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**A RANDOMIZED CONTROLLED STUDY EXAMINING THE
EFFECTIVENESS OF A GRATITUDE INTERVENTION AND
AN OPTIMISM INTERVENTION ON WELL-BEING:
MODERATING EFFECTS OF PERSONALITY
DISPOSITION AND SOCIAL SUPPORT**

by

J. Brandon Waits, B.A., M.A.

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

COLLEGE OF EDUCATION
LOUISIANA TECH UNIVERSITY

August 2017

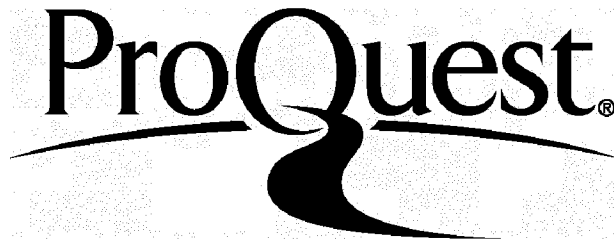
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LOUISIANA TECH UNIVERSITY

THE GRADUATE SCHOOL

August 2017

Date

We hereby recommend that the dissertation prepared under our supervision
by J. Brandon Waits

entitled A Randomized Controlled Study Examining the Effectiveness of a Gratitude
Intervention and an Optimism Intervention on Well-Being: Moderating
Effects of Personality Disposition and Social Support

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ABSTRACT

Research suggests that engaging in activities that highlight gratitude and optimism can significantly increase well-being. However, additional research is needed to explore characteristics or conditions that optimize the effectiveness of such interventions. The purpose of the present study was to contribute to research in this area by examining the effectiveness each of a gratitude intervention and an optimism intervention on both subjective well-being and psychological well-being among college students. In addition, the current study examined whether personality disposition (i.e., trait gratitude and trait optimism) and social support moderated the effectiveness of these interventions on well-being. Data were collected from 144 college students attending a public university in the South. Participants were randomly assigned to three conditions: a gratitude condition, an optimism condition, and a control condition. Prior to engaging in the intervention, participants were instructed to complete a baseline survey, which included informed consent; a demographic questionnaire; and measures of personality dispositions (i.e., gratitude and optimism), social support, and well-being. Participants in experimental groups reflected on an experience or topic intended to elicit gratitude or optimism, while participants in the control group engaged in a similar intervention that involved reflection and journaling on an early memory. Participants engaged in one of these interventions for approximately 20 minutes a day for three consecutive days. After the intervention, all participants completed a survey immediately and four weeks later, which included the

well-being measures included in the baseline survey. The results of separate two-way mixed repeated measures analysis of variance (ANOVA) tests indicated there were no significant interactions between time and intervention conditions on the outcome variables; however, the results did show the gratitude intervention was associated with a significant main effect on psychological well-being. Specifically, the gratitude group showed greater mean well-being increases than did the optimism group. Finally, the results of a series of hierarchical regression analyses used to examine potential moderators of the positive psychology intervention – well-being relationships indicated social support moderated the relationship between the optimism intervention and Time 3 subjective well-being. For those in the optimism group, lower baseline social support was related to significant decreases in Time 3 subjective well-being while higher social support at baseline was not significantly associated with changes in subjective well-being at Time 3.

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Date June 16, 2017

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CHAPTER ONE

INTRODUCTION

After World War II, clinically oriented psychologists have primarily focused on identifying, understanding, and treating mental illness (see Seligman & Csikszentmihalyi, 2000; also, see Smith, 1997, for a recent review of the history of psychology). That is, much of the focus within the clinical sub-disciplines in psychology has centered on healing disorder and the psychologically impaired. On one level this was quite understandable: As many soldiers reintegrated into popular culture across the West following the war, psychologists became aware of the immense need (and opportunity) to diagnose and treat veterans (Seligman & Csikszentmihalyi, 2000). This focus on pathology led to many important psychological discoveries, the development of effective treatments for various psychological disorders, and has had other positive effects; however, this focus arguably led to an excessive focus on disorder and pathology that has likely inhibited our understanding of positive psychological experiences, and more generally, the factors that contribute most to human flourishing (i.e., being “filled with positive emotion and to be functioning well psychologically and socially,” Keyes, 2002, p. 210).

As a result, beginning in the late twentieth and early twenty-first centuries, a growing number of psychologists began to advocate for psychology to expand its research and clinical foci toward an understanding of positive human traits,

institutions, and other subjective experiences. From this perspective, individuals and the collective human race will be able to optimally thrive only if positive subjective experiences became more highly valued such that they are viewed as important aspects of the human experience that are worth identifying, developing, and savoring. These ideals have served as the foundation for a new wave of psychological research on positive human experiences and to what is now referred to as the positive psychology movement (Seligman, 1999; Seligman & Csikszentmihalyi, 2000).

The Good Life

Positive psychology has been defined as “the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions” (Gable & Haidt, 2005, p. 103). Positive psychology draws from other psychological traditions (e.g., humanistic psychology) that have been studying constructs that are positively oriented for years (e.g., positive mental health, self-actualization, and personal growth; Jahoda, 1958; Maslow, 1968; Rogers, 1961). For thousands of years, various philosophers and philosophical traditions have produced writings regarding the important roles pleasure, virtues, and other positive experiences have in the development of the good life. This is especially true among Western philosophical traditions, from which Western psychology and culture at large owe much of its heritage and ideals (Hergenhahn, 2005). It may even be accurately stated that the pursuit of the good life and happiness is as old as the human race. Therefore, if human flourishing is to be cultivated by the fruit of psychological research, then it is important to understand the philosophical traditions and value-laden underpinnings from which this endeavor proceeds. With this foundation, two primary and yet contrasting philosophies of the good life have strongly

influenced positive psychology research—namely, hedonism and eudaimonism (for a review, see Ryan & Deci, 2001 and Chapter Three [Jørgensen & Nafstad, 2004] in Linley & Joseph, 2004).

Hedonism

One philosophical tradition that has had a significant influence on positive psychology research is hedonism (Ryan & Deci, 2001). This tradition has a long history, with records from as early as the fourth century B.C. indicating the ancient Greek philosopher, Aristippus, posited the ultimate pursuit of the good life was to maximize pleasure and minimize pain. More specifically, he argued happiness equaled the total of one's pleasurable (or hedonic) experiences in life. Since then, a number of other philosophers have built on this theory, suggesting happiness is the result of successfully pursuing human appetites (i.e., Hobbes, 1651/1994), sensations (i.e., de Sade, 1791/2013), or bringing about the overall good of society by pursuing activities that optimize one's sense of pleasure (i.e., Bentham, 1780/2007) (Ryan & Deci, 2001). In sum, the hedonistic viewpoint conceptualizes life as best lived through the pursuit of bodily pleasures, sensations, and the satisfaction of internal appetites in an attempt to maximize pleasure and self-interest.

Eudaimonism

Although hedonistic philosophy has been popular in a number of strands of philosophy since its conception, other philosophers and theorists have criticized the hedonistic conception of happiness and well-being as limited and unrefined. Among the most prominent dissenters was Aristotle, as he argued the good life was best achieved by the development and expression of virtue, not the mere attainment of a pleasurable life

(Aristotle, 349 B.C./1985; Deci & Ryan, 2001; Waterman, 1993). In his *Nicomachean Ethics* (349 B.C./1985), he wrote about the potentialities of every individual, to which he termed the daimon of each person, and argued the greatest fulfillment in life comes from developing the daimon through effortful activity (the process Aristotle termed *eudaimonia*; Waterman, 1993). According to Aristotle's stance, *eudaimonic* well-being involves the pursuit of excellence or perfection as one seeks to optimally develop and express him or herself. Pleasure and engagement are not viewed as bad entities from this perspective; rather, they are seen as the positive effects of pursuing what is "worth desiring and worth having" in this life (Telfer, 1980, p. 37)—namely, the identification and development of the daimon (or true self; Waterman, 1993).

Emerging Psychological Models of Well-Being

Whereas some psychological researchers have studied the development and effects of pleasure and happiness (similar to the hedonistic perspective), others have focused their research endeavors on understanding well-being from a *eudaimonic* perspective. This is understandable since empirical research suggests hedonic enjoyment and *eudaimonic* well-being are positively related, yet distinct constructs (Waterman, 1993). As a result, two distinct, but related, psychological theories of well-being have been developed and have been receiving increased levels of attention in the empirical literature.

Subjective (Hedonic) Well-Being

In some researchers measure well-being in a manner that more closely resembles hedonistic philosophy. From this perspective, well-being is considered to be comprised of the subjective appraisals individuals make in three primary domains: life satisfaction,

low levels of negative affect, and high levels of positive affect (Ryan & Deci, 2001).

Taken together, appraisals from each of these domains account for an individuals' overall sense of happiness, or as it is often referred to, individuals' sense of subjective well-being (Diener, 1984). Although a comprehensive account of subjective well-being is theorized to involve the sum of one's experiences from each of these domains, in practice, many researchers studying subjective well-being measure the construct with one or more measures (i.e., positive/negative affect, life satisfaction). In other words, it has been common to study subjective well-being by measuring one or more of the aspects of the construct, instead of measuring all three components in a single study. Additionally, the terms happiness, well-being, life satisfaction, and positive affect have often been used interchangeably as terms that generally relate to the superordinate concept of subjective well-being. In the present study, subjective well-being is conceptualized as a three dimensional construct involving life satisfaction, negative affect, and positive affect.

Psychological (Eudaimonic) Well-Being

Similar to how some philosophers (e.g., Aristotle) challenged hedonistic philosophy as being overly simplistic and crass, some researchers suggest well-being is a more complex construct than simply increasing momentary pleasures in life and minimizing painful experiences (Ryan & Deci, 2000; Ryff, 1989; Ryff & Keyes, 1995; Seligman, 2012). From this viewpoint, well-being is considered to be a multifaceted phenomenon resulting from satisfaction achieved from a variety of psychological processes. Although differences exist among these theories in terms of what theorists consider to be vital components of well-being, a common assertion assumed by each theory is similar to Aristotle's eudaimonic perspective—namely, that well-being results

from achieving satisfaction in a variety of psychological domains (e.g., frequently experiencing freedom and autonomy in one's life [Ryan & Deci, 2000], having positive relationships with others [Ryff, 1989], or developing a sense of meaning in life [Seligman, 2012]).

One commonly studied theory of psychological well-being in the literature has been Ryff's model of psychological well-being (Ryff, 1989; Ryff & Keyes, 1995; Ryff & Singer, 1998). To develop a multifaceted theory of psychological well-being, Ryff and colleagues' integrated concepts from several theories including Erickson's (1959) psychosocial theory of development, Allport's (1961) conception of maturity, and Maslow (1968) and Roger's (1961) humanistic theories. For example, the humanistic concepts of self-actualization and optimal functioning lie at the core of Ryff's psychological well-being model. Indeed, according to Ryff's model, well-being is not viewed as the mere attainment of pleasurable experiences, but as "the striving for perfection that represents the realization of one's true potential" (Ryff, 1995, p. 100).

Ryff and colleagues' conceptualization of one's true potential draws from Aristotle's conception of the daimon in that a person is thought to achieve his or her potentialities by maximizing the development of the daimon through experiencing positive psychological states and relationships (Aristotle, 349 B.C./1985; Ryff, 1995). In line with Aristotle's eudaimonic philosophy, Ryff and colleagues' theory posits individuals have a single daimon (true self), but can experience multiple potentialities that can emerge by developing one's individual talents (Aristotle, 349 B.C./1985; Ryff, 2014). This model of well-being shares Aristotle's assertion that the good life involves engaging in activities that express virtue (i.e., in which virtue can be understood as

engaging in the best action possible, achieving the best within oneself, or achieving excellence; Ackrill, 1973; McDowell, 1980) through personal expressiveness or self-realization (Waterman, 1993).

Instead of placing ultimate importance on enjoying and being pleased with one's life, Ryff and colleagues' concept of psychological well-being suggests realizing one's potential involves experiencing satisfaction in the following six areas: self-acceptance, purpose in life, environmental mastery, positive relations with others, autonomy, and personal growth (Ryff, 1989; Ryff, 1995; Ryff & Keyes, 1995; Ryff & Singer, 1998). In other words, individuals high in psychological well-being accept themselves as they are (both negative and positive experiences), have a purpose in life, choose or create environments that are suitable to them, have warm and trusting interpersonal relationships, experience freedom and self-determination in regulating their own behavior, and experience a sense of development and growth as a person. High psychological well-being is a theorized ideal and it is unclear how many people achieve this overall state as there is currently no agreed upon cutoff point for determining high or optimal psychological well-being. Still, higher scores on the psychological well-being subscales are considered to be indicative of higher overall psychological well-being (Ryff, 2014).

Since Ryff's model was developed from a eudaimonic perspective, it is theoretically distinct from the hedonic psychology view of well-being (i.e., subjective well-being; Ryff, 1989; Ryff, 1995). Empirical findings support this distinction and suggest that subjective well-being and psychological well-being are related but distinct constructs (Ryff, 1989). For example, Ryff (1989) reported that correlation coefficients

between components of psychological well-being and subjective well-being ranged from 0.42 to 0.73; the mean correlation coefficient was 0.59 (Ryff, 1989). Similarly, other empirical findings have provided additional evidence that psychological well-being is positively related, yet distinct from subjective well-being (e.g., Chen & Chan, 2005; Clarke, Marshall, Ryff, & Wheaton, 2001; Ryff & Keyes, 1995; Ryff & Singer, 2006; Springer & Hauser, 2006; Van Dierendonck, 2004).

Statement of the Problem

Factors that predict the development of the good life and happiness have been posited and discussed for millennia (Diener, Oishi, & Lucas, 2003). Two of the more prominent theories of well-being stem from hedonistic and eudaimonic philosophies, both of which have roots in ancient Greek philosophy (Ryan & Deci, 2001). With this philosophical background, two related but distinguishable theories of well-being have been developed in the psychological literature: subjective well-being and psychological well-being (Diener, 1984; Ryff, 1989; Ryff & Keyes, 1995). Both forms of well-being are generally viewed as desirable states, and empirical research supports this viewpoint. For instance, subjective well-being has been linked to increased job satisfaction (Tait, Padgett, & Baldwin, 1989), marital satisfaction (Dush & Amato, 2005), better physical health (Cho, Martin, Margrett, MacDonald, & Poon, 2011; George & Landerman, 1984), higher levels of creativity (Erez & Isen, 2002), and increased life expectancy (Diener & Chan, 2011) (for reviews see, Diener, Suh, Lucas, & Smith, 1999 and Lyubomirsky, King, & Diener, 2005). Similarly, research has shown psychological well-being is associated with positive outcomes such as higher levels of ego development as one ages, increased commitment to one's career, better mental health, and fewer chronic health

problems (see Ryff, 2014, for a review). Taken together, it seems there are important theoretical and empirically based reasons for viewing both subjective well-being and psychological well-being as desirable psychological states.

If well-being is a desirable outcome, it is important to determine whether well-being can be enhanced or whether it is largely predicted by variables that may exist outside of one's immediate control (e.g., personality traits and demographical variables). Some evidence suggests both forms of well-being show stability over time. For example, various aspects of subjective well-being and psychological well-being have demonstrated significant correlations with several of the big five personality traits, which are often considered to be relatively stable personality characteristics across the lifespan (Diener et al., 2003; Schmutte & Ryff, 1997). Other evidence suggests genetic heritability accounts for approximately 50% of the variance in subjective well-being (Lykken & Tellegen, 1996; Tellegen et al., 1988) and 10-15% of the variance can be attributed to situational factors (e.g., age, income, etc.; Andrews & Withey, 1976; Diener, 1984). Lucas and Donnellan (2007) found similar results regarding the stability of subjective well-being after exploring panel data from Germany and England collected over a 7-11 year time span. They found stable trait components (i.e., factors demonstrating little variability over time) accounted for about 34-38% of the variance in life satisfaction. Regarding the positive and negative affect components of subjective well-being, Charles, Reynolds, and Gatz (2001) reviewed data collected over a 23-year-period and found negative affect (i.e., whether individuals felt restless, lonely, bored, depressed, or upset over the past week) decreased during the aging process. However, the authors found positive affect was

mostly stable during younger and middle adulthood, and portrayed small decreases during older adulthood.

Furthermore, research has indicated subjective well-being may be inhibited by the presence of a *hedonic treadmill* (i.e., the tendency of the emotional system to adjust to current life circumstances similar to how the physical senses adjust to the environment; Brickman & Campbell, 1971; Diener, Lucas, & Scollon, 2006), in which increases in well-being only last temporarily in some circumstances because humans adapt quickly to change and often need novel stimuli to continue to experience previously attained levels of enjoyment (Lyubomirsky et al., 2005). For example, making more money may increase one's subjective well-being temporarily, but research has shown most of the subjective well-being increases following a raise disappear as soon as one year later (Stutzer, 2004).

Similar to the findings regarding the stability of subjective well-being, numerous studies suggest psychological well-being is influenced by heritable and stable factors (for a review, see Ryff, 2014). For instance, each domain of Ryff's scales of psychological well-being positively correlate with variables considered generally stable over time (i.e., the big five factor personality traits). For example, findings suggest openness to experience positively correlates with personal growth, agreeableness positively correlates with positive relations with others, and extraversion, conscientiousness, and neuroticism are significantly correlated with environmental mastery, purpose in life, and self-acceptance (negatively correlated with neuroticism; Ryff, 2014). In summary, these findings suggest significant variance in one's level of happiness and well-being is attributable to factors that may change slowly over time (e.g., personality traits).

However, other evidence suggests well-being is malleable and the activities one engages in can strongly influence one's subjective well-being and psychological well-being (for a review, see Lyubomirsky, Sheldon, & Schkade, 2005 and Sheldon & Lyubomirsky, 2006). For example, participating in various forms of psychotherapy can significantly affect one's mood and overall adjustment (for a review, see Smith, Glass, & Miller, 1980). Other studies have shown engaging in activities intended to elicit positive psychological experiences (e.g., such as gratitude or optimism) can increase individuals' subjective well-being and psychological well-being (e.g., Emmons & McCullough, 2003; Fordyce, 1977/1983; Sergeant & Mongrain, 2014).

Although there may be a "set point" in which genetic and situational factors limit the extent to which well-being can be enhanced (Lyubomirsky et al., 2005, p. 112), research findings also clearly suggest well-being can be effectively increased by engaging in particular activities (see Bolier et al., 2013 and Sin & Lyubomirsky, 2009, for literature reviews). These findings have led Lyubomirsky and colleagues to develop a model of subjective well-being enhancement that posits approximately 50% of subjective well-being is accounted for by genetics, 10% by life situations, and 40% by the activities people choose (Lyubomirsky et al., 2005; Sheldon & Lyubomirsky, 2006). Additionally, a review of conditions that influence the effectiveness of positive interventions, Lyubomirsky and Layous argued certain variables can inhibit the hedonic treadmill from occurring (e.g., varying activities one engages in, autonomously choosing which activities to engage in, etc.), and thus, enable subjective well-being to be significantly enhanced over time (for a review, see Lyubomirsky & Layous, 2013). Similar findings suggest psychological well-being is pliable and can be improved through engaging in

activities that elicit positive psychological experiences (e.g., reflecting on one's life in late adulthood [Arkoff, Meredith, & Dubanoski, 2004] and highlighting the experience of positive emotions in young adolescents [Ruini, Belaise, Brombin, Caffo, & Fava, 2006]).

Since research indicates well-being is susceptible to change, then it is important to understand the situations and conditions that are optimal for positive change to occur. As such, researchers have explored which activities facilitate well-being, as well as the factors that influence the effectiveness of the activities (for reviews, see Bolier et al., 2013, Layous & Lyubomirsky, 2012, and Sin & Lyubomirsky, 2009). Some moderators emerging from this line of research include features of the person engaging in the activity (e.g., self-selecting which activities to engage in and the level of effort applied to the activity; Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011) and features of the activity itself (e.g., frequency and timing in which the activity is engaged; Lyubomirsky et al., 2005). As Lyubomirsky and Layous (2013) noted, however, research regarding moderating factors that may enhance the effectiveness of positive exercises is still relatively new and the roles of numerous variables such as personality traits and social support still need to be explored.

Justification for the Present Study

Research indicates a variety of activities and interventions can effectively increase subjective well-being and psychological well-being (Lyubomirsky & Layous, 2013; Sergeant & Mongrain, 2014). Some interventions that have received significant attention in the recent literature include activities that elicit gratitude and optimism (e.g., Emmons & McCullough, 2003; Seligman, Steen, Park, & Peterson, 2005; Sergeant & Mongrain, 2014). Specifically, findings suggest that reflecting on things that one is grateful for, and

subsequently journaling on this topic, can produce significant increases in subjective well-being (e.g., Emmons & McCullough, 2003; Lyubomirsky et al., 2011; Seligman et al., Peterson, 2005). Similarly, data also suggest thinking about an ideal future and writing about it (i.e., engaging in an optimism intervention) is associated with significant increases in subjective well-being and psychological well-being (Sergeant & Mongrain, 2014; Shapira & Mongrain, 2010).

Clearly, gratitude and optimism interventions can enhance well-being; however, less is known regarding when and for whom these interventions are most effective. Although it has been hypothesized that the effects of these interventions may be moderated by personality characteristics, such as dispositional optimism or gratitude, as well as other factors, such as social support (Lyubomirsky & Layous, 2013; McCullough, Tsang, & Emmons, 2004), only a few studies have examined these variables. Furthermore, more studies have examined the relationship between gratitude and optimism exercises and subjective well-being than the relation between these exercises and psychological well-being; therefore, studies exploring how these interventions affect psychological well-being are needed.

The present study was intended to fill some of these important gaps in the literature by examining the moderators of the effects of two positive psychology interventions (i.e., gratitude and optimism) on each of subjective well-being and psychological well-being. Specifically, the purpose of this of this study was two-fold: 1) to examine the effects of two positive psychology interventions (i.e., optimism and gratitude) on each of subjective well-being and psychological well-being, and 2) to

determine if dispositional optimism, gratitude, and social support moderated the effects of these interventions on both subjective well-being and psychological well-being.

Identifying moderators that influence the effects of positive psychology interventions on well-being is important because it will contribute to the literature regarding methods and conditions that can enhance well-being. Findings from the present study should prove useful to professionals in psychology and medicine in diverse settings that are interested in brief interventions that can facilitate well-being among those under their care. Additionally, understanding what enhances the effectiveness of these interventions can help mental health practitioners choose the interventions that fit best to their clients' strengths, resources (e.g., social support), and personality.

CHAPTER TWO

REVIEW OF THE LITERATURE

Throughout human history, it has been common for people to seek to understand and live good lives (Diener, 2000). This emphasis has often led to various pursuits that vary as a function of individual differences in what one values (e.g., prioritizing the pursuit of pleasure or the development of a moral way of living). Although these value-led pursuits differ in important ways (e.g., pursuing pleasure or pursuing the realization of the self), one shared aspect emanating from these traditions is an appreciation for experiencing or exhibiting psychological states that improve the life of oneself or another person. Two such states that have traditionally been viewed, almost universally, in this positive manner include gratitude and optimism (e.g., Carman & Streng, 1989; Fischer & Chalmers, 2008; McCullough, Kilpatrick, Emmons, & Larson, 2001). As a result, understanding how these psychological constructs influence the development of a happy or fulfilling life may help identify ways to facilitate individual and collective well-being.

Gratitude

Traditionally, gratitude has held an important role in some of the world's major monotheistic religions including Christianity, Islam, and Judaism (Carman & Streng, 1989). These religions suggest gratitude is an important virtue for people to feel and

express toward others. Many societies tend to hold gratitude in high esteem and many people believe expressing gratitude is a moral obligation if one has received a benefit or gift (Bono, Emmons, & McCullough, 2004). Psychologists have traditionally viewed gratitude in a positive light, but only recently begun empirically examining this construct (Emmons & Mishra, 2012).

As a construct, gratitude has drawn attention from individuals and sources from diverse disciplines including religion, philosophy, and psychology (Emmons & Mishra, 2012). As such, definitions of gratitude have varied considerably. For example, in the Merriam-Webster Dictionary (2014) gratitude is defined as “a feeling of appreciation or thanks” while philosophers have defined the concept in behavioral and affective terms (e.g., experiencing a “delightful emotion” that results from experiencing some kindness from another, Brown, 1820, p. 291; honoring others after receiving kindness, Kant, 1964). Other theorists have conceptualized gratitude in cognitive or attitudinal terms such as defining gratitude as an “estimate of gain coupled with the judgment that someone else is responsible for that gain” (Solomon, 1977, p. 316) and an “attitude” toward a “giver” and “gift” that represents one’s “determination to use it well” according to the “intention of the giver” (Hamed, 1997, p. 175).

Theories of Gratitude

As gratitude has received increasing research attention, theories have emerged attempting to conceptualize gratitude and to understand its social implications. McCullough, Kilpatrick, Emmons, and Larson (2001) posited one such theory. They argue that gratitude is moral affect related to past and future behavior. According to the authors, gratitude functions as a positive reinforcer of generous behavior in that

benefactors who receive expressions of gratitude from recipients are theoretically more likely to exhibit kind behaviors in the future. Additionally, gratitude is thought to serve as a motivational factor for future engagement in prosocial behaviors (i.e., behaviors that benefit others) due to the benefactor and/or the recipient experiencing increased concern for the well-being of others. The authors considered gratitude *moral* in a more personal rather than global sense, in part, because one might feel grateful in response to something that only benefits him or her. Additionally, the theorists suggested gratitude is distinguished from other moral affective states (e.g., guilt, shame, and sympathy) in that the person experiencing gratitude is the recipient of another person's prosocial behavior.

Other theorists have also conceptualized gratitude in a value-laden manner as a virtue or paradoxical response to unmerited blessings or gifts (e.g., Berger, 1975; Emmons & Crumpler, 2000; Roberts, 1984; 1987; 1991a; 1991b). For instance, Roberts (1991b) argued that gratitude, like other virtues, is connected to a number of rules guiding its usage and experience. These rules help define the nature of the virtue and what connections can be considered included, excluded, or related to the experience of gratitude. Ultimately, theorists that view gratitude as a virtue see this phenomenon as involving positive feelings resulting from perceived benevolence (Berger, 1975; Roberts, 1991b). Other theorists frame gratitude as a paradoxical response intended to "repay debts for which no payment may be possible" (Emmons & Crumpler, 2000, p. 58). From this perspective, gratitude is seen as a duty (Berger, 1975) and obligation (Meilaender, 1984), but not as a response proceeding from a state of resentment. Instead, gratitude is viewed as willingness on the recipient's part to remain a debtor to another person and to acknowledge his or her dependence on the benefactor. Paradoxically, however, one's

willingness to remain indebted to a giver functions as an appropriate repayment of sorts for the gift. By conceptualizing gratitude as a virtue or paradoxical response, recipients are considered to feel indebted to benefactors and are thought to express gratitude toward others as a virtuous obligation (Schimmel, 1997).

Definitions of gratitude have differed among various theoretical perspectives. For example, theorists from the cognitive emotion perspective have posited that gratitude is an emotional outcome elicited by a judgment or appraisal of some event (e.g., Lazarus & Lazarus, 1994; Weiner, 1986). On the other hand, theorists ascribing to an evolutionary framework have suggested gratitude functions as a social insurance policy through which gratitude reinforces the generous actions of others and increases the likelihood similar behaviors will benefit recipients in the future (e.g., Trivers, 1971). In both cases, gratitude has been conceptualized from perspectives that have been applied to a variety of existing psychological phenomena and proponents of these perspectives view gratitude as a positive response (whether emotional or behavioral) to some event initiated by another person.

Dispositional Gratitude

In the more recent literature, gratitude is conceptualized as a higher order multifaceted construct and framed as a dispositional life orientation in which an individual notices and appreciates the positive in the world (Wood, Froh, & Geraghty, 2010) and Wood and colleagues (2010) distinguished this tendency to appreciate the positive in life from optimism and hope. They argued this tendency to appreciate the positive in life can be distinguished from an optimistic disposition since optimism involves positive expectations for future outcomes. They also posited that gratitude is

distinct from hope, since a hopeful disposition involves having an optimistic focus and envisioning pathways through which positive outcomes can be attained (research also supports distinguishing hope and optimism since hope is focused more on direct attainment of particular goals and optimism involves broader expectations relating to the expected quality of future outcomes; Bryant & Cvengros, 2004).

Wood, Maltby, Stewart, and Joseph (2008) explored whether there was a higher order gratitude factor in which affect, behavior, appreciation, and other constructs are components of gratitude by administering 12 subscales to participants from three commonly used gratitude questionnaires. Next, they conducted exploratory and confirmatory factor analyses to determine whether the scales measured a higher order factor. Their results indicated that the subscales were facets of a higher order gratitude factor and they concluded that gratitude is a multifaceted life orientation involving affective, cognitive, and behavioral components. In addition, they found that the higher order factor was comprised of the following eight facets: individual differences in terms of grateful affect, appreciating other people, a focus on what one has, awe, behavior, a focus on the present moment, an appreciation of life's brevity, and positive social comparisons (i.e., realizing life circumstances could be worse).

When conceptualized as a life orientation, gratitude is essentially being framed as a personality disposition (or trait). As a feature of personality, gratitude is positively correlated with facets in personality domains of extraversion (e.g., positive emotions), agreeableness (e.g., trust and altruism), and openness (e.g., feelings), while it is negatively correlated with facets in the neuroticism domain (e.g., depression and anger hostility) (McCullough et al., 2004; Wood et al., 2008a; Wood et al., 2008b). Evidence

has also suggested gratitude is positively correlated with conscientiousness (e.g., facets such as dutifulness and self-discipline) (Wood et al., 2008a); however, some researchers have found nonsignificant correlations between gratitude and conscientiousness and significant correlations have generally been weak (<0.20 ; McCullough, Emmons, & Tsang, 2002; Wood et al., 2008a). Overall, theoretical and empirical studies support conceptualizing gratitude as a dispositional life orientation (e.g., gratitude correlates highly with similar personality traits). This provides a good rationale to conceptualize the construct as a personality disposition. Therefore, gratitude was conceptualized as a personality disposition in the present study.

Measuring Gratitude

Extending from these theories and related findings, several scales have been constructed to measure various aspects of gratitude and the grateful experiences people experience. For example, the Gratitude Questionnaire-6-Item-Form (GQ-6) (McCullough, Emmons, & Tsang, 2001) conceptualizes gratitude as a personality trait and measures daily experiences and expressions of gratitude, especially the feelings a receiver experiences after receiving a gift. Additionally, Watkins, Woodward, Stone, and Kolts (2003) developed the Gratitude, Resentment, and Appreciation Test (GRAT) to measure three aspects of this trait: one's sense of abundance, one's appreciativeness of simple life pleasures, and one's appreciation for his or her social connections. Finally, the Appreciation Scale (AS; Adler & Fagley, 2005) measures eight aspects of appreciation including gratitude, awe, and focusing on what one has. According to Wood and colleagues (2010), findings that have utilized these measures should be integrated (although all of the measures need not be used in a single study) such that research

findings should be interpreted as describing and explaining an underlying personality disposition.

Other findings also support the conceptualization of gratitude as a personality disposition (Wood et al., 2008a, 2010). For example, Wood and colleagues (2008a) found gratitude is significantly correlated with each aspect of psychological well-being (i.e., autonomy, environmental mastery, personal growth, positive relationships with others, purpose in life, and self-acceptance) and predicts personal growth, positive relationships, purpose in life, and self-acceptance over and above all big five personality facets (30 total facets; e.g., warmth, vulnerability, tender-mindedness, and competence). Additionally, gratitude has been measured as a personality trait in a number of studies and numerous studies have shown the trait is associated with well-being (Watkins et al., 2003) and other positive outcomes (e.g., decreased depressive symptoms; Wood, Maltby, Gillett, Linley, & Joseph, 2008). These findings corroborate gratitude as a personality disposition.

Optimism

Like gratitude, optimism is generally viewed as an admirable and desirable characteristic. Scientists tend to agree that optimism involves positive expectations for the future and is related to expectancy-value models of motivation (Carver, Scheier, & Segerstrom, 2010). Such models assume behavior is a function of internal goals and desired states perceived to increase the likelihood that certain goals are met (e.g., Carver & Scheier, 1998; Higgins, 2006). Goals that have increased personal importance are described as having higher value. In addition, valuable goals are pursued optimistically when one expects to have them met; that is, when a person is confident he or she will be able to activate the internal and external resources to meet such goals.

Theories of Optimism

Also like gratitude, there is disagreement regarding the best way to conceptualize optimism as a construct. For instance, Seligman and colleagues (Peterson et al., 1982; Seligman, 1998) framed their understanding of optimism according to attributional style theory. According to these authors, optimism is a cognitive style in which individuals attribute the causes of events to external or fleeting factors that exist outside of the person (e.g., current circumstances; Carr, 2004). In addition, some theorists have posited optimism is a single dimension with two aspects: one aspect characterized by positive expectations for the future (optimism) and an opposite component characterized by negative expectations for the future (pessimism) (e.g., Rauch, Schweizer, & Moosbrugger, 2007). In contrast, other theorists have conceptualized optimism as inversely related to pessimism, but view optimism and pessimism as fully distinct and independent constructs (e.g., Herzberg, Glaesmer, & Hoyer, 2006). According to Carver et al. (2010), the core issue in this debate is whether the amount of variance between affirmative responses to positive outlook and negative outlook items on self-report inventories suggests a unidimensional or multidimensional conceptualization of optimism and pessimism. Although further research is needed to determine which of these perspectives is best supported by the data, theories that frame optimism and pessimism as a single dimension with differing outlooks on life have received empirical support and have been frequently employed in research (e.g., Rauch, Schweizer, & Moosbrugger, 2007; Scheier & Carver, 1992).

Dispositional Optimism

One popular model that proceeds from the single dimension theory of optimism is Scheier and Carver's (1985) life orientation model. They conceptualized optimism as a personality disposition that is a function of an underlying behavioral tendency to exhibit behaviors that bring a person closer to particular goals or standards. In this way, the theory uses a behavioral self-regulation perspective that assumes goal-directed behavior utilizes closed-loop negative feedback systems to reduce discrepancies between present behavior and future goals. From this perspective, people exhibit behavior that results from feedback from the environment that indicates a desirable, yet currently unmet, goal or standard.

Scheier and Carver (1985) used this underlying view of behavior and motivation to frame optimism as a dispositional awareness of discrepancies between current behavior and future goals, and yet develop an expectation that favorable events such as goal achievement will occur in the future. This positive outcome-expectancy is thought to develop as impediments to goals are manageable, and the result of positive expectancies is predicted to be increased effort toward meeting goals or standards. That is, an optimist is theorized to expect that obstacles can be managed and discrepancies between current behavior and future goals can be reduced; as a result, the person is likely to experience revitalized effort toward engaging in behaviors that make meeting goals or standards more likely.

Framed in this manner, research has shown optimism is associated with a wide variety of positive outcomes. For instance, compared to pessimists, optimists tend to experience more positive affect (Carver & Scheier, 1998; Scheier & Carver, 1992),

reduced depressive symptoms prior to and following childbirth (Carver & Gaines, 1987), whereas individuals that exhibit lower trait optimism tend to experience higher distress in difficult situations (e.g., dealing with AIDS [Taylor et al., 1992], caring for cancer patients [Given et al., 1993], etc.). Additionally, findings from a large body of literature indicates high trait optimism is associated with positive physical health outcomes such as resilience before and after breast surgery (Carver et al., 1993), reduced distress following unsuccessful infertility treatment (Litt, Tennen, Affleck, & Klock, 1992), and decreased depressive symptomatology among patients treated for ischemic heart disease (Shnek, Irvine, Stewart, & Abbey, 2001). Another study found that optimists experienced less distress prior to surgery, felt optimistic about the particular surgery at-hand, and experienced greater life satisfaction following the surgery (Fitzgerald, Tennen, Affleck, & Pransky, 1993). Similarly, research has suggested optimism is related to satisfaction with life as a mediator of the self-efficacy – life satisfaction and social support – life satisfaction relationships (Karademas, 2006). Therefore, optimism is usually considered a desirable personality trait and the conceptualization of optimism as a personality disposition has received considerable empirical support (Carver, Scheier, & Sergerstrom, 2010). As a result, optimism was conceptualized as a personality disposition in the present study.

Measuring Optimism

Optimism has frequently been measured as a personality trait, and test-retest correlations have been relatively high, ranging from 0.58 to 0.79 over various time periods, including those lasting a few weeks to those lasting approximately 10 years (Atienza, Stephens, & Townsend, 2004; Lucas, Diener, & Suh, 1996; Matthews,

Räikkönen, Sutton-Tyrrell, & Kuller, 2004; Scheier & Carver, 1985; Scheier et al., 1994). Theorists suggest this is partially due to its heritability, with estimates suggesting optimism is approximately 25% heritable (Plomin et al., 1992). Although this is a lower heritability estimate than many other personality traits (Carver et al., 2010), this still suggests genetic predisposition plays an important role in the development and manifestation of optimism. Like gratitude, optimism has been measured as a personality trait in a number of prior studies indicating that it is associated with positive outcomes (e.g., positive relations with well-being; King, 2001; Sergeant & Mongrain, 2014), and researchers have often conceptualized the trait using Scheier and Carver's dispositional theory of optimism (measured using the Life Orientation Test-Revised, Scheier, Carver, & Bridges, 1994).

Positive Psychology Interventions

Since research has suggested that gratitude and optimism are both related to well-being, it is important to know whether these traits can be accentuated in a way that facilitates well-being. As such, researchers have explored this issue by developing and testing interventions intended to elicit gratitude and optimism, and other desirable psychological characteristics to enhance well-being (see Bolier et al., 2013 and Sin & Lyubomirsky, 2009, for a review). This research assumes that both subjective well-being and psychological well-being can be increased through intentional activities and positive pursuits (Lyubomirsky et al., 2005; Raymond et al., 1999), and a number of interventions have been developed as exercises intended to increase well-being, including those that target gratitude and optimism (e.g., Seligman et al., 2005; Sergeant & Mongrain, 2014).

Some of the first formal attempts to develop and test positive interventions to increase well-being were conducted by Fordyce (1977/1983). In his first set of studies (1977), Fordyce gathered a sample of 338 community college students and tested whether a bibliotherapy program (i.e., a program teaching students various activities that are commonly employed by happy people) could effectively increase the happiness of those students. The program was based on his literature review in which various fundamental activity traits of happy people were isolated and targeted as points of emphasis, including keeping busy and being more active, increasing the amount of time one spends socializing, and decreasing worrying (Fordyce, 1977/1981). Those who engaged in various happiness-boosting activities experienced increased happiness.

Fordyce (1983) later replicated and extended these findings by conducting modified replications of the first set of interventions he tested. He evaluated the effects of providing psychoeducation about the techniques he had previously found that can increase personal happiness by comparing different combinations of the full and partial program (e.g., comparing the full happiness program that had the 14 happiness boosting techniques with portions of the program split into thirds). The results indicated providing more detail about individual techniques and teaching participants the full happiness program was more effective than providing less detail about the techniques and only teaching some of the techniques to individuals. Additionally, he found the increases in happiness made meaningful differences (i.e., participants still thought about the information they learned, claimed the information still positively impacted them, and they continued to practice many of the techniques) in the majority of participants' lives up to 18 months after the active intervention concluded.

Subsequently, researchers have created and tested a variety of interventions, exercises, and activities to increase happiness and well-being. Additionally, researchers have tested interventions intended to facilitate specific positive emotions, cognitions, or behaviors thought to be linked to happiness and well-being by using a randomized controlled trial research method. For example, Seligman and colleagues (2005) tested the effects of five distinct interventions by asking participants to express gratitude (i.e., write and deliver a letter expressing gratitude to someone [i.e., gratitude visit]), reflect and write on positive aspects of their lives (i.e., three good things), reflect on personal strengths (i.e., you at your best), identify personal strengths of character (i.e., identifying signature strengths), or use one's character strengths in new ways (i.e., using signature strengths). Researchers randomly assigned participants into one of these groups, or a control group, to isolate the causal effects of these activities on subjective well-being and depressive symptoms. They found that each of the experimental groups outperformed the control intervention at various time points (i.e., at immediate posttest for the gratitude visit, you at your best, and identifying signature strengths exercises and at follow-up [between one week and six months] for the three good things and using signature strengths exercises). Other randomized studies (e.g., Sergeant & Mongrain, 2014; Shapira & Mongrain, 2010; Wing, Schutte, & Byrne, 2006) have also replicated Seligman et al.'s findings by suggesting that engaging in various positive activities (e.g., reflecting on strengths or things that elicit gratitude) can significantly increase well-being.

Following the inauguration of the positive psychology movement in the late twentieth and early twenty-first centuries, these activities have been termed positive psychology interventions (PPIs)—since the purpose of the activities is to increase well-

being through focusing on positive aspects of human experiences and behaviors (e.g., Duckworth, Steen, & Seligman, 2005; Seligman et al., 2005; Sin & Lyubomirsky, 2009). PPIs are effective when administered both in-person and online (e.g., Layous, Nelson, & Lyubomirsky, 2012; Reed & Enright, 2006; Sergeant & Mongrain, 2014; Wing et al., 2006). One example of a PPI effectively administered online is Wing and colleagues' (2006) study that compared two positive writing exercises on subjective well-being with a control group. They utilized a dedicated website to recruit some of their participants and randomly assigned participants to one of the three groups by manually scrambling participant data. Both of the experimental groups involved asking participants to write in explicit detail about intensely positive experiences they had experienced for three consecutive days. However, in one condition (emotional regulation condition), participants were also cued to think and write about ways they could recreate similar positive experiences in their lives for three days. Subjects in the control group were asked to simply write about their plans for the current day. They did not monitor participants as they were instructed to engage in one of three exercises, but were asked to self-report their level of exercise compliance after three days of writing.

The results showed a significant positive relationship between the positive experiences plus emotional regulation writing exercise and life satisfaction at a three-day posttest and at a 2-week follow-up. In contrast, neither writing about positive experiences without an emotional regulation cue nor completing the control group exercise were associated with increases in life satisfaction. A similar study conducted by Sergeant and Mongrain (2014) demonstrated an online-administered optimism intervention effectively increased psychological well-being among a community sample. Similar studies utilizing

gratitude list and gratitude diary exercises have shown that administering the exercises in-person can also increase well-being (e.g., Emmons & McCullough, 2003; Lyubomirsky et al., 2011).

In both in-person and online administration formats, PPIs are effective with minimal personal or therapeutic interaction between researchers and participants. Online PPIs increase well-being in the short- and long-term (e.g., subjective well-being increases lasting up to six months following an online gratitude intervention [Seligman et al., 2005]), and some evidence suggests interventions administered online are no less effective at enhancing well-being than those administered in-person (Layous et al., 2012). Other research suggests that online data collection may increase the likelihood individuals reveal personal information and represent their actual behavior (e.g., Turner et al., 1998; Velicer, Prochaska, Rossi, & Snow, 1992). These findings have important implications for testing PPIs, since many of these interventions (e.g., gratitude and optimism exercises) require individuals to write about sensitive and personal information that may be viewed by researchers. Taken together, prior studies justify administering PPIs online, and as such, the present study utilized this method to test two such interventions.

Effects of PPIs on Well-Being

The types and variety of available PPIs have rapidly increased over the past 10 to 15 years (Sin & Lyubomirsky, 2009). For example, a previously mentioned large internet-based PPI study conducted by Seligman et al. (2005) evaluated the effects of five PPIs on subjective well-being (the PPIs were either gratitude interventions or interventions that highlighted one's strengths). The results indicated each of the PPIs

increased happiness more than the control intervention at various time points (between immediate posttest and six months later). These findings show that engaging in exercises that highlight one's strengths or facilitate positive experiences, such as gratitude, can have significant positive effects on well-being. In addition, Seligman et al.'s findings suggest that some positive interventions may be more effective than others (e.g., well-being increased over longer time period in gratitude group compared to identifying signature strengths condition) and may vary in effectiveness based upon factors such as the situation or population in which the intervention is applied.

Several other PPI interventions, such as forgiveness, mindfulness, and kindness interventions, can enhance well-being as well (e.g., Buchanan & Bardi, 2010; Frederickson, Cohn, Coffey, Pek, & Finkel, 2008; Otake, Shimai, Takana-Matsumi, Otsui, & Frederickson, 2006; Reed & Enright, 2006). For example, a forgiveness intervention can increase environmental mastery (a form of psychological well-being) among survivors of spousal abuse (Reed & Enright, 2006). Additionally, mindfulness-enhancing interventions (Frederickson et al., 2008) and counting the number of kind acts one exhibits (Buchanan & Bardi, 2010; Otake et al., 2006) have been shown to significantly increase both subjective well-being and psychological well-being. In summary, a variety of interventions centered on eliciting positive emotions or cognitions (e.g., reflecting on some event) tangibly increase both subjective well-being and psychological well-being.

The positive effects of PPIs have also been explored cross-culturally and with diverse age groups. Ruini and colleagues (2006) asked middle school children in an Italian school to focus on positive qualities of classmates and themselves. Next, they

asked the children to pay compliments to classmates using the positive observations they made as well as share some positive life experiences and positive personality traits they personally have with another classmate. Analyses showed that these activities significantly increased psychological well-being. The results of other studies suggest PPIs are effective with a wide range of age groups, including middle school adolescents (Froh, Sefick, & Emmons, 2008), college students (Lyubomirsky et al., 2011), and the elderly (Netz, Wu, Becker, & Tenenbaum, 2005).

Additional cross-cultural research has shown that coming from an individualist or collectivist culture can moderate the effect of optimism and gratitude interventions (Boehm, Lyubomirsky, & Sheldon, 2011). For instance, Boehm, Lyubomirsky, and Sheldon (2011) found that participants from both Anglo-Saxon and Asian-American backgrounds experienced increased life satisfaction in the optimism and gratitude groups; however, cultural background moderated the effectiveness of the interventions in that those with an Anglo-Saxon cultural heritage experienced greater life satisfaction in the optimism condition while Asian-American participants experienced significantly more life satisfaction compared to Anglo-Saxon participants in the gratitude condition. The authors suggested that the optimism condition required a more individualistic focus (focusing on a positive future) versus a more collectivistic focus required when expressing gratefulness to someone else. These findings suggest that one's cultural background and associated social values influences the effectiveness of PPIs.

Across studies, PPIs have effect sizes for well-being ranging from small to large (r 's ranged from -0.31 to 0.84; Cohen, 1988; Rosenthal, 1996), and according to one meta-analysis, 96% of the effect sizes were in the significant positive direction (Sin &

Lyubomirsky, 2009; only one study showed a negative relation between a gratitude intervention and well-being). Although the majority of PPI effect sizes indicate that engaging in these interventions is associated with increased well-being, the wide range of effect sizes suggests that moderators influence the link between PPIs and well-being. Interventions that focus on gratitude and optimism have been two of the more highly researched types of interventions and have been shown to increase well-being (e.g., McCullough et al., 2003; Seligman et al., 2005; Sergeant & Mongrain, 2014); as such, gratitude and optimism interventions are good candidates for also evaluating variables that may moderate the effects PPIs have on well-being.

Gratitude Interventions

A number of PPIs that specifically facilitate gratitude have been developed as techniques to improve well-being. For instance, Emmons and McCullough (2003) evaluated the effects of a gratitude-enhancing activity on psychological well-being, subjective well-being, and physical health. They asked undergraduate college students in the gratitude group to keep a journal of up to five things for which they were grateful once a week for nine weeks. Data from the gratitude group were compared with data from a hassles-listing group (asked to reflect on and list up to five things that annoyed or bothered them that day) and a neutral event-listing group (asked to think about and list up to five things that had an impact on them during the past week). They found that individuals who focused on positive aspects of life experienced enhanced well-being both when the journal entries were recorded weekly (study 1) and daily (study 2). Specifically, participants in the gratitude-listing condition experienced greater optimism ($r = 0.24$), greater joy and happiness ($r = 0.41$ for joy and $r = 0.42$ for happiness), and more overall

satisfaction with their lives ($r = 0.22$) compared to those in hassles-listing and neutral event-listing groups. In the second study, the researchers found participants in the gratitude group portrayed significantly more positive affect and increased levels of prosocial behavior than those in a hassles-listing and a downward social comparison group.

Finally, in a third study, the authors evaluated the effects of the gratitude-listing intervention on well-being among a sample of 65 participants who had previously been diagnosed with a neuromuscular disease. The results suggested those in the gratitude condition, compared to those in the control condition (only completed baseline measures daily), experienced greater positive affect ($d = 0.56$), reduced negative affect ($d = -0.51$), greater subjective well-being (measured by how they felt about their lives as a whole, increased optimism about the upcoming week, and increased connectedness to others, $d = 0.91$), and improved quantity ($d = 0.58$) and quality of sleep ($d = 0.44$). Further, the spouses or romantic partners of participants in the gratitude condition reported observing significantly more gains in positive affect and life satisfaction than the romantic partners of those in the control group. These findings suggest the effect size of these interventions with various measures of subjective well-being (studies one to three) ranged from small to large (e.g., $r = 0.22$ for satisfaction with life in study one and $d = 0.91$ for measures of global life satisfaction in study three) (see Cohen, 1977/1988 for recommended guidelines for interpreting effect sizes).

As mentioned previously, Seligman et al. (2005) conducted a large online study in which five PPIs were administered to participants through random assignment on a web site. One of the five PPIs was a gratitude exercise that asked participants ($n = 59$) to list

three good things that went well and write about possible causes for these blessings each night for a week. The authors assessed the participants' level of happiness immediately following the exercise period (immediate posttest) as well as at one week, one month, three months, and six months after the intervention period was complete. The main effect of the gratitude (i.e., three good things) exercise produced a statistically significant and moderate effect on happiness ($d=0.51$). Additionally, individuals who continued to perform the gratitude exercise after the one-week period experienced the greatest happiness gains.

Lyubomirsky, Tkach, and Sheldon (2004) tested the effects of a similar gratitude exercise on positive affect among a college student sample, but their exercise only asked participants to contemplate things for which they were grateful and did not involve a writing component (unpublished data as cited in Lyubomirsky, Sheldon, & Schkade, 2005). Participants engaging in this exercise were randomly assigned into one of two groups that differed in terms of how often they were to contemplate the blessings in their lives: once or three times a week. Those who counted their blessings once per week exhibited greater increases in well-being (type of well-being unspecified) than those in the control group; however, participants who counted blessings three times a week did not show significantly increased well-being relative to controls. This suggests that habituation may influence the effects of PPIs following persistent exercise engagement and warrants further study to determine optimal dosages and conditions for increasing well-being.

The benefits of reflecting and journaling about people and experiences for which one is grateful are not limited to young and middle adulthood. For example, Froh, Sefick,

and Emmons (2008) studied gratitude among youth by randomly assigning 221 middle school students into one of three conditions: gratitude, hassles, or control. Participants in the gratitude group were instructed to think about their lives over the past day and write down up to five things for which they were grateful. Those in the hassles group were instructed to think about their lives over the past day and list up to five things that annoyed them. The control group had no treatment. After engaging in the exercises during class time at school each day for two weeks, the results showed that students who counted blessings experienced greater reductions in negative affect than those who listed daily hassles ($\eta^2=0.06$ [moderate effect size]). Youth in the gratitude condition experienced significantly increased life satisfaction ($d=0.35$ compared to both daily hassles and control groups [small to moderate effect size]), higher satisfaction with school and residency, and also felt more optimistic about their future. These results are promising in that well-being benefits of engaging in a gratitude-listing intervention may not only apply to adult populations, but also to youth and early adolescents.

Similarly, Watkins et al. (2003) evaluated whether college students who reflected on and wrote about personal accomplishments they were grateful for, or things they wish they had completed, would experience more positive affect. Participants in the gratitude condition were asked to write for five minutes about things they were grateful they accomplished the previous summer. Those in the control condition were asked to write about things they wish they had accomplished. Researchers found that participants in the gratitude condition experienced significantly less negative affect than those in the other condition ($\eta_p^2=0.06$ [moderate effect size]). Next, they conducted a follow-up study to evaluate whether the nature of the grateful experience or expression significantly

influenced positive affect. The results showed that participants in the gratitude condition experienced significantly more positive affect than those in the control condition ($\eta_p^2 = 0.12$ [moderate effect size]). Finally, researchers compared the effect of three types of gratitude interventions, including thinking about someone one was grateful for [thinking condition], writing about someone one was grateful for [essay condition], and writing a letter to someone one was grateful for [letter condition]) with a control condition (i.e., writing about the layout of one's living room) administered for five minutes each (administered on one occasion). They found each gratitude exercise enhanced positive affect compared to the control condition ($\eta_p^2 = 0.12$ [moderate effect size]), and the thinking condition was associated with the highest gains in well-being.

Other findings have suggested preexisting levels of affect can significantly influence the effectiveness of these exercises. For example, Froh and colleagues (2009) randomly assigned 89 children and adolescents between the ages of eight and 19 to either a gratitude or control condition in a classroom setting. Participants in the gratitude condition were asked to write a letter expressing appreciation to someone they had never properly thanked, and were then asked to deliver this letter to the individual in person. The participants in the control condition were asked to think about their activities from the day before and to write about their feelings related to these activities. Both groups were allotted up to 15 minutes of class time to work on their respective tasks for up to three days a week over a two-week period. The researchers found positive affect measured at pretest moderated the relationship between the gratitude intervention and positive affect at posttest, in that those who were low in positive affect initially

experienced greater positive affect immediately following the gratitude intervention and at a 2-month follow-up (when compared to those in the control condition).

In another gratitude intervention study, Lyubomirsky et al. (2011) evaluated experimentally the effects of three conditions on four types of subjective well-being (a composite measure that included positive affect, negative affect, life satisfaction, and happiness scores): expressing gratitude, expressing optimism, and a control condition. Participants were randomly assigned to one of the three groups. Participants in the expressing gratitude condition were instructed to write a series of gratitude letters to someone they had not appropriately thanked (but not deliver them). Participants in the expressing optimism intervention were asked to journal for up to 15 minutes per week about living a life consistent with an ideal future self. The significant differences in subjective well-being were found between those in the gratitude and optimism conditions; however, participants who self-selected into the gratitude and optimism conditions experienced more happiness than those in the control group immediately following the intervention ($r = 0.12$) and at a 6-months posttest ($r = 0.14$).

In a similar study, Dickerhoof (2007) examined whether college students that wrote letters expressing gratitude to various individuals in their lives experienced significant increases in subjective well-being (measured as a composite of life satisfaction and positive affect). She asked participants to spend approximately 15 minutes a week writing a gratitude letter to a new person each week for eight weeks. Students were randomly assigned into the gratitude group or one of two other conditions (an optimism and a control condition). In the control group, individuals were asked to spend 15 minutes a week for eight weeks writing about what they did for the past seven

days in a list format. The participants in the control group were also asked to write in a manner that was detail oriented, but to avoid writing about “emotions, feelings, or opinions” (p. 30). The participants were given measures of well-being before the study, immediately following the 8-week intervention, and 3-months post-intervention to evaluate any gains in subjective well-being, as well as the longevity of such gains. The results indicated that participants in the gratitude group experienced significantly higher levels of subjective well-being than controls mid-intervention ($r = 0.11$), post-intervention ($r = 0.13$), and at 3-months post-intervention ($r = 0.13$), as well as increased happiness immediately following the intervention ($r = 0.09$). Interestingly, participants in the gratitude condition also experienced significantly greater subjective well-being than the optimism group three months after the intervention had completed ($r = 0.12$).

Gratitude exercises may not only facilitate positive thinking, but also reduce negative perceptions. For example, Geraghty, Wood, and Hyland (2010) randomly assigned self-referred participants on a website to a gratitude diary, thought restructuring, or waitlist condition. For two weeks, participants in each condition recorded daily entries into their diaries on their assigned topic (i.e., writing about daily blessings [gratitude group] or keeping an automatic thought record [thought restructuring group]) and were given a rationale for how engaging in these exercises would reduce their body dissatisfaction. The authors found the gratitude diary exercise was as effective as the thought restructuring exercise, and more effective than the waitlist control condition, in terms of reducing body dissatisfaction on two separate instruments ($d = 0.62$ and 0.71).

Although the majority of studies on gratitude interventions show significant positive relationships between gratitude interventions and components of well-being, one

study did not demonstrate a positive relationship between these variables. Sheldon and Lyubomirsky (2006) randomly assigned 21 participants to think about people and experiences that have impacted them in a positive manner but that they had not spent much time or effort appreciating. Next, they asked participants to write in great detail about the many things in their lives “both large and small” for which they are grateful and encouraged them to continue practicing this exercise at least twice a week for the next four weeks. The researchers found that participants experienced significant reductions in negative affect in the gratitude and control groups; however, those in the gratitude group did not experience greater positive affect than those who simply listed life details (control group) (Sheldon & Lyubomirsky, 2006). This conflicting evidence from Sheldon and Lyubomirsky (2006) underlines the importance of exploring optimal conditions for engaging in gratitude interventions. Additionally, the sample size in this study was small ($n = 21$ in the gratitude condition), and as such, the results may be a reflection of low power.

Optimism Interventions

Similar to the various gratitude interventions, researchers have developed and tested the effectiveness of PPIs centered on highlighting or, eliciting optimism. King (2001) conducted one of the first examples of this type of intervention. The author utilized a positive writing exercise based upon James Pennebaker’s writing paradigm (1986/1997) in which participants are randomly assigned to a group and asked to write about a topic for 15 to 30 minutes a day for three to five consecutive days. King evaluated the experience of 81 undergraduate students that were randomly assigned to one of four groups asking them to write about a particular topic for 20 minutes a day for

four consecutive days. Following random assignment, participants were asked to write about either a traumatic event, one's best possible future self, a traumatic event for the first two days and one's best possible future self on the third and fourth days (combined condition), or their plans for the current day in detail (control condition).

The results indicated the optimistic writing condition in which one envisioned and wrote about a best possible future self reduced negative mood ratings compared to writing about trauma or the combined trauma/best possible self group. Additionally, only those in the best possible selves (BPS) condition experienced significant increases in positive affect ($d = 1.55$). A follow-up assessment five months after the intervention period indicated that those in the BPS writing group experienced significantly fewer medical doctor appointments to treat an illness (measured by number of visits seen on medical charts) than those in the control group ($d = 0.95$). Thus, it appears that reflecting and writing about the positive, including being optimistic about who one might become, can increase physical health and subjective well-being.

As mentioned previously, Dickerhoof (2007) designed an experiment for her dissertation in which she compared gratitude, optimism, and control interventions on subjective well-being. In the optimism condition, she borrowed from King's (2001) BPS condition and asked college students to imagine ideal future selves in which everything has "gone as well as it possibly could" in a particular life domain and the topic rotated weekly (e.g., educational attainment, romantic relationships, and career life). Participants were also asked to journal about what they imagined for 15 minutes a week for the next eight weeks. Participants in each of the conditions were tested before the intervention,

mid-intervention, immediately after the 8-week intervention, and three months after the intervention had been completed.

Similar to the results of those in the gratitude condition, individuals in the optimism group experienced significantly higher subjective well-being than controls mid-intervention ($r = 0.11$), post-intervention ($r = 0.13$), and at a 3-month follow-up ($r = 0.13$). Interestingly, individuals in the optimism group only experienced significantly higher increases in subjective well-being when compared to controls immediately post-intervention if they self-selected into the optimism condition (and theoretically experienced higher motivation). The optimism group also experienced greater increases in positive affect than those in the gratitude group mid-intervention; however, this affective advantage was not evident when comparing the results of the optimism and control group mid-intervention.

Shapira and Mongrain (2010) compared the effectiveness of an optimism exercise with a control group in a large non-clinical Canadian sample ($N = 1,002$) by asking subjects to reflect and journal for seven consecutive nights on a topic intended to elicit optimism. The optimism intervention involved asking subjects to imagine and write in detail about a positive future they will experience in which some of their current problems are solved, while subjects in the control group were instructed to write about some of their early memories in detail. Regardless of initial happiness levels, the results indicated those in the optimism intervention were significantly happier than those in the control condition (i.e., writing about early memories) at immediate posttest ($d = 0.40$), at three months ($d = 0.47$), and at 6-month ($d = 0.37$) time points. The optimism intervention was associated with a moderate effect on subjective well-being.

Similarly, Sergeant and Mongrain (2014) tested the effects of a three-week optimism intervention that involved training in two important aspects of dispositional optimism: having a tendency to remember positive experiences and viewing one's goals as valuable and achievable. The intervention lasted three weeks and involved completing one of two tasks that alternated daily. On the first day of the intervention, participants were to list five things they believed made their lives worthwhile, as well as three things that could help them see a more positive side of a difficult situation. On the next day, participants were asked to describe a personal goal they wanted to meet in the next one to two days and the steps needed to achieve this goal. The control group followed a similar format in which participants completed one of two alternating tasks, but were asked to describe and journal about their experience over the past day as if they were writing for a newspaper. For the alternate aspect of the exercise, participants were asked to describe what they believed the following day would involve (e.g., people they would see, where they would go, etc.). Those in the optimism condition experienced significantly greater psychological well-being (measured by engagement in life) than those in the control group, with a small effect, $f^2 = 0.03$.

In the present study, a gratitude and an optimism intervention were administered to examine whether they significantly influenced well-being among college students. Since prior studies have demonstrated both interventions (and similar exercises that focused on gratitude and optimism) can significantly and positively influence subjective well-being (e.g., Seligman et al., 2005; Shapiro & Mongrain, 2010), one purpose of this study is to replicate previous findings among a college sample in the South. Additionally, it appears only one study to date has explored whether these one of these interventions

can enhance psychological well-being ([i.e., an optimism intervention; Sergeant & Mongrain, 2014); however, the researchers did not explore whether the intervention enhanced overall psychological well-being (i.e., a composite of several factors comprising psychological well-being). It does not appear any prior studies have tested the effects of a gratitude intervention on psychological well-being. Therefore, a major strength of the present study is its contribution to the literature regarding whether a gratitude and an optimism intervention positively affect individuals' overall sense of psychological well-being.

Moderators Affecting Intervention Effectiveness

Since research has demonstrated PPIs can increase subjective well-being and psychological well-being, researchers have begun to explore variables that influence the effectiveness of these interventions. A model developed by Lyubomirsky and Layous (2013) proposed that intentionally engaging in certain activities can enhance well-being (e.g., counting one's blessings), and certain conditions are optimal for maximizing gains from such activities. The authors suggested a variety of factors, such as conditions relating to the positive activity (e.g., the frequency and length individuals engage in the activity [i.e., dosage] and variety), as well as the characteristics of the individual (e.g., personality and social support), may moderate the PPI – well-being relationship. In addition, they posited PPIs are most effective when individuals engage in positive interventions while they experience a personalized congruence between activity-related and person-related features, which they call person-activity fit. As the fit between the person and the positive activity is increased, the theorists posit the effectiveness of the interventions will be magnified and personal well-being will be enhanced. An example of

high person-activity fit might include some aspect of an individual's personality (e.g., introversion) positively interacting with the activity type (e.g., a gratitude exercise that involves reflection on blessings in a private setting) such that the individual gains more enjoyment and well-being increases from participating in the intervention.

Activity-Related Factors

Research supports Lyubomirsky and Layous's thesis that the effects of these interventions can be moderated by activity-related factors. The dosage (i.e., frequency and timing) of the intervention can influence the effectiveness of the exercise. For example, Lyubomirsky, Sheldon, and Schkade (2005) found conducting five acts of kindness in one day was more effective than conducting five acts of kindness over the course of a week. Lyubomirsky et al. (2005) also found counting one's blessings once per week was more effective than doing so three times a week. These findings suggest spreading out instances of kindness and reflecting on the blessings in one's life too frequently may dilute the beneficial outcomes for the person engaging in these behaviors.

Other findings, however, suggest reflecting on and writing about blessings in one's life each day for a week can significantly increase happiness for at least six months (Seligman et al., 2005). Similarly, researchers have found journaling about a topic intended to elicit optimism for three consecutive days can significantly increase subjective well-being at immediate posttest and two weeks later (Wing et al., 2006). Still, other findings suggest writing a gratitude letter (but not delivering it) to another person for approximately fifteen minutes a day once a week for four weeks can effectively enhance well-being immediately after the intervention and at least up to six months later (Seligman et al., 2005). These findings seem to conflict with Lyubomirsky et al.'s (2005)

finding that administering an intervention on multiple occasions over time may dilute their efficacy (i.e., is less effective than engaging in the intervention in a more concentrated [on one day] manner). The findings also suggest that there is not yet an universal consensus regarding optimal dosage for various activities and indicates PPIs may be effectively administered once a week, a few times a week, or every day for a week. Some of the other activity-related variables that moderate the PPI – well-being relation include varying the types of positive interventions one engages in (Sheldon, Boehm, & Lyubomirsky, 2012).

Individual Factors

Research has also shown that individual features of the person engaging in the activity can also influence PPI effectiveness. For instance, Lyubomirsky et al. (2011) found that college students who self-selected into a happiness intervention experienced greater gains in happiness following engagement in the exercise than those who self-selected into a more general cognitive exercise (i.e., control group). The authors interpreted this as suggesting self-selection elicits motivation to engage in a particular PPI, which in turn, facilitates well-being. A limitation of allowing participants to self-select into intervention groups, however, is the lack of random assignment inherent in this design. As a result, there are a number of possible confounding variables (e.g., a disproportionate amount of unhappy individuals volunteering to participate in the happiness-boosting condition) that could have influenced Lyubomirsky et al.'s (2011) results. Nonetheless, motivation is important when testing PPIs because stronger effect sizes have been demonstrated in studies in which participants expected to experience well-being improvements (e.g., Seligman et al., 2005). This also underlines how

important it is for participants' to expect that they will gain something positive from PPIs before the intervention period initiates (e.g., providing a rationale to participants in order to increase positive expectations for the interventions' effects), since self-selected participants presumably expect that they will gain something from their participation.

Other person-related features also moderate the effectiveness of PPIs such as self-concordance (motivation stemming from a belief that the activities will be useful and enjoyable; Sheldon & Lyubomirsky, 2006), continuing to engage in the exercise (e.g., Seligman et al., 2005), and the overall person-activity fit (e.g., how enjoyable the activity is or how natural the activity fits with the individuals' values and goals; Dickerhoof, 2007). In addition, there is conflicting evidence regarding whether it is better for those participating in PPIs to experience low levels of positive affect or moderate depressive symptoms prior to engaging in the exercises (Froh et al., 2009; Seligman et al., 2005) or if being depressed inhibits a person's ability to experience the full benefits of the interventions (Sin, Della Porta, & Lyubomirsky, 2011). In summary, these findings suggest that individual difference such as self-selection, effort, person-activity fit, and initial affective state may hold important roles in the PPI – well-being relationship. Although not all of the activity and person-related features that have been reviewed will be tested in the current model, they highlight the important roles activity and person-related variables can have on the efficacy of PPIs.

Personality Disposition

Another aspect of the individual that may influence the effectiveness of PPIs is personality disposition. It has been suggested in the theoretical literature that individuals may experience enhanced well-being by participating in interventions that match their

high preexisting levels of a particular personality trait or disposition (termed the conductance hypothesis by McCullough et al., 2004). According to this hypothesis, individuals that are high on the optimism domain of personality may benefit more from an optimism intervention than those who are low on optimism. Likewise, individuals who are high on the gratitude domain may benefit more from gratitude interventions than those who are low on this domain.

Similar theoretical assertions have been proposed regarding a construct that is closely related to personality, namely, character strengths (Seligman et al., 2005; see Peterson & Seligman, 2004, for a more detailed discussion of character strengths and correlates with personality traits). These theorists (Seligman et al., 2005) have asserted that intentionally engaging in activities that fit well with an individual's character strengths (i.e., a character trait in which the individual has scored high in such as curiosity; Peterson & Seligman, 2004) will not only help an individual further develop this strength, but it also should increase the individual's well-being.

Other theoretical literature suggests individuals may gain more from engaging in PPIs if the intervention targets a personality trait or disposition in which the individual has scored low (termed the *resistance hypothesis* by McCullough et al., 2004). According to this theory, individuals who are low on a particular personality disposition (e.g., gratitude or optimism) are more dependent on dynamic events that elicit positive affect in order to more fully experience the affective-psychological benefits of these personality components. If true, this would indicate individuals who are low on gratitude or optimism before engaging in a relevant PPI would experience significantly higher increases in well-

being after the intervention period than those who were high on those dispositions prior to engaging in the intervention.

Empirical findings have provided support for both the concordance and resistance hypotheses. For instance, Watkins et al.'s (2003) found that those with higher dispositional gratitude at pretest experienced significantly greater subjective well-being at immediate posttest than those with lower dispositional gratitude at baseline. Similarly, Dossett's (2011) findings from a sample of college students showed a gratitude journal exercise to be more effective in increasing subjective well-being for those with higher baseline gratitude. Additional support for this hypothesis comes from findings suggesting that new ways to use one of a person's top character strengths (considered a positive trait) in daily life are related to increased subjective well-being and reduced depression anywhere between three to six months following the intervention (Gander, Proyer, Ruch, & Wyss, 2012; Mongrain & Anselmo-Matthews, 2012; Seligman et al., 2005).

On the other hand, Rash, Matsuba, and Prkachin (2011) published results supporting the resistance hypothesis using a sample of primarily young Caucasian adults in an urban area. They were interested in directly testing whether high or low levels of trait gratitude moderated the relationship between a gratitude intervention and life satisfaction. Participants were asked to reflect (for five minutes on each day of the intervention) on items, events, or people for which they were grateful two days a week for four weeks, and also to journal about these gratitude-inducing experiences. The findings indicated that individuals who were low on trait gratitude during the pretest phase experienced greater life satisfaction after engaging in the gratitude intervention than those who were high on trait gratitude pre-intervention.

Similarly, Sergeant and Mongrain (2014) found trait pessimism (defined as low scores on an optimism scale) moderated the relationship between an intervention designed to elicit optimism and psychological well-being (measured as a composite of depressive symptoms and engagement in life). Specifically, they found individuals who were low on optimism experienced significantly increased levels of engagement in life and significantly reduced levels of depressive symptomatology after participating in the optimism exercise. While findings supporting the conductance hypothesis may highlight the importance of matching individuals to positive activities that might come naturally to them, findings supporting the resistance hypothesis may suggest individuals who are low on a particular personality disposition have more to gain from participating in an intervention targeting that characteristic.

In summary, findings to date have provided a rationale for predicting low (e.g., Rash et al., 2011) or high (e.g., Watkins et al., 2003) levels of dispositional gratitude will increase the effect of gratitude interventions on subjective well-being; therefore, further research is needed to determine whether the resistance or conductance hypothesis better accounts for the data. Regarding optimism, theoretical literature provides a rationale for the conductance hypothesis (e.g., using strengths [gratitude] in new ways can increase well-being; Seligman et al., 2005), but findings have provided some support for the resistance hypothesis (Sergeant & Mongrain, 2014). More specifically, it appears only one study to date has specifically examined whether dispositional optimism moderates the effectiveness of an optimism intervention (Sergeant & Mongrain, 2014); as a result, additional data are needed to determine whether the conductance or resistance hypothesis

is better supported by the data as it relates to optimism interventions, or whether both hypotheses may be true in certain circumstances.

No studies to date have evaluated whether dispositional gratitude or optimism moderate the effectiveness of a gratitude and an optimism intervention on overall psychological well-being. As such, additional research is needed to examine whether dispositional gratitude and optimism moderate the effect of these interventions (i.e., dispositional gratitude in a gratitude intervention and dispositional optimism in an optimism intervention) on psychological well-being. Therefore, one of the aims of this study was to determine whether dispositional optimism and gratitude moderated the relationships between the two PPIs (i.e., optimism and gratitude) and well-being (i.e., subjective well-being and psychological well-being).

Social Support

According to their person-activity fit model, Lyubomirsky and Layous (2013) posit that social support may also moderate the relationship between PPIs and well-being. This idea is consistent with social learning theory (Bandura, 1986), which suggests that positive behavioral changes and psychological benefits gained by engaging in gratitude and optimism exercises may be more likely when individuals experience positive social support. Indeed, several empirical studies highlight the benefits of social support and suggest that support from others may enhance the effectiveness of psychological interventions. For instance, Layous, Nelson, and Lyubomirsky (2012) found that individuals who read a peer testimonial that expressed empathy (i.e., empathy relating to the challenges associated with engaging in an optimism exercise) experienced greater subjective well-being (i.e., affect) than those who did not read the testimonial. Similarly,

individuals who received autonomy-supporting messages from peers while engaging in acts of kindness experienced more happiness than those who did not experience social support (i.e., autonomy-supporting messages) or engaged in a control activity (Della Porta, Jacobs Bao, & Lyubomirsky, 2012).

While these findings suggest that specific messages received from supportive others enhance the effectiveness of PPIs, no prior studies have evaluated whether other forms of support (e.g., general support, provisions of support) may influence the effectiveness of PPIs. Therefore, another aim of the present study was to determine whether provisions of social support influenced the effectiveness of gratitude and optimism interventions.

Provisions of social support refer to the specific functions served by social support (Russell & Cutrona, 1987; Weiss, 1973/1974). According to Weiss's (1974) model of social provisions, six social functions or provisions can be delivered through interpersonal relationships. These provisions can be assistance-related (i.e., guidance and reliable alliance) and non-assistance-related (i.e., reassurance of worth, attachment, opportunity for nurturance, and social integration). In the assistance-related category, guidance refers to receiving advice or information from others, while reliable alliance refers to one's confidence that others can be counted on for tangible assistance during stressful times. In the non-assistance-related category, reassurance of worth refers to other people recognizing one's competence and skills; attachment refers to emotional closeness with others that provides security; opportunity for nurturance refers to individuals having opportunities to help others; and social integration refers to a belongingness with others in which interests, concerns, and recreational activities are

shared in common with others. According to this model, all six of these provisions are necessary to experience adequate support from others.

Unlike several other conceptualizations of social support (e.g., Cobb, 1979; Cohen & Wills, 1985; Kahn, 1979; Schaefer, Coyne, & Lazarus, 1981), which focus only one aspect of the construct (e.g., how frequently one receives support from others, number of supportive others, or the quality of the support one receives), Weiss' (1973/1974) model of social support (also see Russell & Cutrona, 1987) offers a more comprehensive view of perceived social support. Therefore, the present study focused on provisions of social support and examined whether social provisions moderated the effects of gratitude and optimism interventions on well-being.

The Present Study

Although prior studies have demonstrated interventions designed to elicit gratitude and optimism can increase subjective well-being (e.g., Lyubomirsky et al., 2011; Seligman et al., 2005; Sergeant & Mongrain, 2010), there is limited information in the literature regarding how these interventions affect psychological well-being. Further, the variables that enhance the effectiveness of these interventions have yet to be fully explored in the existing literature. Indeed, although prior research has suggested that several variables, including activity-related factors, individual factors, and social support moderate the relationship between these interventions and well-being (Lyubomirsky & Layous, 2013), few studies have focused on examining these moderators (e.g., Rash et al., 2011; Watkins et al., 2003; for a review, see Lyubomirsky & Layous, 2013). Therefore, the present study was aimed at addressing these gaps in the literature by examining whether the effects of two PPIs (i.e., gratitude and optimism) on both

subjective well-being and psychological well-being are moderated by personality disposition and social support.

The specific hypotheses for the present study were as follows:

1. PPIs will have significant effects on subjective well-being. Specifically, participants in the gratitude and optimism groups will exhibit significantly greater gains in subjective well-being than those in the control group immediately following the intervention (Time 2; T2) and at follow-up (Time 3; T3); however, the change in subjective well-being will not be significantly different between the gratitude and optimism groups.
2. PPIs will have significant effects on psychological well-being. Specifically, participants in the gratitude and optimism groups will exhibit significantly greater gains in psychological well-being than those in the control group immediately following the intervention (T2) and at follow-up (T3); however, the change in psychological well-being will not be significantly different between the gratitude and optimism groups.
3. Social support will moderate the relationships between PPIs and subjective well-being such that those who perceive they are receiving higher levels of social support at pretest (Time 1; T1) will exhibit significantly greater increases in subjective well-being at T2 and T3.
4. Social support will moderate the relationships between PPIs and psychological well-being such that those who perceive they are receiving higher levels of social support at pretest (T1) will exhibit significantly greater increases in psychological well-being at T2 and T3.

Empirical findings have been conflicting regarding the direction of the moderating effects of personality dispositions on well-being (Dossett, 2011; Rash et al., 2011; Sergeant & Mongrain, 2014; Watkins et al., 2003). For example, while some studies suggest that individuals who are low on gratitude may benefit more from gratitude interventions, other findings suggest that gratitude interventions may be most effective for those who are high on gratitude (e.g., Rash et al., 2011; Watkins et al., 2003). As a result, the following research questions were explored:

- 1) Do dispositional gratitude and dispositional optimism moderate the effects of the PPIs on subjective well-being at T2 and T3?
- 2) Do dispositional gratitude and dispositional optimism moderate the effects of the PPIs on psychological well-being at T2 and T3?

CHAPTER THREE

METHOD

Participants

A total of 609 subjects agreed to participate in this study by giving informed consent and completing the baseline survey. Using a random number generator (www.randomizer.org), the participants were then randomly assigned to one of three conditions such that 215 participants were assigned to the gratitude condition, 206 to the optimism condition, and 188 to the control condition. As recommended in the literature (e.g., Peng et al., 2006), subjects who completed 80% or fewer of the study items on one or more scales at one or more time points were removed from the sample.

Of the initial sample ($N = 609$), a total of 431 participants did not meet the criteria for completing more than 80% of the study items and were thus removed from the sample. This reduced the sample to 178 participants. Next, individuals that received a mean journal rating of three or fewer for the first journal entry were also removed from the sample (see the “Manipulation Check” heading for more details). This included those who did not complete a journal at all and those who did not adequately complete the first journal entry (e.g., wrote about something that made them sad while in the gratitude condition). This reduced the sample to 155 participants. Next, participants who received a mean journal rating of three or below for the second journal post were removed and this

reduced the sample size to 150 participants. Data from participants were then removed if they received a mean rating of three or below on the third journal entry. This reduced the sample to 145 participants. Finally, data from a 17-year-old participant were removed, as one of the two criteria for participating in the study required participants to be 18 years of age or older (with the other inclusion criterion being that students were enrolled in a university). Thus, the final sample size was comprised of 144 participants.

Out of the 144 total participants, 61 were in the gratitude condition, 38 were in the optimism condition, and 45 were in the control condition. The majority of participants were female (70.1%) and the ages of participants ranged from 18 to 43 years old ($M = 19.53$, $SD = 3.12$). Subjects self-identified as White/Caucasian (72.9%), Black/African-American (14.6%), Hispanic/Latino (5.6%), Asian/Asian-American (3.5%), Biracial/Multiracial (2.1%), Native American/Pacific Islander (0.7%), and Other (“Indian”; 0.7%). Regarding academic classification, freshmen comprised 51.4% of the final sample, sophomores comprised 27.8%, juniors comprised 13.9%, and seniors comprised 6.9%.

Statistical tests were conducted in order to determine whether the demographic characteristics in the original sample ($N = 609$) significantly differed from those in the final sample ($N = 144$). First, gender (0 = *white*; 1 = *minority*) and the retained data (0 = *original sample*; 1 = *retained data/final sample*) were dummy coded. Then, a chi square association test was conducted using the dummy coded retained variable and gender. The results of the chi square test indicated there were significantly more males in the original sample (40.1% of the sample identified as male; one participant did not identify his or her gender in the original sample) than the final sample (29.9% identified as male),

$\chi^2(1) = 9.44, p = 0.002$ (this is discussed as a limitation of the present study in the “Discussion” section). A chi square association test was also conducted using the dummy coded ethnicity and dummy coded retained data variables. The results of this analysis suggested the ethnic diversity in the original (72.2% of the sample identified as Caucasian) and final samples (72.9% of the sample identified as Caucasian) were not significantly different, $\chi^2(1) = 0.00, p = 0.993$. Finally, an independent samples t test was conducted to determine whether there were mean age differences in the original and final samples (with the dummy coded retained data variable as the independent variable and age as the outcome variable). The results indicated age did not significantly differ in the original ($M = 19.54; SD = 3.39$) and final samples ($M = 19.52; SD = 3.12$), $t(606) = 0.057, p = 0.955$. The demographic characteristics of participants in each experimental group are presented in Table 1.

Table 1

Frequencies of Demographic Variables Sorted by Experimental Condition

Demographic Variables	Gratitude N (%)	Optimism N (%)	Control N (%)
Total N (%)	61 (100%)	38 (100%)	45 (100%)
Gender			
Male	21 (31.4%)	9 (23.7%)	13 (28.9%)
Female	40 (65.6%)	29 (76.3%)	32 (71.1%)
Ethnicity			
Caucasian	48 (78.7%)	23 (60.5%)	34 (75.6%)
African-American	6 (9.6%)	8 (21.1%)	7 (15.6%)
Asian-American	3 (4.9%)	1 (2.6%)	1 (2.2%)
Biracial/Multiracial	1 (1.6%)	2 (5.3%)	-
Hispanic	3 (4.9%)	3 (7.9%)	2 (4.4%)
Native American	-	-	1 (2.2%)
Other	-	1 (2.6%)	-
Academic Classification			
Freshman	37 (60.7%)	17 (44.7%)	20 (44.4%)
Sophomore	9 (14.8%)	14 (36.8%)	17 (37.8%)
Junior	10 (16.4%)	4 (10.5%)	6 (13.3%)
Senior	5 (8.2%)	3 (7.9%)	2 (4.4%)

Instruments

Table 1 displays the results of a demographic questionnaire that was included in the online survey (see Appendix A). Some of the characteristics the questionnaire assessed included participants' age, sex, relationship status, academic classification, ethnicity, and the college that housed one's academic major (e.g., College of Engineering). Table 2 portrays the Cronbach's alpha coefficients, means, and standard deviations among the scales at each time point included in this study.

Table 2

Cronbach's Alpha Coefficients, Means, and Standard Deviations at Each Time Point for the Scales Used in the Present Study

Variable	Pretest			Immediate Posttest			4-week Follow-Up		
	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α
1. SWLS	4.89	1.43	.90	5.00	1.44	.90	4.94	1.39	.91
2. PA	3.37	.74	.87	3.28	.82	.89	3.31	.80	.91
3. NA	2.10	.71	.86	1.92	.72	.88	2.01	.73	.89
4. PWB	4.39	.65	.92	4.42	.71	.94	4.42	.74	.95
5. GQ6	6.04	.88	.83	-	-	-	-	-	-
6. LOT	2.33	.76	.85	-	-	-	-	-	-
7. Social Support	3.35	.51	.89	-	-	-	-	-	-

Note: Means and standard deviations have been converted into mean item scores on the scales. These mean item raw scores were used to calculate the alpha coefficients, as well as the other analyses in this study.

N = 144. SWLS = the Satisfaction with Life Scale, PA = Positive Affect subscale from Positive and Negative Affect Schedule, NA = Negative Affect subscale from Positive and Negative Affect Schedule, PWB = Ryff's Scales of Psychological Well-Being-Revised, GQ6 = Gratitude Questionnaire-Six Item Form, LOT = Life Orientation Test-Revised, and Social Support = Social Provisions Scale.

Satisfaction with Life

Life satisfaction, a component of subjective well-being, was measured using the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985; see Appendix B). The SWLS is composed of five items that measure the extent to which one is satisfied overall with his or her life on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Sample items include "In most ways my life is close to my ideal" and "I am satisfied with my life." Moderately strong correlations with other measures of well-being and strong negative correlations with measures of distress suggest the scale has good convergent and discriminant validity (for a review, see Pavot & Diener, 1993).

Cronbach's alpha coefficients for the scale among college samples have been

demonstrated to be 0.85 and 0.87 (Diener, 1985; Pavot, Diener, Colvin, & Sandvik, 1991). In the present study, the Cronbach's alpha coefficient for the SWLS was 0.90 at T1, 0.90 at T2, and 0.91 at T3.

Positive and Negative Affect

The positive and negative affect dimensions of subjective well-being were measured using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988; see Appendix B). The PANAS is comprised of two 10-item scales that measure the extent to which an individual feels positive affect (PA; e.g., interested and excited) and negative affect (NA; e.g., scared and nervous) on a 5-point Likert scale (1 = very slightly or not at all, 5 = extremely). Various time frames for rating affect with the PANAS have been used (e.g., "since yesterday," "past week," and "past few weeks") and these time frames have demonstrated good internal consistency coefficients (e.g., using these time frames alphas have ranged from 0.82 to 0.91 in student, adolescent, and college samples; Froh et al., 2008; Froh et al., 2009; Lyubomirsky et al., 2011). In an attempt to measure baseline affect, as well as affect-related changes during and after the intervention, positive and negative affect were measured using the following time frames in the present study: "over the past week" (Time 1), "over the past few days" (Time 2), and "over the past few weeks" (Time 3). Feeling words utilized in the scale include "interested," "guilty," and "alert." Psychometric data indicate the PANAS has good concurrent validity (e.g., positively correlates with measures of psychopathology) and good reliability (Cronbach's alphas ranged from 0.86 to 0.90 for PA and 0.84 to 0.87 for NA among a large general population sample in the United Kingdom and a large undergraduate college sample; Crawford & Henry, 2004; Watson et al., 1988). Further,

Watson and colleagues (1988) also published Cronbach's alphas using the following time frames with the instrument (using a primarily undergraduate college sample): "past few days" ($\alpha = 0.88$ for PA and $\alpha = 0.85$ for NA) and "past few weeks" ($\alpha = 0.87$ for PA and $\alpha = 0.87$ for NA). In the present study, Cronbach's alphas ranged from 0.87 to 0.91 for PA and from 0.86 to 0.89 for NA.

Psychological Well-Being

Ryff's Scales of Psychological Well-Being-Revised (SPWB-R; Ryff, 1989; Ryff & Keyes, 1995; see Appendix B) were used to assess psychological well-being. The SPWB-R are comprised of six factors that, together, comprise an overall measure of psychological well-being: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. Items are measured on a 6-point Likert scale (1 = strongly disagree; 6 = strongly agree) and an overall measure of psychological well-being can be calculated by summing scores from all 42 items (after reverse coding relevant items). Item examples include "I have confidence in my opinions, even if they are contrary to the general consensus" (autonomy), "In general, I feel I am in charge of the situation in which I live" (environmental mastery), "I have the sense that I have developed a lot as a person over time" (personal growth), "Most people see me as loving and affectionate" (positive relations with others), "I have a sense of direction and purpose in life" (purpose in life), and "In general, I feel confident and positive about myself" (self-acceptance). The 42-item version was adapted from the original 84-item version (Ryff, 1989), and covers the same six dimensions of psychological well-being as does the longer version. Published data provide support for the convergent (e.g., positively correlated with life satisfaction) and discriminant (e.g., negatively correlated

with depression) validity of the scales (Ryff, 1989; Ryff & Keyes, 1995). Cronbach's alphas for this instrument in the present study were between 0.92 and 0.95, and prior studies have found Cronbach's alpha coefficients for the 42-item version have ranged from 0.72 to 0.85 in an undergraduate college sample and 0.71 to 0.84 in a middle-aged community sample (Gallagher, Lopez, & Preacher, 2009).

Dispositional Gratitude

The Gratitude Questionnaire-Six Item Form (GQ-6; McCullough, Emmons, & Tsang, 2002; see Appendix B) was utilized to measure dispositional gratitude. The GQ-6 is a six-item self-report questionnaire designed to assess the tendency to experience gratitude in everyday life. It measures a single gratitude factor (an affective trait) that involves the experience of gratefulness and appreciation in everyday life (McCullough et al., 2002). Items are measured on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) and example items include "I have so much in life to be thankful for" and "If I had to list everything that I felt grateful for, it would be a very long list." Items three and six are reverse coded on the GQ-6 and higher scores suggest higher dispositional gratitude. McCullough et al.'s (2002) findings showed the GQ-6 can be discriminated from related constructs (e.g., life satisfaction) and is yet significantly correlated with similar constructs such as religious and spiritual tendencies, positive emotionality, hope, and vitality. Research has also shown a grateful disposition could not simply be reduced to a linear combination of big five personality traits, and thus, is distinct from the big five traits (McCullough et al., 2002; Wood et al., 2008). Cronbach's alpha coefficients for total scale scores have ranged from 0.76 (undergraduate college

sample) to 0.87 (general nonstudent population) (McCullough et al., 2002; McCullough, Tsang, & Emmons, 2004). In the present study, Cronbach's alpha coefficient for the GQ-6 at baseline was 0.83.

Dispositional Optimism

Dispositional optimism was measured using the Life Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994; see Appendix B). The LOT-R is a 10-item scale measuring general expectancies of positive versus negative future outcomes on a five-point Likert scale (0 = strongly disagree, 4 = strongly agree). Sample items include "In uncertain times, I usually expect the best," "I'm always optimistic about my future," and "I rarely count on good things happening to me." Four statements are filler items and are not included in calculating dispositional optimism scores (e.g., "I don't get upset too easily"). Items three, seven, and nine are reverse coded, and higher scores indicate higher trait optimism. Empirical findings have portrayed mostly modest correlations with related constructs (e.g., positively correlated with self-esteem and self-mastery, and negatively correlated with neuroticism), thus providing evidence for the discriminant and convergent validity of the LOT-R (Scheier, Carver, & Bridges, 1994; Glaesmer et al., 2011). Test-retest reliability coefficients have ranged from 0.56 to 0.78 over 24 months and Cronbach's alpha coefficient was 0.82 in a large undergraduate student sample (N = 4,309) (Scheier, Carver, & Bridges, 1994). In this study, the LOT-R demonstrated good internal consistency in terms of measuring optimism traits at baseline (Cronbach's alpha coefficient =0.85).

Social Support

A short version of Russell and colleagues' Social Provisions Scale (SPS; Russell et al., 1984; see Appendix B) was used to measure the extent to which participants experience social provisions from other people. The scale is composed of 10 items that are scored on a 4-point Likert scale (1 = *strongly disagree*; 4 = *strongly agree*). The scale measures five of the six social provisions as theorized by Weiss (1973/1974) and includes the following five subscales: attachment, social integration, reassurance of worth, reliable alliance, and guidance (excluding opportunity for nurturance). Two items measure each provision (i.e., one positively worded item and one negatively worded item). Sample items include (attachment provision) "I have close relationships that provide me with a sense of emotional security and well-being" (positively worded) and "I feel that I do not have close personal relationships with other people" (negatively worded). Five of the items on the short version of the SPS are reverse coded, and higher scores on the SPS indicate individuals perceive they are receiving better provisions from current social relationships.

Although validity information for the short version has not been published, one of the original authors has hypothesized that the short version of the SPS has similar validity data as the longer version (Russell, personal communication, August 5, 2015). As such, supporting the validity of the long version of the SPS, data suggest the instrument negatively predicts loneliness (Cutrona, 1982) and that college students' self-rated satisfaction with various relational sources (i.e., family, friends, and romantic partners) significantly predicted the six social provisions (Russell et al., 1984). Using data collected from a number of studies (that included college samples) that has accumulated

over 2,000 cases (Constable & Russell, 1986; Russell, Altmaier, & Van Velzen, 1987; Russell & Cutrona, 1987; Russell, personal communication, August 5, 2015), the Cronbach's alpha coefficient for the total scale score on the short version was demonstrated to be 0.83 (Russell, personal communication, August 5, 2015). In the present study, the SPS portrayed a Cronbach's alpha coefficient of 0.89 at baseline measurement.

Procedure

Following approval from the Institutional Review Board at the relevant university, this study was conducted via an online survey platform. With the permission of instructors, the primary investigator visited undergraduate classes to describe the study and to solicit research participation. Additionally, emails that announced the opportunity to participate in the study were sent from the primary investigator or class instructors, and extra credit was typically offered to students for participating in the study. The lead investigator sent a standardized email to all instructors who were willing to share the research opportunity with students. This email included information about the study and included a survey link that enabled potential participants to review and endorse the informed consent documentation, as well as to complete baseline measures.

After indicating informed consent on this platform, participants completed a demographic questionnaire and six measures, including measures that assessed participants' current well-being levels, dispositional gratitude and dispositional optimism, and perceived social support. The order in which the measures were administered was randomized to control for order effects. Every three days, baseline data from new participants were downloaded from the survey software website. Then, an online-based

random number generator (viz., www.randomizer.com) was used to derive a randomly assorted list of numbers from one to three. The primary investigator then randomly assigned participants in each downloaded wave of baseline data to one of the three experimental groups (i.e., 1 = gratitude, 2 = optimism, and 3 = control).

Email addresses were collected from each participant and were used to send emails over the course of approximately one month to remind participants to complete study measures at three time points (pretest, posttest, and follow-up) and to engage in the assigned intervention. Separate emails with unique survey links were sent to participants the first two days of the intervention, on the final day of the intervention (this survey also included the well-being measures as an immediate posttest), and at the 4-week posttest. Participants who adequately completed all portions of the study completed a total of five surveys.

In order to categorize survey responses by participant, all participants were given a unique identification (ID) number that was linked to each survey they completed. For the purposes of data analysis and the written portion of the present study (i.e., the results and discussion sections), ID numbers (and connected survey responses) and email addresses were retained until data analysis was complete. Although the survey software automatically collected IP addresses, the lead investigator and his dissertation chair were the only people that were able to view this information. Additionally, this information was not used to identify participants' responses during data collection or analysis.

The emails included an embedded survey link (a separate link for each condition and for each day of the intervention) from which participants could directly access the relevant questionnaire or intervention. Email links directed participants to an open-ended

response box in which participants were asked to first reflect on and then to briefly write on a particular topic. Daily emails were sent to participants using the primary investigator's university email address. Specific instructions regarding how to engage in an intervention differed depending on the group to which participants were assigned, but common information to be communicated to all participants included the following: participants were instructed to reflect on a topic and journal about it for 20 minutes a day for three days and to read a brief rationale intended to elicit positive expectancies for the effects of engaging in the interventions (including the control intervention). Participants were directed to the first exercise immediately after completing the baseline measures (T1). On each intervention day, participants were asked to record journal entries in a blank text box so entries could be retained for use during a manipulation check (see below).

Similar intervention formats (in terms of duration) and topics (e.g., optimism) have been used in prior studies and findings from those studies indicated that brief interventions were associated with significant increases in subjective well-being (following 3-day-long [Wing et al., 2006] and 4-day-long intervention periods [King, 2001]). Prior findings indicate positive interventions have been administered with widely variable dosages (e.g., a gratitude intervention administered 15 minutes once a week for eight weeks [Dickerhoof, 2007], a positive writing intervention administered 15 minutes a day for three consecutive days over the course of one week [Wing et al., 2006], and a gratitude intervention administered 10 minutes each night for a week [Seligman et al., 2005]). There does not appear to be consensus regarding recommended dosage in the literature, and a briefer intervention period may be optimal in this study due to the high

risk of dropout due to the within-subject experimental design (i.e., due to the within subjects factor—time). Additionally, if it is determined that well-being can be significantly enhanced by relatively brief interventions (i.e., approximately 20 minutes a day) over a three-day-period, this may have important implications for applied settings (e.g., counselors can recommend these interventions in smaller doses and still expect significant well-being effects).

Gratitude Condition

In addition to receiving the general instructions regarding the study procedure listed previously, participants in the gratitude condition completed an exercise adapted from the “three good things in life” exercise as described by Seligman and colleagues (2005, p. 416). For this exercise, participants were asked to reflect and write about three good things that happened that day, why they believed those events occurred, and ways they could attempt to recreate such positive experiences in the future.

Optimism Condition

In addition to receiving the general procedure instructions, participants in the optimism condition were asked to imagine a positive future in a number of life domains including family, school, and general life. Participants were then be asked to write about this positive future by imagining details of this future, reflecting on current issues they were experiencing that will be resolved by then, and to use their future self to provide sage advice to their current self. The rationale and instructions for participating in this exercise followed the instructions provided by Shapira and Mongrain (2010) in their original article describing the exercise:

Imagine yourself in the future (6 months/1 year/ 2 years/5 years/10 years from now – Pick a time frame that makes sense to you). Imagine you are in a better place where you have resolved some of the issues that are concerning you now.

(1) Describe where you are, what you are doing, and what is happening in your life. Enrich with as much detail as possible.

(2) Tell yourself the crucial things you realized or the critical steps you took to get there. Give yourself some sage and compassionate advice from a better future. (p. 381)

Control Condition

Finally, the control condition involved asking participants to reflect on and write about an early memory in detail. Participants were asked to write about this memory as if they were a reporter for a newspaper and were instructed to avoid becoming emotionally engaged in the journal entry. Participants then read a statement that informed them of the possibility that engaging in the exercise may help them gain insight and understanding into who they are as well as facilitate their overall well-being. Similar rationales and instructions for control conditions have been used in previous studies and the present control condition combined aspects of more than one condition utilized as a control in past studies (Seligman et al., 2005; Sergeant & Mongrain, 2014; Shapira & Mongrain, 2010).

On the final day of the active intervention period (day 3), participants were asked to complete the assigned exercise, and subsequently complete the well-being measures they previously filled out (i.e., this survey included the third day of the assigned intervention and other measures that were completed on a single survey at baseline).

Emails with another survey link that included these measures were sent to participants as a 4-week posttest (this final follow-up included the baseline well-being measures).

Data Analysis

Manipulation Check

A manipulation check was conducted in the present study by reviewing journal posts to ensure compliance on each of the three days of the active intervention period. Many prior studies did not evaluate the content of journal entries for the purpose of ensuring adequate engagement in the exercise (e.g., Mongrain & Shapiro, 2010; Seligman et al., 2005; Sergeant & Mongrain, 2014); however, employing this method in the present study was done with the intention of improving the integrity of data analysis by retaining more valid data (e.g., removing data in which journal posts were simply copied and pasted each day). As a result, two doctoral students and an undergraduate student rated the extent to which participants followed the intervention instructions by reading all journal entries and rating each entry on a seven-point Likert scale (1 = did not enter a journal entry; 7 = entered a new journal post and it was extremely relevant to the intervention instructions). Raters were trained and instructed to evaluate the extent to which participants wrote a new post on each day of the intervention and that each post related to the topic to which they were assigned (e.g., whether a gratitude group participant wrote a unique post on each day of the intervention relating to things for which he or she was grateful). They were also given specific descriptors for each of the Likert scale values and were asked to ascribe the most relevant descriptor to each journal entry. Raters' scores for each entry were averaged and mean ratings of four or above

were considered acceptable journal entries (those with mean ratings of three or below were handled as missing data and were thus removed from the final sample).

After the coders finished rating each journal entry and mean ratings were calculated for each of the entries, interrater agreement was assessed using guidelines recommended in the literature (i.e., average measure unit intraclass correlation coefficients [ICCs] were calculated since the ratings from three non-randomly selected coders were used to calculate mean ratings for each journal post; Hallgren, 2012). In the present study, the average measures unit ICC was 0.984 on day one, 0.978 on day two, and 0.982 on day three. Using conventional levels recommended in the literature (i.e., researchers recommend ICCs between 0.60 and 0.74 are “good” and 0.75 and above are “excellent”; Cicchetti, 1994; Hallgren, 2012), these coefficients suggested the interrater reliability during this task was excellent. This manipulation check combines methodological components from prior literature (Lyubomirsky et al., 2011; Rash et al., 2011), as well as a technique (i.e., using independent coders to rate compliance using certain criteria) that, at this point, has not been frequently applied in this body of literature.

CHAPTER FOUR

RESULTS

The final sample of this study included 144 college students. All participants completed each part of the intervention and completed at least 80% of the questions on baseline and follow-up surveys. Missing data were handled using the person mean substitution method. Prior empirical research supports the use of person mean substitution over competing options such as listwise deletion or item mean substitution (Hawthorne & Elliott, 2005), and evidence also suggests it is an effective and valid method for removing missing data for participants with missing data values of 20% or less (Downey & King, 1998).

Preliminary analyses were conducted prior to testing the study hypotheses and research questions. First, two separate one-way analyses of variance (ANOVA) were conducted to determine whether participants had significant differences in terms of baseline subjective or psychological well-being by treatment group. The results of the one-way ANOVA comparing groups on subjective well-being indicated there were no statistically significant differences between treatment groups, $F(2, 141) = 2.09, p = 0.127$. Similarly, the results of the one-way ANOVA comparing treatment groups in psychological well-being were not statistically significantly different, $F(2, 141) = 2.30, p = 0.104$. Taken together, these results show no statistically significant differences in

baseline levels of subjective well-being and psychological well-being between the treatment groups.

Next, two separate independent t-tests were conducted to determine whether there were significant gender differences in baseline subjective well-being and psychological well-being. Results indicated there were no significant gender differences in baseline subjective well-being, $t(142) = -0.14, p = 0.89$; similarly, there were no significant gender differences in baseline psychological well-being, $t(142) = -1.01, p = 0.31$.

Hypothesis 1: PPIs Will Have Significant Positive Effects on T2 and T3 Subjective Well-Being

To test whether the interventions affected subjective well-being over time, a two-way repeated measures mixed analysis of variance (ANOVA) was conducted. It was hypothesized that PPIs will have significant effects on subjective well-being.

Specifically, it was expected that participants in the gratitude and optimism groups would exhibit significantly greater gains in subjective well-being than those in the control group immediately following the intervention (T2) and at follow-up (T3); however, subjective well-being changes in the gratitude and optimism groups were not expected to be significantly different.

This analysis included two independent factors: a between-subjects factor (intervention) and a within subjects factor (time). The between-subjects factor included three levels: gratitude, optimism, and control. Likewise, the within-subjects factor included three levels: pretest, immediate posttest, and four-week follow-up. The dependent variable, subjective well-being, was calculated by taking the sum of the standardized scores of positive affect, negative affect, and life satisfaction. This method

has been used to measure subjective well-being in prior empirical studies (e.g., Lyubomirsky et al., 2011) and there does not appear to be any empirical or theoretical studies that suggest one or more of these components (i.e., positive affect, negative affect, or life satisfaction) differentially contribute to subjective well-being. The items of the negative affect variable were reverse coded prior to computing the subjective well-being variable.

Prior to testing Hypothesis 1, the assumptions of the two-way repeated measures ANOVA (Tabachnick & Fidell, 2013) were examined. First, to explore whether there were any outliers within each level of the independent factors (i.e., time and intervention), standardized scores were computed. An evaluation of these values indicated there were no standardized scores greater than ± 3.29 ($p < 0.001$, two-tailed test); therefore, it was concluded that there were no outliers in the data (Tabachnick & Fidell, 2013). The assumption of normality was examined within each level of the independent factors by evaluating the histograms, Q-Q plots of the standardized residuals, and skewness and kurtosis values, which ranged from -0.68 to 0.40; thus, none of the subjective well-being measurements showed significant skewness or kurtosis problems by group or time (values less than ± 2 are considered acceptable; Tabachnick & Fidell, 2013). An inspection of histograms, normality plots, and Shapiro-Wilks tests for subjective well-being scores within the gratitude group at T2 portrayed slight violations of normality ($p < 0.05$ for Shapiro-Wilks test). However, ANOVA analyses are considered robust against deviations from normality (Tabachnick & Fidell, 2013); therefore, the original nontransformed data were used during formal analysis.

In order to test the sphericity assumption Mauchly's test of sphericity was evaluated. The results of this test indicated that the sphericity assumption was met, $\chi^2(2) = 2.21, p = 0.33$.

The means and standard deviations of subjective well-being scores at each level of the independent factors are presented in Table 3. The results of the two-way repeated measures mixed ANOVA indicated there was no significant interaction between intervention and time on subjective well-being, $F(4, 282) = 0.42, p = 0.80$. Additionally, there was no main effect of time on subjective well-being across the various time points, $F(2, 282) = 0.001, p = 0.99$. Likewise, the main effect of intervention on subjective well-being was nonsignificant, $F(2, 282) = 2.54, p = 0.08$. These results indicated the PPIs did not produce significant positive effects on subjective well-being at T2 and T3; as such, Hypothesis 1 was not supported.

Table 3

Means and Standard Deviations for Subjective Well-being at Each Level of the Independent Factors

Variable	T1 SWB		T2 SWB		T3 SWB		Marginal Mean Estimates
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Gratitude	.45	2.26	.47	2.09	.40	2.26	.44 (.27)
Optimism	-.41	1.81	-.43	2.18	-.57	2.25	-.47 (.34)
Control	-.26	2.58	-.28	2.35	-.06	2.46	-.20 (.31)

Note: SWB = Subjective well-being; variable consists of the summed mean values for positive affect, negative affect (reverse coded), and satisfaction with life. The estimated marginal means are in the far right column and the standard error for these means are in the parentheses. The pairwise comparisons suggested there were no statistically significant estimated marginal means.

Hypothesis 2: The PPIs Will Have Significant Positive Effects on T2 and T3 Psychological Well-Being

A two-way repeated measures mixed ANOVA determined whether the interventions had a significant effect on psychological well-being over time. It was hypothesized that participants in the gratitude and optimism groups would exhibit significantly greater gains in psychological well-being than those in the control group immediately post-intervention (T2) and at follow-up (T3). Additionally, it was expected that the gratitude and optimism groups would not differ in changes in psychological well-being. Similar to Hypothesis 1, the independent factors in this analysis included the intervention levels and time. Participants' overall psychological well-being scores were used as the dependent variable in this analysis.

The assumptions of the two-way repeated measures mixed ANOVA were examined prior to testing Hypothesis 2. This analysis indicated there were two outliers, both from the same participant (one at T1 and the other at T2). In order to determine whether the outliers significantly affected the results, separate two-way repeated measures mixed ANOVAs were conducted with and without the outliers included. The results portrayed a significant main effect of intervention on psychological well-being when the outliers were removed, but a nonsignificant effect when the outliers were included. Since both outliers came from the same participant's responses, the participant's other responses were evaluated to ensure his or her results were not the result of response bias. The other responses were variable (i.e., not all 1's, etc.) and consistent (i.e., most items were consistently rated on low end of rating scales); thus, the

participant's responses did not seem to be a result of response bias. However, the participant's data were still removed from the present analysis since they significantly affected the results.

The normality assumption was examined within each level of the independent factors and indicated psychological well-being deviated from normality in the gratitude condition (Skewness = -1.12, Kurtosis = 2.31 [T1] and Skewness = -1.01, Kurtosis = 1.65 [T2]). However, neither square root or logarithmic transformations improved the skewness or kurtosis of psychological well-being; therefore, the original data were used during subsequent analysis. Both the homogeneity of variance ($p=0.02$ at T1) and sphericity assumptions were violated ($p=0.048$), and as such, Greenhouse-Geisser values were interpreted during the formal analysis.

The means and standard deviations for participants' levels of psychological well-being at each level of the independent factors are listed in Table 4. The results of the two-way repeated measures mixed ANOVA indicated there was no interaction between the intervention and time on psychological well-being, $F(3.84, 268.50) = 1.06, p = 0.37$. In addition, the main effect of time on psychological well-being at all time points was not significant, $F(1.92, 268.50) = 0.66, p = 0.51$. However, there was a significant main effect of intervention on psychological well-being, $F(2, 140) = 3.51, p = 0.03, \eta_p^2 = 0.05$ (small to medium effect size; Cohen, 1988). Pairwise comparisons indicated that the gratitude condition exhibited significantly higher psychological well-being than the optimism condition with 95% CIs between [0.02, 0.65]. However, the gratitude condition did not differ from the control condition in terms of psychological well-being. Similarly, the optimism and control conditions did not differ in psychological well-being. For the

gratitude group, psychological well-being increased the most at T2, before slightly decreasing at T3 (although psychological well-being at T3 was still higher than baseline levels). The optimism group incrementally increased in psychological well-being at each time point. Finally, the control group displayed a decrease in psychological well-being at T2 and an increase at T3.

These results suggest Hypothesis 2 was not supported, since the PPIs did not significantly differ from the control condition, but the two active conditions (i.e., the gratitude intervention and the optimism intervention) significantly differed from each other (i.e., the gratitude intervention was associated with significant increases in psychological well-being when compared to the optimism condition). Figure 1 displays the significant main effect of the gratitude intervention on psychological well-being when compared to the optimism intervention.

Table 4

Means and Standard Deviations for Psychological Well-being at Each Level of the Independent Factors

Variable	T1 PWB		T2 PWB		T3 PWB		Marginal Mean Estimates
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Gratitude	4.53	.56	4.62	.63	4.56	.69	4.57 (.08)*
Optimism	4.21	.52	4.23	.60	4.28	.66	4.24 (.10)*
Control	4.39	.72	4.35	.77	4.41	.78	4.39 (.09)

Note: PWB = Psychological well-being. * = significantly differ from the other value with an asterisk at $p < 0.05$ cutoff. In this case, this suggests the estimated marginal means for the gratitude condition were significantly higher than the estimated marginal mean in the optimism condition. The standard errors of these means are listed in the parentheses.

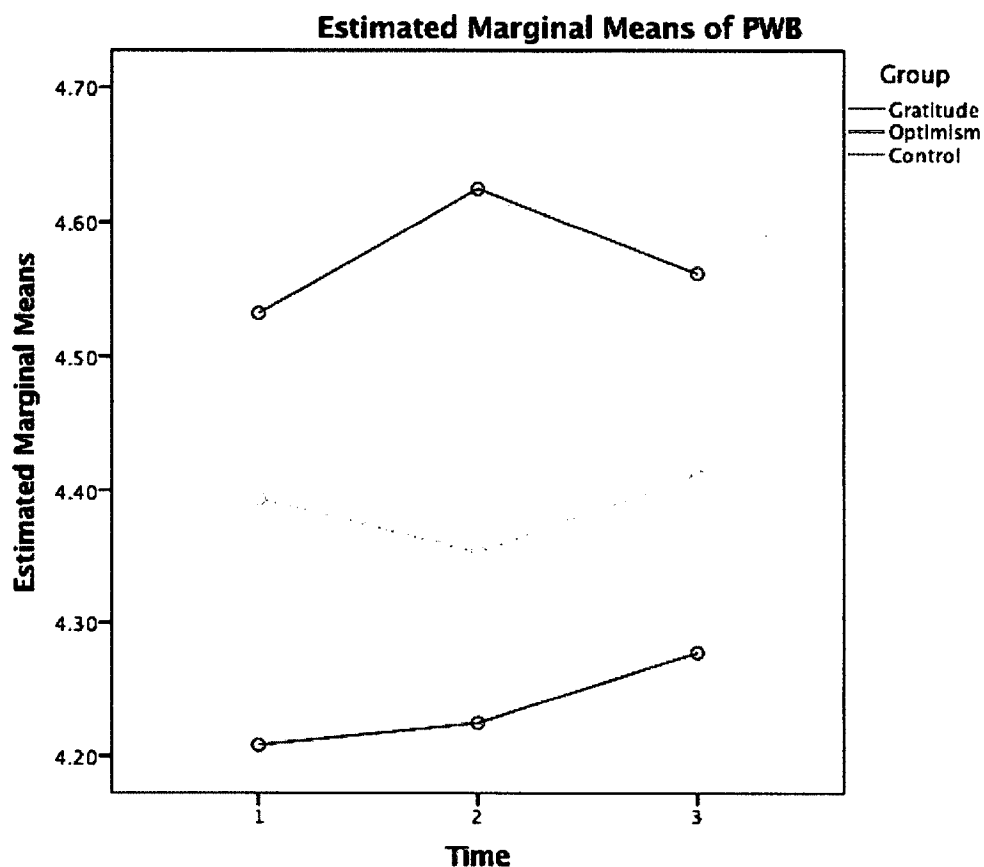


Figure 1. Estimated Marginal Means of PWB

The line represents the estimated marginal means for psychological well-being (PWB) following the intervention conditions. Notice the gratitude condition experienced greater psychological well-being than the optimism condition ($p = 0.03$), but none of the other comparisons significantly differed.

Hypothesis 3: Social Support Will Moderate the Relationships Between the PPIs and Subjective Well-Being

It was hypothesized that those who perceived they were receiving higher levels of social support at pretest would exhibit significantly greater increases in subjective well-being at T2 and T3. As such, two hierarchical multiple regression analyses were conducted to evaluate whether social support moderated the relationships between the interventions (i.e., gratitude and optimism) and subjective well-being (separate analyses included either T2 or T3 subjective well-being), after controlling for baseline subjective

well-being (Baron & Kenny, 1986; Frazier et al., 2004). Frazier et al.'s (2004) recommended steps for testing moderation hypotheses were followed to test Hypothesis 3. As such, the intervention variable was first dummy coded prior to conducting the analyses. Using the control group as the reference category, two dummy variables (i.e., optimism and gratitude) were created. The continuous predictor (i.e., T1 subjective well-being) and moderator (i.e., social support) variables were then standardized. Next, the interaction between the intervention conditions (i.e., gratitude and optimism) and social support were computed by taking the product of each dummy variable and standardized social support (i.e., social support X gratitude and social support X optimism).

Once the dummy variables, standardized continuous variables, and interaction terms were created, these variables were inserted into separate three-step hierarchical multiple regression analyses. Using subjective well-being as the dependent variable (i.e., T2 subjective well-being in the initial analysis and T3 subjective well-being in the second regression analysis), each regression equation included T1 subjective well-being as a covariate in step one, dummy coded predictor variables (i.e., gratitude and optimism) and the moderator variable, baseline social support, in step two, and the interaction terms (i.e., social support X gratitude intervention and social support X optimism condition) in step three. As proposed by Frazier et al. (2004), moderation was interpreted as occurring if step three in these analyses portrayed a significant change in the amount of variance accounted for by the interaction terms (assessed by statistical significance of ΔR^2 values). Table 5 is listed below and includes bivariate correlations among all predictor, moderator, and dependent variables included in Hypotheses 3 and 4 (i.e., T2 and T3 subjective well-being and psychological well-being).

Table 5

Means, Standard Deviations, Cronbach's Alphas, and Bivariate Correlations Among the Predictor, Moderator, and Dependent Variables for Hypotheses 3 and 4

Variable	1	2	3	4	5	6	7	8	9	10	11	Mean	SD	Alpha
1. SWB1	-	.77**	.75**	.77**	.70**	.69**	.17*	-.11	.61**	.45**	.11	0.00	1.00	-
2. SWB2		-	.79**	.72**	.78**	.74**	.18*	-.12	.58**	.41**	.22*	0.00	2.22	-
3. SWB3			-	.67**	.70**	.81**	.15	-.15	.53**	.32	.23*	0.00	2.34	-
4. PWB1				-	.86**	.82**	.14	-.17*	.75**	.57**	.17*	0.00	1.00	.92 ^a
5. PWB2					-	.85**	.20*	-.16	.69**	.51**	.19*	4.42	.71	.94
6. PWB3						-	.12	-.12	.66**	.47**	.24*	4.42	.74	.95
7. Grat Intervention							-	-.51**	.13	.11	.15	.42	.50	-
8. Opt Intervention								-	-.16	-.05	-.29*	.26	.44	-
9. Social Support									-	.70**	.42**	0.00	1.00	.89 ^a
10. SS x Grat										-	.02	.06	.69	-
11. SS x Opt											-	-.07	.41	-

^a = the Cronbach's alpha coefficients listed for PWB1 and Social Support were calculated using the unstandardized variables. Cronbach's alphas are not displayed for SWB1, SWB2, or SWB3 since they are comprised of positive affect, negative affect (reverse coded), and satisfaction with life. The Cronbach's alphas for these scales are listed in the "Instruments" portion of the Method section.
N = 144.

Note: SWB1, PWB1, and Social Support were standardized prior to conducting this correlation analysis. Grat Intervention and Opt Intervention were dummy coded with the control intervention serving as the reference group for each dummy coded variable. SS x Grat and SS x Opt are the products of standardized social support with each of the gratitude and optimism dummy variables. * $p < 0.05$. ** $p < 0.001$.

Hypothesis 3A: Social Support Will Moderate the Relationships Between the Gratitude and Optimism Interventions and T2 Subjective Well-Being

Prior to assessing whether social support moderated the hypothesized effect of the experimental conditions on T2 subjective well-being (after controlling for T1 subjective well-being), data were evaluated to ensure the assumptions of linear regression were met. An inspection of scatter plots indicated the standardized residuals among the predictors on T2 subjective well-being approximated a linear pattern; thus, the linearity assumption was met. The normality of residuals assumption was evaluated by examining the normal P-P plot of the standardized residuals and histograms for each of the predictors. The results suggested the standardized residuals of T2 subjective well-being for each of the predictors approximated the normal P-P plot, as well as a normally distributed histogram; as a result, the normality of standardized residuals assumption was met. Additionally, an inspection of the standardized residuals and standardized predicted values for T2 subjective well-being suggested the variability of the residuals was constant for T2 subjective well-being; thus, the homoscedasticity assumption was met.

Potential outliers were assessed by evaluating the Maholonobis distance, centered leverage, and Cook's distance values. An inspection of these values revealed that data from four participants met criteria as being both multivariate and univariate outliers (i.e., participants produced values greater than a chi square cutoff of 22.46 [chi-square table; $df = \text{number of predictors}$] for Maholonobis distance and centered leverage values greater than the cutoff level [.146 in this case; calculated with formula published in Stevens, 2012]). The analyses were run with and without these participants' data included in order to discern whether the outliers significantly affected the results of the hierarchical

multiple regression. The results indicated the outliers did not significantly influence the results; as such, the outliers were retained in the data during subsequent analysis. In addition, an inspection of variance inflation values (VIF) indicated multicollinearity was not a problem for any of the predictors or moderators, and thus, the multicollinearity assumption was met (all VIF values were under 10; Tabachnick & Fidell, 2013).

Finally, a hierarchical multiple regression analysis was conducted to examine whether there were significant changes in variation of T2 subjective well-being after adding an interaction term between social support and the dummy coded experimental conditions (i.e., gratitude and optimism conditions). The results of the hierarchical multiple regression analysis are presented in Table 6. In step one, the results suggested T1 subjective well-being was positively related to increases in T2 subjective well-being, $\Delta F(1, 142) = 211.73, p < 0.001, R^2 = 0.60$. The predictors included in step two of the analysis were not significantly related to T2 subjective well-being, $\Delta F(3, 139) = 2.62, p = 0.053, \Delta R^2 = 0.021$. However, an analysis of the regression coefficients produced in step two indicated T1 subjective well-being ($B = 1.46; p < 0.001$) and social support ($B = 0.39; p = 0.01$) were both statistically significant predictors of T2 subjective well-being. In step three, the results indicated the interaction terms were nonsignificant, $\Delta F(2, 137) = 1.57, p = 0.21, \Delta R^2 = 0.008$. These findings suggest that social support did not moderate the relationships between PPIs and T2 subjective well-being. Therefore, Hypothesis 3A was not supported.

Table 6

Hierarchical Multiple Regression: Examining Social Support as a Moderator of the Relationship between Active PPIs and T2 Subjective Well-Being

Variable	R ²	ΔR ²	B ^a	SE B	β ^b	t	95% CI
Step 1	.60***	.60***					
SWB1			1.72***	.12	.77***	14.55	1.48, 1.95
Step 2	.62	.021					
SWB1			1.46***	.15	.66***	9.86	1.17, 1.76
Grat Intervention			.26	.28	.06	.93	-.288, .801
Opt Intervention			.06	.31	.01	.20	-.547, -.672
Social Support			.39*	.15	.17*	2.60	.092, .679
Step 3	.63	.008					
SWB1			1.53***	.15	.69***	10.04	1.23, 1.83
Grat Intervention			.24	.28	.05	.88	-.303, .785
Opt Intervention			.17	.31	.04	.55	-.448, .796
Social Support			.17	.23	.08	.72	-.290, .624
SS x Gratitude			.16	.26	.05	.59	-.361, .671
SS x Optimism			.64	.37	.12	1.76	-.079, 1.36

^a Unstandardized regression coefficient

^b Standardized beta weight

N = 144. SWB1 and Social Support variables were standardized prior to conducting the regression analysis.

* p < 0.05, ** p < 0.01, *** p < 0.001.

**Hypothesis 3B: Social Support Will Moderate the Relationships
Between the Gratitude and Optimism Interventions and
T3 Subjective Well-Being**

Before examining whether social support moderated the hypothesized effect of the experimental conditions on T3 subjective well-being (after controlling for T1 subjective well-being), the assumptions of linear regression were examined. The results indicated the normality of residuals, linearity, multicollinearity, and homoscedasticity assumptions were met. However, an analysis of the outliers assumption suggested there were four possible outliers in the data (using same cutoff values utilized in Hypothesis 3A); therefore, two hierarchical multiple regressions were conducted (i.e., one with and one without data from participants' from which the potential outliers were derived). In the regression analysis in which the outliers were not included, the results suggested the interaction term for social support and the optimism dummy variable significantly moderated the effect of the optimism condition on T3 subjective well-being, $\Delta F(2, 133) = 4.58, p = 0.01, \Delta R^2 = 0.030$. Due to this discrepancy, and since a closer inspection of these data did not seem to suggest the presence of response bias, the outliers were removed prior to conducting the following analysis as this allowed the apparent moderation effect to be examined more closely. Table 7 presents bivariate correlations for the variables included in this analysis, after removing the outliers.

Table 7

Means, Standard Deviations, Cronbach's Alphas, and Bivariate Correlations Among the Predictor, Moderator, and Dependent Variables for Hypothesis 3: Outliers Removed

Variable	1	2	3	4	5	6	7	8	Mean	SD	Alpha
1. SWB1	-	.75***	.73***	.17*	-.14	.57***	.42***	.11	.05	.97	-
2. SWB2		-	.77***	.19*	-.15	.52***	.38***	.24**	.11	2.13	-
3. SWB3			-	.15	-.18*	.47***	.28**	.27**	.11	2.26	-
4. Grat Intervention				-	-.52***	.13	.18*	.13	.43	.50	-
5. Opt Intervention					-	-.21*	-.09	-.25**	.26	.44	-
6. Social Support						-	.71***	.46***	.09	.87	.86 ^a
7. SS x Grat							-	.02	.09	.61	-
8. SS x Opt								-	-.06	.37	-

^a = the Cronbach's alpha coefficient listed for Social Support was calculated using the unstandardized variable. $N = 140$.

Note: SWB1 and Social Support were standardized prior to conducting this correlation analysis. Grat Intervention and Opt Intervention were dummy coded with the control intervention serving as the reference group for each dummy coded variable. SS x Grat and SS x Opt are the products of standardized social support with each of the gratitude and optimism dummy variables. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

The hierarchical multiple regression analysis was examined, without the four outliers, to further evaluate whether social support moderated the hypothesized effect between experimental conditions and T3 subjective well-being. Table 8 presents the results of this hierarchical multiple regression analysis. The results of step one showed that T1 subjective well-being predicted T3 subjective well-being, $\Delta F(1, 138) = 153.27$, $p < 0.001$, $R^2 = 0.53$. In step two, the predictors and moderator variable were not significantly related to T3 subjective well-being, $\Delta F(3, 135) = 1.12$, $p = 0.34$, $\Delta R^2 = 0.011$. However, in step three, the addition of the interaction terms accounted for a significant change in the variance of T3 subjective well-being, $\Delta F(2, 133) = 4.58$, $p = 0.01$, $\Delta R^2 = 0.030$. Similarly, an analysis of the unstandardized regression weight for the two-way interaction between social support and the optimism condition was significant, $B = 1.20$; $t(133) = 2.60$, $p = 0.01$. These findings suggest that social support moderated at least one of the relationships between the PPIs and T3 subjective well-being. Therefore, Hypothesis 3B was at least partially supported and follow-up analyses were required in order to explore the nature of the moderation effect(s) (e.g., whether social support moderated the effects of both active interventions on subjective well-being).

Table 8

Hierarchical Multiple Regression: Examining Social Support as a Moderator of the Relationship between Active PPIs and T3 Subjective Well-Being

Variable	R ²	ΔR ²	B ^a	SE B	β ^b	t	95% CI
Step 1	.53***	.53***					
SWBI			1.70***	.14	.68***	12.38	1.43, 1.97
Step 2	.54	.011					
SWBI			1.58***	.17	.68***	9.42	1.25, 1.91
Grat Intervention			-.11	.31	-.02	-.34	-.729, .513
Opt Intervention			-.45	.36	-.09	-1.27	-1.15, .252
Social Support			.20	.19	.08	1.04	-.177, .568
Step 3	.57***	.030***					
SWBI			1.69***	.17	.72***	10.01	1.35, 2.02
Grat Intervention			-.12	.31	-.03	-.37	-.734, .505
Opt Intervention			-.28	.35	-.06	-.80	-.976, .415
Social Support			-.08	.31	-.03	-.25	-.692, .536
SS x Gratitude			-.03	.35	-.01	-.08	-.720, .663
SS x Optimism			1.20***	.46	.20***	2.60	.287, 2.12

^a Unstandardized regression coefficient

^b Standardized beta weight

N = 140. SWBI and Social Support variables were standardized prior to conducting the regression analysis.

* p < 0.05, ** p < 0.01, *** p < 0.001.

In addition, the squared semi-partial correlation (sr^2) for the PPI X social support interaction was calculated to determine the amount of the variance in T3 subjective well-being accounted for by this interaction (for discussions, see Cohen, Cohen, West, & Aiken, 2003 and Frazier et al., 2004). The sr^2 value for the PPI x social support interaction term was 0.023, suggesting the PPI X social support interaction term accounted for 2.3% of the variance in subjective well-being at T3. This is not considered a small effect size, as it is larger than 0.02 (Cohen, 1992). Additionally, the effect size for this interaction falls within the typical range (i.e., accounting for between 1% and 3% of the variance in an outcome; Champoux & Peters, 1987; Chaplin, 1991).

As recommended by Frazier et al. (2004), the moderation effect was further examined by plotting and interpreting the simple slopes. Additionally, the statistical significance of the simple slopes were tested using an Excel file designed by Dawson (2014). This file followed accepted procedures for testing simple slopes as seen in other published literature (e.g., Aiken & West, 2003; Dawson, 2014). Specifically, the means, standard deviations, and unstandardized regression coefficients of the categorical independent variable (i.e., dummy coded optimism condition) and moderator variable (i.e., standardized social support) were used, as were the variance coefficients for the independent variable and interaction term. Additionally, the covariance of the coefficients for the independent variable and interaction term were also included in this analysis (Dawson, 2014). The results of the simple slope tests indicated that the optimism intervention was negatively related to subjective well-being at low levels of social support, $B = -1.218$, $t = 2.529$, $p = 0.013$. At high levels of social support, there was no

relationship between optimism and subjective well-being, $B = 0.863$, $t = 1.471$, $p = 0.144$.

Figure 2 displays the plotted interaction between social support and the optimism intervention on T3 subjective well-being.

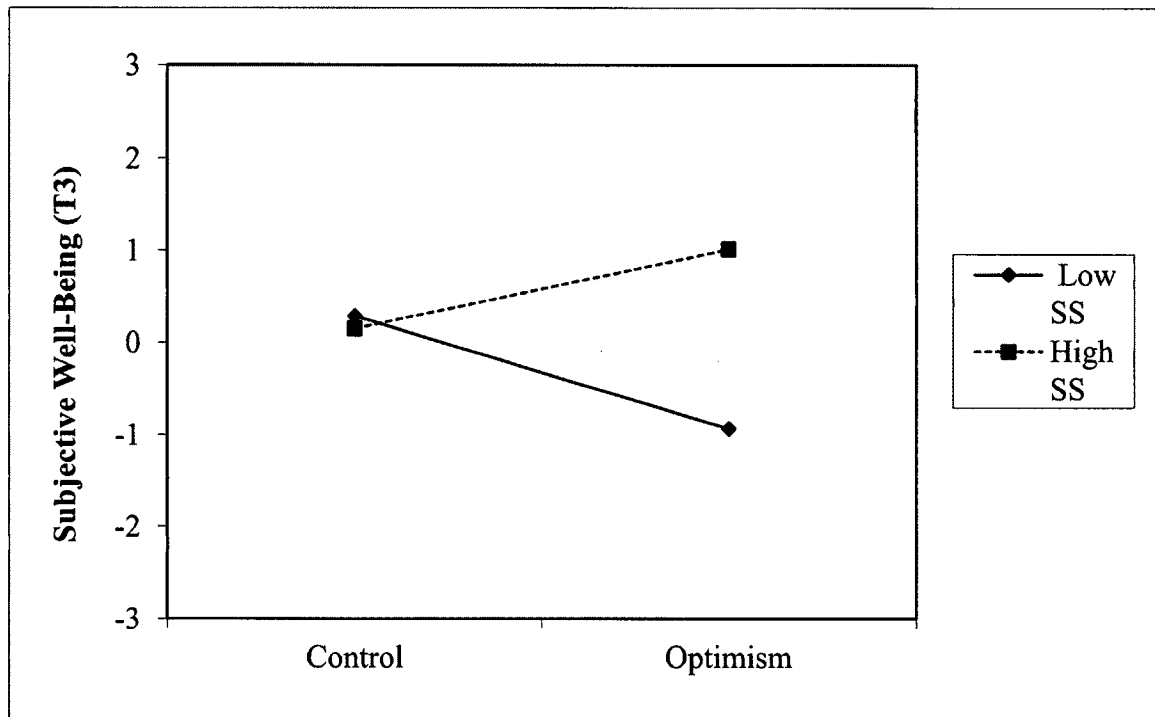


Figure 2. Subjective Well-Being (T3)

Prediction of T3 subjective well-being at high (i.e., 1 *SD* above the mean) and low (i.e., 1 *SD* below the mean) levels of baseline social support. The optimism and control conditions are depicted in terms of unstandardized unit changes from the mean level of subjective well-being at T3 ($M = 0.11$).

Hypothesis 4: Social Support Will Moderate the Relationships Between the PPIs and Psychological Well-Being

I hypothesized that those who perceived they were receiving more social support at baseline would exhibit greater increases in psychological well-being at T2 and T3. Similar to Hypothesis 3, two separate hierarchical multiple regression analyses were conducted to evaluate whether higher pretest levels of social support moderated the hypothesized relationships between levels of the intervention (i.e., gratitude and optimism) and psychological well-being at T2 and T3, after controlling for baseline psychological well-being (Baron & Kenny, 1986; Frazier et al., 2004). The recommended procedure for testing moderation of Frazier and colleagues (2004) was also used to test Hypothesis 4. Similar to the analyses that were used to test Hypothesis 3, the control group also served as the reference group in these analyses. T1 psychological well-being and social support were also standardized prior to running the analyses.

When conducting the analyses, standardized T1 psychological well-being was included in step one, while the dummy variables (i.e., gratitude and optimism dummy variables) and standardized social support were included in step two. The interaction terms for the intervention levels and social support (i.e., gratitude X social support and optimism X social support) were included in step three. Following Frazier et al.'s (2004) suggestions, a significant moderation effect would be present if a significant amount of variation in the dependent variable (i.e., T2 psychological well-being in the first analysis and T3 psychological well-being in the second analysis) could be attributed to the addition of the interaction terms in step three (i.e., as seen by a significant ΔR^2 value).

Hypothesis 4A: Social Support Will Moderate the Relationships Between the Gratitude and Optimism Interventions and T2 Psychological Well-Being

To examine whether social support moderated the predicted relationship between the experimental conditions and T2 psychological well-being, a hierarchical multiple regression analysis was conducted. Prior to interpreting the results, however, data were evaluated to ensure that the assumptions of linear regression were met. The results indicated the normal distribution of residuals, linearity, multicollinearity, and homoscedasticity assumptions were met. However, there were four potential multivariate and univariate outliers (i.e., had values greater than the Mahalanobis distance cutoff of 22.46 and centered leverage cutoff of 0.146); therefore, hierarchical multiple regressions were conducted with and without the potential outliers included to see if these data significantly influenced the results. The results of the regression analyses were not significantly different; thus, data from these four participants were retained in the subsequent analysis.

A hierarchical multiple regression analysis examined whether social support moderated the hypothesized relationship between intervention group and T2 psychological well-being. The results of the hierarchical multiple regression analysis are presented in Table 9. The results of step one indicated T1 psychological well-being was significantly related to T2 psychological well-being, $\Delta F(1, 142) = 414.47, p < 0.001, R^2 = 0.75$. In step two, however, the addition of social support and dummy coded intervention levels did not account for additional variation in T2 psychological well-being, $\Delta F(3, 139) = 1.90, p = 0.13, \Delta R^2 = 0.010$. Finally, in step three, social support did not moderate the effect of the interventions on T2 psychological well-being,

$\Delta F(2, 137) = 0.19, p = 0.83, \Delta R^2 = 0.001$. Only T1 psychological well-being was a significant predictor of T2 psychological well-being in steps two ($B = 0.57; p < 0.001$) and three ($B = 0.57; p < 0.001$) of the regression analysis. Overall, social support did not moderate the effects of the PPIs on T2 psychological well-being; thus, Hypothesis 4A was not supported.

Table 9

Hierarchical Multiple Regression: Examining Social Support as a Moderator of the Relationship between Active PPIs and T2 Psychological Well-Being

Variable	R ²	ΔR ²	B ^a	SE B	β ^b	t	95% CI
Step 1	.75***	.75***					
PWB1			.62***	.03	.86***	20.36	4.24, 4.45
Step 2	.76	.010					
PWB1			.57***	.05	.79***	12.45	.475, .655
Grat Intervention			.14	.07	.09	1.91	-.004, .275
Opt Intervention			.05	.08	.03	.65	-.105, .209
Social Support			.06	.05	.09	1.34	-.029, .150
Step 3	.76	.001					
PWB1			.57***	.05	.80***	12.03	.477, .665
Grat Intervention			.14	.07	.10	1.93	-.003, .279
Opt Intervention			.06	.08	.04	.74	-.102, .224
Social Support			.07	.07	.09	1.03	-.061, .196
SS x Gratitude			-.03	.07	-.03	-.42	-.163, .105
SS x Optimism			.02	.10	.01	.23	-.167, .210

^a Unstandardized regression coefficient

^b Standardized beta weight

N = 144. PWB1 and Social Support variables were standardized prior to conducting the regression analysis.

* p < 0.05, ** p < 0.01, *** p < 0.001.

**Hypothesis 4B: Social Support Will Moderate the Relationships
Between the Gratitude and Optimism Interventions and T3
Psychological Well-Being**

The assumptions of linear regression were again examined prior to testing whether social support moderated the hypothesized relationship between the experimental conditions and T3 psychological well-being. All of the assumptions were met, except there were four potential multivariate and univariate outliers in the data. To examine whether these data significantly influenced the results, separate hierarchical multiple regression analyses were conducted with and without these data. The results of these analyses did not differ; as a result, the potential outliers were retained in the data for the following analysis.

A hierarchical multiple regression analysis was conducted to evaluate whether social support moderated the hypothesized relationship between intervention conditions and T3 psychological well-being. Table 10 presents the results of this hierarchical multiple regression analysis. In step one, T1 psychological well-being was significantly related to T3 psychological well-being, $\Delta F(1, 142) = 282.04, p < 0.001, R^2 = 0.67$. In step two, the results showed the addition of social support and intervention levels (i.e., gratitude and optimism conditions) did not account for more variance in T3 psychological well-being, $\Delta F(3, 139) = 0.83, p = 0.48, \Delta R^2 = 0.006$. In step three, social support did not moderate the effect of the interventions on T3 psychological well-being, $\Delta F(2, 137) = 1.58, p = 0.21, \Delta R^2 = 0.007$. T1 psychological well-being was the only statistically significant predictor of T3 psychological well-being in steps two ($B = 0.54; p < 0.001$) and

three ($B = 0.57$; $p < 0.001$) of the regression analysis. Overall, social support did not moderate the effects of the PPIs on T3 psychological well-being; thus, Hypothesis 4B was not supported.

Table 10

Hierarchical Multiple Regression: Examining Social Support as a Moderator of the Relationship between Active PPIs and T3 Psychological Well-Being

Variable	R ²	ΔR ²	B ^a	SE B	β ^b	t	95% CI
Step 1	.67***	.67***					
PWB1			.60***	.04	.82***	16.79	.530, .672
Step 2	.66	.006					
PWB1			.54***	.05	.73***	9.97	.434, .648
Grat Intervention			.02	.08	.01	.22	-.148, .186
Opt Intervention			.05	.10	.03	.48	-.142, .234
Social Support			.08	.05	.11	1.53	-.024, .190
Step 3	.68	.007					
PWB1			.57***	.06	.77***	10.12	.457, .679
Grat Intervention			.02	.08	.01	.25	-.146, .188
Opt Intervention			.09	.10	.05	.90	-.105, .281
Social Support			.04	.08	.05	.45	-.118, .187
SS x Gratitude			-.00	.08	-.00	-.03	-.161, .156
SS x Optimism			.18	.11	.10	1.60	-.043, .404

^a Unstandardized regression coefficient

^b Standardized beta weight

N = 144. PWB1 and Social Support variables were standardized prior to conducting the regression analysis.

* p < 0.05, ** p < 0.01, *** p < 0.001.

Research Questions

Due to conflicted findings in the literature regarding the directional effects of personality disposition on the PPI—well-being relationships (e.g., Dossett, 2011; Rash et al., 2011; Sergeant & Mongrain, 2014; Watkins et al., 2003), the role of preexisting personality traits on both subjective well-being and psychological well-being were explored as research questions. For instance, it is unclear how gratitude or optimism personality traits prior to the intervention relate to increases in well-being post-intervention. Thus, the following analyses explored this issue by testing a series of specific research questions.

Specifically, to examine whether baseline personality disposition moderated the effects of the gratitude and optimism interventions on each of subjective well-being and psychological well-being (after controlling for baseline subjective or psychological well-being, depending on which outcome variable was being evaluated), a series of hierarchical multiple regression analyses were conducted (Baron & Kenny, 1986; Frazier et al., 2004). Similar to tests of Hypotheses 3 and 4, the steps suggested by Frazier et al. (2004) to test moderation were used to assess whether personality disposition (i.e., gratitude and optimism personality traits at T1) moderated the relationship between the interventions (i.e., gratitude and optimism conditions) and well-being (i.e., subjective well-being and psychological well-being at both T2 and T3). As such, the gratitude and optimism conditions were dummy coded, with the control condition serving as the reference group for the gratitude and optimism conditions. Next, the continuous predictors (i.e., baseline subjective well-being and psychological well-being) and moderators (i.e., baseline gratitude and optimism personality traits) were standardized.

Interaction terms were computed by calculating the products of baseline gratitude and optimism personality traits and the experimental conditions (i.e., gratitude traits X gratitude condition, optimism traits X gratitude condition, optimism traits X optimism condition, and gratitude traits X optimism condition).

The dummy variables, predictors, moderators, and interaction terms were then added in three steps. Step one included either T1 subjective or psychological well-being as covariates, depending on the outcome being measured. More specifically, T1 subjective well-being was included as covariate when examining T2 and T3 subjective well-being were the outcome variables, and T1 psychological well-being was included as the covariate when T2 and T3 psychological well-being were the outcome variables. In each of the analyses, step two included the dummy variables and baseline gratitude and optimism traits. Finally, each of the regression analyses included all four interaction terms in step three. A total of four separate hierarchical multiple regression analyses were conducted, with a single dependent variable included in each regression model (i.e., T2 subjective well-being, T3 subjective well-being, T2 psychological well-being, and T3 psychological well-being).

Prior to running the analyses, regression analyses were first conducted in order to discern whether including the cross-matched personality and intervention interaction terms (i.e., optimism traits X gratitude condition and gratitude traits X optimism condition) in each hierarchical multiple regression analysis significantly affected the results. To wit, separate hierarchical multiple regression analyses were conducted with and without the cross-matched interactions included in the model. The results of the analyses did not vary; therefore, the cross-matched interactions were included with the

congruent interaction pairs (i.e., gratitude traits X gratitude condition and optimism traits X optimism condition) in the third step of each of the four subsequent regression analyses (i.e., four separate interaction terms were included in step three in each of the four hierarchical multiple regression analyses). As seen below, Table 11 lists bivariate correlations among all predictor, moderator, and dependent variables included in the following analyses.

Table 11

Means, Standard Deviations, Cronbach's Alphas, and Bivariate Correlations Among the Predictor, Moderator, and Dependent Variables for the Research Questions

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Mean	SD	Alpha
1. SWB1	-	.77**	.75**	.77**	.70**	.69**	.17*	-.11	.60**	.54**	.46**	.18*	.14	.38**	0.00	1.00	-
2. SWB2		-	.79**	.72**	.78**	.74**	.18*	-.12	.52**	.49**	.38**	.18*	.16	.33**	0.00	2.22	-
3. SWB3			-	.67**	.70**	.81**	.15	-.15	.52**	.48**	.33**	.15	.16	.32**	0.00	2.34	-
4. PWB1				-	.86**	.82**	.14	-.17*	.66**	.60**	.48**	.18*	.22*	.43**	0.00	1.00	.92 ^a
5. PWB2					-	.85**	.20*	-.16	.61**	.53**	.41**	.19*	.18*	.33**	4.42	.71	.94
6. PWB3						-	.12	-.12	.60**	.56**	.42**	.23*	.20*	.34**	4.42	.74	.95
7. Grat Intervention							-	-.51**	.05	.07	.04	.05	-.03	.06	.42	.50	-
8. Opt Intervention								-	.03	-.08	-.02	-.10	.05	-.03	.26	.44	-
9. GQ6									-	.46**	.73**	.17*	.45**	.38**	0.00	1.00	.83
10. LOT										-	.34**	.59**	.22*	.64**	0.00	1.00	.85
11. GQ6 x Grat											-	.002	-.001	.53**	.03	.73	-
12. LOT x Opt												-	.38**	.003	-.03	.59	-
13. GQ6 x Opt													-	-.002	.01	.45	-
14. LOT x Grat														-	.03	.64	-

^a = the Cronbach's alpha coefficients listed for PWB1 and Social Support were calculated using the unstandardized variables. Cronbach's alphas are not displayed for SWB1, SWB2, or SWB3 since they are comprised of positive affect, negative affect (reverse coded), and satisfaction with life. The Cronbach's alphas for these scales are listed in the "Instruments" portion of the Method section.

N = 144.

Note: SWB1, PWB1, GQ6, and LOT were standardized prior to conducting this correlation analysis. Grat Intervention and Opt Intervention were dummy coded with the control intervention serving as the reference group for each dummy coded variable. Variables 11-14 are the cross-matched and congruent pair products of the standardized personality traits and each of the gratitude and optimism dummy variables. * $p < 0.05$. ** $p < 0.001$.

Research Question 1: Do Pre-Intervention Levels of Dispositional Gratitude and Dispositional Optimism Moderate the Effects of the PPIs on Subjective Well-Being at T2 and T3?

Separate regression analyses were conducted to determine whether baseline gratitude or optimism dispositions significantly moderated the effects of the gratitude and optimism interventions on subjective well-being at T2 and T3.

Research Question 1A: Do Dispositional Gratitude and Dispositional Optimism Moderate the Effects of the PPIs on Subjective Well-Being at T2?

Before evaluating whether personality disposition significantly moderated the relationship between the intervention condition (i.e., gratitude and optimism conditions) and T2 subjective well-being (after controlling for T1 subjective well-being), the data were examined to ensure that the assumptions of linear regression were met. All of the assumptions were met, except there were five potential multivariate and univariate outliers (i.e., values were greater than the chi square cutoff of 27.88 and centered leverage cutoff of 0.208); as a result, hierarchical multiple regressions were conducted with and without the potential outliers included to determine if these data significantly influenced the results. The results of the regression analyses did not vary; thus, the data from these five participants were retained in the subsequent analysis.

Next, a hierarchical multiple regression analysis tested whether personality disposition at T1 (i.e., baseline gratitude and/or personality traits) moderated the hypothesized effect of the gratitude and optimism interventions on T2 subjective well-being. The results of the hierarchical multiple regression analysis are presented in Table 12. As such, the results of step one indicated T1 subjective well-being was statistically significantly associated with T2 subjective well-being, $\Delta F(1, 142) = 211.73, p < 0.001, R^2 = 0.60$. In step two, adding the independent variables (i.e., the gratitude and optimism

conditions) and baseline personality disposition (i.e., gratitude and optimism personality traits at T1) did not account for additional variance in T2 subjective well-being, $\Delta F(4, 138) = 1.35, p = 0.25, \Delta R^2 = 0.015$. Similarly, an analysis of the interaction term statistics in step three suggested personality disposition did not moderate the hypothesized relationships between experimental condition and T2 subjective well-being, $\Delta F(4, 134) = 0.19, p = 0.95, \Delta R^2 = 0.002$. Only T1 subjective well-being was a significant predictor of T2 subjective well-being in steps two ($B = 1.48; p < 0.001$) and three ($B = 1.47; p < 0.001$). In terms of Research Question 1A, these results suggest personality disposition did not moderate the effects of the PPIs on T2 subjective well-being.

Table 12

Hierarchical Multiple Regression: Examining Personality Disposition as a Moderator of the Hypothesized Relationship between the Active PPIs and T2 Subjective Well-Being

Variable	R ²	ΔR ²	B ^a	SE B	β ^b	t	95% CI
Step 1	.60***	.60***					
SWB1			1.72***	.12	.77***	14.55	1.48, 1.95
Step 2	.60	.015					
SWB1			1.48***	.16	.68***	9.28	1.17, 1.80
Grat Intervention			.25	.28	.06	.90	-.300, .802
Opt Intervention			-.05	.31	-.01	-.17	-.671, .563
GQ6			.18	.15	.08	1.17	-.121, .476
LOT			.20	.14	.09	1.42	-.079, .485
Step 3	.59	.002					
SWB1			1.47***	.17	.66***	8.79	1.14, 1.80
Grat Intervention			.26	.28	.06	.91	-.304, .819
Opt Intervention			-.07	.32	-.01	-.22	-.700, .558
GQ6			.20	.27	.09	.74	-.336, .738
LOT			.36	.29	.16	1.24	-.214, .927
GQ6 x Grat			-.07	.32	-.02	-.21	-.710, .572
LOT x Opt			-.22	.36	-.06	-.62	-.922, .484
GQ6 x Opt			.07	.39	.01	.18	-.702, .846
LOT x Grat			-.18	.35	-.05	-.50	-.876, .521

^a Unstandardized regression coefficient

^b Standardized beta weight

N = 144. SWB1, GQ6, and LOT variables were standardized prior to conducting the regression analysis. GQ6 x Grat, LOT x Opt, GQ6 x Opt, and LOT x Grat are the interactions terms between personality disposition and each of the cross-matched/congruent PPI condition pairs.

* p < 0.05, ** p < 0.01, *** p < 0.001.

Research Question 1B: Do Dispositional Gratitude and Dispositional Optimism Moderate the Effects of the PPIs on Subjective Well-Being at T3?

Another hierarchical multiple regression analysis was conducted to examine whether baseline personality disposition moderated the hypothesized effect of the experimental interventions on subjective well-being at T3, after controlling for T1 subjective well-being. Prior to conducting the analysis, the assumptions of linear regression were tested and were met, except there were five outliers. Hierarchical multiple regressions were conducted with and without the outliers to determine if these data significantly influenced the results. Because the results of these analyses did not vary, the outliers were included in the subsequent analysis.

A hierarchical multiple regression analysis was conducted to test whether personality disposition at T1 significantly moderated the hypothesized relationship between the experimental conditions and T3 subjective well-being. Table 13 displays the results of the hierarchical multiple regression analysis. In step one of the hierarchical multiple regression, the results showed T1 subjective well-being predicted T3 subjective well-being, $\Delta F(1, 142) = 181.54, p < 0.001, R^2 = 0.56$. However, the variables added in step two (i.e., dummy coded gratitude and optimism conditions, and baseline gratitude and optimism personality traits) did not explain additional variance in T3 subjective well-being, $\Delta F(4, 138) = 1.70, p = 0.15, \Delta R^2 = 0.021$. Similarly, the interaction terms entered in step three did not either, $\Delta F(4, 134) = 1.37, p = 0.25, \Delta R^2 = 0.016$. T1 subjective well-being was a significant predictor of T3 subjective well-being in steps two ($B = 1.48; p < 0.001$) and three ($B = 1.47; p < 0.001$), while baseline gratitude personality disposition

was significantly related with T3 subjective well-being in step three ($B=0.62$; $p=0.04$).

In relation to Research Question 1B, these results suggest personality disposition did not moderate the effects of the PPIs on T3 subjective well-being.

Table 13

Hierarchical Multiple Regression: Examining Personality Disposition as a Moderator of the Hypothesized Relationship between the Active PPIs and T3 Subjective Well-Being

Variable	R ²	ΔR ²	B ^a	SE B	β ^b	t	95% CI
Step 1	.56***	.56***					
SWB1			1.75***	.13	.75***	13.47	1.50, 2.01
Step 2	.58	.021					
SWB1			1.47***	.18	.63***	8.42	1.13, 1.82
Grat Intervention			-.05	.31	-.01	-.18	-.658, .551
Opt Intervention			-.42	.34	-.08	-1.24	-1.01, .253
GQ6			.26	.17	.11	1.55	-.072, .584
LOT			.21	.16	.09	1.34	-.100, .519
Step 3	.60	.016					
SWB1			1.43***	.18	.61***	7.98	1.08, 1.79
Grat Intervention			-.08	.31	-.02	-.26	-.685, .525
Opt Intervention			-.50	.34	-.10	-1.47	-1.18, .175
GQ6			.62*	.29	.26*	2.10	.037, 1.20
LOT			.39	.31	.17	1.26	-.223, 1.01
GQ6 x Grat			-.60	.35	-.19	-1.72	-1.29, .089
LOT x Opt			-.36	.38	-.09	-.95	-1.12, .394
GQ6 x Opt			-.23	.42	-.04	-.55	-1.07, .601
LOT x Grat			-.08	.38	-.02	-.22	-.836, .669

^a Unstandardized regression coefficient

^b Standardized beta weight

N = 144. SWB1, GQ6, and LOT variables were standardized prior to conducting the regression analysis. GQ6 x Grat, LOT x Opt, GQ6 x Opt, and LOT x Grat are the interactions terms between personality disposition and each of the cross-matched/congruent PPI condition pairs.

* p < 0.05, ** p < 0.01, *** p < 0.001

Research Question 2: Do Pre-Intervention Levels of Dispositional Gratitude and Dispositional Optimism Moderate the Effects of the PPIs on Psychological Well-Being at T2 and T3?

Separate regression analyses were conducted to determine whether dispositional gratitude and dispositional optimism at baseline significantly moderated the effects of the gratitude and optimism interventions on psychological well-being at T2 and T3.

Research Question 2A: Do Dispositional Gratitude and Dispositional Optimism Moderate the Effects of the PPIs on Psychological Well-Being at T2?

A hierarchical multiple regression analysis explored whether personality disposition significantly moderated the hypothesized relationship between the experimental conditions and T2 psychological well-being, after controlling for T1 psychological well-being. First, the assumptions of linear regression were tested. The only assumption that was threatened related to the presence of possible outliers. Specifically, there were data from five participants that met criteria for consideration as multivariate and univariate outliers. As a result, separate hierarchical multiple regression analyses were conducted to compare whether the presence of these data significantly influenced the results, which they did not; therefore, the potential outliers were included in the formal moderation analysis.

A hierarchical multiple regression analysis was conducted to test whether personality disposition at T1 significantly moderated the hypothesized relationship between the experimental conditions and T2 psychological well-being. The results of the hierarchical multiple regression analysis can be seen in Table 14. In step one, the results indicated T1 psychological well-being was significantly related with T2 psychological well-being, $\Delta F(1, 142) = 414.47, p < 0.001, R^2 = 0.75$. In step two, the independent

variables (i.e., dummy coded gratitude and optimism conditions) and hypothesized moderator variables (i.e., baseline gratitude and optimism personality traits) did not account for additional variance of T2 psychological well-being, $\Delta F(4, 138) = 1.29$, $p = 0.28$, $\Delta R^2 = 0.009$. In step three, the interaction terms between the experimental conditions and baseline personality disposition did not significantly moderate the hypothesized effect of the gratitude and optimism interventions on T2 psychological well-being, $\Delta F(4, 134) = 0.93$, $p = 0.45$, $\Delta R^2 = 0.007$. Only T1 psychological well-being significantly predicted T2 psychological well-being in steps two ($B = 0.57$; $p < 0.001$) and three ($B = 0.57$; $p < 0.001$). In terms of Research Question 2A, these results suggest personality disposition did not moderate the effects of the PPIs on T2 psychological well-being.

Table 14

Hierarchical Multiple Regression: Examining Personality Disposition as a Moderator of the Hypothesized Relationship between the Active PPIs and T2 Psychological Well-Being

Variable	R ²	ΔR ²	B ^a	SE B	β ^b	t	95% CI
Step 1	.75***	.75***					
PWB1			.62***	.03	.86***	20.36	.557, .676
Step 2	.75	.009					
PWB1			.57***	.05	.80***	12.45	.482, .663
Grat Intervention			.13	.07	.09	1.86	-.008, .273
Opt Intervention			.03	.08	.02	.38	-.131, .192
GQ6			.04	.04	.06	1.02	-.040, .124
LOT			.02	.04	.02	.40	-.060, .090
Step 3	.76	.007					
PWB1			.57***	.05	.79	11.75	.472, .662
Grat Intervention			.14	.07	.10	1.91	-.005, .278
Opt Intervention			.04	.08	.02	.46	-.125, .201
GQ6			.04	.07	.06	.61	-.097, .184
LOT			.07	.08	.10	.96	-.077, .223
GQ6 x Grat			.04	.08	.04	.49	-.122, .203
LOT x Opt			-.01	.09	-.01	-.14	-.195, .169
GQ6 x Opt			-.06	.10	-.04	-.61	-.256, .136
LOT x Grat			-.13	.09	-.12	-1.49	-.311, .044

^a Unstandardized regression coefficient

^b Standardized beta weight

N = 144. PWB1, GQ6, and LOT variables were standardized prior to conducting the regression analysis. GQ6 x Grat, LOT x Opt, GQ6 x Opt, and LOT x Grat are the interactions terms between personality disposition and each of the cross-matched/congruent PPI condition pairs.

* p < 0.05, ** p < 0.01, *** p < 0.001

Research Question 2B: Do Dispositional Gratitude and Dispositional Optimism Moderate the Effects of the PPIs on Psychological Well-Being at T3?

A final hierarchical multiple regression analysis explored whether personality disposition significantly moderated the hypothesized effect of the gratitude and optimism interventions on T3 psychological well-being, after controlling for T1 psychological well-being. First, the assumptions of linear regression were all met, except there were five multivariate and univariate outliers. As such, results of a hierarchical multiple regression analysis that included the potential outliers were compared with a hierarchical multiple regression analysis without these outliers. No differences were found; therefore, the data from these five participants were retained during subsequent analysis.

A hierarchical multiple regression analysis tested whether baseline personality disposition was a significant moderator of the hypothesized relationship between the experimental conditions and T3 psychological well-being. The results of the hierarchical multiple regression analysis can be viewed in Table 15. In step one, T1 psychological well-being was significantly related with T3 psychological well-being, $\Delta F(1, 142) = 282.04, p < 0.001, R^2 = 0.67$. In step two, dummy coded gratitude and optimism variables, as well as the baseline personality disposition variables (i.e., gratitude and optimism personality traits), were not significantly related with T3 psychological well-being, $\Delta F(4, 138) = 1.30, p = 0.27, \Delta R^2 = 0.012$. In step three, the interaction between the experimental conditions and baseline personality disposition did not contribute to the variance accounted for in T3 psychological well-being, $\Delta F(4, 134) = 0.70, p = 0.60, \Delta R^2 = 0.007$. T1 psychological well-being was the only significant predictor of T3 psychological

well-being in steps two ($B = 0.51; p < 0.001$) and three ($B = 0.51; p < 0.001$). In relation to Research Question 2B, these results suggest personality disposition did not moderate the effects of the PPIs on T3 psychological well-being.

Table 15

Hierarchical Multiple Regression: Examining Personality Disposition as a Moderator of the Hypothesized Relationship between the Active PPIs and T3 Psychological Well-Being

Variable	R ²	ΔR^2	B ^a	SE B	β^b	t	95% CI
Step 1	.67***	.67***					
PWB1			.60***	.04	.82***	16.79	.530, .672
Step 2	.68	.012					
PWB1			.51***	.05	.70***	9.46	.407, .621
Grat Intervention			.02	.08	.01	.19	-.151, .182
Opt Intervention			.01	.10	.01	.12	-.179, .202
GQ6			.07	.05	.09	1.33	-.032, .162
LOT			.07	.05	.10	1.65	-.015, .162
Step 3	.68	.007					
PWB1			.51***	.06	.69***	8.91	.396, .622
Grat Intervention			.02	.09	.01	.19	-.152, .184
Opt Intervention			.02	.10	.01	.16	-.178, .209
GQ6			.10	.08	.14	1.19	-.066, .266
LOT			.12	.09	.16	1.28	-.063, .292
GQ6 x Grat			-.02	.10	-.01	-.15	-.207, .178
LOT x Opt			.01	.11	.01	.10	-.205, .226
GQ6 x Opt			-.09	.12	-.05	-.73	-.318, .146
LOT x Grat			-.11	.11	-.10	-1.06	-.323, .098

^a Unstandardized regression coefficient

^b Standardized beta weight

N = 144. PWB1, GQ6, and LOT variables were standardized prior to conducting the regression analysis. GQ6 x Grat, LOT x Opt, GQ6 x Opt, and LOT x Grat are the interactions terms between personality disposition and each of the cross-matched/congruent PPI condition pairs.

* p < 0.05, ** p < 0.01, *** p < 0.001.

CHAPTER FIVE

DISCUSSION

Research has demonstrated that reflecting and journaling about topics that focus on gratitude and optimism can significantly increase one's sense of both subjective well-being and psychological well-being (e.g., Emmons & McCullough, 2003; King et al., 2001; Seligman et al., 2005; Sergeant & Mongrain, 2014). These activities can enhance both forms of well-being when administered online (e.g., Seligman et al., 2005; Sergeant & Mongrain, 2014) and in-person (e.g., Lyubomirsky et al., 2011) experiments.

However, factors that may optimize or limit the effects these activities (i.e., positive psychological interventions [PPIs]) have on well-being are not well understood.

Therefore, the purpose of this study was to examine the effects each of an online-administered gratitude intervention and an optimism intervention on both subjective well-being and psychological well-being in a sample of college students. Specifically, this study was designed to explore whether preexisting social support and personality traits moderated the hypothesized relationships between two PPIs (i.e., a gratitude intervention and an optimism intervention) and subjective well-being, as well as psychological well-being.

Hypotheses 1 and 2

Hypotheses 1 and 2 predicted that participants in the gratitude and optimism conditions would show greater increases in both subjective well-being and psychological well-being than the control group. For the most part, however, the results of the two-way mixed repeated measures ANOVAs did not support these hypotheses. Indeed, the results showed no statistically significant interactions between time and intervention on either subjective or psychological well-being. There were also no significant main effects of time or intervention on subjective well-being.

However, there was a significant main effect of one intervention on psychological well-being. Specifically, following the three-day active intervention period, participants in the gratitude condition had greater psychological well-being than those in the optimism condition ($\eta_p^2 = 0.05$; small to medium effect size; Cohen, 1988), but not the control condition. Those in the optimism and control conditions also did not significantly differ in terms psychological well-being following the intervention. Although it was surprising that the gratitude group outperformed the optimism condition (but not the control condition), this may be accounted for by the unexpected potency of the control intervention. That is, the control intervention may have elicited positive psychological effects that were comparable to the gratitude and optimism interventions because it was also an active (i.e., not a placebo control) intervention. Therefore, the inclusion of the particular control intervention in this study may have hidden the positive effects on well-being that the gratitude and optimism interventions may have otherwise shown if they were compared to an inert control intervention (this issue is discussed in more detail under the subheading “Limitations and Suggestions for Future Research”).

Although a plethora of studies have demonstrated that gratitude interventions are associated with small to medium effects on subjective well-being (e.g., Emmons & McCullough, 2003; Lyubomirsky et al., 2011; Seligman et al., 2005), no prior studies have demonstrated that gratitude interventions similarly affect overall psychological well-being. However, the results of Hypothesis 2 (i.e., the gratitude condition showed significant increases in psychological well-being when compared to the optimism condition) may indicate a brief gratitude journaling exercise can enhance one's overall psychological well-being (as measured by a multidimensional model of psychological well-being; i.e., related to Aristotle's conception of *eudaimonia*).

However, it is possible that a significant main effect of intervention on psychological well-being could have occurred due to the well-being of those in the optimism condition simply deteriorating more than it did for those in the gratitude condition. However, an inspection of the mean levels of psychological well-being at each time point for both conditions did not support this interpretation. That is, an inspection of these means indicated psychological well-being slightly positively increased for those in the optimism condition at each time point ($M = 4.21$ at T1; $M = 4.23$ at T2; $M = 4.28$ at T3; though the increases were not statistically significant for the optimism condition), and mean psychological well-being statistically significantly increased over time in the gratitude condition as well ($M = 4.53$ at T1; $M = 4.62$ at T2; $M = 4.56$ at T3; though the largest increase in psychological well-being occurred at T2). This suggests it is unlikely that the psychological well-being of those in the gratitude condition did not deteriorate as

much as it did in the optimism group; rather, it appears that, when compared to the optimism intervention, the gratitude intervention produced significant positive increases in psychological well-being.

These findings build upon results from prior studies and suggest, in addition to positively affecting subjective well-being, that gratitude interventions can also enhance psychological well-being. Additionally, the effect size for the gratitude intervention on psychological well-being in this study ($\eta_p^2 = 0.05$) is comparable to the effect sizes observed in prior literature (e.g., small to medium effects on subjective well-being; Emmons & McCullough, 2003, Lyubomirsky et al., 2011, and Seligman et al., 2005). Taken together with prior empirical findings, the results of this study indicate that reflecting and journaling on things for which one is grateful not only enhance subjective well-being, but can also positively influence psychological well-being.

This finding also contributes to our understanding regarding recommended dosages of gratitude interventions for improving well-being. On one hand, the findings of the present study suggest reflecting and journaling on three blessings and their causes for a brief period of time (i.e., approximately 20 minutes a day for three consecutive days) can increase psychological well-being, at least in the short-term (i.e., for about one month). On the other hand, the lack of the superiority of the gratitude and optimism interventions over the control intervention (in terms of promoting both subjective well-being and psychological well-being) may indicate that the interventions would have been more effective if they were longer in duration (e.g., seven consecutive days), as well as the importance of including inactive control interventions in PPI effectiveness studies.

However, it should also be noted that this finding may point to the lack of superiority of the hypothesized active interventions versus the control condition, as simply engaging in journaling interventions may produce comparable effects on well-being.

Hypotheses 3 and 4

Hypotheses 3 and 4 predicted that provisions received through social support would moderate the effects of the gratitude and optimism interventions. Specifically, it was expected that those who reported receiving better provisions (e.g., feeling attached to others, being reassured of personal worthiness, receiving guidance) from supportive people in their lives (i.e., higher social support) would show greater increases in each of subjective well-being and psychological well-being than those who reported receiving poorer provisions from others at baseline. This hypothesis was not supported by the testing of social support as a moderator of the hypothesized relationship between the active interventions (i.e., the gratitude and optimism interventions) and T2 subjective well-being or psychological well-being at T2 or T3.

Although the Hypotheses 3 and 4 were not supported, this does not mean social support did not have an important role in terms of influencing how these interventions affected well-being in this study. Instead, for those who engaged in the optimism condition, lower baseline social support produced a negative intervention effect on T3 subjective well-being. It is also possible that the nonsignificant simple slope (i.e., higher baseline social support increasing the positive effect of the optimism intervention on T3 subjective well-being) would have been statistically significant if the sample size had been larger ($n = 38$ for the optimism condition in the present study). That is, the relatively small sample size in this group may have reduced the power of the simple slope test to

detect a significant strengthening effect of higher baseline social support on the positive relationship between the optimism intervention and T3 subjective well-being (a more detailed discussion of how a smaller sample size may have reduced the power in this study is described in the “Limitations and Suggestions for Future Research” section). In summary, although higher baseline social support did not moderate the effects of the optimism intervention on subjective well-being (as was predicted in Hypotheses 3 and 4), the evidence showed that social support significantly influenced the effectiveness of one of the interventions of interest, as lower social support at T1 predicted significant decreases in subjective well-being at T3 for those in the optimism condition.

One reason why social support may have moderated the effectiveness of the optimism intervention on subjective well-being is because of the relationship between optimism and hope. Research suggests that hope is a correlated, yet distinct, construct from optimism (Alarcon, Bowling, & Khazon, 2013). Whereas optimism involves positive “generalized outcome expectancies” (Scheier & Carver, 1985, p. 219), hope has been conceptualized as involving a sense that one has both the *agency* (i.e., determination and resolve to achieve goals) and *pathways* (i.e., having specific methods or strategies for achieving goals) that are necessary to achieve a particular goal (Alarcon et al., 2013; Synder et al., 1991). It may be that social support and hope are related such that those with greater social support also experience greater hope. If so, those who engage in optimism interventions with higher preexisting social support may experience greater gains in subjective well-being because they perceive they have others to rely on as they pursue their goals. In other words, the positive future that is imagined and written about in an optimism intervention may seem more achievable if one perceives he or she is

receiving support from others that will facilitate this pursuit. Future research may explore this explanation of the data by examining the relationships between the provisions of social support, hope, and the effectiveness of optimism interventions on subjective well-being.

Although social support moderated the effect of the optimism intervention on T3 subjective well-being, it was surprising that the effectiveness of the gratitude intervention was not influenced by baseline social support. It may be that social support is simply more important for those who engage in optimism interventions (e.g., due to increasing one's hope or confidence that he or she will be able to achieve an imagined positive future) than for those who engage in gratitude interventions. It may also be that the brief gratitude intervention of this study was not long enough to produce noticeable changes in trait gratitude, which in turn, may have inhibited the facilitation of positive social support perceptions. Since previous research suggests gratitude personality traits are significantly related with social support (Wood et al., 2008), it would seem reasonable to suggest social support may moderate the effectiveness of gratitude interventions if trait gratitude is affected (and thus, contributes to increased perceptions of social support). This explanation was not tested in the present study, however, as potential changes in trait gratitude were not evaluated at T2 or T3.

Research Questions

The purpose of the research questions was to explore whether preexisting levels of gratitude and personality dispositions moderate the hypothesized effect of the PPIs (i.e., the gratitude and optimism interventions) on subjective well-being and psychological well-being. Research has rarely addressed this issue, and the few existing

studies have produced conflicting results (i.e., only three studies could be found that addressed the role of personality in the effectiveness of PPIs on well-being; Rash et al., 2011; Sergeant & Mongrain, 2014; Watkins et al., 2003). Whereas some findings have supported the assertion that lower baseline personality traits provide a higher ceiling for well-being increases (e.g., Rash et al., 2011; Sergeant & Mongrain, 2014), at least one study found that higher baseline personality traits enhanced the effect of the PPI on subjective well-being (i.e., Watkins et al., 2003). Clearly, more research is needed to explore the role of personality on the effects of PPIs.

The present results indicated that neither baseline gratitude nor optimism personality traits moderated the effects of the gratitude or optimism interventions on subjective or psychological well-being. It is unclear exactly why baseline personality disposition did not significantly influence the effects of these interventions; however, it is important to reiterate that the duration of the intervention may have been too short. Optimal doses of PPIs are still unclear, and whether or not optimal dosages depend on characteristics of individuals is not known.

Limitations and Suggestions for Future Research

Although the present study has many strengths (e.g., the use of random assignment, the manipulation check procedure, the inclusion of potential moderator variables, and the use empirically-supported PPIs), it is important to emphasize some of its limitations. First, both subjective well-being and psychological well-being were each assessed by retrospective self-report measures (e.g., measuring the extent to which one has experienced happiness in the past week) and may have been influenced by personal biases (e.g., low insight, demand characteristics). This point is especially important in

light of some theoretical and empirical research suggesting that the ability to accurately report levels of happiness or satisfaction with life are often based on heuristics that have particular biases (e.g., biased report of well-being based on sampling of recent experiences to report current life satisfaction [variant of availability heuristic; see Kahneman [2003/2011] for more detail]). As such, including a variety of methods for assessing well-being, such as Kahneman's experienced utility method, may be useful (Kahneman, 2011). For example, this model of well-being measurement suggests a moment-based approach in which real-time samplings of valence (i.e., good or bad) and intensity (i.e., mild to extreme) of experiences are tallied to compute a measure of well-being based on subjective ratings of experiences in the immediate moment (thus, not relying on memory). Similarly, observer reports from close friends or loved ones might also be useful indicators of individuals' well-being, especially if they are combined with self-report measures.

This study was also limited by low power in detecting the effects of the interventions on each of subjective well-being and psychological well-being. Many studies that examined the effectiveness of PPIs found these interventions were associated with small to medium effects on both subjective well-being and psychological well-being (e.g., Lyubomirsky et al. 2011; Sergeant & Mongrain, 2014; Shapira & Mongrain, 2010; for a review, see Bolier et al., 2013 and Sin & Lyubomirsky, 2009). As such, it was estimated that data would need to be collected from at least 53 participants in each treatment group ($N = 159$) in order to detect a medium effect of these interventions on well-being (i.e., to have power of 0.80; Cohen, 1977/1980). Although more than enough participants were randomly assigned to each of the groups, the high rate of attrition in

each group (percentage of subjects that adequately completed all three journal entries ranged from 54.5% in the gratitude condition to 60.42% in the optimism condition) resulted in a reduction of statistical power that likely limited the ability of the statistical tests to detect intervention effects. It should be noted that the rate of attrition in the present study was at least partially related to the stringent data inclusion criteria implemented (e.g., the manipulation check); still, the quality of future studies would likely be enhanced by collecting a sample of data that includes enough participants in each treatment group that meets the criteria for reaching a power of at least 0.80 (or by adding incentives to improve likelihood participants will adequately complete all portions of the study).

Similarly, efforts to reduce attrition rates may be especially relevant to this pursuit, as this was a primary factor that limited the power of the present study (i.e., original sample consisted of 609 participants, but final $N = 144$ [23.6% of initial pool of participants were retained]). Although this is a high dropout rate compared to some studies that used a repeated measures design (e.g., 42% average attrition rate found among 152 longitudinal studies [48 of these studies used college samples]; Roberts & DelVecchio, 2000), it is comparable to similar published studies in the PPI literature (e.g., approximately 24% of participants' data were retained in a similar study published in the *Journal of Clinical and Consulting Psychology* that tested the effectiveness of an online-administered optimism intervention; Sergeant & Mongrain, 2014). In addition, many of the previously published studies in the PPI literature examining the effects of positive journaling interventions did not evaluate the journal entry content to ensure participants adequately engaged in the interventions (e.g., Lyubomirsky et al., 2011; Seligman et al.,

2005; Sergeant & Mongrain, 2014), thus potentially producing underestimated rates of attrition in those studies (in the present study, data from 5.4% of the participants were excluded due to the manipulation check procedure). Still, the large amount of data that were not retained in the present study is concerning and future studies should consider including additional procedures that might reduce the rate of attrition in online PPI studies (e.g., offer increased monetary incentives).

In this vein, research suggests that PPIs work especially well when individuals self-select into interventions (Lyubomirsky et al., 2011). Therefore, collecting data from participants who are already interested in PPIs (e.g., individuals who use apps attempting to promote well-being, etc.), or at least by implementing a method that enables participants to decide which PPI in which they participate, might reduce attrition by facilitating autonomy and motivation (although this would reduce internal validity due to a lack of random assignment). However, more empirical studies are needed to explore these suggestions, as well as to discover other methods that might reduce attrition rates within PPIs.

Another limitation of the present study concerns the dosage (e.g., duration and intensity) of the interventions. Significant group differences may not have been seen between the active (i.e., gratitude and optimism) and control interventions (albeit the control condition may have also been an active condition in the present study; see explanation in next paragraph) because the interventions were too short. While the results of the present study did suggest relatively brief gratitude and optimism interventions might significantly affect both subjective well-being and psychological well-being, these results were not as consistent as expected (i.e., significant relationships between the

gratitude and optimism interventions with each of subjective well-being and psychological well-being were only found in two statistical analyses). In addition to low power, the length or intensity (e.g., administering the intervention over consecutive days or for extended periods of time once a week) in terms of the interventions' administration may need to be altered to facilitate potency. Thus, it is suggested that future research that uses similar interventions extend the length and vary the intensity of these interventions during administration. As extending the length of PPIs may increase the rate of attrition, researchers can also consider including additional incentives that may increase the rate of study completion. At this point, empirical studies have not identified an optimal length or intensity for gratitude or optimism interventions (for a discussion, see Layous & Lyubomirsky, 2013); as a result, future studies can explore whether there are ideal dosages of PPIs for promoting well-being and whether these dosages depend on other characteristics such as personality or social support.

Additionally, the lack of robust differences between the treatment conditions and control condition may have been due to the nature of the control intervention, adapted from prior research (i.e., reflecting and journaling on an early memory from an emotionally neutral perspective; Seligman et al., 2005; Sergeant & Mongrain, 2014; Shapira & Mongrain, 2010). A placebo control was included in this study to compare the generalized effects of journaling on a neutral topic with the hypothesized active treatment ingredients (i.e., gratitude and optimism). In retrospect, however, it is plausible that the control intervention masked the positive effects of the active interventions because simply reflecting and journaling on early childhood experiences may elicit positive emotion and other pleasant experiences.

Indeed, research within cognitive psychology regarding the fading affect bias suggests that negative affect associated with unpleasant memories fades more quickly than positive affect linked with pleasant memories (for a review, see Walker & Skowronski, 2009). This phenomenon seems to be especially potent when autobiographical memories are recalled (Walker & Skowronski, 2009); as such, participants in a control condition may have reflected and journaled on pleasant memories (instead of a neutral memory, as instructed) due to the nature of how autobiographical memory interacts with affect. As in this study, future studies may consider collecting the textual content of journal entries and rate the extent to which the entries were positively valenced. As such, researchers can explore the frequency in which participants who are instructed to write emotionally neutral journal entries actually write positively worded entries. This would enable researchers to explore whether the fading affect bias is activated by reflecting on and writing about early memories. Conducting this procedure was outside of the scope of the present study, since journal entries were collected in the present study primarily to ensure participants were submitting new and relevant posts on each day of the intervention (as opposed to examining the role of journal content on well-being). This alone was an important advance to the methodology used in PPI literature. However, future studies would help to extend this approach by exploring the role of journal entry content on well-being.

Future studies may also consider including a placebo intervention that involves participants recalling a more recent autobiographical memory (e.g., recalling a list of activities one engaged in during the day). The use of an alternative placebo intervention (e.g., involving the recall of a recent memory) may reduce the likelihood that a positively

valenced memory is recalled since the negative affect related to unpleasant memories has had less time to fade (and thus, the likelihood a pleasant versus unpleasant memory will be retrieved is closer to chance levels). Further, a waitlist control condition may bypass this problem altogether, as the treatment effects of the active interventions could be compared with the effects of expecting to engage in a PPI in the near future.

Additionally, the quality of the posts submitted by participants in this study was not assessed qualitatively. That is, factors such as the length of journal posts, the emotional valence of the content, enthusiasm of participants (i.e., as displayed in post content), and other such factors, may influence the effectiveness of PPIs. In this study, journal posts were examined to ensure they were sufficiently relevant to the instructions provided in the condition (i.e., to ensure participants were generating unique relevant posts on each day of the intervention). Although this manipulation check was a strength of the present study, future studies may build upon this procedure by using naive coders to also rate the quality of journal posts. Following Layous and Lyubomirsky's (2013) suggestion that subjects' motivation, effort, and beliefs may moderate the effectiveness of PPIs, researchers interested in exploring this issue may consider rating and evaluating journal posts along these dimensions (e.g., by asking naïve coders to rate the level of effort in which subjects engaged in the journal posts) to see if they significantly influence the effects PPIs have on well-being. This would help determine whether the quality of participants' engagement in PPIs significantly influence the effects of the interventions on each of subjective well-being and psychological well-being.

Finally, the general lack of diversity of the demographic characteristics represented in this sample reduces the external validity of the study. For one, data were

collected from college students, thus limiting the generalizability of these findings only to the college population. Although one of the stated purposes of the present study was to evaluate how PPIs might be optimized to enhance college students' well-being, it is important to note that additional studies that collect data from more diverse samples are needed in order to understand how to optimize PPIs to increase the well-being of other populations.

Furthermore, gender was skewed such that only 29.9% of the final sample identified as male. The skewed nature of gender in this study was further complicated by the statistically significant discrepancy of males that did not complete the study ($N = 465$) and those in the final ($N = 144$) sample (40.1% of those who did not complete the study identified as male, while only 29.9% of the final sample identified as male). This limits the generalizability of the findings of this study, as it is possible that identifying as male was associated with a common underlying factor that reduced the likelihood of completing the study. Similarly, most of the participants in this study were Caucasian (72.9%), and all participants were enrolled at a university (i.e., were highly educated). Again, these factors may have limited the generalizability of the study findings and future research would be improved by testing more diverse and representative samples (e.g., the general population and clinical populations).

REFERENCES

- Ackrill, J. L. (1973). *Aristotle's ethics*. London, UK: Faber and Faber.
- Adler, M. G., & Fagley, N. S. (2005). Appreciation: Individual differences in finding value and meaning as a unique predictor of subjective well-being. *Journal of Personality, 73*, 79-114. doi:<http://dx.doi.org/10.1111/j.14676494.2004.00305.x>
- Aguinis, H. (2004). *Regression analysis for categorical moderators*. New York, NY: The Guilford Press.
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Alarcon, G. M., Bowling, N. A., & Khazon, S. (2013). Great expectations: A meta-analytic examination of optimism and hope. *Personality and Individual Differences, 54*, 821-827. doi:<http://dx.doi.org/10.1016/j.paid.2012.12.004>
- Allport, G. W. (1961). *Pattern and growth in personality*. New York, NY: Holt, Rinehart, & Winston.
- Andrews, F. M., & Withey, S. B. (1976). *Social indicators of well-being: America's perception of life quality*. New York, NY: Plenum Press.
- Aristotle. (1985). *Nicomachean ethics*. (T. Irwin, Trans.). Indianapolis, IN: Hackett Publishing Company, Inc. (Original work published 349 B.C.)

- Arkoff, A., Meredith, G. M., & Dubanoski, J. P. (2004). Gains in well-being achieved through retrospective proactive life review by independent older women. *Journal of Humanistic Psychology, 44*, 204-214. doi:10.1177/0022167804263065
- Atienza, A. A., Stephens, M. A. P., & Townsend, A. L. (2004). Role stressors as predictors of changes in women's optimistic expectations. *Personality and Individual Differences, 37*, 471-484. doi:10.1016/j.paid.2003.09.016
- Azur, M. J., Stuart, E. A., Frangakis, C., & Leaf, P. J. (2011). Multiple imputation by chained equations: What is it and how does it work? *International Journal of Methods in Psychiatric Research, 20*, 40-49. doi:10.1002/mpr.329
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bentham, J. (2007). *An introduction to the principles of morals and legislation*. Mineola, NY: Dover Publications, Inc. (Original work published 1780)
- Berger, F. R. (1975). Gratitude. *Ethics, 85*, 298-309.
doi:http://dx.doi.org/10.1086/291969
- Boehm, J. K., Lyubomirsky, S., & Sheldon, K. M. (2011). A longitudinal experimental study comparing the effectiveness of happiness-enhancing strategies in Anglo Americans and Asian Americans. *Cognition and Emotion, 25*, 1263-1272.
doi:http://dx.doi.org/10.1080/02699931.2010.541227
- Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: A meta-analysis of randomized controlled studies. *BMC Public Health, 13*(119), 1-20. doi:10.1186/14712458-13-119

- Bono, G., Emmons, R. A., & McCullough, M. E. (2004). Gratitude in practice and the practice of gratitude. In P. A. Linley & S. Joseph (Eds.), *Positive psychology in practice* (pp. 464-481). Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/9780470939338.fmatter/summary>
- Brickman, P., & Campbell, D. T. (1971). Hedonic relativism and planning the good society. In M. H. Appley (Ed.), *Adaptation-Level Theory* (pp. 287-302), New York, NY: Academic Press.
- Brown, T. (1820). *Lectures on the philosophy of the human mind*. Edinburgh, UK: Black.
- Buchanan, K. E., & Bardi, A. (2010). Acts of kindness and acts of novelty affect life satisfaction. *The Journal of Social Psychology, 150*, 235-237.
doi:10.1080/00224540903365554
- Carman, J. B., & Streng, F. J. (Eds.). (1989). *Spoken and unspoken thanks: Some comparative soundings* (No. 5). Cambridge, MA: Harvard University.
- Carr, A. (2004). *Positive psychology: The science of happiness and human strengths*. New York, NY: Brunner-Routledge.
- Carver, C. S., & Gaines, J. G. (1987). Optimism, pessimism, and postpartum depression. *Cognitive Therapy and Research, 11*, 449-462. doi:10.1007/BF01175355
- Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., ... Clark, K. C. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology, 65*, 375-390. doi:<http://dx.doi.org/10.1037/00223514.65.2.375>
- Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York, NY: Cambridge University Press.

- Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review, 30*, 879-889. doi:10.1016/j.cpr.2010.01.006
- Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment, 6*, 284-290. doi:http://dx.doi.org/10.1037/10403590.6.4.284
- Champoux, J. E., & Peters, W. S. (1987). Form, effect size, and power in moderated regression analysis. *Journal of Occupational Psychology, 60*, 243–255. doi:10.1111/j.2044-8325.1987.tb00257.x
- Chaplin, W. E. (1991). The next generation of moderator research in personality psychology. *Journal of Personality, 59*, 143–178. doi:10.1111/j.1467-6494.1991.tb00772.x
- Charles, S. T., Reynolds, C. A., & Gatz, M. (2001). Age-related differences and change in positive and negative affect over 23 years. *Journal of personality and social psychology, 80*, 136-151. doi:http://dx.doi.org/10.1037/00223514.80.1.136
- Chen, S. T., & Chan, A. C. M., (2005). Measuring psychological well-being in the Chinese. *Personality and Individual Differences, 38*, 1307–1316. doi:10.1016/j.paid.2004.08.013
- Cho, J., Martin, P., Margrett, J., MacDonald, M., & Poon, L. W. (2011). The relationship between physical health and psychological well-being among oldest-old adults. *Journal of Aging Research, 2011*, 1-8. doi:http://dx.doi.org/10.4061/2011/605041
- Clarke, P. J., Marshall, V. W., Ryff, C. D., & Wheaton, B. (2001). Measuring psychological well-being in the Canadian Study of health and aging. *International Psychogeriatrics, 13*, 79–90. doi:http://dx.doi.org/10.1017/S1041610202008013

- Cobb, S. (1979). Social support and health through the life course. In M. W. Riley (Ed.), *Aging from birth to death: Interdisciplinary perspectives* (pp. 93-106). Boulder, CO: Westview Press.
- Cohen, J. (1977). *Statistical power analysis for the behavioral sciences* (rev. ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155–159.
doi:<http://dx.doi.org/10.1037/0033-2909.112.1.155>
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Erlbaum.
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, *98*, 310-357.
doi:<http://dx.doi.org/10.1037/00332909.98.2.310>
- Constable, J. F., & Russell, D. (1986). The effect of social support and the work environment upon burnout among nurses. *Journal of Human Stress*, *12*, 20-26.
doi:10.1080/0097840X.1986.9936762
- Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, *43*, 245-265.
doi:10.1348/0144665031752934

- Cutrona, C. E. (1982). Transition to college: Loneliness and the process of social adjustment. In L. A. Peplau & D. Perlman (Eds.), *Loneliness: A sourcebook of current theory, research, and therapy* (pp. 291-309). New York, NY: Wiley Interscience.
- Dawson, J. F. (2014). Moderation in management research: What, why, when and how. *Journal of Business and Psychology, 29*, 1-19. doi:10.1007/s10869-0139308-7
- de Sade, M. (2013). *Justine, or the misfortunes of virtue* (1st ed.). (J. Phillips, Trans.). Oxford, UK: Oxford University Press. (Original work published 1791)
- Della Porta, M. D., Jacobs Bao, K., & Lyubomirsky, S. (2012). *Does supporting autonomy facilitate the pursuit of happiness? Results from an experimental longitudinal well-being intervention*. Manuscript submitted for publication.
- Dickerhoof, R. (2007). *Expressing optimism and gratitude: A longitudinal investigation of cognitive strategies to increase well-being* (Unpublished doctoral dissertation). University of California, Riverside, CA.
- Diener E. (1984). Subjective well-being. *Psychological Bulletin, 95*, 542–575.
doi:http://dx.doi.org/10.1037/0033-2909.95.3.542
- Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist, 55*, 34-43.
doi:http://dx.doi.org/10.1037/0003-066X.55.1.34
- Diener, E. (2012). New findings and future directions for subjective well-being research. *American Psychologist, 67*, 590-597. doi: http://dx.doi.org/10.1037/a0029541

- Diener, E., & Chan, M. Y. (2011). Happy people live longer: Subjective well-being contributes to health and longevity. *Applied Psychology: Health and Well Being*, 3, 1-43. doi:10.1111/j.1758-0854.2010.01045.x
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, 49, 71-75.
doi:10.1207/s15327752jpa4901_13
- Diener, E., Lucas, R. E., & Scollon, C. N. (2006). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. *American Psychologist*, 61, 305-314.
doi:10.1037/0003-066X.61.4.305
- Diener, E., Oishi, S., & Lucas, R. E. (2003). Personality, culture, and subjective well-being: Emotional and cognitive evaluations of life. *Annual Review of Psychology*, 54, 403-425. doi:10.1146/annurev.psych.54.101601.145056
- Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125, 276-302.
doi:http://dx.doi.org/10.1037/0033-2909.125.2.276
- Dossett, T. H. (2011). *The influence of the character strengths of gratitude and kindness on subjective well-being* (Unpublished doctoral dissertation). Louisiana Tech University, Ruston, LA.
- Downey, R., & King, C. (1998). Missing data in Likert ratings: A comparison of replacement methods. *The Journal of General Psychology*, 125, 175-191.
doi:10.1080/00221309809595542

- Duckworth, A. L., Steen, T. A., & Seligman, M. E. (2005). Positive psychology in clinical practice. *Annual Review of Clinical Psychology, 1*, 629-651.
doi:10.1146/annurev.clinpsy.1.102803.144154
- Dush, C. M. K., & Amato, P. R. (2005). Consequences of relationship status and quality for subjective well-being. *Journal of Social and Personal Relationships, 22*, 607-627. doi:10.1177/0265407505056438
- Emmons, R. A., & Crumpler, C. A. (2000). Gratitude as a human strength: Appraising the evidence. *Journal of Social and Clinical Psychology, 19*, 5669.
doi:http://dx.doi.org/10.1521/jscp.2000.19.1.56
- Emmons, R. A., & McCullough, M. E. (2003). Counting blessings versus burdens: An experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology, 84*, 377-389.
doi:10.1037/00223514.84.2.377
- Emmons, R. A., & Mishra, A. (2012). Why gratitude enhances well-being: What we know, what we need to know. In Sheldon, K., Kashdan, T., & Steger, M.F. (Eds.) *Designing the future of positive psychology: Taking stock and moving forward*. New York: Oxford University Press.
- Erez, A., & Isen, A. M. (2002). The influence of positive affect on the components of expectancy motivation. *Journal of Applied Psychology, 87*, 1055-1067.
doi:http://dx.doi.org/10.1037/0021-9010.87.6.1055
- Erickson, E. (1959). Identity and the life cycle. *Psychological Issues, 1*, 18-164.

- Fischer, R., & Chalmers, A. (2008). Is optimism universal? A meta-analytical investigation of optimism levels across 22 nations. *Personality and Individual Differences, 45*, 378-382. doi:10.1016/j.paid.2008.05.008
- Fitzgerald, T. E., Tennen, H., Affleck, G., & Pransky, G. S. (1993). The relative importance of dispositional optimism and control appraisals in quality of life after coronary artery bypass surgery. *Journal of Behavioral Medicine, 16*, 25-43. doi: 10.1007/BF00844753
- Fordyce, M. W. (1977). Development of a program to increase personal happiness. *Journal of Counseling Psychology, 24*, 511-521.
doi:http://dx.doi.org/10.1037/00220167.24.6.511
- Fordyce, M. W., (1981). *The psychology of happiness: Fourteen fundamentals*. Fort Myers, FL: Cypress Lake Media.
- Fordyce, M. W. (1983). A program to increase happiness: Further studies. *Journal of Counseling Psychology, 30*, 483-498.
doi:http://dx.doi.org/10.1037/00220167.30.4.483
- Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology, 51*, 115-134. doi:10.1037/0022-0167.51.1.115
- Frederickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., & Finkel, S. M. (2008). Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential positive resources. *Journal of Personality and Social Psychology, 95*, 1045-1062. doi:10.1037/a0013262

- Froh, J. J., Kashdan, T. B., Ozimkowski, K. M., & Miller, N. (2009). Who benefits most from a gratitude intervention in children and adolescents? Examining positive affect as a moderator. *The Journal of Positive Psychology, 4*, 408-422.
doi:10.1080/17439760902992464
- Froh, J. J., Sefick, W. J., & Emmons, R. A. (2008). Counting blessings in early adolescents: An experimental study of gratitude and subjective well-being. *Journal of School Psychology, 46*, 213-233. doi:10.1016/j.jsp.2007.03.005
- Gable, S. L., & Haidt, J. (2005). What (and why) is positive psychology? *Review of General Psychology, 9*, 103-110. doi:10.1037/1089-2680.9.2.103
- Gallagher, M. W., Lopez, S. J., & Preacher, K. J. (2009). The hierarchical structure of well-being. *Journal of Personality, 77*, 1025-1050.
doi:10.1111/j.14676494.2009.00573.x.
- Gander, F., Proyer, R. T., Ruch, W., & Wyss, T. (2012). Strength-based positive interventions: Further evidence for their potential in enhancing well-being. *Journal of Happiness Studies, 14*, 1241-1259. doi:10.1007/s10902-012-93800
- George, J. M. (1991). Time structure and purpose as a mediator of work-life linkages. *Journal of Applied Psychology, 21*, 296-314.
doi:0.1111/j.15591816.1991.tb00522.x
- George, L. K., & Landerman, R. (1984). Health and subjective well-being: A replicated secondary data analysis. *International Journal of Aging and Human Development, 19*, 133-156. doi:10.2190/FHHT-25R8-F8KT-MAJD

- Geraghty, A. W. A., Wood, A. M., & Hyland, M. E. (2010). Attrition from self directed interventions: Investigating the relationship between psychological predictors, intervention content, and dropout from a body dissatisfaction intervention. *Social Science and Medicine*, *71*, 30-37. doi:10.1016/j.socscimed.2010.03.007
- Given, C. W., Stommel, M., Given, B., Osuch, J., Kurtz, M. E., & Kurtz, J. C. (1993). The influence of cancer patients' symptoms and functional states on patients' depression and family caregivers' reaction and depression. *Health Psychology*, *12*, 277-285. doi:http://dx.doi.org/10.1037/0278-6133.12.4.277
- Glaesmer, H., Rief, W., Martin, A., Mewes, R., Brähler, A., Zenger, M., & Hinz, A. (2012). Psychometric properties and population based norms of the Life Orientation Test Revised (LOT-R). *British Journal of Health Psychology*, *17*, 432-445. doi:10.1111/j.2044-8287.2011.02046.x
- Gratitude. (n.d.) 2014. In *Merriam-Webster's online dictionary* (11th ed.). Retrieved from <http://www.merriam-webster.com/dictionary/gratitude>
- Green, S. B., & Salkind, N. J. (2010). *Using SPSS for windows and macintosh: Analyzing and understanding data* (6th ed.). New York, NY: Pearson.
- Hallgren, K. A. (2012). Computing inter-rater reliability for observational data: An overview and tutorial. *Tutorials for Quantitative Methods in Psychology*, *8*, 23-34. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3402032/>
- Harned, D. B. (1997). *Patience: How we wait upon the world*. Cambridge, MA: Cowley.
- Hawthorne, G., & Elliott, P. (2005). Imputing cross-sectional missing data: Comparison of common techniques. *Australian and New Zealand Journal of Psychiatry*, *39*, 583-590. doi:10.1080/j.1440-1614.2005.01630.x

- Hergenhahn, B. R. (2005). *An introduction to the history of psychology* (5th ed.). Belmont, CA: Thomson Wadsworth.
- Herzberg, P. Y., Glaesmer, H., & Hoyer, J. (2006). Separating optimism and pessimism: A robust psychometric analysis of the revised Life Orientation Test (LOT-R). *Psychological Assessment, 18*, 433-438. doi:<http://dx.doi.org/10.1037/10403590.18.4.433>
- Higgins, E. T. (2006). Value from hedonic experience and engagement. *Psychological Review, 113*, 439-460. doi:<http://dx.doi.org/10.1037/0033295X.113.3.439>
- Hobbes, T. (1994). *Leviathan: With selected variants from the Latin edition of 1668*. E. Curley (Ed.). Indianapolis, IN: Hackett Publishing Company, Inc. (Original work published 1651)
- House, J. S., & Kahn, R. L. (1985). Measures and concepts of social support. In S. Cohen & S. L. Syme (Eds.), *Social support and health* (pp. 83-108). New York, NY: Academic Press.
- Jahoda, M. (1958). *Current concepts of positive mental health*. New York, NY: Basic Books.
- Jørgensen, I. S., & Nafstad, H. E. (2004). Positive psychology: Historical, philosophical, and epistemological perspectives. In P. A. Linley & S. Joseph (Eds.), *Positive psychology in practice* (pp. 15-34). Hoboken, NJ: John Wiley & Sons, Inc.
- Kahn, R. L. (1979). Aging and social support. In M. W. Riley (Ed.), *Aging from birth to death: Interdisciplinary perspectives* (pp. 77-91). Boulder, CO: Westview Press.

- Kahneman, D. (2003). Objective happiness. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 325). New York, NY: Russell Sage Foundation.
- Kahneman, D. (2011). *Thinking fast and slow*. New York, NY: Farrar, Straus, and Giroux.
- Kant, I. (1964). *The metaphysical principles of virtue: Part II of The metaphysics of morals* (J. Ellington, Trans.). Indianapolis, IN: Bobbs-Merrill. (Original work published 1797)
- Karademas, E. C. (2006). Self-efficacy, social support and well-being: The mediating role of optimism. *Personality and Individual Differences, 40*, 1281-1290.
doi:10.1016/j.paid.2005.10.019
- Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Research, 43*, 207-222.
doi:http://dx.doi.org/10.2307/3090197
- King, L. A. (2001). The health benefits of writing about life goals. *Personality and Social Psychology Bulletin, 27*, 798-807. doi:10.1177/0146167201277003
- Layous, K., & Lyubomirsky, S. (2012). The how, why, what, when, and who of happiness: Mechanisms underlying the success of positive interventions. To appear in J. Gruber & J. Moskowitz (Eds.), *The light and dark side of positive emotions*. New York, NY: Oxford University Press.
- Layous, K., Nelson, S. K., & Lyubomirsky, S. (2012). What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *Journal of Happiness Studies, 14*, doi:10.1007/s10902-012-9346-2

- Lazarus, R. S., & Lazarus, B. N. (1994). *Passion and reason: Making sense of our emotions*. New York, NY: Oxford University Press.
- Linley, P. A., & Joseph, S. (Eds.). (2004). *Positive psychology in practice*. Hoboken, NJ: John Wiley & Sons, Inc.
- Litt, M. D., Tennen, H., Affleck, G., & Klock, S. (1992). Coping and cognitive factors in adaptation to in vitro fertilization failure. *Journal of Behavioral Medicine, 15*, 171-187. doi:10.1007/BF00848324
- Lucas, R. E., Diener, E., & Suh, E. (1996). Discriminant validity of well-being measures. *Journal of Personality and Social Psychology, 71*, 616-628.
doi:http://dx.doi.org/10.1037/0022-3514.71.3.616
- Lucas, R. E., & Donnellan, M. B. (2007). How stable is happiness? Using the STARTS model to estimate the stability of life satisfaction. *Journal of Research in Personality, 41*, 1091-1098. doi:10.1016/j.jrp.2006.11.005
- Lykken, D., & Tellegen, A. (1996). Happiness is a stochastic phenomenon. *Psychological Science, 7*, 186-189. doi:http://dx.doi.org/10.1111/j.14679280.1996.tb00355.x
- Lyubomirsky, S., Dickerhoof, R., Boehm, J. K., & Sheldon, K. M. (2011). Becoming happier takes both a will and a proper way: An experimental longitudinal intervention to boost well-being. *Emotion, 11*, 391-402. doi:10.1037/a0022575
- Lyubomirsky, S., King, L. A., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin, 131*, 803-855.
doi:http://dx.doi.org/10.1037/0033-2909.131.6.803

Lyubomirsky, S., & Layous, K. (2013). How do simple positive activities increase well-being. *Current Directions in Psychological Science*, 22, 57-62.

doi:10.1177/0963721412469809

Lyubomirsky, S., Sheldon, K., & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology*, 9, 111-131.

doi:http://dx.doi.org/10.1037/1089-2680.9.2.111

Lyubomirsky, S., Tkach, C., & Sheldon, K. M. (2004). *Pursuing sustained happiness through random acts of kindness and counting one's blessings: Tests of two six-week interventions*. Unpublished data, Department of Psychology, University of California, Riverside.

Maslow, A. H. (1968). *Toward a psychology of being* (2nd ed.). New York, NY: Van Nostrand Reinhold.

Matthews, K. A., Räikkönen, K., Sutton-Tyrrell, K., & Kuller, L. H. (2004). Optimistic attitudes protect against progression of carotid atherosclerosis in healthy middle-aged women. *Psychosomatic Medicine*, 66, 640-644.

doi:http://dx.doi.org/10.1097/01.psy.0000139999.99756.a5

McCullough, M. E., Emmons, R. A., & Tsang, J. (2002). The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*, 82, 112-127. doi:10.1037/0022-3514.82.1.112

McCullough, M. E., Kilpatrick, S. D., Emmons, R. A., & Larson, D. B. (2001). Is gratitude a moral affect? *Psychological Bulletin*, 127, 249-266.

doi:http://dx.doi.org/10.1037//0033-2909.127.2.249

- McCullough, M.E., Tsang, J., & Emmons, R.A. (2004). Gratitude in intermediate affective terrain: Links of grateful moods to individual differences and daily emotional experience. *Journal of Personality and Social Psychology, 86*, 295–309. doi:10.1037/0022-3514.86.2.295
- McDowell, J. (1980). The role of eudaimonia in Aristotle's ethics. In A. O. Rorty (Ed.), *Essays on Aristotle's ethics* (pp. 359-376). Berkeley, CA: University of California Press.
- Meilaender, G. C. (1984). *The theory and practice of virtue*. Notre Dame, IN: University of Notre Dame Press.
- Mongrain, M., & Anselmo-Matthews, T. (2012). Do positive psychology exercises work? A replication of Seligman et al. *Journal of Clinical Psychology, 68*, 382-389. doi:10.1002/jclp.21839
- Netz, Y., Wu, M. J., Becker, B. J., & Tenenbaum, G. (2005). Physical activity and psychological well-being in advanced age: A meta-analysis of intervention studies. *Psychology and Aging, 20*, 272-284. doi:10.1037/08827974.20.2.272
- Otake, K., Shimai, S., Takana-Matsumi, J., Otsui, K., & Frederickson, B. L. (2006). Happy people become happier through kindness: A counting kindness intervention. *Journal of Happiness Studies, 7*, 361-375. doi:10.1007/s10902005-3650-z
- Pavot, W., & Diener, E. (1993). Review of the Satisfaction with Life Scale. *Psychological Assessment, 5*, 164-172. doi:10.1037/1040-3590.5.2.164

- Pavot, W., Diener, E. D., Colvin, C. R., & Sandvik, E. (1991). Further validation of the Satisfaction with Life Scale: Evidence for the cross-method convergence of well-being measures. *Journal of Personality Assessment*, *57*, 149-161.
doi:10.1207/s15327752jpa5701_17
- Peng, C.-Y. J., Harwell, M., Liou, S.-M., & Ehman, L. H. (2006). Advances in missing data methods and implications for educational research. In S. Sawilowsky (Ed.), *Real data analysis* (pp. 31–78). Greenwich, CT: Information Age.
- Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science*, *8*, 162-166. doi:10.1111/j.14679280.1997.tb00403.x
- Pennebaker, J. W., & Beall, S. K. (1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. *Journal of Abnormal Psychology*, *95*, 274-281. doi:http://dx.doi.org/10.1037/0021-843X.95.3.274
- Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A classification and handbook*. New York, NY: Oxford University Press/Washington, DC: American Psychological Association.
- Peterson, C., Semmel, A., Baeyer, C., Abramson, L. Y., Metalsky, G. I., & Seligman, M. E. P. (1982). The attributional style questionnaire. *Cognitive Therapy and Research*, *6*, 287-300. doi:10.1007/BF01173577
- Plomin, R., Scheier, M. F., Bergeman, C. S., Pedersen, N. L., Nesselroade, J. R., & McClearn, G. E. (1992). Optimism, pessimism, and mental health: A twin/adoption analysis. *Personality and Individual Differences*, *13*, 921-930.
doi:http://dx.doi.org/10.1016/0191-8869(92)90009-E

- Rash, J. A., Matsuba, M. K., & Prkachin, K. M. (2011). Gratitude and well-being: Who benefits the most from a gratitude intervention? *Applied Psychology: Health and Well-Being, 3*, 350-369. doi:10.1111/j.1758-0854.2011.01058.x
- Rauch, W. A., Schweizer, K., & Moosbrugger, H. (2007). Method effects due to social desirability as a parsimonious explanation of the deviation from unidimensionality in LOT-R scores. *Personality and Individual Differences, 42*, 1597-1607. doi:http://dx.doi.org/10.1016/j.paid.2006.10.035
- Raymond, D. F., Seligman, M. E. P., & Koocher, D. P. (1999). The APA 1998 annual report. *American Psychologist, 54*, 537-568.
doi:http://dx.doi.org/10.1037/0003066X.54.8.537
- Reed, G.L., & Enright, R.D. (2006). The effects of forgiveness therapy on depression, anxiety, and posttraumatic stress for women after spousal emotional abuse. *Journal of Consulting and Clinical Psychology, 74*, 920–929. doi:10.1037/0022-006X.74.5.920
- Research randomizer: Random sampling and random assignment made easy! (2015, September 18). Retrieved from <https://www.randomizer.org>
- Roberts, R. C. (1984). Will power and the virtues. *The Philosophical Review, 93*, 227-247. doi:http://dx.doi.org/10.2307/2184584
- Roberts, R. C. (1987). Psychotherapeutic virtues and the grammar of faith. *Journal of Psychology and Theology, 15*, 191-204. Retrieved from <http://journals.biola.edu/jpt/volumes/15/issues/3/articles/191>

- Roberts, R. C. (1991a). Mental health and the virtues of community: Christian reflections on contextual therapy. *Journal of Psychology and Theology, 19*, 319-333.
Retrieved from <http://journals.biola.edu/jpt/volumes/19/issues/4/articles/319>
- Roberts, R. C. (1991b). Virtues and rules. *Philosophy and Phenomenological Research, 51*, 325-343. doi:<http://dx.doi.org/10.2307/2108130>
- Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin, 126*, 3-25. doi:<http://dx.doi.org/10.1037/0033-2909.126.1.3>
- Rogers, C. R. (1961). *On becoming a person: A therapist's view of psychotherapy*. Boston, MA: Houghton Mifflin Harcourt.
- Rosenthal, J. A. (1996). Qualitative descriptors of strength of association and effect size. *Journal of Social Service Research, 21*, 37-59. doi:10.1300/J079v21n04_02
- Ruini, C., Belaise, C., Brombin, C., Caffo, E., & Fava, G. A. (2006). Well-being therapy in school settings: A pilot study. *Psychotherapy and Psychosomatics, 75*, 331-336. doi:10.1159/000095438
- Russell, D., Altmaier, E., & Van Velzen, D. (1987). Job-related stress, social support, and burnout among classroom teachers. *Journal of Applied Psychology, 72*, 269-274. doi:<http://dx.doi.org/10.1037/0021-9010.72.2.269>
- Russell, D., & Cutrona, C. E. (1987). The Social Provisions Scale: A multidimensional measure of perceived social support. *Unpublished manuscript*.

- Russell, D., & Cutrona, C. E., Rose, J., & Yurko, K. (1984). Social and emotional loneliness: An examination of Weiss's typology of loneliness. *Journal of Personality and Social Psychology*, *6*, 1313-1321.
doi:<http://dx.doi.org/10.1037/0022-3514.46.6.1313>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68–78. doi:<http://dx.doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, *52*, 141-166. doi:<http://dx.doi.org/10.1146/annurev.psych.52.1.141>
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*, 1069-1081. doi:<http://dx.doi.org/10.1037/0022-3514.57.6.1069>
- Ryff, C. D. (1995). Psychological well-being in adult life. *Current Directions in Psychological Science*, *4*, 99–104.
doi:<http://dx.doi.org/10.1111/14678721.ep10772395>
- Ryff, C. D. (2014). Psychological well-being revisited: Advances in the science and practice of eudaimonia. *Psychotherapy and Psychosomatics*, *83*, 10-28.
doi:10.1159/000353263
- Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, *69*, 719–727.
doi:<http://dx.doi.org/10.1037/0022-3514.69.4.719>

- Ryff, C. D., & Singer, B. (1998). The contours of positive human health. *Psychological Inquiry, 9*, 1–28. doi:http://dx.doi.org/10.1207/s15327965pli0901_1
- Ryff, C. D., & Singer, B. H. (2006). Best news yet on the six-factor model of well being. *Social Science Research, 35*, 1103-1119. doi:10.1016/j.ssresearch.2006.01.002
- Schaefer, C., Coyne, J. C., & Lazarus, R. S. (1981). The health-related functions of social support. *Journal of Behavioral Medicine, 4*, 381-406. doi:10.1007/BF00846149
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods, 7*, 147–177. doi:10.1037/1082-989X.7.2.147
- Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implication of generalized outcome expectancies. *Health Psychology, 4*, 219-247. doi:<http://dx.doi.org/10.1037/0278-6133.4.3.219>
- Scheier, M. F., & Carver, C. S. (1992). Effects of optimism on psychological and physical well-being: Theoretical overview and empirical update. *Cognitive Therapy and Research, 16*, 201-228. doi:10.1007/BF01173489
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 67*, 1063-1078. doi:<http://dx.doi.org/10.1037/00223514.67.6.1063>
- Schimmel, S. (1997). *The seven deadly sins: Jewish, Christian, and classical reflections on human nature*. New York, NY: The Free Press.
- Schmutte, P. S., & Ryff, C. D. (1997). Personality and well-being: reexamining methods and meanings. *Journal of Personality and Social Psychology, 73*, 549-559. doi:<http://dx.doi.org/10.1037/0022-3514.73.3.549>

- Seligman, M. E. P. (1998). *Learned optimism: How to change your mind and your life*. New York, NY: Pocket Books.
- Seligman, M. E. P. (1999). The APA 1998 annual report. *American Psychologist*, *54*, 537-568. doi:<http://dx.doi.org/10.1037/0003-066X.54.8.537>
- Seligman, M. E. P. (2012). *Flourish: A visionary new understanding of happiness and well-being*. New York, NY: Free Press.
- Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, *55*, 5-14. doi:[10.1037/0003066X.55.1.5](http://dx.doi.org/10.1037/0003066X.55.1.5)
- Seligman, M. E. P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist*, *60*, 410-421. doi:[10.1037/0003-066X.60.5.410](http://dx.doi.org/10.1037/0003-066X.60.5.410)
- Sergeant, S. & Mongrain, M. (2014). An online optimism intervention reduces depression in pessimistic individuals. *Journal of Consulting and Clinical Psychology*, *82*, 263-274. doi:[10.1037/a0035536](http://dx.doi.org/10.1037/a0035536)
- Shapira, L. B. & Mongrain, M. (2010). The benefits of self-compassion and optimism exercises for individuals vulnerable to depression. *The Journal of Positive Psychology*, *5*, 377-389. doi:[10.1080/17439760.2010.516763](http://dx.doi.org/10.1080/17439760.2010.516763)
- Sheldon, K. M., Boehm, J. K., & Lyubomirsky, S. (2012). Variety is the spice of happiness: The hedonic adaptation prevention (HAP) model. In I. Boniwell & S. David (Eds.), *Oxford handbook of happiness* (pp. 901–914). Oxford, England: Oxford University Press.

- Sheldon, K. M., & Lyubomirsky, S. (2006). How to increase and sustain positive emotion: The effects of expressing gratitude and visualizing best possible selves. *The Journal of Positive Psychology, 1*, 73-82. doi:10.1080/17439760500510676
- Shnek, Z. M., Irvine, J., Stewart, D., & Abbey, S. (2001). Psychological factors and depressive symptoms in ischemic heart disease. *Health psychology, 20*, 141-145. doi:http://dx.doi.org/10.1037/0278-6133.20.2.141
- Sin, N. L., Della Porta, M. D., & Lyubomirsky, S. (2011). Tailoring positive psychology interventions to treat depressed individuals. In S. I. Donaldson, M. Csikszentmihalyi, & J. Nakamura (Eds.), *Applied positive psychology: Improving everyday life, health, schools, work, and society* (pp. 79–96). New York, NY: Routledge.
- Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice friendly meta-analysis. *Journal of Clinical Psychology: In Session, 65*, 467487. doi:10.1002/jclp.20593
- Smead, V. S. (1991). *Measuring well-being is not easy*. Paper presented at the Annual Convention of the American Association of Applied and Preventative Psychology, Washington, D.C.
- Smith, M. L., Glass, G. V., & Miller, T. I. (1980). *The benefits of psychotherapy*. Baltimore, MD: Johns Hopkins University Press.
- Smith, R. (1997). *The human sciences*. New York, NY: Norton.

- Snyder, C. R., Harris, C., Anderson, J. R., Holleran, S. A., Irving, L. M., Sigmon, S.T., ...Harney, P. (1991). The will and the ways: Development and validation of an individual-difference measure of hope. *Journal of Personality and Social Psychology, 60*, 570–585. doi:<http://dx.doi.org/10.1037/0022-3514.60.4.570>
- Solomon, R. C. (1997). *The passions*. Garden City, NY: Anchor Books.
- Springer, K. W., & Hauser, R. M., (2006). An assessment of the construct validity of Ryff's scales of psychological well-being: Method, mode and measurement effects. *Social Science Research, 35*, 1079–1101.
doi:10.1016/j.ssresearch.2005.07.004
- Stevens, J. P. (2012). *Applied multivariate statistics for the social sciences* (5th ed.). New York, NY: Routledge.
- Stutzer, A. (2004). The role of income aspirations in individual happiness. *Journal of Economic Behavior & Organization, 54*, 89-109. doi:10.1016/j.jebo.2003.04.003
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Boston, MA: Pearson Education.
- Tait, M., Padgett, M. Y., & Baldwin, T. T. (1989). Job and life satisfaction: A reevaluation of the strength of the relationship and gender effects as a function of the date of the study. *Journal of Applied Psychology, 74*, 502-507.
doi:<http://dx.doi.org/10.1037/0021-9010.74.3.502>

- Taylor, S. E., Kemeny, M. E., Aspinwall, L. G., Schneider, S. G., Rodriguez, R., & Herbert, M. (1992). Optimism, coping, psychological distress, and high-risk sexual behavior among men at risk for acquired immunodeficiency syndrome (AIDS). *Journal of Personality and Social Psychology*, *63*, 460-473.
doi:<http://dx.doi.org/10.1037/0022-3514.63.3.460>
- Telfer, E. (1980). *Happiness*. New York, NY: St. Martin's Press.
- Tellegen, A., Lykken, D. T., Bouchard, T. J., Wilcox, K. J., Segal, N. L., & Rich, S. (1988). Personality similarity in twins reared apart and together. *Journal of Personality and Social Psychology*, *54*, 1031-1039.
doi:<http://dx.doi.org/10.1037/0022-3514.54.6.1031>
- Trivers, R. L. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology*, *46*, 35-57. doi:<http://dx.doi.org/10.1086/406755>
- Turner, C. F., Ku, L., Rogers, S. M., Lindberg, L. D., Pleck, J. H., & Sonenstein, F. L. (1998). Adolescent sexual behavior, drug use, and violence: Increased reporting with computer survey technology. *Science*, *280*, 867-873.
doi:10.1126/science.280.5365.867
- Van Dierendonck, D., (2004). The construct validity of Ryff's scales of psychological well-being and its extension with spiritual well-being. *Personality and Individual Differences*, *36*, 629-643. doi:10.1016/S0191-8869(03)00122-3
- Velicer, W. F., Prochaska, J. O., Rossi, J. S., & Snow, M. G. (1992). Assessing outcome in smoking cessation studies. *Psychological Bulletin*, *111*, 23-41.
doi:<http://dx.doi.org/10.1037/0033-2909.111.1.23>

- Walker, W. R., & Skowronski, J. J. (2009). The fading affect bias: But what the hell is it for? *Applied Cognitive Psychology, 23*, 1122-1136. doi:10.1002/acp.1614
- Waterman, A. S. (1993). Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of Personality and Social Psychology, 64*, 678-691. doi:http://dx.doi.org/10.1037/00223514.64.4.678
- Watkins, P. C., Woodward, K., Stone, T., & Kolts, R. L. (2003). Gratitude and happiness: Development of a measure of gratitude and relationships with subjective well being. *Social Behavior and Personality, 31*, 431-452.
doi:http://dx.doi.org/10.2224/sbp.2003.31.5.431
- 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*, 1063-1070.
doi:http://dx.doi.org/10.1037/00223514.54.6.1063
- Weiner, B. (1986). Attribution, emotion, and action. In R. M. Sorrentino & E. T. Higgins (Eds.). *Handbook of motivation and cognition* (pp. 281-312). New York, NY: Guilford.
- Weiss, R. S. (Ed.) (1973). *Loneliness: The experience of emotional and social isolation*. Cambridge, MA: MIT Press.
- Weiss, R. S. (1974). The provisions of social relationships. In Z. Rubin (Ed.), *Doing unto others* (pp. 17-26). Englewood Cliffs, NJ: Prentice Hall.
- Wing, J. F., Schutte, N. S., & Byrne, B. (2006). The effect of positive writing on emotional intelligence and life satisfaction. *Journal of Clinical Psychology, 62*, 1291-1302. doi:10.1002/jclp.20292

- Wood, A. M., Froh, J. J. & Geraghty, A. W. A. (2010). Gratitude and well-being: A review and theoretical integration. *Clinical Psychology Review, 30*, 890-905. doi:10.1016/j.cpr.2010.03.005
- Wood, A. M., Joseph, S. & Maltby, J. (2008a). Gratitude predicts psychological well being above the Big Five facets. *Personality and Individual Differences, 46*, 443-447. doi:10.1016/j.paid.2008.11.012
- Wood, A. M., Joseph, S., & Maltby, J. (2008b). Gratitude uniquely predicts satisfaction with life: Incremental validity above the domains and facets of the five factor model. *Personality and Individual Differences, 45*, 49-54. doi:10.1016/j.paid.2008.02.019
- Wood, A. M., Maltby, J., Gillett, R., Linley, P. A., & Joseph, S. (2008). The role of gratitude in the development of social support, stress, and depression: Two longitudinal studies. *Journal of Research in Personality, 42*, 854-871. doi:10.1016/j.jrp.2007.11.003

APPENDIX A

DEMOGRAPHIC QUESTIONNAIRE

Demographic Questionnaire

Age? _____

Sex: Male Female

Please mark the ethnicity with which you most closely identify.

- American Indian/Alaskan Native
 Black/African American
 Native Hawaiian/Pacific Islander
 Asian/Asian American
 Hispanic/Latino
 White/Caucasian
 Biracial/Multiracial
 Other _____

Current relationship status.

- Single
 Married
 Partnered
 Divorced
 Widowed
 Other _____

What religion do you affiliate with, if any?

- Christianity
 Islam
 Hinduism
 Buddhism
 Atheism
 None
 Other _____

What is your current annual household income?

- 0-\$20,000
 \$20,001-35,000
 \$35,001-55,000
 \$55,001-75,000
 \$75,001-100,000
 \$100,001-150,000
 \$150,001 or above

If you are currently a student, please indicate your academic classification; if NOT, please check "Not Applicable"

- Freshman Sophomore Junior Senior
 Master's student Doctoral student Not Applicable
 Other _____

Within what college is your major currently housed at the university?

- Education Business Engineering and Science Liberal
Arts
 Applied and Natural Sciences

APPENDIX B

REMAINING SURVEY MEASURES

Satisfaction with Life Scale (Diener et al., 1985):

Instructions: Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

7 - Strongly agree

6 - Agree

5 - Slightly agree

4 - Neither agree nor disagree

3 - Slightly disagree

2 - Disagree

1 - Strongly disagree

1. ____ In most ways my life is close to my ideal.
2. ____ The conditions of my life are excellent.
3. ____ I am satisfied with my life.
4. ____ So far I have gotten the important things I want in life.
5. ____ If I could live my life over, I would change almost nothing.

Positive and Negative Affect Schedule (Watson et al., 1988):

This scale consists of a number of words that describe different feelings and emotions.

Read each item and then mark the appropriate answer in the space next to that word.

Indicate to what extent you felt each feeling or emotion [“over the past week” (Time 1), “over the past few days” (Time 2), and “over the past few weeks” (Time 3)]. Use the following scale to record your answers.

1- very slightly or not at all 2-a little 3-moderately 4-quite a bit 5-extremely

_ interested

_ distressed

_ excited

_ upset

_ strong

_ guilty

_ scared

_ hostile

_ enthusiastic

_ proud

_ irritable

_ alert

_ ashamed

_ inspired

_ nervous

_determined

_attentive

_jittery

_active

_afraid

Psychological Well-being (Ryff, 1989; Ryff & Keyes, 1995):

The following set of questions deals with how you feel about yourself and your life.

Please remember that there are no right or wrong answers.

Please indicate your degree of agreement (using a score ranging from 1-6) to the following sentences.

Strongly Disagree

Strongly Agree

1 2 3 4 5 6

1. I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people. ____
2. In general, I feel I am in charge of the situation in which I live. ____
3. I am not interested in activities that will expand my horizons. ____
4. Most people see me as loving and affectionate. ____
5. I live life one day at a time and don't really think about the future. ____
6. When I look at the story of my life, I am pleased with how things have turned out. ____
7. My decisions are not usually influenced by what everyone else is doing. ____
8. The demands of everyday life often get me down. ____
9. I think it is important to have new experiences that challenge how you think about yourself and the world. ____
10. Maintaining close relationships has been difficult and frustrating for me. ____
11. I have a sense of direction and purpose in life. ____
12. In general, I feel confident and positive about myself. ____

13. I tend to worry about what other people think of me. ____
14. I do not fit very well with the people and the community around me. ____
15. When I think about it, I haven't really improved much as a person over the years.

16. I often feel lonely because I have few close friends with whom to share my concerns. ____
17. My daily activities often seem trivial and unimportant to me. ____
18. I feel like many of the people I know have gotten more out of life than I have. ____
19. I tend to be influenced by people with strong opinions. ____
20. I am quite good at managing the many responsibilities of my daily life. ____
21. I have the sense that I have developed a lot as a person over time. ____
22. I enjoy personal and mutual conversations with family members or friends. ____
23. I don't have a good sense of what it is I'm trying to accomplish in life.
24. I like most aspects of my personality. ____
25. I have confidence in my opinions, even if they are contrary to the general consensus. ____
26. I often feel overwhelmed by my responsibilities. ____
27. I do not enjoy being in new situations that require me to change my old familiar ways of doing things. ____
28. People would describe me as a giving person, willing to share my time with others. ____
29. I enjoy making plans for the future and working to make them a reality. ____
30. In many ways, I feel disappointed about my achievements in life. ____

31. It's difficult for me to voice my own opinions on controversial matters. ____
32. I have difficulty arranging my life in a way that is satisfying to me. ____
33. For me, life has been a continuous process of learning, changing, and growth. ____
34. I have not experienced many warm and trusting relationships with others. ____
35. Some people wander aimlessly through life, but I am not one of them. ____
36. My attitude about myself is probably not as positive as most people feel about themselves. ____
37. I judge myself by what I think is important, not by the values of what others think is important. ____
38. I have been able to build a home and a lifestyle for myself that is much to my liking. ____
39. I gave up trying to make big improvements or changes in my life a long time ago. ____
40. I know that I can trust my friends, and they know they can trust me. ____
41. I sometimes feel as if I've done all there is to do in life. ____
42. When I compare myself to friends and acquaintances, it makes me feel good about who I am. ____

Dispositional Gratitude (McCullough et al., 2002):

Using the scale below as a guide, write a number beside each statement to indicate how much you agree with it.

1 = strongly disagree 2 = disagree 3 = slightly disagree 4 = neutral

5 = slightly agree 6 = agree 7 = strongly agree

___ 1. I have so much in life to be thankful for.

___ 2. If I had to list everything that I felt grateful for, it would be a very long list.

___ 3. When I look at the world, I don't see much to be grateful for.

___ 4. I am grateful to a wide variety of people.

___ 5. As I get older I find myself more able to appreciate the people, events, and situations that have been part of my life history.

___ 6. Long amounts of time can go by before I feel grateful to something or someone.

Dispositional Optimism (Scheier et al., 1994):

Please answer the following questions about yourself by indicating the extent of your agreement using the following scale: 0 = strongly disagree, 1 = disagree, 2 = neutral, 3 = agree, 4 = strongly agree

Be as honest as you can throughout, and try not to let your responses to one question influence your response to other questions. There are no right or wrong answers.

- 1. In uncertain times, I usually expect the best.
- 2. It's easy for me to relax.
- 3. If something can go wrong for me, it will.
- 4. I'm always optimistic about my future.
- 5. I enjoy my friends a lot.
- 6. It's important for me to keep busy.
- 7. I hardly ever expect things to go my way.
- 8. I don't get upset too easily.
- 9. I rarely count on good things happening to me.
- 10. Overall, I expect more good things to happen to me than bad.

Social Support (Russell et al., 1984):

1 = STRONGLY DISAGREE, 2 = DISAGREE, 3 = AGREE, 4 = STRONGLY AGREE

1. There are people I can depend on to help me if I really need it. ___
2. I feel that I do not have close personal relationships with other people. ___
3. There is no one I can turn to for guidance in times of stress. ___
4. There are people who enjoy the same social activities that I do. ___
5. I do not think other people respect my skills and abilities. ___
6. If something went wrong, no one would come to my assistance. ___
7. I have close relationships that provide me with a sense of emotional security and well being. ___
8. I have relationships where my competence and skills are recognized. ___
9. There is no one who shares my interests and concerns. ___
10. There is a trustworthy person I could turn to for advice if I were having problems. ___

APPENDIX C

HUMAN USE APPROVAL LETTER



LOUISIANA TECH
UNIVERSITY

MEMORANDUM

OFFICE OF UNIVERSITY RESEARCH

TO: Dr. Guler Boyraz and Mr. Brandon Waits
 FROM: Dr. Stan Napper, Vice President Research & Development
 SUBJECT: HUMAN USE COMMITTEE REVIEW
 DATE: October 21, 2015

In order to facilitate your project, an EXPEDITED REVIEW has been done for your proposed study entitled:

"Positive Psychology Exercises and Well-being"

HUC 1351

The proposed study's revised procedures were found to provide reasonable and adequate safeguards against possible risks involving human subjects. The information to be collected may be personal in nature or implication. Therefore, diligent care needs to be taken to protect the privacy of the participants and to assure that the data are kept confidential. Informed consent is a critical part of the research process. The subjects must be informed that their participation is voluntary. It is important that consent materials be presented in a language understandable to every participant. If you have participants in your study whose first language is not English, be sure that informed consent materials are adequately explained or translated. Since your reviewed project appears to do no damage to the participants, the Human Use Committee grants approval of the involvement of human subjects as outlined.

Projects should be renewed annually. *This approval was finalized on October 21, 2015 and this project will need to receive a continuation review by the IRB if the project, including data analysis, continues beyond October 21, 2016.* Any discrepancies in procedure or changes that have been made including approved changes should be noted in the review application. Projects involving NIH funds require annual education training to be documented. For more information regarding this, contact the Office of University Research.

You are requested to maintain written records of your procedures, data collected, and subjects involved. These records will need to be available upon request during the conduct of the study and retained by the university for three years after the conclusion of the study. If changes occur in recruiting of subjects, informed consent process or in your research protocol, or if unanticipated problems should arise it is the Researchers responsibility to notify the Office of Research or IRB in writing. The project should be discontinued until modifications can be reviewed and approved.

• If you have any questions, please contact Dr. Dr. Mary Livingston at 257-2292 or 257-5066.

A MEMBER OF THE UNIVERSITY OF LOUISIANA SYSTEM

P.O. BOX 3092 • RUSTON, LA 71272 • TEL: (318) 257-5075 • FAX: (318) 257-5079

AN EQUAL OPPORTUNITY UNIVERSITY



LOUISIANA TECH
UNIVERSITY

OFFICE OF UNIVERSITY RESEARCH

MEMORANDUM

TO: Mr. Brandon Waits and Dr. Guler Boyrza
 FROM: Dr. Stan Napper, Vice President of Research & Development *Stan Napper*
 SUBJECT: Human Use Committee Review
 DATE: February 6, 2017
 RE: Approved Continuation of Study HUC 17-060 REN17
 TITLE: "Positive Psychology Exercises and Well-being"

HUC 17-060 REN17

The above referenced study has been approved as of February 6, 2017 as a continuation of the original study that received approval on October 15, 2015. **This project will need to receive a continuation review by the IRB if the project, including collecting or analyzing data, continues beyond February 6, 2018.** Any discrepancies in procedure or changes that have been made including approved changes should be noted in the review application. Projects involving NIH funds require annual education training to be documented. For more information regarding this, contact the Office of University Research.

You are requested to maintain written records of your procedures, data collected, and subjects involved. These records will need to be available upon request during the conduct of the study and retained by the university for three years after the conclusion of the study. If changes occur in recruiting of subjects, informed consent process or in your research protocol, or if unanticipated problems should arise it is the Researchers responsibility to notify the Office of Research or IRB in writing. The project should be discontinued until modifications can be reviewed and approved.

Please be aware that you are responsible for reporting any adverse events or unanticipated problems. If you have any questions, please contact Dr. Mary Livingston at 257-5066.

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