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An Examination Of The Short- And Longer-Term Reciprocal Relationship Between Older Adults' Cognitive Reappraisal And Positive Emotions And Their Impact On Psychological Well-Being

Nicole Haverstock

AN EXAMINATION OF THE SHORT- AND LONGER-TERM RECIPROCAL RELATIONSHIP BETWEEN OLDER ADULTS' COGNITIVE REAPPRAISAL AND POSITIVE EMOTIONS AND THEIR IMPACT ON PSYCHOLOGICAL WELL-BEING

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and my cat Carlton.

In loving memory of my nanny Ginny Haverstock, great granny Anne Neufeld, and grandpa Ernie Tayler.

ABSTRACT

Older adults face many age-related challenges, making it critical to identify malleable coping strategies that contribute to more frequent positive emotions and serve to protect overall psychological well-being. Prior research has shown that cognitive reappraisal, or finding meaning in a difficult situation, is a cognitively-based coping strategy that contributes to more frequent positive emotions. The current studies examined the short- and longer-term reciprocal relationship between engagement in cognitive reappraisal and frequency of positive emotions using a cross-lagged panel design. Multiple indices of psychological well-being were also assessed (i.e., perceived control, life satisfaction, self-efficacy, perceived stress, and depressive symptoms). Study 1 focused on cognitive reappraisal and positive emotions as predictors of each other, aimed to determine which directional association was stronger, and examined their stability/change over three months. Cognitive reappraisal was also assessed as a predictor of psychological well-being. Participants were 146 community-dwelling older adults aged 60+ years who completed online surveys assessing sociodemographics (Time 1), cognitive reappraisal, positive emotions (Time 1 and 2), and psychological well-being (Time 2). Study 2 focused on the same objectives but over a two-year period. The study utilized an existing longitudinal dataset of 418 community-dwelling older adults aged 60+ years who completed in-person interviews or mail-in surveys of measures identical to the first study. Results showed that greater engagement in cognitive reappraisal at Time 1 predicted

more frequent positive emotions at Time 2 over the short-term only, whereas more frequent Time 1 positive emotions predicted greater engagement in cognitive reappraisal for both the short- and longer-term. As expected, cognitive reappraisal also predicted better psychological well-being over time, although the benefits were more extensive over three months compared to two years. Findings provide insight into those older adults who may experience better or poorer psychological well-being outcomes over time.

CHAPTER I

INTRODUCTION

Older adulthood is a period of life that is often accompanied by cognitive, physical, financial, and social challenges. In particular, community-dwelling older adults may experience declining cognitive capacity, greater functional limitations, poorer physical health, retirement, relocation, and death of family and friends (Fiksenbaum et al., 2006). More than 90 percent of adults aged 65 years or older have at least one chronic health condition and approximately 25 percent report needing assistance with activities of daily living (Hung et al., 2011). The current studies focused on psychosocial factors that may protect older adults' psychological well-being while facing many of these challenges that accompany aging.

Frequency and Benefits of Positive Emotions in Later Life

Despite the challenges of aging, many older adults enjoy frequent positive emotions (e.g., Charles & Carstensen, 2010). For example, Carstensen and colleagues (2011) assessed emotional experience across a 10-year period and found that frequency of positive emotions increased well into individuals' late 60s and then stabilized. In fact, older adults tend to report more positive emotions than younger adults (e.g., Shook et al., 2017; Shrira et al., 2016). In particular, Chipperfield et al. (2003) found that community-dwelling older adults experienced each of six positive emotions more frequently than each of eight negative emotions. Furthermore, individuals reported experiencing an

average of five positive emotions and only two negative emotions over a two-day period (Chipperfield et al., 2003).

According to Fredrickson's (2001, 2004) Broaden-and-Build Theory, positive emotions enable the expansion of thoughts and actions resulting in a broadening of cognitive and behavioral flexibility that continues to build over time. Thus, despite their transient nature, the benefits of positive emotions accumulate and predict resilience and better psychological well-being (e.g., Gloria & Steinhardt, 2014; Lyubomirsky et al., 2005). Among community-dwelling older adults, more frequent positive emotions have been linked to greater perceived control (Ruthig et al., 2014), life satisfaction (Chipperfield et al., 2003), optimism (Diehl et al., 2011), and self-esteem (Diehl et al., 2011; Meeks et al., 2012). In addition, frequent positive emotions are associated with lower levels of perceived stress and less depressive symptomatology (Meeks et al., 2012; Ruthig et al., 2014).

The benefits of positive emotions extend beyond psychological well-being to include a salutary role in physical health. For example, experiencing more positive emotions has been shown to reduce the risk of developing upper respiratory illnesses following experimental exposure (Cohen et al., 2006). Systematic reviews have demonstrated that positive emotions are associated with greater longevity among community-dwelling older adults (Pressman & Cohen, 2005) and that the protective effects of positive emotions are independent of the impact of negative emotions (Chida & Steptoe, 2008). In fact, positive emotions have been found to counteract the detrimental effects of negative emotions on perceived physical activity and mortality risk in older adulthood (Newall et al., 2013). Similarly, positive emotions appear to buffer the effect

of negative emotions on cardiovascular activation in later life, such that greater frequency of positive emotions is associated with lower blood pressure (Ong & Allaire, 2005). Furthermore, more frequent positive emotions are linked to enhanced ability to perform activities of daily living (Cabrita et al., 2017), indicating that positive emotions are advantageous to functional ability in addition to psychological well-being and physical health.

Correlates and Antecedents of Positive Emotions in Later Life

Given that positive emotions play a central role in the health and well-being of older adults, it is important to identify factors that increase the frequency of positive emotions. For example, sociodemographic factors related to more frequent positive emotions among older adults include being male and married (Steptoe et al., 2011). Some racial differences have also been found such that older adults who self-identified as black reported more frequent positive emotions compared to those who self-identified as white (Krok-Schoen & Baker, 2014).

Beyond sociodemographic factors, it is important to identify malleable psychosocial factors that contribute to more frequent positive emotions. Previous research indicates that mindfulness, or the purposeful, nonjudgmental awareness of the present moment, predicts positive emotions and in turn reduces depressive symptoms (Kiken et al., 2017). Likewise, perceived social support (Ferguson & Goodwin, 2010), positive social interactions (Windsor & Anstey, 2010), optimism, and being future-oriented predict more frequent positive emotions during a six-month period among community-dwelling older adults (Isaacowitz & Seligman, 2002).

Thus, continuing to identify factors that contribute to more frequent positive emotions will provide insight into strategies aimed at ultimately enhancing the quality of life for older adults, as the previously discussed benefits of positive emotions ranged from physical (e.g., greater functional independence) to psychological (e.g., fewer mental health problems). Considering these important implications, the current studies focused on examining cognitive reappraisal, a psychosocial construct that has been shown to contribute to positive emotions in later life.

Cognitive Reappraisal as a Coping Strategy in Later Life

One such malleable psychosocial factor that contributes to more frequent positive emotions is coping strategies that older adults engage in to deal with age-related stressors. Given that many of the stressors that individuals face in later life are beyond their control (e.g., loss of mobility, diminished health, death of a loved one), effective cognitively-based coping strategies are particularly salient to individuals' continued enjoyment of frequent positive emotions and good psychological well-being, despite not being able to directly influence the source of the stressor. The Two-Process Model of Control (Rothbaum et al., 1982) and the Lifespan Theory of Control (Heckhausen & Schulz, 1995) encompass a wide range of cognitively- and behaviorally-based coping strategies that are beneficial in later life.

According to the Lifespan Theory of Control, individuals engage in control strategies to help them reach their goals (Heckhausen & Schulz, 1995), whereas the Two-Process Model of Control conceptualizes the use of control strategies as a way to maintain an overall sense of control (Rothbaum et al., 1982). Primary control strategies, such as persistence and investment of time or effort, are direct outward behavioral

strategies aimed at changing one's social or physical environment to achieve a desired outcome (Heckhausen & Schulz, 1995; Wrosch et al., 2000). In contrast, secondary control strategies consist of intentionally altering one's thinking when individuals perceive their present circumstances as unchangeable and such strategies may include cognitive reappraisal, acceptance, lowering aspirations, and disengagement (Chipperfield et al., 2007; Heckhausen & Schulz, 1995; Wrosch et al., 2000).

Both of these dual process of control models acknowledge that preferred strategies vary as stressors and individual constraints change. In particular, as the opportunity to exert direct outward influence diminishes in a given situation, older individuals may need to increase their reliance on secondary control strategies to reach their goals (Heckhausen & Schulz, 1995) or to maintain an overall sense of control (Rothbaum et al., 1982). Prior research suggests that there are benefits from the use of secondary control strategies when adjusting to age-related challenges, which include enjoying better psychological well-being, greater perceived health, and experiencing lower levels of stress (e.g., Chipperfield et al., 1999; Wrosch et al., 2000). Cognitive reappraisal is one secondary control strategy that is particularly relevant among the aging population and a major focus of the current studies.

Cognitive reappraisal involves intentionally changing the way one thinks to focus on the positive or find meaning in a difficult situation and is particularly adaptive when individuals perceive their present circumstances as beyond their direct personal control (Wrosch et al., 2000). For instance, an older adult who struggles with the loss of mobility due to age-related physical decline or disease progression might engage in cognitive reappraisal by looking for the 'silver lining' in their situation, such as gaining a greater

appreciation and deeper connection with one's spouse who now assists with household tasks. This example illustrates a cognitive coping strategy intended to maintain a sense of control without attempting to alter external outcomes.

A recent meta-analysis demonstrates the link between cognitive reappraisal and psychological well-being. Hu and colleagues (2014) reviewed 48 studies and found a significant positive association between cognitive reappraisal and psychological well-being indices of life satisfaction, positive emotions, depression, anxiety, and negative emotions (Hu et al., 2014). Although this research established that cognitive reappraisal is associated with better psychological well-being, there is limited research specifically examining engagement in cognitive reappraisal among older adults. Nowlan et al. (2015b) conducted the first integrative review of existing research, which included 22 studies. The review indicates that engagement in cognitive reappraisal may be greater among older adults compared to younger adults, with the benefits increasing throughout older adulthood. For example, cognitive reappraisal had a stronger negative correlation with depressive symptoms among older adults compared to younger participants (Garnefski & Kraaij, 2006) and was a stronger predictor of functional and physical health among individuals 80+ years old compared to those who were younger than 80 years (Hall et al., 2010). Although the authors caution that their conclusions are tentative given that most are based on only one or two studies (the 22 articles were grouped into four core themes), the findings that cognitive reappraisal improves life satisfaction, self-acceptance, positive emotions, and depressive symptoms is encouraging (Nowlan et al., 2015b).

In addition, a longitudinal study of community-dwelling older adults examining coping strategies used to deal with restrictions in daily activities as a result of serious health problems found that cognitive reappraisal predicted higher levels of life satisfaction five years later (Hall et al., 2010). The benefits of this coping strategy have also been shown among older adults in poor physical health living in a residential care home, as cognitive reappraisal predicted greater self-acceptance (Danhauer et al., 2005; Schanowitz & Nicassio, 2006). Studies have also demonstrated that the use of cognitive reappraisal is associated with fewer depressive symptoms among older adults in both cross-sectional (Garnefski & Kraaij, 2006) and longitudinal (Kraaij et al., 2002) samples. Furthermore, Moos et al. (1990) found that cognitive reappraisal predicted greater self-confidence and lower levels of depression among older adults with problematic alcohol use. Finally, greater use of cognitive reappraisal is also associated with more frequent positive emotions (Hu et al., 2014; Kivity et al., 2016; Schanowitz & Nicassio, 2006; Yeung et al., 2011). Given that more frequent positive emotions and use of cognitive reappraisal are both beneficial in later life, further research is needed to examine the directionality of their relationship.

Positive Emotions and Cognitive Reappraisal

Past research suggests that positive emotions play an important role in coping with stress by facilitating the use of secondary control strategies (Tobin & George, 2015), such as positive interpretations of events (Folkman & Moskowitz, 2000). For example, a stressful event such as a minor car accident is likely to be interpreted as a simple inconvenience and “no big deal” by someone who was feeling happy and grateful at the time of the accident. In contrast, the same minor accident is likely to be catastrophized by

a person who was already experiencing negative emotions such as anger or intense sadness when the accident occurred. While these findings and examples do not demonstrate a direct relationship, they do suggest that the experience of more frequent positive emotions might contribute to greater engagement in cognitive reappraisal.

However, studies of older adults have also shown the opposite directional relationship: positive emotions are a consequence of cognitive reappraisal rather than its antecedent (Chipperfield et al., 2012; Nakagawa et al., 2017). For example, one experiment demonstrated that individuals who were instructed to use cognitive reappraisal while viewing negative, neutral, and positive images reported fewer negative emotions on a continuum of negative to positive compared to the control group (Livingstone & Isaacowitz, 2018). Similarly, other experiments suggest that cognitive reappraisal is an effective coping strategy for older adults when attempting to decrease negative emotions (Lohani & Isaacowitz, 2014; Shiota & Levenson, 2009). Another study examining the use of cognitive reappraisal in response to a stressor found that greater use of this coping strategy was correlated with more positive emotions (Nowlan, Wuthrich, & Rapee, 2016). In addition, the use of cognitive reappraisal increased over time since the onset of the stressor and predicted positive emotions at three- and six-month follow-up (Nowlan, Wuthrich, & Rapee, 2016).

Studies have demonstrated that community-dwelling older adults can be taught to engage in cognitive reappraisal, which in turn was associated with increases in positive emotions and fewer depressive symptoms (Nowlan et al., 2015a). In fact, a single-session intervention to enhance the use of cognitive reappraisal resulted in significantly increased positive emotions compared to supportive counseling among older adults coping with

type 2 diabetes (Nowlan, Wuthrich, Rapee, et al., 2016). Such results are encouraging, as older adults who use cognitive reappraisal tend to enjoy more frequent positive emotions and better psychological well-being in later life (e.g., Nowlan et al., 2015b).

As subsequently described in detail, the current studies focused on cognitive reappraisal and positive emotions as psychosocial factors that serve to maintain and bolster older adults' psychological well-being. Specifically, the short- and longer-term reciprocal relationship between engagement in cognitive reappraisal and frequency of positive emotions were investigated among samples of community-dwelling older adults. In addition, cognitive reappraisal and positive emotions as predictors of older adults' subsequent psychological well-being outcomes were assessed.

CHAPTER II

STUDY 1

Study 1 investigated the short-term reciprocal relationship between engagement in cognitive reappraisal and frequency of positive emotions among community-dwelling older adults using a three-month cross-lagged panel design. Prior research has demonstrated that cognitive reappraisal predicts more frequent positive emotions (e.g., Nowlan, Wuthrich, & Rapee, 2016) but also that more frequent positive emotions predict greater use of secondary control strategies such as cognitive reappraisal (e.g., Tobin & George, 2015). To date, however, past studies have not examined the bi-directional relationship between these psychosocial constructs. Accordingly, the current study aimed to: 1) determine whether initial (Time 1) cognitive reappraisal predicts subsequent (Time 2) positive emotions beyond the effects of initial (Time 1) positive emotions; 2) determine whether initial positive emotions predict subsequent cognitive reappraisal beyond the effects of initial cognitive reappraisal; 3) clarify which of these two directional associations is stronger; and 4) assess the three-month stability/change in use of cognitive reappraisal and in frequency of positive emotions. In addition, both cognitive reappraisal and positive emotions at Time 1 were evaluated as predictors of multiple indices of psychological well-being at Time 2, including perceived control, life satisfaction, self-efficacy, perceived stress, and depressive symptoms.

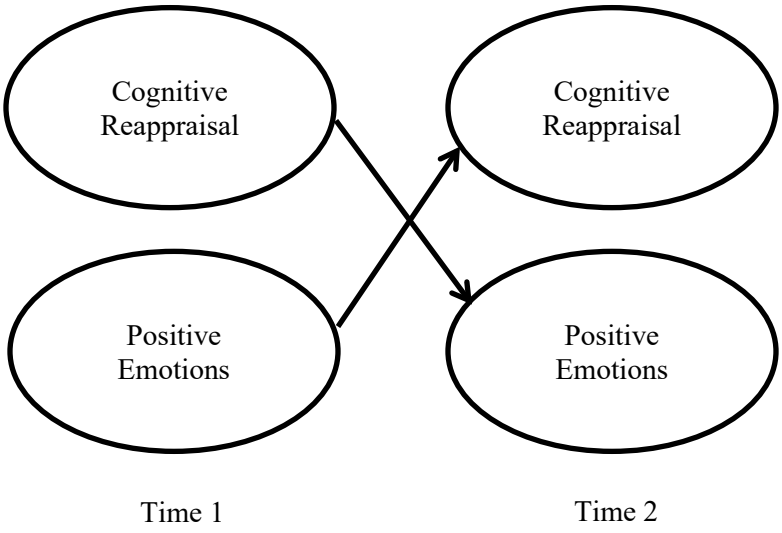
The first main objective of the current study was to examine the reciprocal relationship between engagement in cognitive reappraisal and frequency of positive emotions over a three-month period. If one directional association is significantly stronger than the other, this finding could help to identify older adults who may experience better or poorer psychological well-being outcomes over time. For example, if the directional association between initial cognitive reappraisal and subsequent positive emotions is stronger than the reverse directional association, then this finding would suggest that older adults with low engagement in cognitive reappraisal might have poor well-being. Further research examining the causal nature of this bi-directional association would provide support for interventions focusing on increasing engagement in cognitive reappraisal among older adults in order to promote more frequent positive emotions and better psychological well-being in later life. This will also clarify whether individuals experiencing more frequent positive emotions are subsequently more likely than those who experience fewer positive emotions to engage in cognitive reappraisal, and vice versa (see Figure 1).

Hypothesis 1a: Greater engagement in cognitive reappraisal at Time 1 will predict more frequent positive emotions at Time 2, beyond the effects of initial (Time 1) positive emotions.

Hypothesis 1b: More frequent Time 1 positive emotions will predict greater engagement in cognitive reappraisal at Time 2, beyond the effects of initial (Time 1) cognitive reappraisal.

Figure 1

A Three-Month Cross-Lagged Panel Design Using Engagement in Cognitive Reappraisal and Frequency of Positive Emotions as Predictors



This three-month cross-lagged panel design will also enable examination of stability/change in cognitive reappraisal and in positive emotions. This will provide information about the extent to which these constructs shift over the three-month period, and the frequency, magnitude, and direction of any shifts that occur. For example, the analyses will ascertain whether cognitive reappraisal is more likely to increase or decrease over time, how common such a change is, whether such shifts are slight or substantial, and whether such shifts correspond with similar or opposing shifts in frequency of positive emotions.

Another main objective was to examine cognitive reappraisal as a predictor of psychological well-being three months later, as well as how any shifts in cognitive reappraisal relate to psychological well-being. Specifically, the current study attempted to replicate past findings (e.g., Nowlan et al., 2015b) that greater engagement in cognitive

reappraisal is beneficial to well-being. This study also extended prior research on cognitive reappraisal and well-being by examining whether: 1) consistently high use of cognitive reappraisal is beneficial to well-being and 2) older adults who experience upward or downward shifts in the use of cognitive reappraisal experience better or worse psychological well-being outcomes, respectively, compared to individuals whose cognitive reappraisal does not shift over time.

Hypothesis 2a: Beyond the effect of initial positive emotions, greater engagement in cognitive reappraisal will predict greater perceived control, life satisfaction, and self-efficacy three months later.

Hypothesis 2b: Beyond the effect of initial positive emotions, greater engagement in cognitive reappraisal will predict less perceived stress and depressive symptoms three months later.

Hypothesis 2c: Upward shifts in the use of cognitive reappraisal over three months will predict greater perceived control, life satisfaction, and self-efficacy as well as less perceived stress and depressive symptoms.

Hypothesis 2d: Downward shifts in the use of cognitive reappraisal over three months will predict less perceived control, life satisfaction, and self-efficacy as well as greater perceived stress and depressive symptoms.

Method

Participants and Procedure

Given the focus on cognitive reappraisal and positive emotions in later life, the current sample consisted of exclusively older adults aged 60 years or older who reside in the United States. Participants were recruited via Amazon's Mechanical Turk (MTurk;

Buhrmester et al., 2011). Of the 396 individuals who participated in the study at Time 1, 91 participants failed one or both validity checks and their data were excluded from subsequent analyses[1]. Approximately three months later, of the remaining 305 participants who successfully completed Time 1, 146 (48%) completed the second wave of the study. No differences were found between the initial Time 1 sample of 305 participants compared to those who completed both Time 1 and Time 2 (n = 146), with the exception of gender, $t(303) = 2.24$, $p = .026$. Specifically, more men participated at Time 1 (n = 154) compared to Time 2 (n = 64). All subsequent analyses are based on this sample of 146 participants who completed both Time 1 and Time 2 measures.

At Time 1, participants were informed of the study details, provided consent, and completed sociodemographic information and measures assessing cognitive reappraisal and positive emotions via an online survey. Participants' MTurk identification numbers were also recorded for the purpose of linking their Time 1 responses with their later Time 2 responses. Each participant was compensated $0.25 at Time 1. Approximately three months after completing Time 1, participants were contacted via email and invited to participate in the follow-up survey online. Time 2 participants completed measures assessing cognitive reappraisal and positive emotions identical to those from Time 1, as well as multiple indices of psychological well-being. Participants were compensated an additional $0.25 for participating at Time 2. Time 1 and Time 2 surveys each took approximately 10-15 minutes to complete.

[1] Two validity check questions were included at Time 1 and Time 2: "I have visited all of the countries in the world during the past year" and "I can hold my breath for 30 minutes." Both questions were true or false format.

Measures

Sociodemographics. The following self-reported sociodemographic information was collected from participants at Time 1 in order to examine the potential associations with engagement in cognitive reappraisal and frequency of positive emotions: age, gender, geographic region, racial group, relationship status, level of education, current employment status, and self-rated health. An eligibility check was also included to further ensure that participants met the age requirement of 60 years or older by asking individuals to provide their date of birth (see Appendix A).

The following measures of cognitive reappraisal and positive emotions were assessed at both Time 1 and Time 2.

Cognitive reappraisal. Four items developed by Peng and Lachman (1994; as cited in Wrosch et al., 2000) were used to assess engagement in cognitive reappraisal. Participants were asked to indicate how frequently they used specific coping strategies (e.g., "Even when everything seems to be going wrong, I can usually find a bright side to the situation"). Response options ranged from 1 = *not at all* through 4 = *a lot* (see Appendix B). Composite scores were created by calculating the mean of each participant's responses to the four cognitive reappraisal items. Wrosch et al. (2000) demonstrated construct validity for the scale in terms of its positive correlation with a measure of general control ($r = .39$, $p < .01$) and reported a Cronbach's alpha of .78.

Positive emotions. Frequency of discrete recent positive emotions were measured by having participants rate how often they felt each of 10 emotions in the past two days (Ruthig et al., 2014; Chipperfield et al., 2003). Response options ranged from 0 = *never* through 6 = *almost always,* with a midpoint of 3 = *sometimes* (see Appendix C). Reported

frequencies of all 10 emotions (i.e., proud, grateful, hopeful, happy, compassion, relieved, contented, inspired, excited, and love) were summed to create a total score for each participant so that higher scores indicated more frequent positive emotions.

Psychological well-being. As indicators of psychological well-being, participants completed the following measures of perceived control, life satisfaction, self-efficacy, perceived stress, and depressive symptoms at Time 2.

Participants responded to an 8-item measure of *perceived control* over various aspects of their life (Ruthig et al., 2014; Chipperfield et al., 2004). Items are domain-specific (e.g., "How much influence do you feel you have over your emotional or mental well-being?") and also include a global item (i.e., "How much influence do you feel you have over your life in general?"). Response options range from 1 = *almost totally out of control* through 10 = *totally in control* (see Appendix D). Mean perceived control scores were calculated based on ratings of all eight items. Prior research indicates adequate internal reliability (i.e., $\alpha = .86$; Ruthig et al., 2014).

Six dichotomous items from the SHARP (Stones et al., 1996) were used to assess current *life satisfaction*. For example, "During the past month, have you ever felt particularly content with your life?" (see Appendix E). For the three positively worded items, affirmative responses were scored as follows: Yes = 1, No = 0. For the three negatively worded items, affirmative responses were scored as: Yes = -1, No = 0. Life satisfaction scores were then obtained by summing responses to all six items. Higher scores indicated greater life satisfaction. Stones et al. (1996) reported internal reliability at or above $\alpha = .80$ among several samples using the full 12-item measure.

Participants' *self-efficacy* was assessed using the 10-item Generalized Self-Efficacy scale (Schwarzer & Jerusalem, 1995). For example, "I am confident that I could deal efficiently with unexpected events" (1 = *not at all true*, 2 = *hardly true*, 3 = *moderately true*, 4 = *exactly true*; see Appendix F). Self-efficacy scores were obtained by summing responses to all items. Higher scores indicated greater self-efficacy (α = .86; Scholz et al., 2002).

Perceived stress was assessed by having participants rate how often they felt a certain way during the last month using the seven negatively worded items from the Global Perceived Stress Scale (Cohen et al., 1983). For example: "During the past month, how often have you been upset because of something that happened unexpectedly?" (1 = *never*, 2 = *infrequently*, 3 = *sometimes*, 4 = *frequently*, 5 = *very often*; Appendix G). Perceived stress scores were obtained by summing responses to all items. Higher scores indicated greater perceived stress (α = .78; Ruthig et al., 2014).

The shortened 10-item Center for Epidemiological Studies Depression Scale (CESD-10; Andresen et al., 1994) asks participants to rate the frequency of *depressive symptoms* during the past week. For example: "My sleep was restless" and "I felt lonely" (0 = *rarely or none of the time*, 1 = *some of the time*, 2 = *moderate amount of time*, 3 = *most or all of the time*; see Appendix H). Depressive symptomatology scores were obtained by reverse scoring the two positively worded items (e.g., "I felt hopeful about the future") and then summing responses to all 10 items. Higher scores indicated greater depressive symptomology (α = .79; Ruthig et al., 2014).

Results

Preliminary Analyses

Descriptive statistics were computed for Time 1 sociodemographics (i.e., age, gender, geographic region, racial group, relationship status, level of education, current employment status, and self-rated health), Time 1 and Time 2 measures of cognitive reappraisal and positive emotions, and Time 2 psychological well-being measures (i.e., perceived control, life satisfaction, self-efficacy, perceived stress, and depressive symptoms). These analyses provide a profile of the current sample's characteristics as well as an indication of the level of engagement in cognitive reappraisal, frequency of positive emotions, and overall psychological well-being.

As detailed in Table 1, more than half (56.2%) of the participants were female and currently employed (52.1%). The majority of participants were white (82.2%), in a committed relationship (58.9%), and had earned at least a bachelor's degree (59.6%). Most participants resided in the Southern United States and rated their health as fair-good ($M = 3.73$, $SD = 0.78$). They ranged in age from 60 to 82 years old ($M = 65.45$, $SD = 4.64$).

A one-way ANOVA was conducted to determine if there were differences in cognitive reappraisal, positive emotions, or psychological well-being measures based on geographic region. Interestingly, significant differences were found for Time 1 cognitive reappraisal, $F(3, 142) = 2.65$, $p = .051$, life satisfaction, $F(3, 142) = 2.80$, $p = .042$, self-efficacy, $F(3, 142) = 4.87$, $p = .003$, perceived stress, $F(3, 142) = 4.95$, $p = .003$, and depressive symptoms, $F(3, 140) = 3.42$, $p = .019$. Specifically, Bonferroni post-hoc comparisons revealed that participants who resided in the Southern United States

engaged in more cognitive reappraisal at Time 1 (M = 3.33, SD = 0.54) and reported better life satisfaction (M = 1.93, SD = 1.56) and fewer depressive symptoms (M = 4.87, SD = 4.76) compared to those who resided in the Midwestern United States (M = 2.98, SD = 0.63; M = 0.75, SD = 2.08; M = 8.94, SD = 6.71; respectively). In addition, Southern participants reported more self-efficacy (M = 33.27, SD = 5.41) and less perceived stress (M = 15.29, SD = 4.39) than participants who resided in both the Midwestern (M = 29.34, SD = 5.06; M = 19.31, SD = 4.82; respectively) and the Northeastern part of the country (M = 29.58, SD = 5.65; M = 18.55, SD = 6.19; respectively).

Composite cognitive reappraisal scores were created using the mean of the four cognitive reappraisal items at Time 1 (M = 3.15, α = .84) and again at Time 2 (M = 3.11, α = .80). Regarding frequency of positive emotions at both Time 1 and Time 2, participants reported feeling grateful (M_{Time1} = 4.50, M_{Time2} = 4.59) most frequently, while they reported experiencing pride the least often (M_{Time1} = 3.35, M_{Time2} = 3.29). A total composite score of positive emotions was created by summing responses to all 10 items at Time 1 (M = 40.40, α = .93) and again at Time 2 (M = 40.21, α = .93). In terms of their psychological well-being at Time 2, participants reported having a moderate sense of control (M = 7.71) and self-efficacy (M = 30.92), and they were fairly satisfied with life (M = 1.27). Participants reported moderate levels of stress (M = 17.59) and mild depressive symptoms (M = 6.93). See Table 2 for descriptive statistics of cognitive reappraisal, positive emotions, and psychological well-being.

Bivariate correlations among sociodemographics and measures of cognitive reappraisal, positive emotions, and psychological well-being were then examined to

determine which sociodemographic variables would be included as covariates in the main analyses based on whether they were significantly associated with cognitive reappraisal and positive emotions at Time 1 or Time 2. See Table 3 for bivariate correlations. Age, relationship status, education, and self-rated health were included as covariates in the main analyses based on their correlation with the criterion variables. Specifically, being older was associated with more frequent positive emotions at Time 1 ($r = .24$, $p = .004$). Being in a committed relationship was associated with more frequent positive emotions at Time 1 ($r = .18$, $p = .033$) and Time 2 ($r = .21$, $p = .01$), greater life satisfaction ($r = .27$, $p = .001$), and fewer depressive symptoms ($r = -.17$, $p = .04$). Higher levels of education were associated with greater self-efficacy ($r = .20$, $p = .016$) and fewer depressive symptoms ($r = -.22$, $p = .008$). Finally, better self-rated health was associated with greater cognitive reappraisal at Time 1 ($r = .25$, $p = .002$), more frequent positive emotions at Time 1 ($r = .32$, $p < .001$) and Time 2 ($r = .17$, $p = .044$), greater perceived control ($r = .33$, $p < .001$), and fewer depressive symptoms ($r = -.22$, $p = .009$). Paired samples t-tests revealed no gender differences on any study variables.

Main Analyses

Test-retest reliabilities of cognitive reappraisal and positive emotions were obtained to provide an indication of stability for the two constructs over the three-month period of the study. The three-month test-retest reliabilities were good for both cognitive reappraisal ($r = .59$, $p < .001$) and positive emotions ($r = .76$, $p < .001$). In addition, difference scores (i.e., Time 2 minus Time 1) were computed for cognitive reappraisal and for positive emotions to indicate the direction of any change over time. The results showed a difference score near zero for both cognitive reappraisal ($M = -0.04$, $SD = 0.53$)

and positive emotions (M = -0.20, SD = 8.38), indicating minimal change from Time 1 to Time 2. To assess the magnitude of any change, paired samples t-tests were computed to determine whether any three-month shifts in cognitive reappraisal or positive emotions were statistically significant. Overall level of engagement in cognitive reappraisal did not differ between Time 1 (M = 3.15, SD = 0.58) and Time 2 (M = 3.11, SD = 0.59), $t(145)$ = 0.98, p = .330. Likewise, frequency of positive emotions did not significantly change from Time 1 (M = 40.40, SD = 11.64) compared to Time 2 (M = 40.21, SD = 12.45), $t(145)$ = 0.29, p = .775. Together, these results suggest that both positive emotions and cognitive reappraisal remained fairly stable over the three-month period of the study.

Hypothesis 1a states that greater initial (Time 1) engagement in cognitive reappraisal will predict more frequent positive emotions at Time 2, beyond the effects of initial positive emotions. This hypothesis was tested using a linear regression model in which Time 1 cognitive reappraisal was the predictor, with Time 1 positive emotions, age, relationship status, education, and self-rated health included as covariates, and Time 2 positive emotions as the criterion. As detailed in Table 4, the overall model was significant, R^2 = .62, $F(6, 139)$ = 37.66, $p < .001$. As expected, greater engagement in cognitive reappraisal at Time 1 predicted more frequent positive emotions at Time 2 (β = .15, p = .013), beyond the effects of age, relationship status, education, self-rated health, and Time 1 positive emotions. Poorer self-rated health and Time 1 positive emotions also predicted Time 2 positive emotions (β = -.13, p = .027 and β = .74, $p < .001$, respectively).

Hypothesis 1b states that more frequent initial (Time 1) positive emotions will predict greater engagement in cognitive reappraisal at Time 2, beyond the effects of

initial cognitive reappraisal. This hypothesis was tested using a linear regression model in which Time 1 positive emotions was the predictor, with Time 1 cognitive reappraisal, age, relationship status, education, and self-rated health included as covariates, and Time 2 cognitive reappraisal as the criterion. As shown in Table 4, the overall model was significant, $R^2 = .40$, $F(6, 139) = 15.60$, $p < .001$. As expected, more frequent positive emotions at Time 1 predicted greater engagement in cognitive reappraisal at Time 2 ($\beta = .20$, $p = .011$), beyond the effects of age, relationship status, education, self-rated health, and Time 1 cognitive reappraisal, the latter two of which also predicted Time 2 cognitive reappraisal ($\beta = -.22$, $p = .004$ and $\beta = .55$, $p < .001$, respectively).

The next main objective was to examine cognitive reappraisal as a predictor of subsequent psychological well-being. Hypothesis 2a states that beyond the effect of initial positive emotions, greater engagement in cognitive reappraisal will predict greater perceived control, life satisfaction, and self-efficacy three months later. This hypothesis was tested using a linear regression model in which Time 1 cognitive reappraisal was the predictor, with Time 1 positive emotions, age, relationship status, education, and self-rated health included as covariates, and Time 2 perceived control as the criterion. This analysis was repeated for additional psychological well-being criterion variables of life satisfaction and self-efficacy.

As detailed in Table 5, the overall model predicting perceived control was significant, $R^2 = .37$, $F(6, 139) = 13.64$, $p < .001$. Greater engagement in cognitive reappraisal predicted greater perceived control three months later ($\beta = .17$, $p = .027$), beyond the effects of age, relationship status, education, self-rated health, and Time 1 positive emotions, the latter of which also predicted greater perceived control ($\beta = .48$, p

< .001). The overall model predicting life satisfaction was also significant, $R^2 = .31$, $F(6, 139) = 10.32$, $p < .001$. Greater engagement in cognitive reappraisal predicted greater life satisfaction three months later ($\beta = .25$, $p = .002$), beyond the effects of age, education, self-rated health, relationship status and Time 1 positive emotions. Relationship status and Time 1 positive emotions also predicted later life satisfaction ($\beta = .21$, $p = .004$ and $\beta = .33$, $p < .001$, respectively). Finally, the overall model predicting self-efficacy was significant, $R^2 = .41$, $F(6, 139) = 15.76$, $p < .001$. Greater engagement in cognitive reappraisal predicted greater self-efficacy three months later ($\beta = .46$, $p < .001$), beyond the effects of age, relationship status, self-rated health, education, and Time 1 positive emotions. Higher levels of education and Time 1 positive emotions also predicted greater self-efficacy ($\beta = .16$, $p = .026$ and $\beta = .28$, $p = .001$, respectively) Together, these results support Hypothesis 2a.

Hypothesis 2b states that beyond the effect of initial positive emotions, greater engagement in cognitive reappraisal will predict less perceived stress and depressive symptoms three months later. This hypothesis was tested using a linear regression model in which Time 1 cognitive reappraisal was the predictor, with Time 1 positive emotions, age, relationship status, education, and self-rated health included as covariates, and Time 2 perceived stress as the criterion. The same regression model was repeated for depressive symptoms as the criterion variable.

As shown in Table 6, the overall model predicting perceived stress was significant, $R^2 = .23$, $F(6, 139) = 6.83$, $p < .001$. Greater engagement in cognitive reappraisal predicted less perceived stress three months later ($\beta = -.39$, $p < .001$), beyond the effects of age, relationship status, education, self-rated health, and Time 1 positive

emotions, the latter of which marginally predicted less perceived stress (β = -.18, p = .051). The overall model predicting depressive symptoms was also significant, R^2 = .36, F(6, 137) = 12.88, p < .001. Greater engagement in cognitive reappraisal predicted fewer depressive symptoms three months later (β = -.30, p < .001), beyond the effects of age, relationship status, education, self-rated health, and Time 1 positive emotions, the latter of which also predicted fewer depressive symptoms (β = -.37, p < .001). Together, these results support Hypothesis 2b.

Prior to the next set of hypotheses, participants were categorized according to whether they experienced upward shifts (n = 45), downward shifts (n = 57), or no change (n = 44) in the use of cognitive reappraisal three months later. Hypothesis 2c states that upward shifts in the use of cognitive reappraisal over three months will predict greater perceived control, life satisfaction, and self-efficacy as well as less perceived stress and depressive symptoms. This hypothesis was tested using a linear regression model in which positive difference scores for cognitive reappraisal was the predictor, with Time 1 positive emotions, age, relationship status, education, and self-rated health included as covariates, and Time 2 perceived control as the criterion. The same regression model was repeated for additional psychological well-being criterion variables of life satisfaction, self-efficacy, perceived stress, and depressive symptoms. The following analyses were based on the 45 participants who experienced an upward shift in cognitive reappraisal.

The overall model predicting perceived control was significant, R^2 = .61, F(6, 38) = 9.70, p < .001. The overall models predicting life satisfaction and self-efficacy were also significant, R^2 = .51, F(6, 38) = 6.52, p < .001 and R^2 = .41, F(6, 38) = 4.43, p = .002, respectively. Finally, the overall models predicting perceived stress and depressive

symptoms were significant, $R^2 = .34$, $F(6, 38) = 3.25$, $p = .011$ and $R^2 = .46$, $F(6, 38) = 5.37$, $p < .001$, respectively. However, upward shifts in cognitive reappraisal over three months were not significant predictors of psychological well-being in any of the models. Thus, Hypothesis 2c was not supported.

Hypothesis 2d states that downward shifts in the use of cognitive reappraisal over three months will predict less perceived control, life satisfaction, and self-efficacy as well as greater perceived stress and depressive symptoms. This hypothesis was tested using a linear regression model in which negative mean difference scores for cognitive reappraisal was the predictor, with Time 1 positive emotions, age, relationship status, education, and self-rated health included as covariates, and Time 2 perceived control as the criterion. This analysis was repeated for additional psychological well-being criterion variables of life satisfaction, self-efficacy, perceived stress, and depressive symptoms. The following results were based on the 57 participants who experienced a downward shift in cognitive reappraisal.

As shown in Table 7, the overall model predicting perceived control was significant, $R^2 = .33$, $F(6, 50) = 4.12$, $p = .002$. However, a downward shift in cognitive reappraisal did not predict perceived control. The overall model predicting self-efficacy was also significant, $R^2 = .30$, $F(6, 50) = 3.56$, $p = .005$. Downward shifts in the use of cognitive reappraisal over three months predicted lower self-efficacy ($\beta = .39$, $p = .002$). Finally, the overall models predicting perceived stress and depressive symptoms were significant, $R^2 = .23$, $F(6, 50) = 2.45$, $p = .038$ and $R^2 = .33$, $F(6, 49) = 4.03$, $p = .002$, respectively. However, downward shifts in the use of cognitive reappraisal over three

months only predicted more perceived stress (β = -.43, p = .001) but not depressive symptoms. Therefore, Hypothesis 2d was only partially supported.

Lastly, a multivariate analysis of variance (MANOVA) was conducted based on categorizing participants as "increased" (n = 45) or "decreased" (n = 56) groups for changes in cognitive reappraisal to explore group differences in psychological well-being. The MANOVA indicated that no group differences exist in perceived control, life satisfaction, self-efficacy, perceived stress, and depressive symptoms among older adults who experienced upward shifts in cognitive reappraisal versus those who experienced downward shifts, $\Lambda = 0.98$, $F(5, 95) = 0.43$, p = .83.

Discussion

The overall focus of Study 1 was to investigate the short-term reciprocal relationship between engagement in cognitive reappraisal and frequency of positive emotions among community-dwelling older adults using a three-month cross-lagged panel design. Most participants were well-educated white women residing in the Southern United States who were in a committed relationship and currently employed. Participants were an average of 65 years old and rated their health as fair-good. Participants reported engaging in a moderate amount of cognitive reappraisal and enjoyed frequent positive emotions. Overall, the older adults in this study had good psychological well-being, including a moderate sense of control and self-efficacy, and they were fairly satisfied with life despite having moderate levels of stress and mild depressive symptoms.

As in prior research, older age was related to more frequent positive emotions (e.g., Shook et al., 2017). Being in a committed relationship was associated with more frequent positive emotions, greater life satisfaction, and fewer depressive symptoms. This

finding is consistent with past research demonstrating the benefits of marriage and cohabitation to psychological well-being among older adults, particularly men (Wright & Brown, 2017). Higher levels of education were related to greater self-efficacy and fewer depressive symptoms. Lastly, better self-rated health was related to greater engagement in cognitive reappraisal, more frequent positive emotions, greater perceived control, and fewer depressive symptoms.

A main objective of Study 1 was to examine the reciprocal relationship between engagement in cognitive reappraisal and frequency of positive emotions over a three-month period. Hypothesis 1a was supported, as the results demonstrated that initial cognitive reappraisal predicted positive emotions three months later, after accounting for initial positive emotions. Likewise, and in support of Hypothesis 1b, initial positive emotions predicted cognitive reappraisal three months later, beyond the effects of initial cognitive reappraisal. These results are consistent with prior research demonstrating that cognitive reappraisal predicts more frequent positive emotions (e.g., Nowlan, Wuthrich, & Rapee, 2016) and also that more frequent positive emotions predicts greater use of secondary control strategies such as cognitive reappraisal (e.g., Tobin & George, 2015). However, the current findings did not clarify which of these two directional associations is stronger. The present results indicated that lower self-rated health positively predicted both positive emotions and cognitive reappraisal three months later. It is also notable that cognitive reappraisal and positive emotions were relatively stable over the three-month period.

Another main objective of Study 1 was to examine cognitive reappraisal as a predictor of psychological well-being three months later. As predicted in Hypothesis 2a,

the current results indicated that initial cognitive reappraisal predicted better psychological well-being outcomes three months later, beyond the effects of initial positive emotions. Specifically, greater engagement in cognitive reappraisal predicted greater perceived control, life satisfaction, and self-efficacy. Cognitive reappraisal also predicted less perceived stress and fewer depressive symptoms, supporting Hypothesis 2b.

Finally, upward shifts in cognitive reappraisal over three months failed to predict psychological well-being as predicted Hypothesis 2c. However, downward shifts in cognitive reappraisal predicted less self-efficacy and more perceived stress, which partially supported Hypothesis 2d. These results suggest that short-term decreases in the use of cognitive reappraisal are associated with a corresponding decline in well-being. Although no group differences were present in measures of well-being among older adults who experienced upward versus downward shifts in cognitive reappraisal, the range in scores was restricted given the limited time between measures. Study 2 aimed to replicate the results of Study 1 and extend the findings by examining the longer-term relationship between cognitive reappraisal, positive emotions, and psychological well-being.

CHAPTER III

STUDY 2

Study 2 aimed to replicate the results of Study 1 and extend the findings by examining the longer-term relationship between engagement in cognitive reappraisal and frequency of positive emotions using a two-year cross-lagged panel design. Specifically, the current study entailed secondary analysis of an existing longitudinal dataset of community-dwelling older adults who participated in the Grand Cities Healthy Aging Study (GCHAS) in 2008 and 2010 (Ruthig et al., 2011).

The current study: 1) determined whether initial (Time 1) cognitive reappraisal predicts subsequent (Time 2) positive emotions two years later beyond the effects of initial (Time 1) positive emotions; 2) determined whether initial positive emotions predict subsequent cognitive reappraisal beyond the effects of initial cognitive reappraisal; 3) clarified which of these two directional associations was stronger; and 4) assessed the two-year stability/change in use of cognitive reappraisal and in frequency of positive emotions. In addition, both cognitive reappraisal and positive emotions at Time 1 were evaluated as predictors of multiple indices of psychological well-being at Time 2, including perceived control, life satisfaction, perceived stress, and depressive symptoms.

The first main objective of Study 2 was to examine the reciprocal relationship between engagement in cognitive reappraisal and frequency of positive emotions over a two-year period. This will also inform whether: 1) one directional association is

significantly stronger than the other and 2) individuals experiencing more frequent positive emotions are more likely than those who experience fewer positive emotions to engage in cognitive reappraisal two years later, and vice versa.

Hypothesis 1a: Greater engagement in cognitive reappraisal at Time 1 will predict more frequent positive emotions at Time 2, beyond the effects of initial (Time 1) positive emotions.

Hypothesis 1b: More frequent Time 1 positive emotions will predict greater engagement in cognitive reappraisal at Time 2, beyond the effects of initial (Time 1) cognitive reappraisal.

This two-year cross-lagged panel design will also allow for stability/change in cognitive reappraisal and positive emotions to be examined. This will determine the extent to which these constructs shift over the two-year period, and the frequency, magnitude, and direction of any shifts that occur.

Another main objective was to examine cognitive reappraisal as a predictor of psychological well-being two years later, as well as how any shifts in cognitive reappraisal were associated with psychological well-being. In addition to its attempt to replicate past findings demonstrating the benefits of cognitive reappraisal for well-being, the current study also extended prior research by examining whether: 1) consistently high use of cognitive reappraisal is beneficial to well-being and 2) older adults who experience upward or downward shifts in the use of cognitive reappraisal experience better or worse psychological well-being, respectively, compared to individuals whose cognitive reappraisal remains stable over time.

Hypothesis 2a: Beyond the effect of initial positive emotions, greater engagement in cognitive reappraisal will predict greater perceived control and life satisfaction two years later.

Hypothesis 2b: Beyond the effect of initial positive emotions, greater engagement in cognitive reappraisal will predict less perceived stress and depressive symptoms two years later.

Hypothesis 2c: Upward shifts in the use of cognitive reappraisal over two years will predict greater perceived control and life satisfaction as well as less perceived stress and depressive symptoms.

Hypothesis 2d: Downward shifts in the use of cognitive reappraisal over two years will predict less perceived control and life satisfaction as well as greater perceived stress and depressive symptoms.

Method

Participants and Procedure

Study 2 utilized the 2008 and 2010 waves of the GCHAS, which in 2008 included 488 older adults aged 60 years or older and residing within a 60-mile radius of Grand Forks/East Grand Forks. Participants were recruited from one of two sources: 1) a list of University of North Dakota (UND) alumni and their spouses who had received an undergraduate degree in or prior to 1967 and live within 60 miles of Grand Forks, or 2) a list of participants with involvement in other aging studies within the UND Department of Psychology. Study eligibility required a level of cognitive functioning necessary to complete the majority of the interview without help, as determined by the interviewer. Participants were recruited via telephone and the majority (n = 399; 82%) completed an

individual in-person interview about various health, well-being, and sociodemographic factors. The remaining 89 (18%) participants completed an identical mail-in survey. Participants received monetary compensation.

The majority of the 488 older adults were female (56.4%), white (99.2%), in a committed relationship (74.0%), not currently working (59.7%), and had earned at least a bachelor's degree (82.8%). Participants ranged in age from 60 to 98 years (M = 70.66, SD = 7.84).

In 2010, 418 (86%) of the original GCHAS participants also completed the second wave of the study, which included many of the same measures as in 2008. The majority of the 418 participants (n = 328, 78%) completed an in-person interview and the remaining 90 (22%) completed an identical mail-in survey. No differences were found between participants who completed the in-person interview versus the mail-in survey (Ruthig et al., 2014). Participants received monetary compensation. The majority of the participants were female (56.6%) and they ranged in age from 61 to 100 years (M = 72.22, SD = 7.51).

Of the 488 participants who successfully completed Time 1, 418 (86%) completed the second wave of the study approximately two years later. No differences were found between the initial Time 1 sample of 488 participants compared to those who completed both Time 1 and Time 2 (n = 418), with the exception of age, $t(486) = 3.15$, $p = .002$, and employment status, $t(479) = -2.35$, $p = .019$. Specifically, participants were marginally older at Time 1 (M = 70.66, SD = 7.84) compared to Time 2 (M = 70.21, SD = 7.52), reflecting attrition of many of the oldest participants from Time 1. Additionally, fewer participants were currently working at Time 1 (n = 194) compared to Time 2 (n = 175).

All subsequent analyses are based on this sample of 418 participants who completed both Time 1 and Time 2 measures.

Measures

The following sociodemographic information was collected in 2008: age, gender, racial group, relationship status, level of education, current employment status, and self-rated health. Participants also completed identical measures of cognitive reappraisal and positive emotions in 2008 and 2010 as described in Study 1. In 2010, participants completed identical measures of psychological well-being as described in Study 1 (i.e., perceived control, life satisfaction, perceived stress, and depressive symptoms), with the exception of self-efficacy which was not assessed.

Results

Preliminary Analyses

Descriptive statistics were computed for Time 1 sociodemographics (i.e., age, gender, racial group, relationship status, level of education, current employment status, and self-rated health), Time 1 and Time 2 measures of cognitive reappraisal and positive emotions, and Time 2 psychological well-being measures (i.e., perceived control, life satisfaction, perceived stress, and depressive symptoms). These analyses provide a profile of the current sample's characteristics as well as an indication of the level of engagement in cognitive reappraisal, frequency of positive emotions, and overall psychological well-being.

As detailed in Table 8, more than half (56.9%) of the participants were female and not currently employed (57.5%). The majority of participants were white (99.0%), in a committed relationship (74.6%), and had earned at least a bachelor's degree (82.7%).

Most participants rated their health as good ($M = 4.12$, $SD = 0.77$). They ranged in age from 60 to 98 years old ($M = 70.21$, $SD = 7.52$).

Composite cognitive reappraisal scores were created using the mean of the four cognitive reappraisal items at Time 1 ($M = 3.26$, $\alpha = .78$) and again at Time 2 ($M = 3.17$, $\alpha = .80$). Regarding frequency of positive emotions at both Time 1 and Time 2, participants reported feeling love most frequently ($M_{Time1} = 5.10$, $M_{Time2} = 4.97$), while they reported experiencing relief the least often ($M_{Time1} = 3.63$, $M_{Time2} = 3.34$). A total composite score of positive emotions was created by summing responses to all 10 items at Time 1 ($M = 44.44$, $\alpha = .87$) and again at Time 2 ($M = 42.57$, $\alpha = .89$). In terms of their psychological well-being at Time 2, participants reported having a moderate sense of control ($M = 7.99$) and satisfaction with life ($M = 2.12$). Participants reported moderate levels of stress ($M = 15.19$) and mild depressive symptoms ($M = 4.87$). See Table 9 for descriptive statistics of cognitive reappraisal, positive emotions, and psychological well-being.

Bivariate correlations among sociodemographics and measures of cognitive reappraisal, positive emotions, and psychological well-being were then examined to determine which sociodemographic variables would be included as covariates in the main analyses based on whether they were significantly associated with cognitive reappraisal and positive emotions at Time 1 or Time 2. See Table 10 for bivariate correlations. Age, relationship status, education, and self-rated health were included as covariates in the main analyses based on their correlation with the criterion variables. Specifically, older age was associated with less engagement in cognitive reappraisal at Time 1 ($r = -.14$, $p = .003$) and Time 2 ($r = -.18$, $p < .001$), less perceived control ($r = -.26$, $p < .001$), and more

depressive symptoms (r = .16, p = .002). Being in a committed relationship was associated with more frequent positive emotions at Time 1 (r = .20, p < .001) and Time 2 (r = .18, p < .001), greater perceived control (r = .20, p < .001), greater life satisfaction (r = .15, p = .002), and fewer depressive symptoms (r = -.23, p < .001). Higher levels of education were associated with greater life satisfaction (r = .11, p = .025), less perceived stress (r = -.16, p = .001), and fewer depressive symptoms (r = -.10, p = .037). Finally, better self-rated health was associated with more frequent positive emotions at Time 2 (r = .12, p = .012), greater perceived control (r = .30, p < .001), greater life satisfaction (r = .15, p = .002), less perceived stress (r = -.19, p < .001), and fewer depressive symptoms (r = -.34, p < .001).

Main Analyses

As in Study 1, stability of cognitive reappraisal and positive emotions over the two-year duration of Study 2 was assessed via test-retest reliability for both constructs: cognitive reappraisal (r = .59, p < .001) and positive emotions (r = .62, p < .001). In addition, difference scores (i.e., Time 2 minus Time 1) were computed for cognitive reappraisal and for positive emotions to indicate the direction of any change over time. Consistent with the three-month difference score found in Study 1, the results showed a two-year difference score near zero for cognitive reappraisal (M = -0.10, SD = 0.46), indicating an average minimal change from Time 1 to Time 2. In contrast, a negative difference score for positive emotions (M = -1.99, SD = 7.95) indicates a decline in frequency of positive emotions over the two years. To assess magnitude of any change, paired samples t-tests were computed to determine whether any two-year shifts in cognitive reappraisal or positive emotions were statistically significant. Overall,

engagement in cognitive reappraisal significantly decreased from Time 1 (M = 3.26, SD = 0.50) to Time 2 (M = 3.17, SD = 0.51), $t(409) = -4.25$, $p < .001$. Likewise, frequency of positive emotions significantly declined from Time 1 (M = 44.56, SD = 8.77) to Time 2 (M = 42.56, SD = 9.46), $t(406) = -5.06$, $p < .001$.

Hypothesis 1a states that greater initial (Time 1) engagement in cognitive reappraisal will predict more frequent positive emotions at Time 2, beyond the effects of initial positive emotions. This hypothesis was tested using a linear regression model in which Time 1 cognitive reappraisal was the predictor, with Time 1 positive emotions, age, relationship status, education, and self-rated health included as covariates, and Time 2 positive emotions as the criterion. As detailed in Table 11, the overall model was significant, $R^2 = .40$, $F(6, 397) = 44.82$, $p < .001$. However, greater engagement in cognitive reappraisal at Time 1 did not predict more frequent positive emotions at Time 2, beyond the effects of Time 1 positive emotions ($\beta = .57$, $p < .001$). Thus, Hypothesis 1a was not supported.

Hypothesis 1b states that more frequent initial (Time 1) positive emotions will predict greater engagement in cognitive reappraisal two years later (Time 2), beyond the effects of initial cognitive reappraisal. This hypothesis was tested using a linear regression model in which Time 1 positive emotions was the predictor, with Time 1 cognitive reappraisal, age, relationship status, education, and self-rated health included as covariates, and Time 2 cognitive reappraisal as the criterion. As shown in Table 11, the overall model was significant, $R^2 = .37$, $F(6, 398) = 39.56$, $p < .001$. As expected, more frequent positive emotions at Time 1 predicted greater engagement in cognitive

reappraisal at Time 2 ($\beta = .19$, $p < .001$), beyond the effects of Time 1 cognitive reappraisal ($\beta = .49$, $p < .001$).

The next main objective was to examine cognitive reappraisal as a predictor of subsequent psychological well-being. Hypothesis 2a states that beyond the effect of initial positive emotions, greater engagement in cognitive reappraisal will predict greater perceived control and life satisfaction two years later. This hypothesis was tested using a linear regression model that included Time 1 cognitive reappraisal as the predictor, with Time 1 positive emotions, age, relationship status, education, and self-rated health included as covariates, and Time 2 perceived control as the criterion. This analysis was repeated for life satisfaction as the criterion variable.

As detailed in Table 12, the overall model predicting perceived control was significant, $R^2 = .27$, $F(6, 397) = 24.72$, $p < .001$. However, greater engagement in cognitive reappraisal did not predict greater perceived control two years later, beyond the effects of age ($\beta = -.24$, $p < .001$), education ($\beta = -.10$, $p = .032$), self-rated health ($\beta = .28$, $p < .001$), and Time 1 positive emotions ($\beta = .27$, $p < .001$), all of which predicted greater perceived control. The overall model predicting life satisfaction was also significant, $R^2 = .11$, $F(6, 396) = 7.94$, $p < .001$. Although cognitive reappraisal did not predict greater life satisfaction two years later, better self-rated health and more frequent positive emotions predicted greater life satisfaction ($\beta = .11$, $p = .028$ and $\beta = .26$, $p < .001$, respectively). Thus, Hypothesis 2a was not supported.

Hypothesis 2b states that beyond the effect of initial positive emotions, greater engagement in cognitive reappraisal will predict less perceived stress and depressive symptoms two years later. This hypothesis was tested using a linear regression model in

which Time 1 cognitive reappraisal was the predictor, with Time 1 positive emotions, age, relationship status, education, and self-rated health included as covariates, and Time 2 perceived stress as the criterion. The same regression model was repeated for depressive symptoms as the criterion variable.

As shown in Table 13, the overall model predicting perceived stress was significant, $R^2 = .13$, $F(6, 400) = 10.26$, $p < .001$. As hypothesized, greater engagement in cognitive reappraisal predicted less perceived stress two years later ($\beta = -.11$, $p = .034$), beyond the effects of education ($\beta = -.12$, $p = .01$), self-rated health ($\beta = -.14$, $p = .003$), and Time 1 positive emotions ($\beta = -.24$, $p < .001$), which also predicted less perceived stress. The overall model predicting depressive symptoms was also significant, $R^2 = .26$, $F(6, 393) = 22.81$, $p < .001$. However, greater engagement in cognitive reappraisal did not predict fewer depressive symptoms two years later, beyond the effects of age ($\beta = .11$, $p = .016$), relationship status ($\beta = -.09$, $p = .05$), self-rated health ($\beta = -.29$, $p < .001$), and Time 1 positive emotions ($\beta = -.29$, $p < .001$), all of which predicted fewer depressive symptoms. Thus, Hypotheses 2b was only partially supported.

As in Study 1, participants in the current study were categorized according to whether they experienced upward shifts ($n = 116$), downward shifts ($n = 181$), or no change ($n = 113$) in the use of cognitive reappraisal over two years. Hypothesis 2c states that upward shifts in the use of cognitive reappraisal over two years will predict greater perceived control and life satisfaction as well as less perceived stress and depressive symptoms. This hypothesis was tested using a linear regression model in which positive difference scores for cognitive reappraisal was the predictor, with Time 1 positive emotions, age, relationship status, education, and self-rated health included as covariates,

and Time 2 perceived control as the criterion. The same regression model was repeated for additional psychological well-being criterion variables of life satisfaction, perceived stress, and depressive symptoms. The following analyses were based on the 116 participants who experienced an upward shift in cognitive reappraisal.

The overall models predicting perceived control and life satisfaction were significant, $R^2 = .30$, $F(6, 104) = 7.52$, $p < .001$ and $R^2 = .22$, $F(6, 106) = 4.86$, $p < .001$, respectively. The overall models predicting perceived stress and depressive symptoms were also significant, $R^2 = .20$, $F(6, 107) = 4.44$, $p < .001$ and $R^2 = .28$, $F(6, 104) = 6.70$, $p < .001$, respectively. However, upward shifts in cognitive reappraisal over two years were not significant predictors of psychological well-being in any of the models, indicating a lack of support for Hypotheses 2c.

Hypothesis 2d states that downward shifts in the use of cognitive reappraisal over two years will predict less perceived control and life satisfaction, as well as greater perceived stress and depressive symptoms. This hypothesis was tested using a linear regression model in which negative mean difference scores for cognitive reappraisal was the predictor, with Time 1 positive emotions, age, relationship status, education, and self-rated health included as covariates, and Time 2 perceived control as the criterion. This analysis was repeated for additional psychological well-being criterion variables of life satisfaction, perceived stress, and depressive symptoms. The following results were based on the 181 participants who experienced a downward shift in cognitive reappraisal.

The overall models predicting perceived control and life satisfaction were significant, $R^2 = .25$, $F(6, 171) = 9.25$, $p < .001$ and $R^2 = .09$, $F(6, 169) = 2.90$, $p = .01$, respectively. The overall models predicting perceived stress and depressive symptoms

were also significant, $R^2 = .11$, $F(6, 171) = 3.46$, $p = .003$ and $R^2 = .29$, $F(6, 170) = 11.28$, $p < .001$, respectively. However, downward shifts in cognitive reappraisal over two years were not significant predictors of well-being in any of the models. Thus, Hypothesis 2d was not supported.

Lastly, a multivariate analysis of variance (MANOVA) was computed according to whether participants were classified as the "increased" ($n = 106$) or "decreased" ($n = 178$) groups for changes in cognitive reappraisal. The MANOVA indicated that no group differences exist in perceived control, life satisfaction, perceived stress, and depressive symptoms among older adults who experienced upward shifts in cognitive reappraisal versus those who experienced downward shifts, $\Lambda = 0.98$, $F(4, 279) = 1.50$, $p = .20$.

Discussion

The focus of Study 2 was to replicate the results of Study 1 and extend the findings by examining the longer-term relationship between engagement in cognitive reappraisal and frequency of positive emotions among community-dwelling older adults using a two-year cross-lagged panel design. Similar to Study 1, most participants in Study 2 were well-educated white women in committed relationships who were an average of 70 years old. In Study 2, the majority of participants were not currently employed, and they all resided in the Midwestern United States. Consistent with Study 1, most participants in Study 2 rated their health as good and reported moderate engagement in cognitive reappraisal and frequent positive emotions. Also consistent with Study 1, Study 2 participants had good overall psychological well-being: a moderate sense of control and satisfaction with life despite also having moderate levels of stress and mild depressive symptoms.

Overall, being older was associated with less engagement in cognitive reappraisal, less perceived control, and more depressive symptoms. As in Study 1 and similar to past research (Wright & Brown, 2017), being in a committed relationship was related to more frequent positive emotions, greater perceived control, greater life satisfaction, and fewer depressive symptoms. Higher levels of education were also associated with less perceived stress, fewer depressive symptoms, and greater life satisfaction. Finally, better self-rated health had a beneficial relationship with all indices of psychological well-being (i.e., perceived control, life satisfaction, perceived stress, depressive symptoms) as well as the experience of more frequent positive emotions.

A main objective of Study 2 was to examine the reciprocal relationship between engagement in cognitive reappraisal and frequency of positive emotions over a two-year period. The results supported Hypothesis 1b and were consistent with Study 1 findings that initial positive emotions predicted cognitive reappraisal two years later, beyond the effects of initial cognitive reappraisal. In contrast, initial cognitive reappraisal did not predict later positive emotions, beyond the effects of initial positive emotions. It is notable that both engagement in cognitive reappraisal and frequency of positive emotions significantly diminished over the two-year period.

Another main objective of Study 2 was to examine cognitive reappraisal as a predictor of psychological well-being two years later. Findings indicated that initial cognitive reappraisal did not predict psychological well-being outcomes two years later, after accounting for initial positive emotions, with the exception of less perceived stress. Thus, Study 2 results partially supported Hypothesis 2b. Both upward shifts and

downward shifts in cognitive reappraisal over two years also failed to predict psychological well-being.

Collectively, Study 2 results suggest that the longer-term directional relationship is stronger for initial frequency of positive emotions predicting engagement in cognitive reappraisal compared to the reverse. The current findings also highlight the salience of positive emotions to psychological well-being over time. In contrast, longer-term shifts in cognitive reappraisal appear neither beneficial nor detrimental to well-being.

CHAPTER IV

GENERAL DISCUSSION

The current studies focused on two psychosocial factors as contributors to older adults' psychological well-being. Specifically, two studies assessed the short- and longer-term reciprocal relationship between engagement in cognitive reappraisal and frequency of positive emotions among community-dwelling older adults. Both studies were also used to examine cognitive reappraisal and positive emotions as predictors of psychological well-being three months (Study 1) and two years (Study 2) later.

Sample characteristics across both studies were similar, as the majority of participants were well-educated, white women who were in a committed relationship and reported being in good overall health. Whereas most participants in Study 1 were currently employed, most Study 2 participants were not employed and were an average of five years older than those in Study 1. Participants in both studies reported engaging in a moderate amount of cognitive reappraisal and enjoyed frequent positive emotions. Also, in both studies, participants had good overall psychological well-being: a moderate sense of control and being fairly satisfied with life despite moderate levels of stress and mild depressive symptoms.

Cognitive Reappraisal and Positive Emotions

A main objective of both studies was to examine cognitive reappraisal and positive emotions within a cross-lagged panel design to determine which psychosocial

factor was the better predictor of the other factor. If one directional association was significantly stronger than the other, then this finding could help to identify older adults who may experience better or poorer psychological well-being outcomes over time.

As hypothesized, older adults in both studies who experienced more frequent initial positive emotions were found to have greater engagement in cognitive reappraisal three months and two years later, after accounting for initial cognitive reappraisal. This finding expands upon previous research suggesting that positive emotions facilitate the use of secondary control strategies (Tobin & George, 2015), such as positive interpretations of events (Folkman & Moskowitz, 2000), by demonstrating a direct relationship between positive emotions and later use of cognitive reappraisal. In line with Fredrickson's (2001, 2004) Broaden-and-Build Theory, perhaps the experience of positive emotions allows for greater cognitive flexibility, which enables older adults to cognitively reframe or find the 'silver lining' in a difficult situation. For example, an older adult faced with the necessity of moving into an assisted living home who frequently feels grateful and love might engage in cognitive reappraisal by focusing on the opportunity to build social connections with fellow residents.

In addition to positive emotions, poorer self-rated health also predicted greater engagement in cognitive reappraisal three months later. This is consistent with past research which posits that as the opportunity to exert direct outward influence diminishes in a given situation, as is often the case with declining health status, older individuals may rely more on secondary control strategies such as cognitive reappraisal to reach their goals (Heckhausen & Schulz, 1995) or to maintain an overall sense of control (Rothbaum et al., 1982). Given the positive association between initial cognitive appraisal and later

psychological well-being as detailed below, the current findings may help to identify individuals who are at risk for poorer well-being outcomes in later life. Specifically, older adults with low engagement in cognitive reappraisal, particularly those who are in poorer health, could be targeted with the aim of enhancing their use of cognitive reappraisal in order to protect and maintain their psychological well-being, despite the challenges that often occur in conjunction with poor health.

Also as expected and consistent with prior research (e.g., Nowlan, Wuthrich, & Rapee, 2016), Study 1 demonstrated that older adults who engaged in greater use of initial cognitive reappraisal enjoyed more frequent positive emotions three months later, after accounting for initial positive emotions. Perhaps the ability to focus on the positive enables older adults to cope effectively with life challenges and preserves the experience of positive emotions, at least over the next few months. In contrast, greater initial use of cognitive reappraisal did not predict more frequent positive emotions over the longer two-year period of Study 2.

Findings from Study 1 did not clarify which of these two directional associations is stronger, perhaps due to the restricted range of scores over the three-month period. In contrast, Study 2 demonstrated that the experience of positive emotions was the salient predictor in the reciprocal relationship between frequency of positive emotions and engagement in cognitive reappraisal two years later. This finding that positive emotions predict cognitive reappraisal two years later, after accounting for initial cognitive reappraisal, as well as age, relationship status, education level, and self-rated health, is an important contribution to the literature. It builds upon prior research on emotions in later life (e.g., Carstensen et al., 2011; Chipperfield et al., 2003) by demonstrating the longer-

term benefits of frequent positive emotions. As discussed above, the experience of positive emotions might allow for greater cognitive flexibility and, in turn, greater use of cognitive reappraisal. This reasoning is consistent with Fredrickson's (2001, 2004) Broaden-and-Build Theory and past research demonstrating that the benefits of positive emotions accumulate over time to predict resilience and better psychological well-being (e.g., Gloria & Steinhardt, 2014; Lyubomirsky et al., 2005). Specifically, frequency of positive emotions among community-dwelling older adults is associated with greater perceived control (Ruthig et al., 2014), life satisfaction (Chipperfield et al., 2003), optimism (Diehl et al., 2011), and self-esteem (Diehl et al., 2011; Meeks et al., 2012), as well as lower levels of stress and fewer depressive symptoms (Meeks et al., 2012; Ruthig et al., 2014). Furthermore, the benefits of positive emotions extend beyond psychological well-being to include implications for physical health, including greater longevity (Pressman & Cohen, 2005).

While positive emotions and cognitive reappraisal were relatively stable over the three-month period, both psychosocial factors significantly diminished over the two-year period of Study 2. This finding is in contrast with past research suggesting that cognitive reappraisal (e.g., Heckhausen & Schulz, 1995) and positive emotions (e.g., Shook et al., 2017; Shrira et al., 2016) increase in later life. One explanation might be that older adults in Study 2 were dealing with more daily hassles, such as managing housework and finances, which have been shown to negatively impact individuals' emotional experience (Aldwin et al., 2014). Participants also may have been more likely to endure a major life event during the two-year period, such as the death of a family member or friend. It is also possible that older adults in such situations might have relied on coping strategies

other than cognitive reappraisal, such as seeking social support. Accordingly, to gain further insight into why older adults may experience diminished cognitive reappraisal and positive emotions over time, future research could examine the roles of older adults' exposure to and intensity of daily hassles and major life events as well as a broader range of coping strategies.

Nonetheless, findings from both of the current studies suggest that the experience of more frequent positive emotions may provide both short- and longer-term benefits in bolstering the use of cognitive reappraisal. Although cognitive reappraisal as a predictor of positive emotions was not supported over the two-year period, the impact of this coping strategy on subsequent psychological well-being as discussed below nevertheless highlights its importance among older adults.

Predicting Psychological Well-Being

Another main objective of both studies was to examine cognitive reappraisal as a predictor of subsequent psychological well-being, as well as how any shifts in cognitive reappraisal are beneficial or detrimental to well-being. As expected and beyond the impact of age, relationship status, education level, as well as initial positive emotions and self-rated health, greater engagement in cognitive reappraisal predicted greater perceived control, life satisfaction, and self-efficacy, as well as less perceived stress and fewer depressive symptoms three months later. These findings of Study 1 support prior research demonstrating the benefits of cognitive reappraisal to psychological well-being among older adults (e.g., Hall et al., 2010; Hu et al., 2014; Kraaij et al., 2002). The current findings also extend prior research by suggesting that consistently high use of cognitive reappraisal is beneficial to short-term well-being.

In contrast to the clear benefits of cognitive reappraisal across all indices of psychological well-being in the short-term, Study 2 found that engagement in cognitive reappraisal only predicted less perceived stress two years later. It did not predict any of the other well-being indices over the longer-term after accounting for sociodemographics and initial self-rated health and positive emotions. One explanation may relate to the finding that cognitive reappraisal significantly declined among the older adults in this sample and therefore its impact on well-being was lessened. As discussed above, it is also possible that other coping strategies, such as seeking social support, became more salient to these older adults and their subsequent psychological well-being. Further research could examine this possibility by assessing a variety of coping strategies and comparing their predictive link to longer-term psychological well-being.

Apart from cognitive reappraisal, frequency of positive emotions was also a significant predictor of all indices of psychological well-being assessed in both studies. Older adults who experienced more frequent positive emotions also reported greater perceived control, life satisfaction, and self-efficacy three months later, as well as less perceived stress and fewer depressive symptoms both three months and two years later. As previously discussed, this finding highlights the benefits of positive emotions and contributes to prior research showing the advantages of this psychosocial factor among older adults (e.g., Chipperfield et al., 2003; Meeks et al., 2012; Ruthig et al., 2014). Moreover, the present findings also suggest the importance of assessing frequency of positive emotions in order to identify older adults who may be at risk of poor longer-term psychological well-being. In particular, low frequency of positive emotions may signal poorer well-being in the coming months or years. Accordingly, enhancing positive

emotions among these individuals could protect their subsequent well-being. On the other hand, older adults who experience frequent positive emotions would likely continue to enjoy well-being in terms of lower stress and fewer depressive symptoms over time.

Overall, the results from both studies encourage the use of cognitive reappraisal among older adults to protect against the detrimental effects of age-related challenges. The findings also demonstrate the salience of positive emotions to short- and longer-term well-being.

Shifts in Cognitive Reappraisal Predicting Well-Being

Both studies also extended prior research by investigating whether older adults who experience upward or downward shifts in the use of cognitive reappraisal also experience better or worse psychological well-being outcomes. Unexpectedly, the results of both studies found that upward shifts in cognitive reappraisal over three months and two years failed to predict well-being. This may suggest that older adults do not benefit from increased engagement in cognitive reappraisal over time. Another explanation could be that the magnitude of the upward shift was too small to meaningfully relate to well-being given that overall engagement in cognitive reappraisal remained fairly stable over the three-month period of Study 1 and significantly decreased over the two-year period of Study 2. Furthermore, Study 1 included less than half of the recommended sample size of those who experienced upward shifts in their use of cognitive reappraisal to yield significant regression results (Green, 1991). Future research could target participants who experience shifts in their use of cognitive reappraisal to ensure a sufficient sample to better investigate this issue of whether upwards shifts predict later well-being.

Study 1 results did suggest that short-term decreases in the use of cognitive reappraisal are associated with the predicted corresponding decline in well-being. Specifically, Study 1 found that downward shifts in cognitive reappraisal predicted less self-efficacy and more perceived stress three months later. For example, the less that older adults were able to find meaning or a 'silver lining', the more distress they experienced and the less competent they felt. Study 2 did not find an association between downward shifts in cognitive reappraisal and psychological well-being two years later. Together, these findings suggest that consistent engagement in cognitive reappraisal may protect against the declines in well-being associated with decreased engagement in this coping strategy. Future research could therefore examine the benefits of cognitive reappraisal booster sessions following the initial intervention as a way to maintain steady use of cognitive reappraisal and better psychological well-being over time.

Clinical Implications

Study 1 demonstrated that greater engagement in cognitive reappraisal benefited all indices of psychological well-being assessed over a three-month period (i.e., perceived control, life satisfaction, self-efficacy, perceived stress, and depressive symptoms). Study 2 findings supported the beneficial impact of cognitive reappraisal over two years in terms of predicting less perceived stress. Both studies also demonstrated the salience of positive emotions as a predictor of later engagement in cognitive reappraisal and better psychological well-being. Therefore, low use of cognitive reappraisal and less frequent positive emotions may signal which older adults are at risk for poorer psychological well-being in later life. The current studies suggest that helping older adults to view their situation in a different way, to derive meaning from a difficult situation, and to focus on

the positive are some of the strategies that will contribute to the experience of more frequent positive emotions. In fact, studies have shown the use of cognitive reappraisal can be enhanced among older adults and contribute to more frequent positive emotions, with benefits occurring after only a single session (Nowlan et al., 2015a; Nowlan, Wuthrich, Rapee, et al., 2016).

The current findings may be particularly relevant given the recent COVID-19 pandemic, which has undoubtedly affected the psychological well-being of many older adults who might be struggling with increased social isolation and negative impacts to mental health resulting from the pandemic and greater risk to older adults, in addition to other age-related challenges. Furthermore, the current findings may provide some favorable insight for the physical health implications of the pandemic, as prior research has shown that positive emotions protect against the risk of respiratory illness (Cohen et al., 2006) and health conditions that have been associated with more severe outcomes from the coronavirus, such as hypertension (Ong & Allaire, 2005).

Limitations and Future Directions

The current studies consisted of predominantly white female participants with a high level of education. Past research has found associations between frequency of positive emotions and sociodemographic factors. For example, more frequent positive emotions have been reported in later life among males and married participants compared to females and unmarried individuals (Steptoe et al., 2011), as well as older adults who self-identified as black compared to those who self-identified as white (Krok-Schoen & Baker, 2014). Future studies should therefore focus on recruiting samples that are more diverse in terms of race, gender, and relationship status, to determine whether the

demonstrated benefits of positive emotions and cognitive reappraisal generalize beyond the current samples.

Additional limitations include self-report data and participant self-selection. One potential issue with self-report data relates to errors in recall. For example, participants may have had difficulty remembering the stress they experienced during the past month or they may have been inaccurate in estimating their level of engagement in cognitive reappraisal. Future research could address this concern by asking participants to maintain a daily record rather than retrospectively assessing cognitive reappraisal, positive emotions, and psychological well-being. Regarding self-selection, it is possible that the current studies do not reflect the experience of older adults who are severely struggling due to age-related challenges, as these individuals would likely not have the time nor the energy to participate. Perhaps providing additional incentive, such as greater compensation or respite for those caring for a dependent, would facilitate the likelihood of such older adults participating in similar future research. Lastly, the current studies were based on non-experimental methodology. Thus, despite the longitudinal nature and controlling for baseline measures and sociodemographics, causal relationships between cognitive reappraisal, positive emotions, and psychological well-being cannot be inferred. Other factors, such as various daily hassles or major life events, could have impacted well-being or caused cognitive reappraisal and positive emotions to change over time. Subsequent research that incorporates a direct manipulation of cognitive reappraisal or positive emotions would contribute to determining the causal nature of these associations and, in turn, provide support for clinical interventions aimed at increasing well-being in later life.

Conclusion

Overall, the current studies contribute to the literature by identifying the short- and longer-term associations between cognitive reappraisal and positive emotions, and clarifying that positive emotions was the salient predictor in this bi-directional relationship over the two-year period. The latter finding builds upon prior research by showing the longer-term benefits of experiencing more frequent positive emotions. Finally, both studies also extend prior research by examining the use of cognitive reappraisal as a predictor of later psychological well-being. These results provide support for the use of cognitive reappraisal and frequency of positive emotions in order to protect and maintain psychological well-being in later life. The findings suggest that older adults who have low engagement in cognitive reappraisal or experience fewer positive emotions may be more likely to struggle with poor well-being. Ideally, research will continue to investigate the bi-directional relationship between cognitive reappraisal and positive emotions using experimental methodology, which will provide support for interventions designed to protect against the challenges of aging and ultimately enhance the quality of life for older adults.

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Table 1

Study 1: Participant Characteristics

Variables	*n* (*M*)	% (*SD*)	Range
Gender			
Female	82	56.2%	-
Male	64	43.8%	-
Age	(65.45)	(4.64)	60–82
Geographic region			
Midwest	32	21.9%	-
Northeast	38	26.0%	-
South	45	30.8%	-
West	31	21.2%	-
Race			
White	120	82.2%	-
Non-white	26	17.8%	-
Education			
High school or less	8	5.5%	-
Some college	37	25.3%	-
Associate degree	14	9.6%	-
Bachelor's degree or higher	87	59.6%	-
Relationship status			
Committed (married/cohabitating)	86	58.9%	-
Non-committed	60	41.1%	-
Employment status			
Not currently employed (incl. retired)	70	47.9%	-
Employed full-time/part-time/casually	76	52.1%	-
Self-rated health	(3.73)	(0.78)	1–5

Note. Respondents classified as Non-white identified as African American/Black (*n* = 11), Latino-a/Hispanic (*n* = 7), Asian American/Pacific Islander (*n* = 5), American Indian (*n* = 2), or "other" (*n* = 1).

Table 2

Study 1: Descriptive Statistics of Cognitive Reappraisal, Positive Emotions, and Well-Being

Variable	*M*	*SD*	Range	Possible Range	Alpha
		Time 1			
Cognitive reappraisal	3.15	0.58	1.50–4	1–4	.84
Positive emotions	40.40	11.64	3–60	0–60	.93
		Time 2			
Cognitive reappraisal	3.11	0.59	1–4	1–4	.80
Positive emotions	40.21	12.45	3–60	0–60	.93
Perceived control	7.71	1.49	3.25–10	1–10	.91
Life satisfaction	1.27	1.95	(-3)–(+3)	(-3)–(+3)	.82
Self-efficacy	30.92	5.41	12–40	10–40	.93
Perceived stress	17.59	5.21	7–35	7–35	.87
Depressive symptoms	6.93	5.95	0–23	0–30	.89

Table 3

Study 1: Bivariate Correlations Among Sociodemographics, Cognitive Reappraisal, Positive Emotions, and Well-Being

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Age	-.01	.03	-.12	-.10	-.23**	-.06	.08	.24**	.10	.09	.01	.09	.14	-.02	-.02
2. Gender	–	.06	.07	.06	-.09	.03	-.04	-.05	.11	-.06	-.08	.05	.03	-.02	-.08
3. Race		–	.06	.02	-.06	-.02	-.01	.06	.01	.03	.03	.05	.07	-.03	-.06
4. Relationship			–	.08	.06	.03	-.02	.18*	-.01	.21**	.07	.27***	.02	-.12	-.17*
5. Education				–	.04	.31***	.12	.11	.11	.14	.13	.15	.20*	-.10	-.22**
6. Employed					–	-.02	.08	-.02	.07	.02	.09	-.05	.06	-.05	-.05
7. Health						–	.25**	.32***	.01	.17*	.33***	.13	.13	-.04	-.22**
8. T1 Reappraisal							–	.41***	.59***	.42***	.39***	.38***	.57***	-.43***	-.46***
9. T1 Emotions								–	.36***	.76***	.56***	.46***	.45***	-.30***	-.50***
10. T2 Reappraisal									–	.55***	.39***	.45***	.66***	-.47***	-.48***
11. T2 Emotions										–	.63***	.62***	.59***	-.46***	-.63***
12. Control											–	.52***	.60***	-.44***	-.58***
13. Satisfaction												–	.57***	-.73***	-.83***
14. Self-efficacy													–	-.61***	-.59***
15. Stress														–	.76***
16. Depression															–

*$p < .05$. **$p \leq .01$. ***$p \leq .001$.

Table 4

Study 1: Predicting Later Positive Emotions and Cognitive Reappraisal

Time 1 Predictors	Positive Emotions at Time 2				Cognitive Reappraisal at Time 2			
	B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
Age	-0.23	0.15	-.09	-1.55	0.00	0.01	-.00	-0.02
Relationship	1.86	1.37	.07	1.35	-0.04	0.08	-.04	-0.51
Education	0.60	0.53	.06	1.13	0.04	0.03	.09	1.25
Self-rated health	-2.10	0.94	-.13*	-2.23	-0.16	0.06	-.22**	-2.96
Cognitive reappraisal	3.16	1.25	.15*	2.53	0.56	0.07	.55***	7.51
Positive emotions	0.79	0.07	.74***	11.79	0.01	0.00	.20*	2.57
R^2	.62***				.40***			

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 5

Study 1: Predicting Three-Month Perceived Control, Life Satisfaction, and Self-Efficacy

Time 1 Predictors	Perceived Control				Life Satisfaction				Self-Efficacy			
	B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
Age	-0.04	0.02	-.11	-1.56	0.01	0.03	.02	0.31	0.06	0.08	.05	0.67
Relationship	-0.10	0.21	-.03	-0.46	0.84	0.29	.21**	2.89	-0.23	0.75	-.02	-0.31
Education	0.01	0.08	.01	0.16	0.13	0.11	.09	1.17	0.65	0.29	.16*	2.25
Self-rated health	0.24	0.14	.13	1.69	-0.17	0.20	-.07	-0.84	-0.84	0.51	-.12	-1.64
Cognitive reappraisal	0.43	0.19	.17*	2.23	0.85	0.26	.25**	3.20	4.27	0.68	.46***	6.30
Positive emotions	0.06	0.01	.48***	5.92	0.06	0.01	.33***	3.85	0.13	0.04	.28***	3.50
R^2	.37***				.31***				.41***			

*$p < .05$. **$p < .01$. ***$p \leq .001$.

Table 6

Study 1: Predicting Three-Month Perceived Stress and Depressive Symptoms

Time 1 Predictors	Perceived Stress				Depressive Symptoms			
	B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
Age	0.05	0.09	.04	0.51	0.08	0.09	.06	0.86
Relationship	-0.92	0.82	-.09	-1.12	-1.06	0.85	-.09	-1.24
Education	-0.24	0.32	-.06	-0.75	-0.63	0.33	-.14	-1.90
Self-rated health	0.90	0.56	.13	1.61	0.18	0.59	.02	0.30
Cognitive reappraisal	-3.46	0.74	-.39**	-4.65	-3.07	0.78	-.30**	-3.92
Positive emotions	-0.08	0.04	-.18*	-1.97	-0.19	0.04	-.37**	-4.45
R^2	.23**				.36**			

*$p \leq .05$. **$p < .001$.

Table 7

Study 1: Downward Shifts in Cognitive Reappraisal Predicting Psychological Well-Being

Time 1 Predictors	Perceived Control				Life Satisfaction				Self-Efficacy			
	B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
Age	0.04	0.03	.13	1.04	0.01	0.05	.02	0.11	0.03	0.13	.03	0.20
Relationship	0.34	0.35	.12	0.98	0.64	0.55	.16	1.17	-0.94	1.35	-.09	-0.69
Education	-0.04	0.13	-.04	-0.32	0.05	0.21	.03	0.22	0.33	0.51	.08	0.64
Self-rated health	0.50	0.26	.25	1.96	0.13	0.40	.05	0.32	0.39	0.99	.05	0.39
Cognitive reappraisal (Downward shift)	0.60	0.48	.14	1.23	1.61	0.75	.27*	2.13	6.08	1.87	.39**	3.26
Positive emotions	0.05	0.02	.39**	2.93	0.05	0.02	.31*	2.12	0.16	0.06	.38**	2.76
R^2	.33**				.21				.30**			

Time 1 Predictors	Perceived Stress				Depressive Symptoms			
	B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
Age	0.03	0.13	.03	0.23	0.13	0.14	.11	0.87
Relationship	0.24	1.35	.02	0.18	0.10	1.50	.01	0.07
Education	-0.08	0.51	-.02	-0.15	-0.55	0.56	-.12	-0.98
Self-rated health	-0.12	0.99	-.02	-0.12	-0.70	1.10	-.08	-0.63
Cognitive reappraisal (Downward shift)	-6.34	1.87	-.43***	-3.40	-3.81	2.05	-.22	-1.86
Positive emotions	-0.11	0.06	-.26	-1.82	-0.24	0.07	-.50***	-3.71
R^2	.23*				.33**			

*$p < .05$. **$p < .01$. ***$p \leq .001$.

Table 8

Study 2: Participant Characteristics

Variables	*n* (*M*)	% (*SD*)	Range
Gender			
Female	238	56.9%	-
Male	180	43.1%	-
Age	(70.21)	(7.52)	60–98
Race			
White	413	99.0%	-
Non-white	4	1.0%	-
Education			
High school or less	27	6.5%	-
Some college/Associate degree	45	10.8%	-
Bachelor's degree	190	45.5%	-
Master's degree or higher	155	37.2%	-
Relationship status			
Committed (married/cohabitating)	312	74.6%	-
Non-committed	106	25.4%	-
Employment status			
Not currently employed (incl. retired)	237	57.5%	-
Employed full-time/part-time/casually	175	42.5%	-
Self-rated health	(4.12)	(0.77)	1–5

Note. Respondents classified as Non-white identified as African American (n = 1), Native American (n = 1), or "other" (n = 2).

Table 9

Study 2: Descriptive Statistics of Cognitive Reappraisal, Positive Emotions, and Well-Being

Variable	*M*	*SD*	Range	Possible Range	Alpha
		Time 1			
Cognitive reappraisal	3.26	0.50	1.75–4	1–4	.78
Positive emotions	44.44	8.81	8–60	0–60	.87
		Time 2			
Cognitive reappraisal	3.17	0.51	1.50–4	1–4	.80
Positive emotions	42.57	9.43	5–60	0–60	.89
Perceived control	7.99	1.28	2.25–10	1–10	.89
Life satisfaction	2.12	1.06	(-3)–(+3)	(-3)–(+3)	.50
Perceived stress	15.19	4.17	7–33	7–35	.83
Depressive symptoms	4.87	4.35	0–23	0–30	.83

Table 10

Study 2: Bivariate Correlations Among Sociodemographics, Cognitive Reappraisal, Positive Emotions, and Well-Being

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	-.05	-.02	-.20***	-.05	-.38***	-.00	-.14**	-.02	-.18***	-.06	-.26***	-.01	.02	.16**
2. Gender	–	-.01	-.25***	-.32***	-.11*	-.10*	.04	-.00	.05	.01	-.01	-.12*	.13**	.09
3. Race		–	.00	-.02	-.02	-.08	-.05	.00	-.01	.04	.00	.04	-.03	.01
4. Relationship			–	.18***	.01	.23***	.05	.20***	.07	.18***	.20***	.15**	-.05	-.23***
5. Education				–	.09	.16***	.05	-.01	.02	-.01	-.02	.11*	-.16***	-.10*
6. Employed					–	.03	.10*	-.01	.08	-.03	.12*	.06	-.04	-.06
7. Health						–	.10	.09	.05	.12*	.30***	.15**	-.19***	-.34***
8. T1 reappraisal							–	.44***	.59***	.34***	.26***	.14**	-.26***	-.26***
9. T1 Emotions								–	.40***	.62***	.34***	.28***	-.29***	-.36***
10. T2 Reappraisal									–	.51***	.35***	.19***	-.26***	-.29***
11. T2 Emotions										–	.44***	.28***	-.27***	-.40***
12. Control											–	.39***	-.44***	-.56***
13. Satisfaction												–	-.56***	-.60***
14. Stress													–	.67***
15. Depression														–

*$p < .05$. **$p < .01$. ***$p \leq .001$.

Table 11

Study 2: Predicting Later Positive Emotions and Cognitive Reappraisal

Time 1 Predictors	Positive Emotions at Time 2				Cognitive Reappraisal at Time 2			
	B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
Age	-0.04	0.05	-.03	-0.70	-0.01	0.00	-.08	-1.92
Relationship	1.11	0.91	.05	1.22	0.00	0.05	.00	0.00
Education	-0.20	0.37	-.02	-0.53	-0.01	0.02	-.01	-0.30
Self-rated health	0.79	0.50	.06	1.60	-0.00	0.03	-.01	-0.15
Cognitive reappraisal	1.49	0.83	.08	1.81	0.50	0.05	.49*	11.04
Positive emotions	0.62	0.05	.57*	12.99	0.01	0.00	.19*	4.12
R^2			.40*				.37*	

*$p < .001$.

Table 12

Study 2: Predicting Two-Year Perceived Control and Life Satisfaction

Time 1 Predictors	Perceived Control				Life Satisfaction			
	B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
Age	-0.04	0.01	-.24**	-5.39	0.01	0.01	.03	0.65
Relationship	0.18	0.14	.06	1.36	0.16	0.13	.07	1.25
Education	-0.12	0.06	-.10*	-2.16	0.08	0.05	.07	1.48
Self-rated health	0.47	0.07	.28**	6.29	0.15	0.07	.11*	2.20
Cognitive reappraisal	0.18	0.12	.07	1.45	-0.00	0.11	-.00	-0.02
Positive emotions	0.04	0.01	.27**	5.51	0.03	0.01	.26**	4.87
R^2	.27**				.11**			

*$p < .05$. **$p < .001$.

Table 13

Study 2: Predicting Two-Year Perceived Stress and Depressive Symptoms

Time 1 Predictors	Perceived Stress				Depressive Symptoms			
	B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
Age	-0.01	0.03	-.02	-0.32	0.06	0.03	.11*	2.42
Relationship	0.48	0.47	.05	1.03	-0.91	0.46	-.09*	-1.97
Education	-0.49	0.19	-.12**	-2.57	-0.10	0.19	-.02	-0.52
Self-rated health	-0.76	0.26	-.14**	-2.96	-1.60	0.25	-.29***	-6.35
Cognitive reappraisal	-0.91	0.43	-.11*	-2.12	-0.63	0.42	-.07	-1.51
Positive emotions	-0.11	0.02	-.24***	-4.47	-0.14	0.02	-.29***	-5.83
R^2	.13***				.26***			

*$p \leq .05$. **$p \leq .01$. ***$p < .001$.

APPENDICES

Appendix A

Coping and Well-Being in Older Adulthood Survey: Sociodemographics

We want to learn more about a variety of issues related to aging. The following questions will ask about your beliefs and feelings. You are under no obligation to answer questions that you would prefer not to. However, your answers will be of great assistance in our research. Thank you again for giving us your time and assistance by participating in what we regard as a very important study. Also, we again want to assure you of complete confidentiality.

First, we would like to ask some general questions about your background.

1. How old are you? _____ years

2. When were you born? Month: _____ Day: _____ Year: _____

3. What is your gender? ____ Female____ Male ____ Other

4. In what region of the United States do you reside?
   ____ Midwest ____ Northeast____ South ____ West

5. Which of the following racial groups do you identify with?
   ____ African American/Black ____ American Indian
   ____ Asian American/Pacific Islander ____ European American/White
   ____ Latino-a/Hispanic ____ Other, please specify: _____

6. What is your current relationship status?
   ____ Single, never married ____ Married/Cohabitating
   ____ Widowed ____ Divorced/Separated

7. What is your highest level of education completed?
   ____ Less than a high school diploma ____ Bachelor's degree
   ____ High school diploma/GED ____ Master's degree
   ____ Some college ____ PhD/MD/JD
   ____ Associate degree

8. Are you currently employed?
   ____ No (fully retired or never employed)
   ____ Yes (full-time, part-time, or casually)

9. In general, how would you rate your current health?

Bad	Poor	Fair	Good	Excellent
1	2	3	4	5

Appendix B

Coping and Well-Being in Older Adulthood Survey: Cognitive Reappraisal

How well do the following statements describe you?

	Not at all			A lot
10. I find I usually learn something meaningful from a difficult situation.	1	2	3	4
11. When I am faced with a bad situation, it helps to find a different way of looking at things.	1	2	3	4
12. Even when everything seems to be going wrong, I can usually find a bright side to the situation.	1	2	3	4
13. I can find something positive, even in the worst situations.	1	2	3	4

Appendix C

Coping and Well-Being in Older Adulthood Survey: Positive Emotions

Next, we would like to know about the emotions you experience. Please indicate the extent to which you have felt each of these in the past two days.

During the <u>PAST TWO DAYS</u>, how often have you felt…?

	Never			Sometimes			Almost always
14. Proud	0	1	2	3	4	5	6
15. Grateful	0	1	2	3	4	5	6
16. Hopeful	0	1	2	3	4	5	6
17. Happy	0	1	2	3	4	5	6
18. Compassion	0	1	2	3	4	5	6
19. Relieved	0	1	2	3	4	5	6
20. Contented	0	1	2	3	4	5	6
21. Inspired	0	1	2	3	4	5	6
22. Excited	0	1	2	3	4	5	6
23. Love	0	1	2	3	4	5	6

Appendix D

Coping and Well-Being in Older Adulthood Survey: Perceived Control

Next, we would like to ask the extent to which you feel you can influence things by what you do or say. Please select a number from the scale below and write your answer on the line next to each question.

Almost totally out of control									Totally in control
1	2	3	4	5	6	7	8	9	10

How much influence do you feel you have over…?

24. …your physical health _____

25. …the things you can do for fun and enjoyment _____

26. …developing new friendships _____

27. …your physical fitness _____

28. …your physical comfort or discomfort _____

29. …your emotional or mental well-being _____

30. …the usual tasks that need to be done (e.g., housework, yard work, shopping, laundry) _____

31. …your life in general _____

Appendix E

Coping and Well-Being in Older Adulthood Survey: Life Satisfaction

Next, we are interested in how things are going these days. Please answer "Yes" or "No."

During the <u>PAST MONTH</u>, have you ever felt…

	Yes	No
32. In high spirits?	1	0
33. Particularly content with your life?	1	0
34. Depressed or very unhappy?	-1	0
35. Flustered because you didn't know what to do?	-1	0
36. Bitter about the way your life has turned out?	-1	0
37. Generally satisfied with the way your life has turned out?	1	0

Appendix F

Coping and Well-Being in Older Adulthood Survey: Self-Efficacy

How true are the following statements in describing you?

	Not at all true	Hardly true	Moderately true	Exactly true
38. I can always manage to solve difficult problems if I try hard enough.	1	2	3	4
39. If someone opposes me, I can find the means and ways to get what I want.	1	2	3	4
40. It is easy for me to stick to my aims and accomplish my goals.	1	2	3	4
41. I am confident that I could deal efficiently with unexpected events.	1	2	3	4
42. Thanks to my resourcefulness, I know how to handle unforeseen situations.	1	2	3	4
43. I can solve most problems if I invest the necessary effort.	1	2	3	4
44. I can remain calm when facing difficulties because I can rely on my coping abilities.	1	2	3	4
45. When I am confronted with a problem, I can usually find several solutions.	1	2	3	4
46. If I am in trouble, I can usually think of a solution.	1	2	3	4
47. I can usually handle whatever comes my way.	1	2	3	4

Appendix G

Coping and Well-Being in Older Adulthood Survey: Perceived Stress

The next questions concern your feelings and thoughts about various things that have happened in your life during the past month. In each case, please indicate how often you felt or thought a certain way.

During the PAST MONTH…

	Never	Infrequently	Sometimes	Frequently	Very often
48. How often have you been upset because of something that happened unexpectedly?	1	2	3	4	5
49. How often have you felt that you were unable to control the important things in your life?	1	2	3	4	5
50. How often have you felt nervous and "stressed"?	1	2	3	4	5
51. How often have you found that you could not cope with all the things that you had to do?	1	2	3	4	5
52. How often have you been angered because of things that happened that were outside of your control?	1	2	3	4	5
53. How often have you found yourself thinking about things that you would have to accomplish?	1	2	3	4	5
54. How often have you felt difficulties were piling up so high that you could not overcome them?	1	2	3	4	5

Appendix H

Coping and Well-Being in Older Adulthood Survey: Depressive Symptoms

The last questions address how you are feeling about yourself these days. In each case, please indicate how often you felt or behaved a certain way.

During the <u>PAST WEEK</u>…

	Rarely or none of the time (less than 1 day)	Some of the time (1-2 days)	Moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
55. I was bothered by things that don't usually bother me.	0	1	2	3
56. I had trouble keeping my mind on what I was doing.	0	1	2	3
57. I felt depressed.	0	1	2	3
58. I felt that everything I did was an effort.	0	1	2	3
59. I felt hopeful about the future.	0	1	2	3
60. I felt fearful.	0	1	2	3
61. My sleep was restless.	0	1	2	3
62. I was happy.	0	1	2	3
63. I felt lonely.	0	1	2	3
64. I could not get going.	0	1	2	3