem-, and avoidance-focused coping, and denial, while the SRGS-R scores were unrelated to those four types of coping. Boals and Schuler (2019) also found that the PTGI was correlated with multiple outcome measures, and that individuals scored high on the measure implying illusory growth. The opposite was found

with the SRGS-R, which uses neutral language and allows participants to report both negative and positive changes. The authors mention that if PTG is related to avoidant coping, it is likely maladaptive because it could mean that individuals believe themselves to have positively changed as a way to cope with the distress of the potentially traumatic event. They suggest that because of the measurement controversy, research needs to use the term "perceived" PTG; authentic PTG is hard to measure and most PTG is wishful thinking. These researchers explain how the unclear definitions of growth may have contributed to the mixed literature results between growth/BF and mental and physical health outcomes.

Summary. In sum, there are several proposed reasons for the mixed effects of BF on mental and physical health outcomes found in the literature. The mixed results may be due to not including time since diagnosis, the severity of illness, the stage of illness, and/or due to using different measures or definitions of BF. As possible solutions, researchers state that more time since the stressful event has occurred may be needed for BF to positively influence health outcomes (Helgeson et al., 2006), studies should include patients with more severe or advanced stages of illness (Carver & Antoni, 2004), and BF should be better conceptualized when used either as a measure of actual change or as a cognitive reappraisal coping strategy (Boals & Schuler, 2019).

CVD and BF

What is CVD?

Cardiovascular disease (CVD) is a group of disorders of the heart and blood vessels that can cause myocardial infarctions (i.e., heart attacks; MI) or stroke (World Health Organization, 2017). Among these disorders there are arrhythmias, coronary heart disease,

and high blood pressure (National Heart, Lung, and Blood Institute, n.d.). Surgical operations may be required to treat CVD, such as coronary artery bypass, balloon angioplasty, heart valve repair and replacement, or the use of medical devices such as pacemakers, prosthetic valves, or patches for closing holes in the heart. According to the American Heart Association (Benjamin et al., 2019), there were 121.5 million adults aged 20 years or older in the United States diagnosed with CVD in 2016. Globally there were approximately 17.6 million deaths attributable to CVD in 2016, which was a 14.5% increase from 2006. Heart disease continues to be the leading cause of death in the United States.

Cardiac rehabilitation (CR) is a comprehensive secondary prevention strategy that helps decrease patients' risks of re-experiencing a cardiac event by modifying nutritional and behavioral risk factors (Braverman, 2011). In the short term, it helps control cardiac symptoms and enhances functional capacity, while in the long term it changes or resets the history of coronary artery disease to decrease the progression of atherosclerosis or morbidity and mortality. CR is necessary for individuals with any of the following: acute MI, coronary artery bypass graft, stable angina pectoris, heart valve repair or replacement, percutaneous transluminal coronary angioplasty (or stent), and heart transplantation. However, CR reduces the risk of recurrence in all types of patients, even the less serious cases, by helping reduce cholesterol and triglyceride levels, systolic blood pressure, and smoking rates (Barzi et al., 2003). In CR, patients engage in physical activity, counseling to reduce everyday stress, and educational programs to learn to manage risk factors (American Heart Association, 2016). Besides lowering the risk of a future cardiac event, participating in CR helps patients learn to eat better, lose weight, return to work, and/or engage in daily activities.

CVD, CR, and BF

Despite the vast amount of research on BF and related constructs, there has not been many studies that examine BF in patients with CVD, and even fewer for those enrolled in CR. This is surprising, considering that CVD is a stressful life experience and using BF may theoretically improve physical and mental health outcomes. Only four studies were found and are summarized below.

First, Sanjuán et al. (2017) validated the Benefit Finding Scale (Antoni et al., 2001) after translating it to Spanish using a prospective study of patients with CVD ($N = 153$) enrolled in a CR program in Spain. Their aim was to analyze the psychometric properties of the translated scale in patients who had just suffered a first cardiac event, since most research on BF has focused on patients with cancer, and because CVD is the leading cause of death (Sanjuán et al., 2017). Other measures included participant demographics, social support, self-efficacy, coping skills, positive and negative affect, and functional capacity. They surveyed participants at one time point and again eight weeks later ($N = 96$). After controlling for significant correlations between BF and demographics at baseline, results showed that BF at baseline was positively correlated with positive affect, self-efficacy, and social support at baseline and at eight weeks follow-up. The dimension of *acceptance of situations* was positively related to effective coping at baseline and at follow-up. However, the BF scale as a whole was not found to be significantly correlated with effective coping or functional capacity at baseline nor follow-up.

Furthermore, individuals who lived with others and who had fewer years of education had higher levels of BF, and there were no gender differences in levels of BF (Sanjuán et al.,

2017). Results also showed that the scale and its sub-items, as translated in Spanish, were shown to have high internal consistency, test-retest reliability, and good predictive ability. They found three dimensions of the BF scale: (1) personal growth, (2) the importance of family and empathy towards others, and (3) acceptance of situations. It is noteworthy, though, that the authors state that it can be used as a one-dimensional scale. The researchers concluded that the Benefit Finding Scale, as translated in Spanish, can be reliably administered to Spanish-speaking participants. One limitation of the study is that they did not examine the relationship of BF to physical health outcomes, besides functional capacity, and they did not survey participants at the end of the CR program.

Second, Smith et al. (2017) conducted cross-sectional, qualitative in-depth interviews using ten men three to five months post-MI and currently participating in their third week of CR in London. The purpose of the study was to gain insight into the subjective experiences and meaning making of participants who reported themselves as positively adjusted following an MI. Researchers used open-ended questions during the interview, which was audio recorded and later transcribed and analyzed. They found one overarching theme, which they called "I was in control of it from the start," and six subthemes: "a new lease on life; heart attack as trigger for positive change," "responsibility to others; appreciation of social support," "empowered experience of care and recovery," "personal resilience and adaptive coping strategies," "limited impact on self despite shock of heart attack," and "acceptance of continued adjustment in relationship with body." An example of "a new lease on life…" is how participants described the experience of an MI as a motivator to make positive lifestyle changes, which ranged from quitting smoking to changing diet and increasing physical

activity. All participants reported moving beyond shock surrounding their MI to develop meaningful actions and positively adjust to their health conditions. These actions can be seen as a form of BF even though the researchers did not specifically mention BF in their study. Although the study did not measure physical and mental health outcomes and used a small sample size consisting of only men, the results suggested that all participants were able to positively adjust and felt in control following enrollment in CR for an MI.

Other studies have examined the effects of BF following a cardiac event in patients not enrolled in CR. For example, Affleck et al. (1987) conducted secondary data analyses from prospective interviews with 287 men in their homes seven weeks after their first MI and again eight years later. Their purpose was to determine if patients who either attributed their heart attack to personal behaviors or who used BF would be less likely to suffer a future occurrence. These authors also tested whether those who blamed others for their attacks would have more adverse health outcomes. They measured causal attributions, BF, health status, symptoms of cardiac illness, and prognostic severity following the first MI. Results showed that patients who used BF following their first MI were less likely to experience a second MI seven years later, and they also had decreased mortality rates compared to their counterparts who did not use BF seven weeks after their first MI.

After controlling for age, socioeconomic status, and prognostic severity, the combination of low BF at seven weeks and the tendency to blame others was associated with a higher chance of experiencing a second MI within eight years (Affleck et al., 1987). The experience of a second MI was associated with increased BF and greater causal attributions related to personal behavior, other individuals, stress responses, and heredity. Ninety-two

participants died from a second MI at follow-up, but they did not differ in BF, causal attributions, or sociodemographic variables compared to those who survived a second MI. Limitations of this study include the lack of psychological outcome variables, such as symptoms of anxiety or depression, and the researchers stated that their measure of causal attributions may not be valid or reliable. More importantly, they did not measure whether participants were enrolled in CR, so this study's application to patients enrolled in CR is unclear.

Similarly, Javed and Dawood (2016) examined the cross-sectional, psychosocial predictors of PTG in patients following an MI in order to determine whether individuals can create or find positive changes after experiencing an MI. Although they used the term PTG, they described it as "positive psychological changes after experiencing a [potentially] traumatic event" (p. 366), which is conceptually similar to BF. Measures included PTG (via the Posttraumatic Growth Inventory; Tedeschi & Calhoun, 1996), perceived social support, personality traits, and coping strategies. Their sample consisted of 90 patients with ages ranging from 45 to 65 years who had experienced a single MI in the past month to three years. They also limited participants to those who were currently receiving treatment from any one of four different government hospitals in Pakistan. Exclusion criteria consisted of patients who did not have "any hope for recovery," (Javed & Dawood, 2016, p. 369), who had gone through any type of surgical procedure other than for hypertension or diabetes, the diagnosis of any psychiatric illness, and having been diagnosed with CVD before experiencing an MI.

Results showed that PTG was positively related to perceived social support, problem-focused coping, active emotional coping, extraversion, agreeableness, conscientiousness, and openness to experience (Javed & Dawood, 2016). Additionally, PTG was negatively related to avoidant emotional coping and neuroticism. After controlling for participant demographics (e.g., age, gender, education, job status, income, family system, residence type, marital status, duration of MI, and other physiological illnesses), results showed that openness to experience and perceived social support were positively related to PTG. Two limitations of this study include its cross-sectional nature and the lack of outcomes related to experiencing an MI.

Summary. In sum, BF has been positively correlated with positive affect, self-efficacy, and social support (Sanjuán et al., 2017) in Spanish-speaking patients participating in CR. Among these participants, those who lived with others and who had fewer years of education had higher levels of BF than their counterparts. BF/positive adjustment was also found via open-ended interviews in male patients enrolled in their third week of CR (Smith et al., 2017). Among those not enrolled in CR, participants who used BF following their first MI were less likely to experience a second MI seven years later and had decreased mortality rates compared to their counterparts who did not use BF (Affleck et al., 1987). Additionally, PTG was positively related to perceived social support, problem-focused coping, and active emotional coping in a different sample of participants not enrolled in CR (Javed & Dawood, 2016). Also, PTG was found to be negatively related to avoidant emotional coping. These four studies describe participant demographics related to BF and show that BF has positive associations with health outcomes both in patients with CVD enrolled and not enrolled in

CR.

Gaps in the Literature and Hypotheses

Among patients with CVD, research shows positive associations between BF, positive affect, self-efficacy, and social support at the beginning of CR and eight weeks later (Sanjuán et al., 2017); decreased mortality rates and recurrence of a second MI eight years following the first MI (Affleck et al., 1987); and cross-sectionally, use of problem-focused and active emotional coping (Javed & Dawood, 2016). However, these studies are cross-sectional or qualitative in nature, do not include participants enrolled in CR, or do not include a range of potential mental and objective physical health outcomes. It is unknown whether improved physical and mental health outcomes, such as healthy dietary behaviors or physical functioning, are positively related to BF in patients in CR, or whether BF is negatively related to distress, such as depressive symptoms.

The literature is also missing examinations of potential moderator and mediator variables. First, on one hand, in a sample of mothers of children undergoing stem-cell transplants, optimism moderated the association between perceived growth and positive adjustment (Park & Helgeson, 2006). This suggests that *positive affect*, a concept similar to optimism, may moderate the association between perceived growth and positive adjustment following a stressful event. On the other hand, Tran et al. (2011) suggested post-hoc that BF may work as a buffer by allowing adolescents with diabetes to positively reframe the meaning of their diabetes-related distress via positive affect, so positive affect may mediate the association between BF and distress. Bower et al. (2009, p. 158) also suggest that, "positive affect may be a factor in mediating the effects of [BF] on physical health." Second,

Helgeson et al. (2006) also suggested that *time since the stressful event occurred*, such as diagnosis, may moderate the association between health outcomes and BF. Therefore, cross-sectionally, BF may be a cognitive strategy to reduce distress and may be associated with poor health outcomes. However, longitudinally, BF may be a measure of actual change and growth, and may be associated with better health outcomes. Additionally, Tedeschi and Calhoun (2004) suggest that BF emerges when more time has passed since a potentially traumatic event because individuals have had time to process the event.

Third, *disease severity* may also be a moderator variable; in their sample of patients with breast cancer, Tomich and Helgeson (2004) found that at seven- and thirteen-months post-diagnosis, participants who were diagnosed at Stage II reported more BF than those who were diagnosed at Stage I. In their meta-analysis, Pascoe and Edvardsson (2013) also suggest that BF's effects on health outcomes may differ depending on the stage of illness. Similarly, Park and Helgeson (2006) propose that that the relationship between BF and mental and physical health outcomes differ depending on disease severity. In Carver and Antoni's (2004) study, BF was positively correlated with cancer stage at baseline and longitudinally, and it was positively related to positive affect and QoL at follow-up. Therefore, it is worth examining whether disease stage or severity moderates the relationship between BF and patient outcomes.

In sum, the literature on BF is missing an examination of potential moderators such as disease severity and time since diagnosis, and it is missing an examination of mediator variables such as optimism or positive affect. Moving forward, research needs to take these variables into account when examining associations between BF and health outcomes. When

these mediator and moderator variables are taken into account, they may affect the strength and direction of the focal relationship between BF and health outcome variables. For example, using a moderation model predicting mental health-related QoL from BF interacting with stage of disease, Tomich and Helgeson (2004) found a large, indirect effect ($R^2 = .29$). Within a meta-analysis consisting of cross-sectional studies, BF and depressive symptoms have been shown to have small or non-significant effect sizes, but a similar study found large effect sizes (Pascoe & Edvardsson, 2012; Littlewood et al., 2008). BF was also shown to be predictive of physical activity levels within a cross-sectional study, although the effect size was small (Littlewood et al., 2008). Additionally, a small effect size was found between levels of PTG and healthy diet at baseline, but not at follow-up approximately one and a half years later (Milam, 2004). Therefore, based on the research summarized above, I hypothesized the following:

1. Hypothesis one: BF would increase over time, such that BF at the end of CR (i.e., Time 2), would be significantly higher than BF at the beginning of CR (i.e., Time 1).
2. Hypothesis two: The relationship between BF and health outcomes would be mediated by positive affect, which would be moderated by disease severity (i.e., moderated mediation).
    a. BF at Time 1 would be positively related to positive affect, which in turn would be negatively related to *depressive symptoms* at Time 2. The mediation effect would be moderated by risk stratification, a measure of disease severity. That is, the positive relationship between BF and positive affect was predicted

to be stronger for those high/intermediate in risk stratification compared to those low in risk stratification.

b. BF at Time 1 would be positively related to positive affect, which in turn would be positively related to *healthy dietary behaviors* at Time 2. The mediation effect would be moderated by risk stratification, a measure of disease severity. That is, the positive relationship between BF and positive affect was predicted to be stronger for those high/intermediate in risk stratification compared to those low in risk stratification.

c. BF at Time 1 would be positively related to positive affect, which in turn would be positively related to *functional capacity via steps taken during a 6-minute walk test* at Time 2. The mediation effect would be moderated by risk stratification, a measure of disease severity. That is, the positive relationship between BF and positive affect was predicted to be stronger for those high/intermediate in risk stratification compared to those low in risk stratification.

CHAPTER 3 METHODOLOGY

Participants

This project analyzed secondary data from an ongoing study at a CR program in a Midwestern hospital, which is a safety-net hospital (SNH). SNHs serve the most vulnerable individuals in the community by offering healthcare to all, regardless of ability to pay (Truman Medical Centers, 2013). This results in a large percentage of racial/ethnic minorities, low income, and uninsured patients being served, compared to non-SNHs (Popescu et al., 2019). Participants consisted of (N = 162) English-speaking patients 18 years or older who had recently experienced a diagnosis of CVD and were enrolled in the study at the start of their participation in the CR program. Exclusion criteria were: 1) Physical impairments that would prevent the completion of CR or study materials, 2) Patients transferred to an outside facility for revascularization procedures, 3) Previous participation in the study, and 4) non-English speaking. At Time 2 at the end of CR, the sample consisted of 96 individuals.

Procedures

These secondary data were collected from an ongoing study at a CR program in a Midwestern hospital. Participants were individuals who had recently experienced a diagnosis of CVD and agreed to participate in a CR program. They were approached and provided information about the study while attending an orientation session at the CR program. Participants who expressed interest in the study were given study materials and an informed consent document; those who agreed to participate signed the consent document. Seventy-eight participants declined participation in the study for the following reasons: 57 were not

interested, 14 due to a language barrier, four said the questionnaire was too long, two were unsure they would participate in the CR program, and one did not give a reason. This resulted in a 67.5% participation rate among those who were invited to take part in the study, with a total sample of 162 participants at Time 1. Follow-up data at Time 2 were collected from 96 of these participants, yielding an attrition rate of 41%. The vast majority of those who did not complete the study left their CR program before the Time 2 questionnaire could be administered.

Following the consent document, participants were given several minutes to complete the study's Time 1 questionnaire. At the end of their CR programs, typically three to four months later, participants were re-contacted by CR staff members about completing their Time 2 questionnaires. They were given several minutes in a private office at the CR to complete these questionnaires. In addition, the consent form provided us permission to collect medical information from participants' medical charts. Participants in the study were assigned identification numbers in order to ensure confidentiality, and study materials were kept in a locked file cabinet only accessible to research team members. Participants were compensated ten dollars per survey completed, for a total of twenty dollars. The University of Missouri-Kansas City Institutional Review Board and respective hospital research board approved all study procedures.

Table 1 provides descriptive statistics for the sample. Participants ranged in age from 30 to 78 years old. The majority of the sample was male (59.3%), White (50.3%), partnered (58.9%), and not employed outside the house (65.2%). The total number of CR sessions completed ranged from 0 to 36, with 57 individuals (36.8%) completing all 36 available

sessions. The annual household income ranged from less than $10,000 a year to $100,000 or more a year, with a median annual income of $10,000 to $19,999. Additionally, 18.1% of participants did not have any form of insurance compared to their insured counterparts (81.9%). Of those insured, 54.4% had Medicare and/or Medicaid (n = 88).

Table 1

Descriptive Statistics of Participant Characteristics

Participant Characteristic	Time 1 (N = 162)		Time 2 (n = 96)
	M (*SD*)		
Age (years)	56.85 (8.96)		
CR sessions			25.13 (13.51)
BF	40.53 (9.74)		42.21 (10.14)
Positive affect	10.52 (4.05)		12.91 (4.65)
Depressive symptoms	5.63 (4.45)		5.93 (4.65)
Healthy dietary behaviors	43.35 (8.92)		52.06 (9.13)
6-minute walk test (ft)	1189.67 (356.31)		1441.78 (402.62)
	n	%	
Male	96	59.3	
Race/Ethnicity			
White	81	50.3	
Black/African American	74	46.0	
Hispanic/Latino	3	1.9	
Other or mixed race/ethnicity	2	1.2	
Asian American	1	0.6	
Racial and/or ethnic minority	80	49.7	
Partnered	93	58.9	
Not employed	105	65.2	
Education			
Some high school	38	23.5	
High school/GED	54	33.3	
Some college/Trade school	49	30.2	
2-year college degree	4	2.5	
4-year college degree	15	9.3	
Graduate degree	2	1.2	

Reason for CR referral		
MI and/or stent	108	67.5
Coronary artery bypass	21	13.1
Congestive heart failure	14	8.8
Valve replacement/repair	12	7.5
Angina	5	3.1
Risk stratification		
Low	71	43.8
Intermediate	33	20.4
High	58	35.8

Measures

Measures from this study were comprised of data collected from participants' medical charts (including demographics), and from self-report validated questionnaires. Questionnaires included the Benefit-Finding Scale by Tomich and Helgeson (2006), Rate Your Plate (RYP; Gans et al., 1993), the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001), and an adapted brief version of the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). Data collected from participants' medical charts included CR nurses' evaluations of patients' risk stratification for disease progression and a six-minute walk test. All questionnaires were completed twice, including the six-minute walk test, before starting CR (i.e., Time 1) and at completion of the program, typically 12 weeks later (i.e., Time 2).

Demographics

The following demographic information was extracted from participants' medical records: age, gender, race and/or ethnicity, education level, and insurance status. In addition, the questionnaire asked participants to report their marital status and employment status.

Benefit Finding (Predictor)

The Benefit-Finding Scale (Tomich & Helgeson, 2006) consists of 14 items using a four-point scale (1 = *Not at all*; 4 = *Very much*) that were summed to calculate a total score, with higher scores indicating higher levels of BF. For example, participants responded to a question asking, "Having a cardiac event has made me more sensitive to family issues." For the purposes of the research study, the wording was changed from "having had breast cancer…" to "having a cardiac event…" to reflect this sample's experiences. The instrument has not been previously used in a sample of patients with CVD, but the reliability has been reported to be excellent when used in samples of patients with breast cancer ($\alpha = .95$, $\alpha = .92$; Tomich & Helgeson, 2004, 2006, respectively). In this study, the coefficient alphas were .92 and .94 at Time 1 and Time 2, respectively.

Positive Affect (Mediator)

The PANAS (Watson et al., 1988) sums items into a total score for positive and negative affect sub-scales, but for the purposes of this study, only the positive affect subscale score was used. This adapted, brief version of the PANAS used four items that asked how often a participant's cardiac event made them feel the following forms of positive affect over the past one to two weeks: inspired, proud, excited, and determined. Responses ranged from 1 to 5 (1 = *Very slightly or not at all*; 5 = *Extremely*), with higher scores indicating higher levels of positive affect. Using the full version of the positive affect subscale in a sample of patients with coronary artery disease, reliability was excellent ($\alpha = .93$; Hoen et al., 2013). In this study, the adapted PA scale yielded an alpha coefficient of .83, which is within the acceptable range.

Risk Stratification (Moderator)

As stated by Singh and Zeltser (2020), risk stratification for disease progression is an evaluation of a patient's risk of developing CVD or the risk of a cardiac event based on modifiable (e.g., health conditions such as hypertension or lifestyle factors such as diet and exercise) and non-modifiable risk factors (e.g., age, gender, and family history). Patients were categorized into one of three categories by CR staff: "low," intermediate," or "high" at risk of developing CVD within ten years. Information about modifiable and non-modifiable risk factors was collected from participants' medical charts, and patients' classifications into one of the three categories was made by one of two CR nurses at the beginning of the program.

Depressive Symptoms (Outcome)

The PHQ-9 (Kroenke et al., 2001) measured depressive symptoms over the last two weeks using nine items that asked how often a participant was bothered by a number of issues (e.g., "little interest or pleasure in doing things"). Response options were on a four-point scale from 0 (*Not at all*) to 3 (*Nearly every day*). A tenth item asked how difficult the problems have made it to, "work, take care of things at home, or get along with other people?" Scores were summed and ranged from 0 to 27, with higher scores indicating more depressive symptoms. The PHQ-9 has shown excellent reliability in a sample of participants with CVD ($\alpha = .90$; Stafford et al., 2007). Patients' total scores for this measure were obtained from their electronic medical records, so a reliability coefficient could not be calculated.

Healthy Dietary Behaviors (Outcome)

RYP (Gans et al., 2000) is an eating pattern assessment and educational tool that was used to measure healthy eating behaviors. The instrument consisted of 24 items that cover 24 food categories, which are divided into three columns. Column A lists the most "heart-healthy" food choices (assigned 3 points), Column C lists the least "heart-healthy" choices (assigned 1 point), and Column B is a middle ground between Columns A and C (assigned 2 points). Scores for this measure were summed and can range from 23 to 69, with higher scores indicating a more heart-healthy diet. Participants were asked to think about the way they usually eat when answering each food choice item. When RYP has been used for cholesterol-screening and in education programs, such as CR, cholesterol levels and healthy diets improved (Gans et al., 1993; 2000), but Cronbach's alphas were not provided nor could they be located in the literature. The developers of the instrument state that it can indicate whether an individual's typical eating pattern is high or low in fat, saturated fat, and cholesterol based on its concurrent validity with the Willett food frequency questionnaire (Gans et al., 2000; Willett et al., 1987). Patients' total scores for this measure were obtained from their electronic medical records, so Cronbach's alpha could not be calculated.

Six-Minute Walk Test (Outcome)

The six-minute walk test measured how far of a distance (in feet) a patient can quickly walk on a flat, hard surface in six minutes. Participants were allowed to stop and rest during the six minutes. The test was a measure of functional capacity since it, "evaluates the global and integrated responses of all the systems involved during exercise, including the pulmonary and cardiovascular systems, systemic circulation, peripheral circulation, blood,

neuromuscular units, and muscle metabolism," (Crapo et al., 2002, p. 111). The test is also used to measure responses to medical interventions for cardiac disease, as well as being a predictor of morbidity and mortality. The six-minute walk test has been shown to have strong test-retest reliability in a sample of patients in CR ($\alpha = .97$; Hamilton & Haennel, 2000). For the purposes of this study, six-minute walk results were collected from participants' medical charts at orientation and at graduation from CR.

Data Analysis

The data were analyzed using SPSS 26.0 (IBM Corp., 2019) and the PROCESS macro (Hayes, 2020). Prior to testing the hypotheses, the data were screened for being missing at random and for normality assumptions. First, descriptive statistics were run to confirm that data were not missing at random. Histograms, scatterplots, and P-P plots were then created to determine whether the predictor and outcome variables were normally distributed and to identify outliers. The variables were also transformed to standardized scores and boxplots were created. Next, independent samples *t*-tests and bivariate correlations were computed to identify any potential covariates (e.g., age, gender, marital status, and insurance status) to be included in the moderated mediation models estimated.

Based on the aforementioned hypotheses, the data analysis plan for each was as follows:

1. A paired-samples *t*-test was conducted to determine whether average levels of BF at Time 2 were significantly higher than average levels of BF at baseline, or Time 1.

2. Using Hayes' Process Macro (2013; 2020) for moderated mediation Model 7, three hierarchical linear regression models were used to predict whether the relationship between BF at Time 1 (X) and three health outcomes at Time 2 (Y) were mediated by positive affect (M_i), and in turn moderated by disease severity (W). For this analysis, disease severity was dichotomized: participants low in risk for disease progression (n = 71) were compared to those intermediate or high in risk for disease progression (n = 91). Moderated mediation was determined to occur when p-values were less than .01, and when conditional indirect effects' Bootstrapped confidence intervals (CIs) did not contain 0 (Preacher et al., 2007). The analyses used 5000 Bootstrapped samples for the moderated mediation models. Thus, the following were estimated:
    a. The indirect effect of X on Y through M, or path a multiplied by path b, = path c
    b. The direct effect of X on Y, or X predicting Y controlling for M, = path c', which should not be significant
    c. The conditional indirect effect of W and X on Y through $M_i = (a_{1i} + a_{3i}W)b_i$
3. Additionally, path b, or M, controlling for X, predicting Y, should be statistically significant in the moderated mediation models in order to show mediation.

Power Analysis

Among cross-sectional studies, BF and depressive symptoms showed small effect sizes within a meta-analysis, but other studies have found large effect sizes within other samples (Pascoe & Edvardsson, 2012; Littlewood et al., 2008). Few BF studies have

examined physical health outcomes, but within those, small effect sizes have been found when cross-sectionally predicting physical activity levels and healthy diet (Littlewood et al., 2008; Milam, 2004). However, within one study there was no relationship between PTG and healthy diet at follow-up approximately one and one-half years later (Milam, 2004). On the other hand, as mentioned before, when mediator and moderator variables are considered, they may affect the strength of the relationship between BF and health outcome variables to provide larger effect sizes. For example, a large, indirect effect ($R^2 = .29$) was found using a moderation model that predicted mental health-related QoL from BF interacting with stage of disease (Tomich & Helgeson, 2004).

Cohen (1992) recommends a sample size of 63 to have 0.80 power to detect a large effect in a multiple regression analysis with *six* predictors at alpha .01. For the purposes of this study, correcting for family-wise error results in an alpha level of .017; we used .01 as the alpha level when figuring Cohen's sample size recommendations, since the article does not provide alpha levels higher than .01. The six predictor variables in each of the three regressions included BF at Time 1, Positive affect, and four possible covariates (including the Time 1 health outcome). Using G*Power (Faul et al., 2009) to calculate necessary sample sizes yielded similar estimates to Cohen (1992). G*Power (Faul et al., 2009) suggested a sample size of 60 was needed to have 0.80 power to detect a large effect size using *six* predictors. Therefore, across both means of calculating power, a large effect was detectable with the current sample size of 96 at Time 2.

CHAPTER 4 RESULTS

Normality Assumptions, Descriptive Statistics, and Covariates

Using SPSS (2020), descriptive statistics revealed that among baseline variables, BF, positive affect, healthy dietary behaviors, depressive symptoms, and six-minute walk test results had 19, six, two, one, and three missing values, respectively. Little's test (1988) for data missing completely at random (MCAR) showed that the null hypothesis could not be rejected ($p = .06$), which means that the data can be assumed to be missing at random. Boxplots, Mahalanobis distance, and standardized scores revealed that there were no extreme univariate or multivariate outliers. The histograms, P-P plots, skewness, and kurtosis results showed that the data were approximately normal.

Additionally, correlations among all study variables are shown in Table 2. Of note, baseline levels of BF were positively correlated with Time 1 positive affect and Time 2 healthy dietary behaviors, but negatively related to depressive symptoms at Time 1 ($p = .001$, $p = .03$, $p = .001$, respectively). The lack of association between BF and the remaining health outcomes was surprising, especially at Time 2 since research has suggested that there is a positive correlation between health outcomes and BF as more time has passed (Fox et al., 2014; Helgeson et al., 2006). This also means that the hypothesized moderated mediation models may not be *fully* mediated by positive affect. BF levels at Times 1 and 2 were positively correlated ($r = .67$, $p < .001$), which was expected as the first hypothesis proposes that BF would be higher at Time 2 compared to Time 1. Table 2 also provides alpha coefficients for scales where it was possible for them to be computed. All alpha levels are within the acceptable range.

Table 2

Correlations between all Study Variables

Variable	1	2	3	4	5	6	7	8	9
1. BF T1	--	.67*	.03	.24*	.69*	-.29*	-.18	-.11	-.04
2. BF T2	--	--	-.12	.29	.50*	-.12	-.19	-.17	-.17
3. RYP T1	--	--	--	.28*	.03	.01	-.01	.08	.08
4. RYP T2	--	--	--	--	-.01	-.11	.00	-.01	.18
5. PA T1	--	--	--	--	--	-.31*	-.28*	.04	-.06
6. Dep T1	--	--	--	--	--	--	.60*	-.16*	.02
7. Dep T2	--	--	--	--	--	--	--	-.15	-.02
8. 6-min T1	--	--	--	--	--	--	--	--	.76*
9. 6-min T2	--	--	--	--	--	--	--	--	--
n	143	90	160	94	156	161	96	159	94
M	40.53	42.21	43.35	52.06	10.52	5.63	5.93	1189.67	1441.78
SD	9.74	10.14	8.92	9.13	4.05	4.45	4.65	356.31	402.62
Coefficient alpha	.92	.94	--	--	.83	--	--	--	--

Note. BF = benefit finding; T1 = Time 1; T2 = Time 2; RYP = Rate Your Plate; PA = Positive Affect; Dep = Depressive symptoms via the PHQ-9; and 6-min = Six Minute Walk.
$^{*}p < .05$.

Independent samples *t*-tests and bivariate correlations were computed to identify any potential covariates (e.g., age, gender, marital status, and insurance status) to be included in the moderated mediation models estimated. Results showed a few statistically significant differences (see Table 3). Male participants, and those who identified as White, walked significantly further at Time 2 than their female and racial/ethnic minority counterparts. Participants with health insurance reported fewer depressive symptoms at Time 2 than

participants without health insurance. And, participants who were partnered reported fewer healthy dietary behaviors at Time 2 compared to their counterparts who were not partnered.

Table 3

Demographic Comparisons for Possible Covariates in Moderated Mediation Models

	Gender								
	Male			Female			95% CI for Mean Difference		
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	df
Healthy diet T2	51.40	10.37	57	53.08	6.81	37	-5.51, 2.16	-.87	92
Depressive symptoms T2	5.60	4.42	58	6.42	5.00	38	-2.75, 1.11	-.84	94
6-minute walk test T2**	1581.34	364.24	56	1236.11	370.57	38	192.12, 498.34	4.48	92
	Race and/or ethnicity								
	Racial and/or ethnic minority			White			95% CI for Mean Difference		
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	df
Healthy diet T2	53.10	9.80	49	50.86	8.38	44	-1.54, 6.02	1.18	91
Depressive symptoms T2	5.77	4.28	44	6.10	5.02	51	-1.59, 2.24	.34	93
6-minute walk test T2*	1337.00	359.00	43	1521.42	418.94	50	22.30, 346.54	2.26	91
	Health insurance status								

	Insured			Uninsured			95% CI for Mean Difference	*t*	df
	M	*SD*	*n*	*M*	*SD*	*n*			
Healthy diet T2	52.14	9.22	76	52.41	8.75	17	-4.61, 5.14	.11	91
Depressive symptoms T2*	5.49	4.61	78	8.12	4.41	17	.20, 5.07	2.15	93
6-minute walk test T2	1436.08	417.63	77	1470.56	346.78	16	-187.53, 256.50	.31	91

	Marital status						95% CI for Mean Difference	*t*	df
	Partnered			Not partnered					
	M	*SD*	*n*	*M*	*SD*	*n*			
Healthy diet T2*	50.25	9.24	57	54.61	8.30	36	.61, 8.12	2.31	91
Depressive symptoms T2	6.07	4.78	57	5.39	4.09	38	-2.55, 1.20	-.71	93
6-minute walk test T2	1413.11	345.20	55	1470.42	474.38	38	-111.45, 226.07	.68	91

$^{*}p < .05$. $^{**}p < .01$.

The correlations calculated also showed a few significant associations (see Table 4). Education was positively related to Time 2 healthy dietary behaviors, but negatively related to depressive symptoms at Time 2. And, income was positively related to Time 2 healthy dietary behaviors and 6-minute walk distance, but negatively related to depressive symptoms at Time 2.

Table 4

Correlations for Possible Covariates in Moderated Mediation Models (N = 96)

Variable	Healthy diet at T2	Depressive symptoms at T2	6-minute walk test at T2
Age	-.15	-.02	-.15
Education	.31**	-.21*	.19
Annual income	.37**	-.26*	.41**

*$p < .05$. **$p < .01$.

Therefore, these statistically significant covariates were controlled for in the moderated mediation models for these outcomes:

- **depressive symptoms**: insurance status, education, and income.
- **healthy dietary behaviors**: marital status, education, and income.
- **six-minute walk test**: gender, race/ethnic minority status, and income.

Independent samples *t*-tests were also performed to determine whether participants at Time 1 who completed the study ($n = 96$) were significantly different on baseline demographic covariates or study variables than those who dropped out of the study at Time 2 ($n = 66$; See Table 5 for more information.) The results of these *t*-tests showed that there were no statistically significant differences between participants at Time 2 and those participants with only data at Time 1. This is especially important as participants who dropped out of CR do not complete the follow-up questionnaires.

Table 5

Baseline Descriptive Data and Comparisons for Study Completers and Study Non-Completers

Participant Characteristic	Completers (n = 96)		Non-completers (n = 66)	
	M (*SD*)			
Age (years)	57.64 (7.87)		55.71 (10.31)	
BF	39.95 (9.83)		41.33 (9.64)	
Positive affect	10.28 (4.08)		10.86 (4.02)	
Depressive symptoms	5.46 (4.24)		5.89 (4.77)	
Healthy dietary behaviors	44.25 (8.96)		42.03 (8.76)	
6-minute walk test (ft)	1197.29 (384.90)		1178.65 (312.96)	
	n	%	*n*	%
Male	57	59.4	39	59.1
Race/Ethnicity				
White	52	54.7	29	43.9
Black/African American	41	43.2	33	50.0
Hispanic/Latino	1	1.1	2	3.0
Other or mixed race/ethnicity	1	1.1	1	1.5
Asian American	--	--	1	1.5
Racial and/or ethnic minority	43	44.8	37	56.1
Partnered	55	57.9	38	60.3
Unemployed	58	60.4	47	72.3
Education				
Some high school	24	25.0	14	21.2
High school/GED	29	30.2	25	37.9
Some college/Trade school	27	28.1	22	33.3
2-year college degree	4	4.2	--	--
4-year college degree	10	10.4	5	7.6
Graduate degree	2	2.1	--	--
No health insurance	18	18.9	11	16.9
Reason for CR referral				
MI and/or stent	60	63.1	48	73.8
Coronary artery bypass	12	12.6	9	13.8
Congestive heart failure	11	11.6	3	4.6
Valve replacement/repair	9	9.5	3	4.6
Angina	3	3.2	2	3.1
Risk stratification				

Low	38	39.6	33	50.0
Moderate or high	58	60.4	33	50.0

Hypothesized Models

Hypothesis 1

The paired-samples *t*-test, $t(78) = 2.723$, $p = .008$, for BF at Time 1 and Time 2 showed that BF levels significantly increased at Time 2 ($M = 42.58$, $SD = 10.26$) compared to levels of BF at baseline ($M = 40.10$, $SD = 9.72$) which supported the first hypothesis.

Hypothesis 2a Predicting Depressive Symptoms

For hypothesis 2a results, see Table 6.

Direct Effects. As Table 2 shows, there was a high degree of stability in depressive symptoms from Time 1 ($M = 5.63$, $SD = 4.45$) to Time 2 ($M = 5.93$, $SD = 4.65$). This is supported by the high association between depressive symptoms at both time points ($b = .54$, $p < .0001$). Other studies provide mixed evidence for the stability of depressive symptoms across the weeks of a CR program. For example, a prospective study of middle- and high-income CR programs in Brazil, Canada, Colombia, Venezuela, and the United States found that total PHQ-9 scores significantly decreased from pre-CR to post-CR, except for in Brazil, in which less psychosocial intervention was offered, and Canada, in which pre-CR depressive symptoms were low (Ghisi et al., 2017). Similarly, Gardiner et al. (2017) found a decrease in PHQ-9 scores from 4.50 pre-CR to 2.56 post-CR ($n = 79$) ($p < 0.001$). A cross-sectional study on BF and depressive symptoms using the PHQ-9 (Kroenke et al., 2001) found average levels of depressive symptoms of 7.28 ($SD = 4.61$), indicating moderate levels of symptoms

of depression (Bianchini et al., 2017). Therefore, PHQ-9 means in this sample of about 5.50 reflect moderate levels of depressive symptoms at both time points.

As shown in Table 6, BF at Time 1 was not predictive of depressive symptoms at Time 2 when controlling for baseline depressive symptoms, positive affect, and the covariates, so the direct effect was not significant. BF was positively related to positive affect after controlling for the covariates. Risk stratification at low and moderate/high levels of disease severity was not predictive of positive affect. In turn, positive affect was unrelated to depressive symptoms after controlling for BF and the covariates. All other direct paths were not significant, including covariates predicting depressive symptoms.

Indirect Effects. Positive affect at Time 1 did not significantly mediate the relationship between BF at Time 1 and depressive symptoms at Time 2 as the direct effects of BF predicting depressive symptoms and positive affect predicting depressive symptoms were non-significant. The interaction between risk stratification and BF predicting positive affect was also non-significant.

Conditional Indirect Effects. Bootstrapped CIs for the conditional indirect effects included zero when the moderated mediation model took into consideration all the predictor and control variables, so it was not statistically significant, 95% CI [-.02, .08]. Therefore, the relationship between BF at Time 1 and depressive symptoms at Time 2 was not mediated by positive affect nor moderated by disease severity.

Table 6

Model Coefficients for Hypothesis 2a (N = 81)

		Consequent						
		M (Positive affect T1)				*Y* (Depressive symptoms T2)		
Antecedent		Coeff	*SE*	*p*		Coeff	*SE*	*p*
X (BF T1)	a_1	0.42	0.11	.0004	c'_1	0.03	0.06	.66
M (Positive affect T1)		---	---	---	*b*	-0.21	0.14	.14
W (Risk stratification)	a_2	-0.63	0.76	.40	c'_2	---	---	---
X × *W*	a_3	-0.09	0.07	.22	c'_3	---	---	---
Education	i_1	0.19	0.32	.56	i_1	0.01	0.38	.98
Insurance status	i_2	1.39	0.87	.12	i_2	-1.14	1.09	.30
Annual income	i_3	-0.11	0.18	.54	i_3	-0.25	0.19	.19
Depressive symptoms T1	i_4	-0.08	0.09	.38	i_4	0.54	0.11	< .0001
		R^2 = .54				R^2 = .39		
		$F(7, 73) = 12.15$, $p < .0001$				$F(6, 74) = 7.82$ $p < .0001$		

Hypothesis 2b Predicting Dietary Behaviors

For results of hypothesis 2b, see Table 7.

Direct Effects. BF was cross-sectionally, positively related to positive affect, and in turn, baseline levels of positive affect were negatively related to dietary behaviors at Time 2 (after controlling for Time 1 BF, Time 1 healthy dietary behaviors, and the covariates). BF also had a direct effect on healthy dietary behaviors after controlling for positive affect and the control variables. Risk stratification was unrelated to positive affect after controlling for BF, baseline healthy dietary behaviors, education, marital status, and annual income.

Indirect Effects. Since BF and positive affect were correlated with, and both independently predictive of, dietary behaviors, Hayes' Process Macro (2013; 2020) for mediation Model 4 was ran. The results showed that positive affect at Time 1 significantly partially mediated the relationship between BF at Time 1 and healthy dietary behaviors at

Time 2 (controlling for all other predictor, moderator, and control variables), 95% CI [-.40, -.02]. After controlling for other predictor variables, the interaction between risk stratification and BF predicting positive affect was non-significant in the moderated mediation model.

Conditional Indirect Effects. For the full moderated mediation model, Bootstrapped CIs included zero, so it was not statistically significant, 95% CI [-.02, .30]. Therefore, the relationship between BF at Time 1 and healthy dietary behaviors at Time 2 was not both mediated by positive affect and moderated by disease severity when controlling for all covariates.

Table 7

Model Coefficients for Hypothesis 2b (N = 80)

		Consequent						
		M (Positive affect T1)				*Y* (Healthy dietary behaviors T2)		
Antecedent		Coeff	*SE*	*p*		Coeff	*SE*	*p*
X (BF T1)	a_1	0.50	0.12	.0001	c'_1	0.58	0.12	< .0001
M (Positive affect T1)		---	---	---	b	-0.74	0.29	.01
W (Risk stratification)	a_2	-0.13	0.75	.86	c'_2	---	---	---
X × *W*	a_3	-0.13	0.08	.09	c'_3	---	---	---
Education	i_1	0.20	0.31	.53	i_1	1.34	0.77	.08
Marital status	i_2	1.15	0.78	.14	i_2	-1.80	1.89	.34
Annual income	i_3	0.10	0.17	.56	i_3	0.95	0.39	.02
Healthy dietary behaviors T1	i_4	-0.04	0.04	.32	i_4	0.29	0.10	.01
		$R^2 = .54$				$R^2 = .43$		
		$F(7, 72) = 11.92, p < .0001$				$F(6, 73) = 9.35, p < .0001$		

Hypothesis 2c Predicting Six-minute Walk Scores

For the results of hypothesis 2c, see Table 8.

Direct Effects. As Table 2 shows, six-minute walk scores increased from Time 1 (M = 1189.67, SD = 356.31) to Time 2 (M = 1441.78, SD = 402.62). Additionally, there was a high association between six-minute walk scores at both time points (b = .66, $p < .0001$). Gardiner et al. (2017) found an increase in six-minute walk test results from pre-CR to post-CR ($p < 0.001$), however, mean levels of six-minute walk results were not reported.

In this model, BF was also cross-sectionally, positively related to positive affect when taking into account the covariates. However, the relationship between risk stratification and positive affect was non-significant, as was the relationship between positive affect and six-minute walk scores, after controlling for BF and all covariates. The direct effect of BF on six-minute walk scores was not significant when controlling for positive affect, baseline six-minute walk scores, and the control variables.

Three covariates were included in this model, but none was significantly predictive of six-minute walk scores due to the significance level set at alpha = .01 (rather than at .05). However, the direct relationship between race/ethnicity and six-minute walk scores approached statistical significance (p = .02), meaning that identifying as a racial and/or ethnic minority may be associated with lower six-minute walk scores. The direct relationship between annual income and six-minute walk scores also approached significance (p = .07), meaning that income may be positively related with six-minute walk scores.

Indirect Effects. In this model, as in the last two models, the interaction between risk stratification and BF predicting positive affect was not significant due to the significance level set at alpha = .01 (rather than at .05). The indirect effect of BF on six-minute walk

scores through positive affect was also not statistically significant, as BF and positive affect were not independently predictive of six-minute walk scores.

Conditional Indirect Effects. Lastly, the full moderated mediation model was not statistically significant as Bootstrapped CIs for the conditional indirect effect of risk stratification and BF on healthy dietary behaviors through positive affect included zero, 95% CI [-3.10, 3.08]. Therefore, the relationship between BF at Time 1 and healthy dietary behaviors at Time 2 was not mediated by positive affect nor moderated by disease severity for risk stratification when controlling for all other predictor and control variables (i.e., annual income, gender, and race and/or ethnicity).

Table 8

Model Coefficients for Hypothesis 2c (N = 80)

		Consequent						
		M (Positive affect T1)				*Y* (Six-minute walk test T2)		
Antecedent		Coeff	*SE*	*p*		Coeff	*SE*	*p*
X (BF T1)	a_1	0.56	0.11	< .0001	c'_1	2.49	3.97	.53
M (Positive affect T1)		---	---	---	*B*	-1.08	9.12	.91
W (Risk stratification)	a_2	0.17	0.73	.82	c'_2	---	---	---
X × *W*	a_3	-0.18	0.07	.02	c'_3	---	---	---
Gender	i_1	0.72	0.77	.36	i_1	-28.46	61.57	.65
Race and/or ethnicity	i_2	0.86	0.70	.22	i_2	-137.88	56.11	.02
Annual income	i_3	0.09	0.16	.58	i_3	21.19	11.47	.07
Six-minute walk test T1	i_4	0.001	0.001	.32	i_4	0.66	0.08	< .0001
		R^2 = .55				R^2 = .66		
		$F(7, 71) = 12.52$, $p < .0001$				$F(6, 72) = 23.14$, $p < .0001$		

Summary

Overall, results supported the first hypothesis, while the three moderated mediation models for hypotheses 2a, 2b, and 2c were not supported. That is, levels of BF significantly increased at Time 2 (M = 42.58, SD = 10.26) compared to levels of BF at baseline (M = 40.10, SD = 9.72), which supported the first hypothesis. For the remaining hypotheses, Bootstrapped CIs for the conditional indirect effects of risk stratification and BF on the outcome variables through positive affect included zero. Thus, the relationships between BF at Time 1 and health outcome variables at Time 2 were not mediated by positive affect nor moderated by disease severity for risk stratification when controlling for all covariates. Additionally, within the moderated mediation models, positive affect at Time 1 was not predictive of health outcomes at Time 2, or was negatively related to them when controlling for covariates, as shown by the negative association between positive affect and dietary behaviors at Time 2 (b = -.74, p = .01). Lastly, results showed that positive affect partially mediates the association between BF and healthy dietary behaviors as both positive affect and BF were independently predictive of healthy dietary behaviors.

CHAPTER 5 DISCUSSION

As the introduction explained, exposure to acute or chronic stress has been shown to be associated with poor physical and mental health (Colby et al., 2002; Salleh, 2008). However, BF may buffer the effects of stress on health outcomes by helping individuals adjust to stressful events via self-enhancement, creating meaning, and regaining mastery, according to the theory of cognitive adaptation (Helgeson et al., 2006; Taylor, 1983). The literature on BF among patients with CVD shows that past studies have been cross-sectional or qualitative in nature, do not include participants enrolled in a CR program, or do not include a range of potential mental and objective physical health outcomes. The literature linking the relationship between BF and mental and physical health outcomes among other illnesses is mixed (de Vries et al., 2019; Littlewood et al., 2008; Tran et al., 2011). These mixed results may be due to not including mediator and/or moderator variables, such as the severity of illness and positive affect.

Hypotheses

This study examined temporal differences over time in levels of BF (hypothesis #1). This study also examined whether positive affect mediated the relationship between levels of BF at Time 1 (i.e., at CR orientation) and health outcomes at Time 2 (i.e., at completion of CR), and whether the strength or direction of this mediating relationship differed based on low versus moderate/high levels of risk stratification for disease severity (i.e., moderated mediation; hypothesis #2). The three health outcome variables consisted of depressive symptoms (hypothesis #2a), dietary behaviors (hypothesis #2b), and six-minute walk test scores (hypothesis #2c) as a measure of functional capacity. However, results did not support

hypotheses 2a, 2b, and 2c. But, the first hypothesis was supported as mean levels of BF significantly increased from orientation (before starting CR) to completion of the CR program.

Across all three moderated mediation models, risk stratification at low and moderate/high levels of disease severity was not predictive of positive affect, and the interaction between risk stratification and BF predicting positive affect was not significant either, both of which are necessary for moderated mediation to occur. Because risk stratification was not associated with positive affect, and because it did not interact with BF to predict positive affect, the data suggest no moderation.

As for direct effects, results showed varying associations between predictor and outcome variables. For example, BF at Time 1 was unrelated to both depressive symptoms and six-minute walk test results at Time 2. BF and positive affect were positively related across all three moderated mediation models; but among health outcomes, positive affect was only negatively associated with dietary behaviors, and BF was only positively associated with dietary behaviors. BF was still predictive of healthy dietary behaviors after controlling for covariates and positive affect, which shows that engaging in BF at the start of CR may result in increased healthy dietary behaviors at completion of the program. Additionally, the data show that positive affect at Time 1 partially mediates the relationship between BF at Time 1 and healthy dietary behaviors at Time 2 (controlling for all other predictor, moderator, and control variables). The relationship between BF and healthy dietary behaviors was negative when taking into account positive affect. Specifically, increased levels of BF may decrease healthy dietary behaviors when an individual feels a high degree of positive

affect. In all, the most consistent relationship that emerged in this study was between baseline BF and baseline positive affect. Although additional research should explore the nature of this association more, it does suggest conceptual overlap between the two constructs. It is also possible that finding benefits naturally co-occurs with feeling positive emotions. Regardless, these preliminary results suggest that CR practitioners should encourage BF in their patients when possible.

The predicted moderated mediation results may not have occurred due to a number of reasons. First, there was a high degree of stability in mean depressive symptoms from Time 1 to Time 2, which has not been seen in previous CR studies. For example, a prospective study of middle- and high-income CR programs in Brazil, Canada, Colombia, Venezuela, and the United States found that total PHQ-9 scores significantly decreased from pre-CR to post-CR, except for in Brazil, in which less psychosocial intervention was offered, and Canada, in which pre-CR depressive symptoms were low to begin with (Ghisi et al., 2017). Similarly, Gardiner et al. (2017) found a decrease in PHQ-9 scores from pre- to post-CR. In the current study, a post-hoc paired-samples *t*-test showed that PHQ-9 scores did not significantly change from Time 1 ($M = 5.27$, $SD = 4.20$) to Time 2 ($M = 5.93$, $SD = 4.65$), $t(95) = 1.61$, $p = .11$. It is surprising that the data did not show a change between mean depressive symptoms at the start and completion of CR, as previous studies have shown decreases in depressive symptoms among participants enrolled in CR. Furthermore, although the mean comparison did not reach statistical significance, it is surprising that the trend was for an increase in the number of symptoms experienced rather than a decrease.

Since BF and positive affect were unrelated to six-minute walk test scores, as with depressive symptoms, a post-hoc paired samples *t*-test was also analyzed to determine whether mean levels changed. Results showed that mean six-minute walk test scores significantly increased from Time 1 ($M = 1200.72$, $SD = 398.90$) to Time 2 ($M = 1451.90$, $SD = 392.59$), $t(92) = -8.88$, $p < .0001$. This means that participants' mean levels of functional capacity increased since they were able to walk further in six minutes at completion of CR. Similarly, Gardiner et al. (2017) found an increase in six-minute walk test results from pre-CR to post-CR ($p < 0.001$). In the short term, CR is supposed to increase functional capacity (Braverman, 2011). However, it was surprising that BF was unrelated to six-minute walk test results as studies have found BF/PTG to be cross-sectionally positively associated with subjective physical health (Fox et al., 2014; Helgeson et al., 2006). One study suggested that BF may be associated with reduced cortisol levels (Pascoe & Edvardsson, 2013). However, Fox et al. (2014) found that BF was unrelated to objective indicators of health among participants who had undergone a lung transplant. Further research should examine differences between these measures of health to determine associations between BF and self-reported versus observed physical health outcomes.

A second explanation for the current findings may be that there is limited variability in these types of social-cognitive variables between individuals enrolled in a CR program, since participants who have recently received a diagnosis of CVD may be highly motivated to change their behaviors regardless of their risk for disease progression. CR is necessary for individuals who have experienced acute or severe cardiac complications, but it reduces the risk of cardiac recurrences in all types of patients (Barzi et al., 2003; Braverman, 2011). CR

is underutilized by a significant number of patients diagnosed with CVD, including women and racial and ethnic minorities, due to barriers in referrals and participation (Castellanos et al., 2019). This, combined with high levels of motivation, may explain the lack of moderation of risk stratification for disease severity on BF and positive affect.

A post-hoc independent samples *t*-test showed that there were no baseline differences in levels of BF between participants at low ($M = 41.81$, $SD = 10.22$) or intermediate/high risk for disease exacerbation ($M = 39.49$, $SD = 9.27$), $t(141) = 1.42$, $p = .16$. An additional post-hoc independent samples *t*-test revealed no differences in mean levels of BF at Time 2 between participants at low ($M = 44.25$, $SD = 11.72$) or intermediate/high ($M = 40.85$, $SD = 8.79$) risk for disease progression, $t(88) = 1.57$, $p = .12$. In fact, of the 36 total CR sessions, participants attended an average of 25.13 ($SD = 13.51$) sessions. Therefore, the participants who completed their CR and the Time 2 questionnaires may have been highly motivated to engage in behavior change regardless of their risk for disease progression at the start of CR.

Third, because participants were recruited from a SNH, there was a large percentage of racial and/or ethnic minorities, low income, and uninsured patients included in the study sample. The sociodemographic profile of participants in this study differs from many others in the literature, and provides an important context to the findings. Employment may have been disrupted for many following a CVD diagnosis (i.e., 65.2% of participants were not employed). The mean age of the sample was lower than typical CR studies ($M = 56.85$, $SD = 8.96$), as Hurdus et al. (2020) found a mean age of 63.60 years ($SD = 11.90$). The median annual income ranged from $10,000 to $19,999 for the full sample, 18.1% of participants did not have any form of insurance, and more than half (54.4%) had Medicare and/or Medicaid.

Mean levels of depressive symptoms did not significantly change from baseline to follow-up, nor were they associated with BF. Notably, participants with health insurance reported fewer depressive symptoms at Time 2 than participants without health insurance. Additionally, education and income were negatively related to depressive symptoms at Time 2, such that individuals who had fewer years of schooling or lower levels of annual income reported higher levels of depressive symptoms. These compounding effects of stress can damage one's physical and mental health, as research has shown that individuals living in more stressful areas tend to have the highest rates of engaging in behaviors that are harmful to health, such as cigarette smoking (Colby et al., 1994; Schneiderman et al., 2005).

Implications

Despite the lack of support for the hypothesized moderated mediation models, the results of this study suggest that individuals who have recently been diagnosed with CVD may still benefit from engaging in BF. Participants recruited from a SNH who engaged in BF had higher levels of healthy dietary behaviors, regardless of years of education, marital status, and annual income. Results also showed a positive association between BF and positive affect, suggesting that these constructs may conceptually-overlap or co-occur within this population of patients. Positive affect was found to partially mediate the relationship between BF and dietary behaviors, so more research is needed to examine how BF and positive affect may interact to affect health outcomes. Health providers and clinicians should encourage patients with CVD who participate in a CR program to engage in BF as healthy dietary behaviors may improve, and since results suggest BF is related to positive affect. Additionally, this is the first study that the author is aware of that has examined the effects of

BF on health outcome variables via positive affect based on low or intermediate/high levels of risk stratification for disease progression. The results suggest that further research is needed to examine the mechanisms through which BF may interact with disease severity and positive affect to influence health outcomes among patients with CVD enrolled in CR.

Limitations

There are several limitations worth noting to the current study. First, participants were recruited from a single SNH in the Midwestern United States. Therefore, results may not generalize to all patients who participate in a CR program. Results of the study may be limited to SNHs in the Midwestern United States. Second, the current study used a secondary data set, so the author was not involved in the process of selecting the measurement scales, such as the Benefit-Finding Scale by Tomich and Helgeson (2006). Other measures of BF may be more appropriate for use within a CR setting. Although an objective measure of disease severity was used, participants' self-perceptions of disease severity were not measured. Subjective measures of disease severity may not align with objective measures of disease severity given by CR staff. Disease severity may be more appropriately measured using both a subjective and objective measure. Third, participants may have been subjected to memory biases or distortions when filling out the BF scale, resulting in participants thinking they had changed positively over time, as Tennen and Affleck (2009) described. There are also participant biases, such as the social desirability effect, that could have influenced participants' responses while completing the surveys, especially with the BF scale. As stated in Boals and Schuler's (2018) study, evidence was found of illusory growth using two different measures of PTG, so the BF scale used in this current project could be

subject to illusory growth. In other words, participants may have been biased to report positive changes following enrollment in, or completion of, their CR program.

A fourth potential limitation to the study was that there were only two periods of data collection. The results may have occurred due to the limited amount of time between the data collection periods. This means that participants' changes over time were limited to only two periods of time, or a course of three to four months. This short time period may not be adequate to capture changes in health outcome variables, or effects of BF on health outcomes. Since patient health outcomes and BF may need time to change, longer spans between data collection points may be needed to detect meaningful changes in such a cognitively- and emotionally-complex construct. Additionally, the use of additional data collection periods could have allowed the examination of non-linear relationships, such as quadratic trends that may appear between BF and health outcomes.

Fifth, there was a decrease in sample size at Time 2 (n = 96) due to participant attrition, which led to decreased statistical power. There were no data collected from participants who failed to complete the CR program, so there could be unmeasured confounding differences at follow-up between participants who completed the Time 2 surveys versus those who did not complete CR and/or the Time 2 surveys.

Future Directions in Researching BF and Health Outcomes

Based on the literature reviewed in chapter 2, and the results presented in chapter 4, several future directions for research examining associations between BF and health outcomes were identified.

Measure Positive and Negative Life Changes

The BF scale used in this study may have biased participants to report positive life changes when none had occurred due to the measure's positive rating scale. For example, Boals and Schuler (2018) found that 12% of participants ($N = 613$) reported moderate to high levels of illusory PTG as a result of experiencing a cracked cell phone screen, which is not a potentially traumatic event. The SRGS-R (Boals & Schuler, 2019; Park et al., 1996) uses neutral language and participants are able to report both negative and positive changes using a rating scale from -3 (*a very negative change*) to 0 (*no change*) to +3 (*a very positive change*). An example of an item from the revised scale is, "I experienced a change in the extent to which I work through problems and not just give up" (Boals & Schuler, 2017). The neutral wording and revised rating scale can potentially help with validity issues associated with BF instruments that only measure positive changes and may influence the social desirability bias in participants. For example, this may prevent participants from overreporting that they have found positive life changes that may not have actually occurred.

Measure Baseline BF

As Tennen and Affleck described, participants may not accurately report their BF levels before the potentially traumatic event occurred due to memory biases, so they cannot accurately report the degree of change between past and present BF levels (Park et al., 2009). In a study of 201 patients awaiting a diagnosis of breast cancer before undergoing a breast biopsy, Rankin et al. (2019) found that 76 percent of participants reported engaging in preemptive BF before receiving their breast biopsy result. As this study shows, participants can engage in BF before actually being diagnosed with a disease, and could serve as a valid

baseline measure of BF in order to measure changes following participation in an intervention, such as CR.

Break BF Up by Group Trajectories

Cross-sectionally, BF may be a cognitive strategy used to reduce distress, and is related to poor health outcomes, but over time, BF may be a measure of change or actual growth, and may be related to better health outcomes (Helgeson et al., 2016). The associations between BF and mental and physical health outcomes should be examined over more than two periods of time. This may be done via hierarchical linear modeling (HLM) because there may be curvilinear associations that can be analyzed by examining trends in BF using three periods of data collection. Using that statistical analysis, Zhu et al. (2018) found group trajectories in their nine-month sample of breast cancer patients undergoing psychological care; they found that the group with the largest increase in BF reported the largest decrease in depressive symptoms. In a similar study using HLM, researchers found that in a sample of adolescents with diabetes, those with higher levels of BF and negative affect had lower levels of depressive symptoms and blood sugar levels (Tran et al., 2011). Other research has found that as more time has passed, more positive outcomes are seen as a result of BF (Helgeson et al., 2006). Therefore, future research with at least three periods of data collection may benefit from grouping individuals into low to high levels of BF to examine trajectories over time. Further research should measure BF and outcome variables a few months after participants complete CR in order to determine how the variables change following participation in CR.

Conclusion

Associations between BF and mental and physical health outcomes in the literature are mixed, varying from positive, negative, and null associations (Carver & Antoni, 2004; January et al., 2015; Llewellyn et al., 2013). In the current study using patients with CVD enrolled in CR within a SNH, the relationships between baseline BF levels and health outcomes at the end of CR (i.e., depressive symptoms, dietary behaviors, and six-minute walk test results) were not mediated by positive affect nor moderated by risk stratification for disease progression (i.e., disease severity). Results showed that none of the three moderated mediation models were significant. However, the first hypothesis was supported as levels of BF significantly increased at Time 2 compared to levels of BF at baseline. Results also showed that participants who engaged in BF had higher levels of healthy dietary behaviors at the end of CR, regardless of years of education, marital status, and annual income. Health providers and clinicians should encourage patients with CVD who participate in a CR program to engage in BF as healthy dietary behaviors may improve. Results also showed positive associations between BF and positive affect, suggesting another potential advantage to finding benefits to one's cardiac event. Further research should examine BF at more than two periods of time in order to examine trajectories, including measuring positive and negative effects of the stressful event. Research should also analyze whether positive affect partially mediates the relationship between BF and healthy dietary behaviors as the data suggest may occur.

REFERENCES

Affleck, G., Tennen, H., Croog, S., & Levine, S. (1987). Causal attribution, perceived benefits, and morbidity after a heart attack: An 8-year study. *Journal of Consulting and Clinical Psychology*, *55*(1), 29–35. https://doi.org/10.1037/0022-006x.55.1.29

American Heart Association. (2016). *What is cardiac rehabilitation?* https://www.heart.org/en/health-topics/cardiac-rehab/what-is-cardiac-rehabilitation

Antoni, M. H., Lehman, J. M., Kilbourn, K. M., Boyers, A. E., Culver, J. L., Alferi, S. M., Yount, S. E., McGregor, B. A., Arena, P. L., Harris, S. D., Price, A. A., & Carver, C. S. (2001). Cognitive-behavioral stress management intervention decreases the prevalence of depression and enhances benefit finding among women under treatment for early-stage breast cancer. *Health Psychology*, *20*(1), 20–32. https://doi.org/10.1037/0278-6133.20.1.20

Barzi, F., Woodward, M., Marfisi, R. M., Tavazzi, L., Valagussa, F., & Marchioli, R. (2003). Mediterranean diet and all-causes mortality after myocardial infarction: Results from the GISSI-Prevenzione trial. *European Journal of Clinical Nutrition*, *57*(4), 604–611. https://doi.org/10.1038/sj.ejcn.1601575

Benjamin, E. J., Muntner, P., Alonso, A., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Chang, A. R., Cheng, S., Das, S. R., Delling, F. N., Djousse, L., Elkind, M. S. V., Ferguson, J. F., Fornage, M., Jordan, L. C., Khan, S. S., Kissela, B. M., Knutson, K. L., … Virani, S. S. (2019). Heart disease and stroke statistics-2019 update: A report from the American Heart Association. *Circulation*, *139*(10), e56–e66. https://doi.org/10.1161/CIR.0000000000000659

Bianchini, V., Giusti, L., Salza, A., Cofini, V., Cifone, M. G., Casacchia, M., Fabiani, L., & Roncone, R. (2017). Moderate depression promotes posttraumatic growth (Ptg): A young population survey 2 years after the 2009 L'Aquila earthquake. *Clinical Practice & Epidemiology in Mental Health*, *13*(1), 10-19. https://doi.org/10.2174/1745017901713010010

Boals, A., & Schuler, K. L. (2018). Reducing reports of illusory posttraumatic growth: A revised version of the stress-related growth scale (SRGS-R). *Psychological Trauma: Theory, Research, Practice, and Policy*, *10*(2), 190-198. https://doi.org/10.1037/tra0000267

Boals, A., & Schuler, K. (2018). Shattered cell phones, but not shattered lives: A comparison of reports of illusory posttraumatic growth on the posttraumatic growth inventory and the stress-related growth scale-revised. *Psychological Trauma: Theory, Research, Practice, and Policy*, *11*(2), 239–246. https://doi.org/10.1037/tra0000390

Bower, J. E., Epel, E., & Moskowitz J.T. (2009). Biological Correlates. In C. L. Park, S. C. Lechner, M. H. Antoni, & A. L. Stanton (Eds.), *Medical illness and positive life change: Can crisis lead to personal transformation?* (pp. 155-172). American Psychological Association. https://doi.org/10.1037/a0014882

Braverman, D. L. (2011). Cardiac rehabilitation: A contemporary review. *American Journal of Physical Medicine & Rehabilitation*, *90*(7), 599–611. https://doi.org/10.1097/PHM.0b013e31821f71a6

Cann, A., Calhoun, L. G., Tedeschi, R. G., Taku, K., Vishnevsky, T., Triplett, K. N., & Danhauer, S. C. (2010). A short form of the Posttraumatic Growth Inventory. *Anxiety, stress, and coping*, *23*(2), 127–137. https://doi.org/10.1080/10615800903094273

Carver, C. S. (1997). Brief COPE inventory. *PsycTESTS Dataset*. https://doi.org/10.1037/t04102-000

Carver, C. S., & Antoni, M. H. (2004). Finding benefit in breast cancer during the year after diagnosis predicts better adjustment 5 to 8 years after diagnosis. *Health Psychology*, *23*(6), 595–598. https://doi.org/10.1037/0278-6133.23.6.595

Castellanos, L. R., Viramontes, O., Bains, N. K., & Zepeda, I. A. (2018). Disparities in cardiac rehabilitation among individuals from racial and ethnic groups and rural communities—A systematic review. *Journal of Racial and Ethnic Health Disparities*, *6*(1), 1-11. https://doi.org/10.1007/s40615-018-0478-x

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155-159. https://doi.org/10.1037/0033-2909.112.1.155

Colby, J. P., Linsky, A. S., & Straus, M. A. (2002). Social stress and state-to-state differences in smoking and smoking related mortality in the United States. *Social Science & Medicine*, *38*(2), 373–381. https://www-sciencedirect-com.proxy.library.umkc.edu/science/article/abs/pii/0277953694904073?via%3Dihub

Crapo, R. O., Casaburi, R., Coates, A. L., Enright, P. L., MacIntyre, N. R., McKay, R. T., Johnson, D., Wanger, J. S., Zeballos, R. J., Bittner, V., & Mottram, C. (2002). ATS statement: Guidelines for the six-minute walk test. *American Journal of Respiratory*

and Critical Care Medicine, *166*(1), 111-117. https://doi:10.1164/ajrccm.166.1.at1102

de Vries, A. M., Helgeson, V. S., Schulz, T., Almansa, J., Westerhuis, R., Niesing, J., Navis, G. J., Schroevers, M. J., & Ranchor, A. V. (2019). Benefit finding in renal transplantation and its association with psychological and clinical correlates: A prospective study. *British Journal of Health Psychology*, *24*(1), 175–191. https://doi.org/10.1111/bjhp.12346

Evers, A. W. M., Kraaimaat, F. W., Van Lankveld, W., Jongen, P. J. H., Jacobs, J. W. G., & Bijlsma, J. W. J. (2001). Beyond unfavorable thinking: The illness cognition questionnaire for chronic diseases. *Journal of Consulting and Clinical Psychology*, *69*(6), 1026–1036. https://doi.org/10.1037/0022-006X.69.6.1026

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149-1160.

Fox, K. R., Posluszny, D. M., Dimartini, A. F., DeVito Dabbs, A. J., Rosenberger, E. M., Zomak, R. A., Bermudez, C., & Dew, M. A. (2014). Predictors of post-traumatic psychological growth in the late years after lung transplantation. *Clinical Transplantation*, *28*(4), 384–393. https://doi.org/10.1111/ctr.12301

Gans, K. M., Hixson, M. L., Eaton, C. B., & Lasater, T. M. (2000). Rate your plate: A dietary assessment and educational tool for blood cholesterol control. *Nutrition in Clinical Care*, *3*(3), 163-169. https://doi.org/10.1046/j.1523-5408.2000.00045.x

Gans, K. M., Sundaram, S. G., McPhillips, J. B., Hixson, M. L., Linnan, L., & Carleton, R. A. (1993). Rate Your Plate: An eating pattern assessment and educational tool used at cholesterol screening and education programs. *Journal of Nutrition Education*, *25*(1), 29-36. https://doi.org/10.1016/S0022-3182(12)80186-5

Gardiner, F. W., Regan, E., Nwose, E. U., Bwititi, P. T., Crockett, J., & Wang, L. (2017). Outpatient cardiac rehabilitation: Effects on patient improvement outcomes. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *11*, S1025-S1030. https://doi.org/10.1016/j.dsx.2017.07.034

Ghisi, G. L., Santos, C. V., Benaim, B., Lopez-Jimenez, F., Herdy, A. H., Inojosa, J. M., Terzic, C. M., Janovik, L., Rojas, M. F., & Grace, S. L. (2017). Severity of depressive symptoms pre- and Postcardiac rehabilitation. *Journal of Cardiopulmonary Rehabilitation and Prevention*, *37*(3), 182-190. https://doi.org/10.1097/hcr.0000000000000189

Hamilton, D. M., & Haennel, R. G. (2000). Validity and reliability of the 6-Minute walk test in a cardiac rehabilitation population. *Journal of Cardiopulmonary Rehabilitation*, *20*(3), 156-164. https://doi.org/10.1097/00008483-200005000-00003

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.

Hayes, A. F. (2020) PROCESS Procedure for SPSS, Version 3.5.

Helgeson, V. S., Reynolds, K. A., & Tomich, P. L. (2006). A meta-analytic review of benefit finding and growth. *Journal of Consulting and Clinical Psychology*, *74*(5), 797–816. https://doi.org/10.1037/0022-006X.74.5.797

Hoen, P. W., Denollet, J., De Jonge, P., & Whooley, M. A. (2013). Positive affect and survival in patients with stable coronary heart disease. *The Journal of Clinical Psychiatry*, *74*(07), 716-722. https://doi.org/10.4088/jcp.12m08022

Hurdus, B., Munyombwe, T., Dondo, T. B., Aktaa, S., Oliver, G., Hall, M., Doherty, P., Hall, A. S., & Gale, C. P. (2020). Association of cardiac rehabilitation and health-related quality of life following acute myocardial infarction. *Heart*, *106*(22), 1726-1731. https://doi.org/10.1136/heartjnl-2020-316920

Janoff-Bulman, R. (2004). Posttraumatic growth: Three explanatory models. *Psychological Inquiry*, *15*(1), 30–34.

January, A. M., Zebracki, K., Chlan, K. M., & Vogel, L. C. (2015). Understanding post-traumatic growth following pediatric-onset spinal cord injury: The critical role of coping strategies for facilitating positive psychological outcomes. *Developmental Medicine and Child Neurology*, *57*(12), 1143–1149. https://doi.org/10.1111/dmcn.12820

Javed, A., & Dawood, S. (2016). Psychosocial predictors of post-traumatic growth in patients after myocardial infarction. *Pakistan Journal of Psychological Research*, *31*(2), 365–381.

Kirshblum, S. C., Waring, W., Biering-Sorensen, F., Burns, S. P., Johansen, M., Schmidt-Read, M., Donovan, W., Graves, D., Jha, A., Jones, L., Mulcahey, M. J., & Krassioukov, A. (2011). Reference for the 2011 revision of the International Standards for Neurological Classification of Spinal Cord Injury. *Journal of Spinal*

Cord Medicine, *34*(6), 547–554. https://doi.org/10.1179/107902611X13186000420242

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606-613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer Publishing Company.

Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, *83*(404), 1198-1202. https://doi.org/10.1080/01621459.1988.10478722

Littlewood, R. A., Vanable, P. A., Carey, M. P., & Blair, D. C. (2008). The association of benefit finding to psychosocial and health behavior adaptation among HIV+ men and women. *Journal of Behavioral Medicine*, *31*(2), 145–155. https://doi.org/10.1007/s10865-007-9142-3

Llewellyn, C. D., Horney, D. J., McGurk, M., Weinman, J., Herold, J., Altman, K., & Smith, H. E. (2013). Assessing the psychological predictors of benefit finding in patients with head and neck cancer. *Psycho-Oncology*, *22*(1), 97–105. https://doi.org/10.1002/pon.2065

Low, C. A., Stanton, A. L., & Danoff-Burg, S. (2006). Expressive disclosure and benefit finding among breast cancer patients: Mechanisms for positive health effects. *Health Psychology*, *25*(2), 181–189. https://doi.org/10.1037/0278-6133.25.2.181

McMillen, J. C., & Fisher, R. H. (1998). The Perceived Benefit Scale: Measuring perceived positive life changes after negative events. *Social Work Research*, *22*(3), 173–187. https://doi.org/10.1093/swr/22.3.173

Milam, J. E. (2004). Posttraumatic growth among HIV/AIDS patients. *Journal of Applied Social Psychology*, *34*(11), 2353-2376. https://doi.org/10.1111/j.1559-1816.2004.tb01981.x

Mohr, D. C., Dick, L. P., Russo, D., Pinn, J., Boudewyn, A. C., Likosky, W., & Goodkin, D. E. (1999). The psychosocial impact of multiple sclerosis: Exploring the patient's perspective. *Health Psychology*, *18*(4), 376–382. https://doi.org/10.1037/0278-6133.18.4.376

National Heart, Lung, and Blood Institute. (n.d.). *Heart and Vascular Diseases*. Retrieved October 9, 2019, from https://www.nhlbi.nih.gov/science/heart-and-vascular-diseases

National Institute of Diabetes and Digestive and Kidney Diseases. (2018). *The A1C Test & Diabetes*. U.S. Department of Health and Human Services. https://www.niddk.nih.gov/health-information/diabetes/overview/tests-diagnosis/a1c-test

Park, C. L., Cohen, L. H., & Murch, R. L. (1996). Assessment and prediction of stress-related growth. *Journal of Personality*, *64*(1), 71–105. https://doi.org/10.1111/j.1467-6494.1996.tb00815.x

Park, C. L., & Helgeson, V. S. (2006). Introduction to the special section: Growth following highly stressful life events - Current status and future directions. *Journal of*

Consulting and Clinical Psychology, *74*(5), 791–796. https://doi.org/10.1037/0022-006X.74.5.791

Park, C. L., Lechner, S. C., Antoni, M. H., & Stanton, A. L. (2009). *Medical illness and positive life change: Can crisis lead to personal transformation?* American Psychological Association. https://doi.org/10.1037/a0014882

Pascoe, L., & Edvardsson, D. (2013). Benefit finding in cancer: A review of influencing factors and health outcomes. *European Journal of Oncology Nursing*, *17*(6), 760–766. https://doi.org/10.1016/j.ejon.2013.03.005

Popescu, I., Fingar, K. R., Cutler, E., Guo, J., & Jiang, H. J. (2019). Comparison of 3 safety-net hospital definitions and association with hospital characteristics. *JAMA Network Open*, *2*(8), 1–13. https://doi.org/10.1001/jamanetworkopen.2019.8577

Preacher, J., Rucker, D., & Hayes, F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, *42*(1), 185–227.

Rankin, K., Le, D., & Sweeny, K. (2019). Preemptively finding benefit in a breast cancer diagnosis. *Psychology & Health*, *35*(5), 613-628. https://doi.org/10.1080/08870446.2019.1664740

Reker, G. T., & Woo, L. C. (2011). Personal meaning orientations and psychosocial adaptation in older adults. *SAGE Open*, *1*(1), 1–10. https://doi.org/10.1177/2158244011405217

Salleh, M. R. (2008). Life event, stress and illness. *Malaysian Journal of Medical Sciences*, *15*(4), 9–18.

Sanjuán, P., García-Zamora, C., Magallares, A., Arranz, H., & Arranz, Y. A. (2017). Escala de Encuentro de Beneficio para pacientes cardiacos. *Revista de Psicopatologia y Psicologia Clinica [Benefit Finding Scale for cardiac patients]*, *22*(1), 9–19. https://doi.org/10.5944/rppc.vol.22.num.1.2017.16998

Schneiderman, N., Ironson, G., & Siegel, S. D. (2005). Stress and health: Psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology*, *1*(1), 607–628. https://doi.org/10.1146/annurev.clinpsy.1.102803.144141

Singh, S., & Zeltser, R. (2020). *Cardiac risk stratification*. PubMed; StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK507785/

Smith, F., Banwell, E., & Rakhit, R. (2017). "I was in control of it from the start": A qualitative study of men's experiences of positive adjustment following a heart attack. *Journal of Health Psychology*, *22*(10), 1345–1354. https://doi.org/10.1177/1359105315627000

SPSS Inc. (2019). IBM SPSS Statistics for Windows, Version 26.0. IBM Corp.

Stafford, L., Berk, M., & Jackson, H. J. (2007). Validity of the Hospital Anxiety and Depression Scale and Patient Health Questionnaire-9 to screen for depression in patients with coronary artery disease. *General Hospital Psychiatry*, *29*(5), 417-424. https://doi.org/10.1016/j.genhosppsych.2007.06.005

Supplemental material for reducing reports of illusory posttraumatic growth: A revised version of the stress-related growth scale (SRGS-R) by A. Boals & K. L. Schuler 2017). *Psychological Trauma: Theory, Research, Practice, and Policy*. https://doi.org/10.1037/tra0000267.supp

Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. *American Psychologist*, *38*(11), 1161–1173. https://doi.org/10.1037/0003-066X.38.11.1161

Taylor, S. E., Lichtman, R. R., & Wood, J. V. (1984). Attributions, beliefs about control, and adjustment to breast cancer. *Journal of Personality and Social Psychology*, *46*(3), 489–502. https://doi.org/10.1037/0022-3514.46.3.489

Tedeschi, R. G., & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, *9*(3), 455–471. https://doi.org/10.1002/jts.2490090305

Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry*, *15*(1), 1–18.

Tennen, H., & Affleck, G. (2009). Assessing positive life change: In search of meticulous methods. In *Medical illness and positive life change: Can crisis lead to personal transformation?* (pp. 31–49). American Psychological Association. https://doi.org/10.1037/11854-002

Tomich, P. L., & Helgeson, V. S. (2004). Is finding something good in the bad always good? Benefit finding among women with breast cancer. *Health Psychology*, *23*(1), 16–23. https://doi.org/10.1037/0278-6133.23.1.16

Tomich, P. L., & Helgeson, V. S. (2006). Cognitive adaptation theory and breast cancer recurrence: Are there limits? *Journal of Consulting and Clinical Psychology*, *74*(5), 980-987. https://doi.org/10.1037/0022-006x.74.5.980

Tran, V., Wiebe, D. J., Fortenberry, K. T., Butler, J. M., & Berg, C. A. (2011). Benefit finding, affective reactions to diabetes stress, and diabetes management among early adolescents. *Health Psychology*, *30*(2), 212–219. https://doi.org/10.1037/a0022378

Truman Medical Centers. (2013). *2013 Truman Medical Centers Community Health Needs Assessment*. https://trumed.org/files/publications/TMC_HospitalHilll_Report_REVISED.pdf

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063-1070. https://doi.org/10.1037/0022-3514.54.6.1063

World Health Organization. (2017). *Cardiovascular diseases (CVDs)*. https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)

Willett, W. C., Reynolds, R. D., Cottrell-Hoehner, S., Sampson, L., & Browne, M. L. (1987). Validation of a semi-quantitative food frequency questionnaire: Comparison with a 1-year diet record. *Journal of the American Dietetic Association*, *87*(1), 43–47.

Zhu, L., Ranchor, A. V., Helgeson, V. S., van der Lee, M., Garssen, B., Stewart, R. E., Sanderman, R., & Schroevers, M. J. (2018). Benefit finding trajectories in cancer patients receiving psychological care: Predictors and relations to depressive and anxiety symptoms. *British Journal of Health Psychology*, *23*(2), 238–252. https://doi.org/10.1111/bjhp.12283

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