

THE EFFECTS OF HOPE ON ANXIETY AND SUBJECTIVE WELL-BEING AS
MEDIATED BY COGNITIVE REAPPRAISAL AND EXPERIENTIAL AVOIDANCE IN
A COMMUNITY SAMPLE EXPOSED TO HURRICANE HARVEY

by

Johann Mark D'Souza

A dissertation submitted to the Department of Psychology,
College of Liberal Arts and Social Sciences
in partial fulfillment of the requirements for the degree of

DOCTOR of PHILOSOPHY

in Psychology

Chair of Committee: Matthew Gallagher, PhD

Committee Member: Anka Vujanovic, PhD

Committee Member: Vincent Ng, PhD

Committee Member: Bradley Smith, PhD

University of Houston

August 2022

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ABSTRACT

Positive thinking factors such as hope are protective in the face of difficult life events, including natural disasters (Glass, Flory, Hankin, Kloos, & Turecki, 2009). Association studies support the correlation between higher hope, lower anxiety, and higher subjective well-being although little is known about how hope effects position change (SWB; Alarcon, Bowling, & Khazon, 2013). Cognitive and behavioral coping strategies such as higher cognitive reappraisal and lower experiential avoidance have been proposed as two such mechanisms (Gallagher et al., 2017; Kashdan, Barrios, Forsyth, & Steger, 2006; Long et al., 2020). The present study used latent growth curve modeling to test whether the relationship between hope and mental health, as represented by lower anxiety and higher subjective well-being, is mediated by higher cognitive reappraisal and lower experiential avoidance within a sample exposed to Hurricane Harvey. Data collection took place in three waves beginning one year after Hurricane Harvey and continuing for 15 months ($n = 258$). The longitudinal study variables of anxiety (standardized mean gain scores wave 1 to wave 2 = $-.04$; wave 2 to wave 3 = $-.10$), positive affect (W1-W2 = $-.12$; W2-W3 = $.04$), negative affect (W1-W2 = $.06$; W2-W3 = $.03$), and satisfaction with life (W1-W2 = $.01$; W2-W3 = $.01$) showed little change over time that limited the ability to measure how change in mediators related to change in outcomes. Therefore, intercept only models were conducted and revealed the following. First, hope was strongly associated with lower anxiety ($\beta = -.51$), lower negative affect ($\beta = -.39$), higher positive affect ($\beta = .71$), and higher satisfaction with life ($\beta = .71$). Second, cognitive reappraisal was associated with lower anxiety ($\beta = -.22$), lower negative affect ($\beta = -.26$), higher positive affect ($\beta = .58$), and higher satisfaction with life ($\beta = .46$). On the other hand, experiential avoidance was associated with higher anxiety ($\beta = .63$),

higher negative affect ($\beta = .67$), lower positive affect ($\beta = -.35$), and lower satisfaction with life ($\beta = -.35$). Finally, hope had indirect effects on higher positive affect through cognitive reappraisal ($ab = .05$) and hope had indirect effects on lower anxiety ($ab = -.13$) and negative affect ($ab = -.14$) through experiential avoidance. The study supports the research that hope leads to lower mental illness and higher mental well-being over time, even following a major stressor. Further, it provides a unique contribution that indicates that the association between hope and a positive indicator of mental health is mediated by cognitive reappraisal whereas the association between hope and two negative indicators of mental health is mediated by experiential avoidance.

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INTRODUCTION

Natural disasters such as Hurricane Harvey are associated with an increase in mental illnesses such as anxiety, depression, and post-traumatic stress disorder (Neria, Nandi, Galea, 2008; Schwartz et al., 2015). For example, a survey of 801 university students taken 4-10 weeks after Hurricane Harvey made landfall found that 64% endorsed immediate loss and disruption related to the hurricane, 21% endorsed perceived threat to life, 27% met the cutoff for likely diagnosis of major depressive disorder, and 16% met the cutoff for likely diagnosis of post-traumatic stress disorder (Bistricky et al., 2019). However, most individuals who experience a natural disaster do not develop clinical psychopathology. This is in part attributed to resilience factors such as hope, which are protective in the aftermath of natural disasters (Glass, Flory, Hankin, Kloos, & Turecki, 2009). Much research supports the relation between higher hope and improved mental health outcomes such as lower anxiety and higher subjective well-being, but less is known about the mechanisms by which hope leads to positive outcomes, particularly following a hurricane (Long et al., 2020; Gallagher et al., 2017; Alarcon, Bowling, & Khazon, 2013). The current study proposes that hope leads to positive outcomes through the cognitive and behavioral coping strategies of higher cognitive reappraisal and lower experiential avoidance (Kashdan, Barrios, Forsyth, & Steger, 2006).

What follows is a literature review building up to my study proposal. First, I will review hope and its benefits on mental health, specifically lower anxiety and higher SWB. Then, I will review the reasons for considering cognitive reappraisal and experiential avoidance as mechanisms of action for hope. Finally, I will contextualize these findings within the context of a natural disaster such as a hurricane.

Hope

Hope is a cognitive trait characterized by the positive expectation of the future based on two components, the ability to generate specific *pathways* to one's goals and the personal *agency* to apply those pathways to achieve the goals (Snyder, 2002). These components are known as pathways and agency respectively. Those high in pathways thinking can creatively find alternate routes to their goals in the face of difficulty, and those high in agency accurately perceive their ability to achieve their goals.

Studies using factor analysis have found support for the pathways and agency components of hope, as well as the higher-order hope construct containing the two (Edwards, Rand, Lopez, & Snyder, 2007). Pathways and agency build on each other during the pursuit of goals. For example, a high hope individual thinks of a pathway to the goal, has the agency to implement the pathway, and comes up with an alternative pathway if the initial attempt fails. In this way, problem-solving ability and high motivation are characteristics of hope. Therefore, people with high hope are both confident they will achieve their goals and are more likely to do so (Cheavens, Feldman, Woodward, & Snyder, 2006).

Hope is consistently related to a wide spectrum of better mental health and mental well-being (Cheavens, Michael, & Snyder, 2005; Snyder, 2002; Gallagher & Lopez, 2017). For example, a meta-analysis found that hope had a large association with lower stress ($\rho = -.52$) and a large association with higher subjective happiness ($\rho = .59$; Alarcon, Bowling, Khazon, 2013). Furthermore, hope has been shown to have an impact on positive outcomes longitudinally from higher emotional, social, and psychological well-being, to lower anxiety and depression (Arnau, 2017). These benefits of hope are evident even in the face of natural disasters (Long et al., 2020).

While the association between hope and mental health is well-established by prior research, less is known about the mechanisms by which hope operates. Some authors have proposed studies of causal mechanisms by which hope effects mental health although research testing such mechanisms is very limited (e.g., Gallagher et al., 2017). The present study seeks to close this gap in the understanding of how hope affects mental health. Specifically, this study focuses on hope as a predictor of lower anxiety and higher subjective well-being following exposure to a hurricane. The author examines cognitive reappraisal and experiential avoidance as mechanisms in the relationship between hope and the longitudinal course of outcomes.

Hope Predicting Anxiety & Subjective Well-being

Hope relates to several indicators of both lower mental illness and higher mental well-being (Alarcon, Bowling, & Khazon, 2013). The present study examines the effect of hope on one indicator of mental illness (anxiety) and one indicator of mental health (subjective well-being) to capture the full spectrum of mental health.

According to one model, anxiety is a state of helplessness that occurs when an individual perceives a strong threat (Barlow, 2000). The anxious individual responds to the threat on the cognitive, physiological, and behavioral levels, by worrying, experiencing the fight, flight, freeze response, and acting to avoid perceived harm. The maladaptive thoughts and behavioral avoidance that follow from anxiety can lead to functional impairment with high personal and societal costs (Andlin-Sobocki & Wittchen, 2005).

Hope is directly opposed to the helplessness experienced during anxiety. Whereas the anxious individual worries that there is no way out, the hopeful individual can identify specific pathways to success and has self-confidence in following those pathways. The

hopeful individual may reframe the challenge as an exciting opportunity to take on, whereas the anxious individual sees the same challenge as a threat to avoid. In consequence, the hopeful individual engages in positive self-talk rather than worrying and willingly engages in the challenge rather than fleeing from it.

Two reviews document the extensive literature supporting the theoretical relationship between higher hope and lower anxiety (Arnau, 2017; Snyder et al, 1991). Most of the studies are cross-sectional and have found moderate to large associations between higher hope and lower anxiety (Snyder et al., 1991; Abdel-Khalek & Snyder, 2007; Gana, Daigre, & Ledrich, 2013; Carretta, Ridner, & Dietrich, 2014). Some studies have utilized longitudinal analysis to add support to the prospective relationship between higher hope and lower anxiety. For example, one study of American college students used a cross-lagged panel analysis and measured hope with the Adult Hope Scale and anxiety with the anxiety component of the Depression Anxiety Stress Scales (Arnau, Rosen, Finch, Rhudy, & Fortunato, 2007). The study found a small, but statistically significant effect of the agency but not the pathways component of hope on lower anxiety one month later, at both the second wave, and third wave of data collection ($B = -.13$ for and $B = -.14$ respectively).

Also, a randomized controlled trial looked at hope as a mechanism of change in the treatment of anxiety disorders (Gallagher, et al., 2020). The study found that increases in hope, as measured by the Adult Hope Scale, were associated with decreases in anxiety post-treatment, as measured by the clinician-rated Hamilton Anxiety Rating Scale and the self-reported Overall Anxiety Severity and Impairment Scale ($r = .85$ for the hope and clinician-rated anxiety slopes; $r = .77$ for the hope and self-reported anxiety slopes). Thus, there is strong cross-sectional evidence, and some longitudinal evidence, for the relationship between

higher hope and lower anxiety. However, far less is known about the specific mechanisms by which hope leads to lower anxiety over time.

Subjective well-being, sometimes known as emotional or hedonic well-being, is composed of three components, namely high positive emotions, low negative emotions, and high satisfaction with life (SWB; Diener, 1984). Subjective well-being is seen as one of three factors of overall mental well-being, along with eudaimonic well-being, and social well-being (Keyes, 2005).

Hope should positively relate to SWB in general daily living and the pursuit of goals. Those with higher hope are more likely to achieve their goals because of their high pathways thinking and sense of agency (Snyder, 2002). Goal achievement leads to higher positive emotions and satisfaction with life, whereas failing to meet goals leads to negative emotions (Lee & Gallagher, 2017). Therefore, those high in hope should also experience higher SWB after achieving goals. Those high in hope should also experience higher SWB in general, not just after achieving goals. This is because having high hope means one is confident in one's ability to execute (agency) and confident in one's ability to problem-solve (pathways). This knowledge of one's ability should lead to higher positive emotions and satisfaction with life as well as lower negative emotions even when one is not actively pursuing a specific goal.

Empirical research supports the positive relationship between hope and SWB. The cross-sectional relationship between hope and SWB has been summarized by two meta-analyses that have found small to moderate effects of hope on the three components of SWB (Weis & Speridakos, 2011; Alarcon, Bowling, & Khazon, 2013). Also, there is some longitudinal research on the relationship between hope and SWB. Two longitudinal studies looked at hope and one or two components of SWB.

The first longitudinal study used a sample of school children and found that baseline hope, as measured by Snyder's Children's Hope Scale, was moderately to strongly associated with the satisfaction with life component of SWB one year later, as measured by the Students' Life Satisfaction Scale ($r = .41$; Valle, Huebner, & Suldo, 2006). The second also used a sample of school children and found that baseline hope, as measured by the Snyder's Children's Hope Scale, was a small to moderate predictor of the positive and negative emotions components of SWB one year later, as measured by the PANAS-X ($r = .24$ for hope and joviality, $r = -.10$ for hope and fear, $r = -.11$ for hope and sadness, $r = -.11$ for hope and hostility; Ciarrochi, Parker, Kashdan, Heaven, & Barkus, 2015).

Another longitudinal study examined the relationship between hope and all three components of SWB. This study of a community mental health sample found that higher hope, as measured at baseline by the SHS, was strongly associated with higher SWB, as measured by 4 questions capturing the three components of SWB (Irving et al, 2004). Of note, the baseline level of hope correlated with ever-higher levels of SWB as treatment went on, from $r = .61$ at baseline to $r = .90$ by session 11. Taken together, these longitudinal studies provide evidence that hope is a robust predictor over time of higher SWB. These studies were conducted with normative school samples. Little is known about this relationship in the context of a hurricane or other extreme episodic stressors.

Cognitive Reappraisal & Experiential Avoidance as Mechanisms of Change

Longitudinal studies provide evidence for the association between hope and the outcomes of lower anxiety and higher SWB but do not necessarily clarify the mechanism of action. This is a major limitation in the current research on hope and mental health, and several authors have called for studies, ideally, longitudinal studies, to examine the

mechanisms by which hope promotes outcomes such as lower anxiety and higher subjective well-being (Chang & DeSimone, 2001; Gallagher, 2011; Alarcon, Bowling, & Khazon, 2013; Ferguson, Taylor, & McMahon, 2017; Gallagher, et al., 2017; Lee & Gallagher, 2017).

Theoretically, hope may lead to lower anxiety and higher SWB by fostering adaptive emotion regulation strategies and decreasing maladaptive strategies. Two such mechanisms are cognitive reappraisal on the adaptive side and experiential avoidance on the maladaptive side (Kashdan, Barrios, Forsyth, & Steger, 2006). Cognitive reappraisal is an emotion regulation strategy that involves changing one's emotions by changing one's thoughts, either by changing the way one is thinking about a situation or by changing what one is thinking about altogether (Gross & John, 2003). Experiential avoidance is the unwillingness to experience distressing thoughts, emotions, and physical sensations, even at the cost of valued actions (Gámez, Chmielewski, Kotov, Ruggero, Suzuki, & Watson, 2014).

Cognitive reappraisal could be a means by which the pathways and agency components of hope lead to goal achievement. The process of creating pathways to a goal could lead one to think the goal is more likely to be achieved. This in turn would increase one's effort or agency in working towards the goal, all of which would increase the chances of achieving the goal. This higher likelihood of achieving goals would be accompanied by lower anxiety and higher SWB for the reasons described above. On the other hand, experiential avoidance could be negatively related to hope in the route to the goal. High agency means an individual believes they are motivated and capable of reaching their goal, and therefore they would not avoid pursuing their valued goal even in the face of discomfort. Likewise, high pathways thinking means the individual is willing to explore different routes toward a goal, which would be the opposite strategy of someone with high experiential

avoidance who seeks to limit acting to overcome a challenge. One could argue that those high in pathways could both experience high experiential avoidance and achieve their goals. In such a scenario, a person would come up with a pathway that avoids unpleasant experiences to achieve the goal. However, given that pathways thinking refers to goals that are “important” to the individual, it is plausible that the individual would at some point have to experience distress in achieving some goals, and therefore pathways and experiential avoidance would, in general, be inversely related (Zvolensky, Vujanovic, Bernstein, & Leyro, 2010).

To establish cognitive reappraisal and experiential avoidance as mechanisms in the relationship between hope and the outcomes of anxiety and SWB, one would have to establish the relationship between hope and the coping mechanisms and then between the coping mechanisms and the outcomes. Two studies have looked at the direct relationship between hope and cognitive reappraisal and experiential avoidance. One study used hierarchical multiple regression and found that hope and coping were related even after controlling for SWB and psychological distress (Irving et al., 2004). This study found that hope, as measured by the SHS, was related to 2 types of coping, as measured by the COPE scale, even after controlling for SWB and psychological distress (Carver, Scheier, & Weintraub, 2009). The two types of coping were the COPE subscales of Reinterpretation and Planning. When considering broader underlying constructs, Reinterpretation can be seen as a type of cognitive reappraisal, in fact in some versions of the scale, it is called Positive Reframing. Similarly, Planning can be seen as opposed to avoidance, because it involves coming up with a strategy and thinking about what steps to take, which is a way of actively engaging the challenge rather than avoiding it. Consistent with this perspective, one study of

older adults found that hope, as measured by the SHS, had a small to moderate association with experiential avoidance, as measured by the AAQ-ii ($r = -.19$; Ferguson, Taylor, & McMahon, 2017).

There are many studies on the effect of cognitive reappraisal and experiential avoidance on anxiety and SWB. One meta-analysis found that cognitive reappraisal, as measured by the ERQ, correlated negatively with mental illness ($r = -.20$), using measures of anxiety and depression, and positively with mental well-being ($r = .26$), using measures of positive affect, negative affect, and satisfaction with life, and Hu et al., 2014). Likewise, several studies have demonstrated a relationship between higher experiential avoidance and higher anxiety, lower positive emotions, and higher negative emotions. One study used hierarchical linear modeling with a sample of US college students and found that experiential avoidance, as measured by the AAQ, predicted higher social anxiety, lower positive affect, higher negative affect, and lower satisfaction with life ($r = .47$, $r = -.47$, $r = .52$, and $r = -.55$ respectively; Kashdan, Barrios, Forsyth, & Steger, 2006). In this study, experiential avoidance was measured by the AAQ, social anxiety was derived from two lesser-known scales, positive and negative affect were measured by 14 single-emotion items, and satisfaction with life was measured by a single item. These studies show a moderate to strong relationship between cognitive reappraisal and experiential avoidance on anxiety and SWB.

Missing from the above-cited studies is research directly testing cognitive reappraisal and experiential avoidance as mediators in the relationship between hope and the outcomes of anxiety and SWB. To my knowledge, no study has directly tested cognitive reappraisal as a mediator between hope and anxiety (Arnau, 2017). In a parallel line of research, one study found that cognitive reappraisal mediates the relationship between hope and depression

(Chang & DeSimone, 2001). The study used a sample of US college students and found that higher hope, as measured by the SHS, was associated with lower depression, as measured by the Beck Depression Inventory ($\beta = -.23$). When considering potential mechanisms of action, the study found that the relationship between hope and depression was mediated by secondary appraisal, which means how the subject viewed their ability to cope with challenges. However, hope was not related to primary appraisal, which is how the subject viewed the challenge itself. This pattern of results suggests that hope did not affect how individuals view the difficulty of a goal, but it did affect how prepared the individual feels to take on the goal. While this sort of appraisal is not identical to cognitive reappraisal, the study does show an appraisal factor can mediate the relationship between hope and an indicator of mental illness.

The study further found that the relationship between hope and depression was also mediated by engaged and disengaged coping, which means the subject's active engagement with or avoidance of the challenge. Again, engaged and disengaged coping are similar to but distinct from experiential avoidance. Nevertheless, the study supports the general concept that a maladaptive coping mechanism like experiential avoidance mediates the relationship between hope and one indicator of mental illness. It is worth noting that hope had a direct influence on depression even after accounting for appraisal and coping, which means that the coping mechanisms did not fully mediate the relationship between hope and depression.

Another study looked at cognitive reappraisal as a mediator between hope-agency and the outcomes of anxiety and mental well-being (Gallagher, 2011). This study of US college students measured hope-agency using the SHS, cognitive reappraisal using the ERQ, anxiety using the STAI, and overall mental well-being using comprehensive measures of SWB,

eudaimonic well-being, and social well-being. Contrary to the hypothesis, the study found that hope-agency did not have a statistically significant effect on cognitive reappraisal after controlling for optimism ($n = 137$; $B = .06$). This could mean that hope relates to cognitive reappraisal through the pathways rather than the agency component. The cognitive reappraisal strategy of changing one's thoughts could be seen as a pathway to the goal of changing one's emotions, which could be a further pathway to the goal of seeing a difficult task through to the end. It is also possible that the effect of hope-agency on cognitive reappraisal could have been mitigated due to controlling for optimism given that one of the hope-agency items speaks to a more generalized rather than agency-based positive expectation of the future ("I've been pretty successful in life.").

Another study of US college students found that experiential avoidance, as measured by the Acceptance and Action Questionnaire, fully mediated the relationship between rational coping, as measured by the Coping Styles Questionnaire, and anxiety, as measured by the STAI (Kashdan, Barrios, Forsyth, & Steger, 2006). Of note, rational coping is seen as the ability to problem solve in the face of challenges and therefore is very similar to the pathways component of hope. Kashdan and colleagues' study, therefore, provides strong support for the hypothesis that experiential avoidance mediates the relationship between hope and anxiety, although such a conclusion would be strengthened by a longitudinal rather than cross-sectional analysis as is the case in the present study.

A pertinent finding is from a study of cancer patients in which cognitive reappraisal, as measured by the Emotion Regulation Questionnaire, did not mediate the relationship between hope, as measured by the SHS, and anxiety, as measured by the HADS ($b = -.002$; Peh et al., 2017). Conversely, *hope* mediated the relationship between cognitive reappraisal

and anxiety ($b = -.95$). The results of this study are directly contrary to the hypothesis that cognitive reappraisal is a mediator between hope and anxiety. However, the conclusions of this study are limited by its cross-sectional design, which severely weakens the ability to identify a true mediator. Furthermore, given the strong theoretical basis for considering cognitive reappraisal as a mediator between hope and anxiety, it is important to see if the results of Peh and colleagues' study are replicated in the current study. Lastly, Peh and colleagues' study did not include SWB as an outcome but the present study does.

To summarize, there are mixed results within the few studies that have looked at cognitive reappraisal & experiential avoidance as mediators in the relationship between hope as a predictor of anxiety and SWB. The few longitudinal studies are too limited to understand the role of cognitive reappraisal as a possible mediator between hope and the outcomes of anxiety and SWB. However, there is evidence that experiential avoidance mediates the relationship between hope and the outcomes of anxiety and SWB. The present study examines one adaptive and one maladaptive coping strategy, namely cognitive reappraisal and experiential avoidance respectively, as mediators of the relationship between hope and two outcomes of mental health and well-being, namely anxiety and SWB, all within the context of a hurricane-exposed sample.

Resilience in the Context of a Natural Disaster

Hurricanes are significant natural disasters that can have major impacts on hope and mental health. Previous studies have examined the benefits of hope and related coping factors in the context of a hurricane. None of these studies have looked at the benefits of hope after a hurricane while considering the putative mechanisms by which hope works. For example, one study found that hope was a strong predictor of higher subjective well-being and a small

predictor of lower PTSD symptoms in a sample exposed to Hurricane Harvey ($\beta = .55$ and $\beta = -.17$ respectively; Long, et al., 2020). Another study found that state hope was a small predictor of lower anxiety and depression symptomology in a sample exposed to Hurricane Katrina (OR = 1.11; Cherry, et al., 2017). Finally, another study found that hope was a small predictor of lower PTSD symptoms among Black adults exposed to Hurricanes Katrina and Rita, even after controlling for optimism and other factors ($\beta = -.20$; Ai et al., 2011). In sum, these studies have found that hope is a small to moderate predictor of lower mental illness and a moderate to large predictor of higher SWB after a hurricane.

Other studies have looked at the benefits of coping mechanisms without taking into account hope. One study found that higher coping self-efficacy was moderately related to lower PTSD symptoms 14 months after experiencing Hurricane Katrina ($r = -.26$; Cieslak et al., 2009). Another study found that higher coping self-efficacy was related to lower distress and frequency of PTSD symptoms 6 months after a hurricane (Benight et al., 1997). A further study found coping self-efficacy was related to lower distress and lower PTSD symptom severity 4-5 months after a hurricane (Benight, Swift, Sanger, Smith, & Zeppelin, 1999). Finally, a longitudinal study found coping self-efficacy predicted distress at T2 (8-12 months after trauma) even after controlling for baseline distress (1-4 months after trauma) after a hurricane (Benight et al., 1999). These studies support the idea that coping mechanisms are a moderate predictor of lower mental illness following a hurricane.

There is very little research on the effect of hope and coping strategies on positive outcomes in the context of a hurricane. One study found that state hope was a moderate predictor of higher coping following Hurricane Katrina ($b = .19$; Hackbarth, Pavkov, Wetchler, & Flannery, 2012). However, this study did not examine higher coping as a

mechanism between hope and positive outcomes. Of note, one study found that state hope was a moderate predictor of both lower PTSD symptomology and general psychological distress in a sample exposed to Hurricane Katrina ($\beta = -.18$ and $\beta = -.26$; Glass, Flory, Hankin, Kloos, & Turecki, 2009). Furthermore, there was a statistically significant interaction between hope and avoidant coping such that hope moderated the relationship between avoidant coping and general psychological distress ($\beta = -.18$). This study is an important contribution to the idea that hope leads to positive outcomes through specific coping strategies in the context of a hurricane. However, this study did not include an indicator of mental well-being and did not consider the specific mechanisms of cognitive reappraisal and experiential avoidance.

In summary, studies have not specifically looked at cognitive reappraisal and experiential avoidance as mechanisms in the relationship between hope and positive outcomes in the context of a hurricane. When piecing together findings from multiple studies, the literature would suggest that those high in hope would utilize adapting coping mechanisms such as higher cognitive reappraisal and lower experiential avoidance to overcome the many difficulties that arise in the face of a natural disaster, and thus would experience lower anxiety and higher SWB. However, a minority of studies have contradicted others, and a comprehensive examination of mechanisms of action might provide more clarity into the relationship between hope and mental health.

The Present Study

The present study examines the impact of hope on the longitudinal course of anxiety and well-being in a community sample in the aftermath of a hurricane. Previous studies support the idea that hurricane exposure results in higher levels of stress and lower levels of

SWB. Thus hurricane exposure increases the variability of the sample and thus maximizes the predictive power of hope, cognitive reappraisal, and experiential avoidance on the outcomes of anxiety and SWB (Long et al., 2020). This study makes a unique contribution by examining if cognitive reappraisal and experiential avoidance function as mediators in the relationship between higher hope and the outcomes of lower anxiety and higher SWB. To accomplish this, I have three aims:

- **Aim 1:** To quantify the magnitude of the effects of baseline hope on change in four study variables over three waves of data collection (Figure 1). These variables include the two outcomes of anxiety and SWB as well as the two proposed mediators of cognitive reappraisal and experiential avoidance.
- **Hypothesis 1:** Baseline hope is a moderate predictor of lower anxiety and higher SWB over time. Baseline hope is a moderate predictor of higher cognitive reappraisal and lower experiential avoidance over time.
- **Aim 2:** To quantify the magnitude of the effects of change in the proposed mediators (cognitive reappraisal and experiential avoidance) over time on change in the study outcomes (anxiety and SWB) over time (Figure 2).
- **Hypothesis 2:** Change in cognitive reappraisal and change in experiential avoidance over time has a moderate effect on change in anxiety and change in SWB over time.
- **Aim 3:** To test whether change in cognitive reappraisal and experiential avoidance over time mediates the effect of hope on change in anxiety and hope on change in SWB over time (3).

- **Hypothesis 3:** Change in experiential avoidance and cognitive reappraisal mediates the association of hope on lower anxiety and higher SWB over time.

METHODS

Procedures

Upon approval from the University of Houston Internal Review Board, data were collected using MTurk from a community that was exposed to Hurricane Harvey. The primary purpose of the data collection was to examine the impact of resilience factors on mental health and illness following a natural disaster. This is a longitudinal panel study using data collected in three waves beginning one year after Hurricane Harvey and continuing for 15 months, from August 2018 to November 2019.

Wave one was open for recruitment for 9 weeks followed by a 10-week break. Then wave two was open for recruitment for 20 weeks (11 weeks standard recruitment plus 9 weeks replacement recruitment) followed by another 10-week break. Finally, wave three was open for recruitment for 9 weeks. Averaging the completion times, wave one and wave two were separated by 30 weeks, and wave two and wave three were separated by 18 weeks. Wave one had 388 participants, wave two had 400 participants (158 from wave one and 242 replacements), and wave three had 198 participants. The present study focuses on the 258 participants who completed at least two waves of data collection.

Various checks were performed to ensure the validity of data from the MTurk participants including confirming that the geolocation of their IP address corresponded to their reported location, excluding participants who finished the survey in less than 10 minutes (mean completion time was >60 minutes) and using MTurk to restrict participants to the state of Texas. Exposure to Hurricane Harvey was confirmed by asking participants whether they

or a loved one were in Houston during or in the immediate aftermath of Hurricane Harvey. The sample was 44.2% male, 47.6% White, 23.1% Black/African American, 15.2% Hispanic/Latino, and 7.1% Asian. Ages ranged from 18-72 ($M = 33.32$, $SD = 8.90$). Trauma exposure was high, with 36.3% of participants meeting likely PTSD diagnosis at wave one according to the recommended cutoff for the PCL-5 of 33 as anchored to Hurricane Harvey as the traumatic event (Bovin et al., 2016). Respondents endorsed the following stressors due to the hurricane: seeing someone else get badly hurt (25.5%); thinking they might die (18.6%); home being badly damaged or destroyed (12.7%); having to find different lodging for a week or more (18.3%); having trouble getting enough food or water for themselves or their families (37.7%). Descriptive statistics and correlations for each of the study variables across the three waves of data collection are presented in Table 1.

Measures

Hope was measured with the Adult Hope Scale (Snyder et al., 1991), the most widely established measure of adult trait hope in the literature (Rose & Sieben, 2017). Participants rated themselves on 12 items using an 8-point Likert scale. Four items measure agency thinking, four items measure pathways thinking, and four items are distractors. The distraction questions were eliminated, and the items were summed so higher values equal higher hope. No participant was missing all items for the hope scale. A meta-analysis of 16 studies found the internal consistency of the Adult Hope Scale to be $\alpha = .82$ (Hellman, Pittman, & Munoz, 2013). Much research has attested to the convergent and divergent validity of this scale such as strong positive associations with state hope and optimism (Life Orientation Test, $r = .60$) and a strong negative association with hopelessness (Edwards,

Rand, Lopez, & Snyder, 2007; Snyder, 2002). The internal consistency in the present sample was $\alpha = .90$.

Anxiety was measured with the Overall Anxiety Severity and Impairment Scale (OASIS; Norman, Cissell, Means-Christensen, Stein, 2006). Participants rated themselves on 5 items using a 4-point Likert scale. Scores are summed so higher values mean higher anxiety. Less than 4% of the total sample was missing all items for the OASIS across the 3 waves. The original validation study measured the reliability of the scale to be $\alpha = .80$ and found convergent and divergent validity with measures of mental illness and mental well-being such as the Spielberger Trait Anxiety Questionnaire ($r = .62$) and the Connor-Davidson Resiliency Scale ($r = -.59$; Norman, Cissell, Means-Christensen, Stein, 2006). Of note, the OASIS is a measure of general anxiety and not a disorder-specific measure of anxiety. However, high scores on the OASIS indicate the presence of an anxiety disorder. The internal consistency in the present sample was $\alpha = .92$ for each of the three waves.

Positive and Negative Affect were measured with the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a commonly used measure of positive and negative affect. Participants rated themselves on 20 items using a 5-point Likert scale. Ten items measure positive affect and ten items measure negative affect. Less than 7% of the total sample was missing all items for positive or negative affect across the 3 waves. The internal consistency of the PANAS in a large European sample was $\alpha = .89$ for Positive Affect and $\alpha = .85$ for negative affect (Crawford & Henry, 2004). Also, the PANAS has shown strong validity including measurement invariance across demographic subgroups, the two-factor structure corresponding to positive affect and negative affect (robust comparative fit index = .94), strong negative correlations between positive affect and

depression ($r = -.48$), moderate negative correlations between positive affect and anxiety ($r = -.30$), strong positive correlation between negative affect and depression ($r = .60$), and finally strong positive correlation between negative affect and anxiety ($r = .60$; Crawford & Henry, 2004). In the present sample, the internal consistency of Positive Affect was $\alpha = .92$, $\alpha = .93$, $\alpha = .93$ and for Negative Affect was $\alpha = .94$, $\alpha = .93$, $\alpha = .93$ for each of the three waves respectively.

Satisfaction with Life was measured with the Satisfaction with Life Scale (Pavot & Diener, 1993). On this widely used measure, participants rated themselves on 5 items using a 7-point Likert scale. Scores are summed so higher values mean higher satisfaction with life. Less than 7% of the total sample was missing all items for the scale across the 3 waves. A review of six studies using the Satisfaction with Life Scale found strong reliability as measured by coefficient alpha, ranging from .79 to .89 (Pavot & Diener, 1993). In addition, several studies have found strong positive correlations between satisfaction with life and positive affect, optimism, and self-esteem, as well as strong negative correlations between satisfaction with life and negative affect, pessimism, depression, and suicidal ideation (Pavot & Diener, 2008). The internal consistency in the present sample was $\alpha = .94$, $\alpha = .92$, $\alpha = .93$ for each of the three waves respectively.

Cognitive Reappraisal was measured by the cognitive reappraisal subscale of the Emotional Regulation Questionnaire (ERQ; Gross & John, 2003). The ERQ consists of 10 items for which participants rate themselves on a 7-point Likert scale. The cognitive reappraisal subscale consists of 6 of these items. Scores were summed so that higher values mean higher cognitive reappraisal. Less than 5% of the total sample was missing all items for cognitive reappraisal across the 3 waves. The validation study of the cognitive reappraisal

subscale found the internal consistency in four samples to range from $\alpha = .75$ to $\alpha = .82$, with the biggest sample being $\alpha = .80$ (Gross & John, 2003). The same study found strong convergent and divergent validity for this subscale. Specifically, the study found that reappraisers, as opposed to suppressors, experience and express more positive emotions and less negative emotions, are more likely to share their emotions with others, have fewer depression symptoms, and have greater self-esteem and satisfaction with life. The internal consistency of the subscale in the present sample was $\alpha = .88$, $\alpha = .87$, and $\alpha = .89$ for each of the three waves respectively.

Experiential Avoidance was measured by the Brief Experiential Avoidance Questionnaire (BEAQ; Gámez, et al., 2014). Participants rated themselves on 15 items using a 6-point Likert scale. One item was reversed, and scores were summed so that higher values mean higher experiential avoidance. Less than 5% of the total sample was missing all items for the BEAQ across the 3 waves. The validation study of the BEAQ found the internal consistency across several samples to range from $\alpha = .80$ to $\alpha = .89$ (Gámez, et al., 2014). The same study found strong convergent and divergent validity with several measures of mental illness and mental well-being including strong positive correlations with inflexibility/avoidance ($r = .65$), neuroticism ($r = .47$), and depression ($r = .50$), and strong negative correlations with conscientiousness ($r = -.42$) and satisfaction with life ($r = -.38$). The internal consistency of the scale in the present sample was $\alpha = .89$, $\alpha = .89$, and $\alpha = .90$ for each of the three waves respectively.

Analytic Plan

Mplus version 8 (Muthén & Muthén, 1998-2017) was used to calculate means, standard deviations, and inter-correlations for hope, anxiety, SWB, cognitive reappraisal, and

experiential avoidance. Mplus was also used to test study hypotheses using confirmatory factor analysis (CFA), structural equation modeling (SEM), and parallel process growth curve modeling (LGC). Item-level missing data were imputed using robust maximum likelihood estimation.

Parcels were constructed for those variables that contained more than 5 items. Parceling is a common technique used in CFA and SEM by which the individual items of a variable are split up into groups, and the items of each group are averaged together to yield the parcel. This technique results in better reliability than individual items (Little, Cunningham, Shahar, & Widaman, 2002). The 8 items of the hope variable were grouped into four parcels, with each parcel containing one agency and one pathways item that were averaged together. The six items of the cognitive reappraisal subscale were grouped into three parcels of two items randomly selected from the subscale. The 15 items of the experiential avoidance variable were grouped into three parcels of five randomly selected items. SWB was measured by three separate constructs positive affect, negative affect, and satisfaction with life. The 10 items of positive affect were grouped into three parcels of 3 items, 3 items, and 4 items. The 10 items of negative affect were similarly parceled. The five items of the satisfaction with life scale did not require parceling. Likewise, the OASIS consists of only five items, so it was not parceled.

The following recommended criteria were used to test the goodness of fit of the CFA and SEM models (Mueller & Hancock, 2008): root mean square error of approximation (RMSEA) $\leq .06$; standardized root-mean-square residual (SRMR) $\leq .09$; comparative fit index (CFI) and Tucker Lewis Index (TLI) $\geq .96$. To label effect size magnitudes of correlations, I used the conventional cutoffs of weak, $r = .1$, moderate, $r = .3$, and strong, $r =$

.5 (Cohen, 1992). For effect size magnitude of R^2 , I used the recommended cutoffs of weak, $R^2 = .02$, moderate, $R^2 = .13$, and strong, $R^2 = .26$ (Cohen, 1988). Statistical significance was set at $p < .05$.

To verify model fit and to observe the trajectory of change in each variable, I began by running unconditional growth curve models for study outcomes. I reported the mean of the slope in the growth curve model (m) and the slope variance of the latent variable (ψ). Due to the lack of intraindividual change across time in study outcomes, I chose intercept-only latent growth curve models rather than the originally planned traditional latent growth curve models which model a linear trajectory of change over time. Results of the originally planned analyses are reported in Appendix B.

In the first set of analyses, six intercept-only models were constructed with baseline hope as a predictor of the intercept factors of the two study mediators and the four study outcomes (Figure 1). In all models, baseline hope was used because of the strong evidence that hope is a relatively stable construct over time (Hellman, Pittman, & Munoz, 2013). For each model, a loading factor of 1 was specified for each of the three time points to model stability in levels of the outcome over time rather than change over time. The variances of the intercept and slope factors were freely estimated.

In the second set of analyses, eight parallel process intercept-only models were used to examine to what extent study mediators predicted study outcomes (Figure 2). Both mediators and outcomes were measured using individual-level means across time, that is, a loading factor of 1 was specified for each time point to model stability of level across time. The intercepts of each mediator were used to predict the intercepts of each outcome. The variances of the intercept factors were freely estimated.

In the third set of analyses, eight parallel process intercept-only models were used to examine how hope predicted the outcomes of anxiety, positive affect, negative affect, and satisfaction with life via cognitive reappraisal and experiential avoidance. To measure the indirect effect of hope on the study outcomes, baseline hope was specified as a predictor of baseline levels of each mediator (cognitive reappraisal and experiential avoidance) as well as a predictor of individual-level means of each outcome (anxiety, positive affect, negative affect, and satisfaction with life). The indirect effect (ab) was measured by computing the product of the effect of hope on the mediator (a) and the effect of each mediator on each outcome (b). I chose the bootstrap confidence interval method because it is more powerful than the traditional Baron and Kenny methods (Preacher, Rucker, & Hayes, 2007)

The statistical significance of the indirect effects was calculated with the Mplus MODEL INDIRECT command. A loading factor of 1 was specified for each time point of each outcome to model the stability of level across time. The variances of the intercepts were freely estimated.

RESULTS

Measurement Invariance

To test equivalence of measurement across time, I tested each construct for measurement invariance before proceeding to the planned growth curve models (Table 2). Measurement invariance was tested in three stages. First, I tested for configural invariance to see whether the same items measured the same construct across time. Second, I tested for weak invariance by setting relative factor loadings equal across time to see whether factor loadings of items were equivalent across time. Third, I tested for strong invariance by setting both relative factor loadings and relative indicator means equal across time to see whether

means could be compared across time. All variables except SWB and experiential avoidance demonstrated good model fit for configural, weak, and strong invariance.

Subjective well-being did not meet the criteria for strong invariance, and the model fit was acceptable but poor for configural and weak invariance. Therefore, instead of testing SWB as a unified construct, I separated it into the three constructs that compose it, namely positive affect, negative affect, and satisfaction with life. These three constructs taken individually showed good model fit for configural, weak, and strong invariance. For all subsequent analyses, I used positive affect, negative affect, and satisfaction with life, rather than the overarching SWB construct.

Experiential avoidance did not have good model fit for configural, weak, or strong invariance. I tested whether this was an artifact of the parceling method by creating a different random parcel of the BEAQ items. The model fit for these new parcels fell within the acceptable limits. Because of the improved model fit, I used the revised BEAQ parcels for all subsequent analyses.

Unconditional Growth Curve Models

Before testing the study aims using conditional growth curve models, I tested the unconditional growth curve models for each longitudinal variable to investigate changes in study mediators and outcomes over time. Six unconditional growth curve models were constructed for the two study mediators, cognitive reappraisal and experiential avoidance, and the four study outcomes, anxiety, positive affect, negative affect, and satisfaction with life. For each model, a loading factor of 1 was specified for the intercept, and loading factors of 0, 1.0, and 2.0 were specified for the slope to model change over time in the outcomes as a

linear process. The variances of the intercept and slope factors were freely estimated unless otherwise noted.

Cognitive Reappraisal

The model demonstrated good fit on all indices (χ^2 (df = 33) = 50.22, $p < .05$, RMSEA = .05, CFI = .98, TLI = .98, SRMR = .06). The items had good factor loadings, ranging from $\lambda = .74$ to $\lambda = .92$. Cognitive reappraisal increased over time but the increase was not statistically significant which indicates that there was little variation in cognitive reappraisal over time ($m = .16$; $-.15 : .47$; $p = .155$). Likewise, the cognitive reappraisal slope variance was small to moderate and not statistically significant which indicates very little inter-individual differences in intra-individual change ($\psi = .09$; $-.10 : .27$; $p = .349$). This means participants who had higher cognitive reappraisal at wave 1 had higher cognitive reappraisal at wave 3. Finally, there was a very small, statistically non-significant, negative association between cognitive reappraisal slope and cognitive reappraisal mean which indicates very little change in cognitive reappraisal over time ($r = -.07$; $-.99 : .85$; $p = .882$).

Experiential Avoidance

The model demonstrated good fit on all indices (χ^2 (df = 33) = 78.06, $p < .001$, RMSEA = .07, CFI = .96, TLI = .95, SRMR = .05). The items had good factor loadings, ranging from $\lambda = .81$ to $\lambda = .89$. Experiential avoidance increased over time but the increase was not statistically significant which indicates that there was little variation in experiential avoidance over time ($m = .46$; $-7.67 : 8.59$; $p = .912$). Likewise, the experiential avoidance slope variance was very small and not statistically significant which indicates very little inter-individual difference in intra-individual change ($\psi = .004$; $-.13 : .14$; $p = .956$). This means participants who had higher experiential avoidance at wave 1 had higher experiential

avoidance at wave 3. Finally, the moderate, statistically non-significant, positive association between experiential avoidance intercept and slope coupled with the positive slope indicated higher initial rates of experiential avoidance corresponded with faster increases in experiential avoidance over time, whereas lower initial rates of experiential avoidance corresponded to slower increases in experiential avoidance over time ($r = .26$; -7.07 : 7.58 ; $p = .945$). However, the lack of statistical significance indicates very little intraindividual change in experiential avoidance over time.

Anxiety

The model demonstrated good fit on all indices (χ^2 (df = 104) = 268.69, $p < .001$, RMSEA = .08, CFI = .91, TLI = .91, SRMR = .05). The items had good factor loadings, ranging from $\lambda = .77$ to $\lambda = .91$. Anxiety decreased over time, but the decrease was not statistically significant which indicates that there was little variation in anxiety over time ($m = -.44$; -1.05 : $.17$; $p = .155$). Likewise, the anxiety slope variance was small to moderate and not statistically significant which indicates very little inter-individual differences in intraindividual change ($\psi = .07$; $-.09$: $.22$; $p = .399$). This means participants who had higher anxiety at wave 1 had higher anxiety at wave 3. Finally, there was a moderate, statistically non-significant, negative association between anxiety slope and anxiety mean ($r = -.29$; $-.77$: $.20$; $p = .250$). This means higher initial levels of anxiety were associated with a steeper decline in anxiety and lower initial levels of anxiety were associated with a less steep decline in anxiety. However, the lack of statistical significance indicates very little intraindividual change in anxiety over time.

Positive Affect

The planned model yielded a PSI error indicating the latent variable covariance matrix was not positive definite. I ran a second model that constrained the covariances and residuals of positive affect, but the error persisted. This means positive affect cannot be appropriately modeled along a linear trajectory, and an intercept-only model is more fitting.

Negative Affect

The planned model yielded a PSI error indicating the latent variable covariance matrix was not positive definite. I ran a second model that constrained the covariances and residuals of negative affect, but the error persisted. This means negative affect cannot be appropriately modeled along a linear trajectory, and an intercept-only model is more fitting. The errors in the planned models for positive affect and negative affect do not seem to be completely explained by the lack of change in the variables over time since the other variables showed little change over time as well.

Satisfaction with Life

The model demonstrated good fit on all indices (χ^2 (df = 104) = 256.93, $p < .001$, RMSEA = .08, CFI = .92, TLI = .92, SRMR = .06). The items had good factor loadings, ranging from $\lambda = .69$ to $\lambda = .94$. Satisfaction with life increased over time but the increase was not statistically significant which indicates that there was little variation in satisfaction with life over time ($m = .45$; -1.24: 2.14; $p = .600$). Likewise, the satisfaction with life slope variance was small and not statistically significant which indicates very little inter-individual differences in intra-individual change ($\psi = .04$; -.26: .35; $p = .775$). This means participants who had higher satisfaction with life at wave 1 had higher satisfaction with life at wave 3. Finally, the moderate, statistically non-significant, negative association between the satisfaction with life intercept and slope, coupled with the positive slope indicated higher

initial rates of satisfaction with life corresponded with slower increases in satisfaction with life over time, whereas lower initial rates of satisfaction with life corresponded with faster increases in satisfaction with life over time ($r = -.43; -1.17: .31; p = .251$). However, the lack of statistical significance indicates very little intraindividual change in satisfaction with life over time.

In sum, the results of the unconditional growth curve models suggest that there was little change in the study variables over time. This finding was supported by calculating the standardized mean gain scores for the longitudinal variables (Table 3). I concluded that the longitudinal variables cannot be appropriately modeled along a linear trajectory and therefore utilized intercept-only latent growth curve models for all subsequent analyses.

Aim 1: Hope as a Predictor of Mediators & Outcomes

To measure the effect of hope as a predictor of each study variable, six intercept-only models were constructed with baseline hope as a predictor of the two study mediators, cognitive reappraisal and experiential avoidance, and the four study outcomes, anxiety, positive affect, negative affect, and satisfaction with life. For each model, a loading factor of 1 was specified for each of the three time points to model stability in levels of the outcome over time rather than change over time. The variances of the intercept factors were freely estimated.

Hope on Cognitive Reappraisal

The model demonstrated good fit on all indices ($\chi^2 (df = 73) = 110.45, p < .05$, RMSEA = .05, CFI = .97, TLI = .97, SRMR = .07). As expected, baseline hope was a strong, statistically significant predictor of higher cognitive reappraisal as quantified by the intercept factor representing the average level of cognitive reappraisal across three waves ($\beta = .61; .42$

: .80; $p < .001$) and accounted for a large, statistically significant, amount of variance in cognitive reappraisal ($R^2 = .37, p < .05$).

Hope on Experiential Avoidance

The model demonstrated good fit on all indices (χ^2 (df = 73) = 125.37, $p < .001$, RMSEA = .05, CFI = .96, TLI = .96, SRMR = .06). As expected, baseline hope was a strong, statistically significant predictor of lower experiential avoidance as quantified by the intercept factor representing the average level of experiential avoidance across three waves ($\beta = -.57; -.71 : -.43; p < .001$) and accounted for a large, statistically significant, amount of variance in experiential avoidance ($R^2 = .33, p < .001$).

Hope Predicting Anxiety

The model demonstrated good fit on all indices (χ^2 (df = 168) = 372.56, $p < .001$, RMSEA = .07, CFI = .91, TLI = .91, SRMR = .07). As expected, baseline hope was a strong, statistically significant predictor of lower anxiety as quantified by the intercept factor representing the average level of anxiety across three waves ($\beta = -.51; -.68 : -.33; p < .001$) and accounted for a large, statistically significant, amount of variance in anxiety ($R^2 = .26, p < .05$).

Hope Predicting Positive Affect

The model demonstrated good fit on all indices (χ^2 (df = 73) = 88.87, $p < .05$, RMSEA = .03, CFI = .99, TLI = .99, SRMR = .05). As expected, baseline hope was a strong, statistically significant predictor of higher positive affect as quantified by the intercept factor representing the average level of positive affect across three waves ($\beta = .71; .60 : .81; p < .001$) and accounted for a large, statistically significant, amount of variance in positive affect ($R^2 = .50, p < .001$).

Hope Predicting Negative Affect

The model demonstrated good fit on all indices (χ^2 (df = 73) = 112.75, $p < .05$, RMSEA = .05, CFI = .97, TLI = .97, SRMR = .06). As expected, baseline hope was a moderate strong, statistically significant predictor of lower negative affect as quantified by the intercept factor representing the average level of negative affect across three waves ($\beta = -.39$; $-.56 : -.22$; $p < .001$) and accounted for a moderate, statistically significant, amount of variance in negative affect ($R^2 = .16$, $p < .05$).

Hope Predicting Satisfaction with Life

The model demonstrated good fit on all indices except the chi-square test of model fit (χ^2 (df = 168) = 345.94, $p < .001$, RMSEA = .06, CFI = .93, TLI = .93, SRMR = .06). As expected, baseline hope was a strong, statistically significant predictor of higher satisfaction with life as quantified by the intercept factor representing the average level of satisfaction with life across three waves ($\beta = .71$; $.61 : .82$; $p < .001$) and accounted for a large, statistically significant, amount of variance in satisfaction with life ($R^2 = .51$, $p < .001$).

In sum, hope was a strong predictor of higher cognitive reappraisal, lower experiential avoidance, lower anxiety, higher positive affect, and higher satisfaction with life (Table 4). Hope was a moderate to strong predictor of lower negative affect. In addition, hope accounted for a large amount of variance in cognitive reappraisal, experiential avoidance, anxiety, positive affect, and satisfaction with life, and a moderate amount of variance in negative affect. These associations are in line with what I hypothesized.

Aim 2: Mediators as Predictors of Outcomes

In the second set of analyses, eight parallel process intercept-only models were used to examine to what extent study mediators (cognitive reappraisal and experiential avoidance)

predicted study outcomes (anxiety, positive affect, negative affect, and satisfaction with life). Both mediators and outcomes were measured using individual-level means across time, that is, a loading factor of 1 was specified for each time point to model stability of level across time. The variances of the intercepts were freely estimated.

Cognitive Reappraisal and Experiential Avoidance Predicting Anxiety

The model of cognitive reappraisal predicting anxiety demonstrated good fit on all indices (χ^2 (df = 277) = 517.28, $p < .001$, RMSEA = .06, CFI = .92, TLI = .92, SRMR = .06). Cognitive reappraisal was a small to moderate, statistically significant, predictor of lower anxiety ($\beta = -.22$; -.39: -.04; $p < .05$). The magnitude and direction of this effect align with what I would expect from the literature. Cognitive reappraisal accounted for a small, statistically non-significant, amount of variance in anxiety ($R^2 = .05$, $p = .223$). This relationship is weaker than hypothesized.

The model of experiential avoidance predicting anxiety demonstrated good fit on all indices (χ^2 (df = 277) = 559.73, $p < .001$, RMSEA = .06, CFI = .91, TLI = .91, SRMR = .07). As expected, experiential avoidance was a large, statistically significant, predictor of higher anxiety ($\beta = .63$; .51: .75; $p < .001$) and accounted for a large, statistically significant, amount of variance in anxiety ($R^2 = .40$, $p < .001$).

Cognitive Reappraisal and Experiential Avoidance Predicting Positive Affect

The model of cognitive reappraisal predicting positive affect demonstrated good fit on all indices (χ^2 (df = 152) = 196.07, $p < .05$, RMSEA = .03, CFI = .98, TLI = .98, SRMR = .08). As expected, cognitive reappraisal was a large, statistically significant, predictor of higher positive affect ($\beta = .58$; .42: .74; $p < .001$) and accounted for a large, statistically significant, amount of variance in positive affect ($R^2 = .34$, $p < .01$).

The model of experiential avoidance predicting positive affect demonstrated good fit on all indices (χ^2 (df = 152) = 210.04, $p < .01$, RMSEA = .04, CFI = .98, TLI = .98, SRMR = .06). As expected, experiential avoidance was a moderate, statistically significant, predictor of lower positive affect ($\beta = -.35; -.50: -.20; p < .001$) and accounted for a moderate, statistically significant, amount of variance in positive affect ($R^2 = .12, p < .05$).

Cognitive Reappraisal and Experiential Avoidance Predicting Negative Affect

The model of cognitive reappraisal predicting negative affect demonstrated good fit on all indices (χ^2 (df = 152) = 244.72, $p < .001$, RMSEA = .05, CFI = .96, TLI = .96, SRMR = .07). As expected, cognitive reappraisal was a moderate, statistically significant, predictor of lower negative affect ($\beta = -.26; -.42: -.09; p < .01$). Cognitive reappraisal accounted for a small to moderate, statistically non-significant, amount of variance in negative affect which is a weaker association than I would have expected ($R^2 = .07, p = .123$).

The model of experiential avoidance predicting negative affect demonstrated good fit on all indices (χ^2 (df = 152) = 260.01, $p < .001$, RMSEA = .05, CFI = .95, TLI = .95, SRMR = .05). As expected, experiential avoidance was a large, statistically significant, predictor of higher negative affect ($\beta = .67; .57: .78; p < .001$), and accounted for a large, statistically significant, amount of variance in negative affect ($R^2 = .45, p < .001$).

Cognitive Reappraisal and Experiential Avoidance Predicting Satisfaction with Life

The model of cognitive reappraisal predicting satisfaction with life demonstrated good fit on all indices (χ^2 (df = 277) = 526.02, $p < .001$, RMSEA = .06, CFI = .92, TLI = .92, SRMR = .07). As expected, cognitive reappraisal was a large, statistically significant, predictor of higher satisfaction with life ($\beta = .46; .29: .62; p < .001$) and accounted for a

moderate to large, statistically significant, amount of variance in satisfaction with life ($R^2 = .21, p \leq .01$).

The model of experiential avoidance predicting satisfaction with life demonstrated good fit on all indices ($\chi^2 (df = 277) = 499.38, p < .001, RMSEA = .06, CFI = .93, TLI = .93, SRMR = .06$). Experiential avoidance was a moderate, statistically significant, predictor of lower satisfaction with life ($\beta = -.35; -.49: -.21; p < .001$). As expected, Experiential avoidance accounted for a moderate, statistically significant, amount of variance in satisfaction with life ($R^2 = .12, p < .05$).

In sum, cognitive reappraisal predicted lower mental illness and higher mental well-being and experiential avoidance predicted higher mental illness and lower mental well-being (Table 4). Specifically, cognitive reappraisal accounted for more variance and had a stronger effect on positive affect and satisfaction with life than experiential avoidance did. On the other hand, experiential avoidance accounted for more variance and had a stronger effect on anxiety and negative affect than did cognitive reappraisal. In other words, when the mediator and outcome had the same valence, i.e. both in the direction of higher mental health, the associations were stronger, whereas when they had opposite valences, the associations were weaker.

Aim 3: Indirect Effect of Hope on Outcomes through Mediators

In the third set of analyses, eight parallel process intercept-only models were used to examine how hope predicted the outcomes of anxiety, positive affect, negative affect, and satisfaction with life via the mediators of cognitive reappraisal and experiential avoidance (Figure 3). Baseline hope was specified as a predictor of baseline levels of the mediator (a path) and the mediator was specified as a predictor of the outcome, as measured using

individual-level means across time (b path). Baseline hope was also specified as a predictor of the outcome, as measured using individual-level means across time (c path). The indirect effect (ab) was measured by computing the product of the effect of hope on the mediator (a) and the effect of the mediator on the outcome (b). The statistical significance of the indirect effects was calculated with the Mplus MODEL INDIRECT command. A loading factor of 1 was specified for each time point of each outcome to model the stability of level across time. The variances of the intercepts were freely estimated.

Hope Predicting Anxiety as Mediated by Cognitive Reappraisal

The model demonstrated good fit on all indices (χ^2 (df = 223) = 445.12, $p < .001$, RMSEA = .06, CFI = .92, TLI = .91, SRMR = .07). Hope had a large, statistically significant direct effect on cognitive reappraisal ($B = .48$; $.29 : .66$; $\beta = .56$; $p < .001$) and cognitive reappraisal had a small, statistically non-significant direct effect on anxiety, though not in the expected direction ($B = .13$; $-.06 : .31$; $\beta = .15$; $p = .182$). Hope had a small, statistically non-significant, indirect effect on higher anxiety as mediated by lower cognitive reappraisal ($ab = .06$; $-.03 : .15$; $p = .203$). This effect is in the opposite direction from what would be expected in the literature and could be due to cognitive reappraisal predicting higher anxiety. This means that the effect of hope on anxiety was largely a direct relationship rather than mediated by cognitive reappraisal. Hope by itself accounted for a large, statistically significant, amount of variance in anxiety ($R^2 = .27$, $p < .01$) and cognitive reappraisal ($R^2 = .31$, $p < .01$).

Hope Predicting Anxiety as Mediated by Experiential Avoidance

The model demonstrated good fit on all indices (χ^2 (df = 223) = 443.69, $p < .001$, RMSEA = .06, CFI = .92, TLI = .92, SRMR = .07). As expected, hope had a moderate,

statistically significant direct effect on experiential avoidance ($B = -.36; -.51 : -.22; \beta = -.46; p < .001$) and experiential avoidance had a moderate, statistically significant direct effect on anxiety ($B = .35; .18 : .52; \beta = .38; p < .001$). As expected, hope had a small, statistically significant, indirect effect on lower anxiety as mediated by higher experiential avoidance ($ab = -.13; -.19 : -.06; p < .001$). This means that the effect of hope on anxiety is partly accounted for by the effect of experiential avoidance on anxiety. Hope by itself accounted for a large, statistically significant, amount of variance in anxiety ($R^2 = .37, p < .001$) and a moderate to large, statistically significant, amount of variance in experiential avoidance ($R^2 = .22, p < .01$).

Hope Predicting Positive Affect as Mediated by Cognitive Reappraisal

The model demonstrated good fit for all indices ($\chi^2 (df = 110) = 141.10, p < .05$, RMSEA = .03, CFI = .98, TLI = .98, SRMR = .06). Hope had a large, statistically significant direct effect on cognitive reappraisal ($B = .48; .30 : .67; \beta = .55; p < .001$) and cognitive reappraisal had a small, statistically non-significant direct effect on positive affect ($B = .10; -.05 : .25; \beta = .12; p = .201$). Hope had a small, statistically non-significant, indirect effect on higher positive affect as mediated by higher cognitive reappraisal, which is a weaker effect than expected ($ab = .05; -.02 : .12; p = .185$). This means that the effect of hope on positive affect is largely a direct effect rather than mediated by the effect of cognitive reappraisal on positive affect. Hope by itself accounted for a large, statistically significant, amount of variance in positive affect ($R^2 = .51, p < .001$) and a large, statistically significant, amount of variance in cognitive reappraisal ($R^2 = .30, p < .01$).

Hope Predicting Positive Affect as Mediated by Experiential Avoidance

The model demonstrated good fit overall although the chi-square test of model fit did not reach statistical significance (χ^2 (df = 110) = 122.61, $p = .194$, RMSEA = .02, CFI = .99, TLI = .99, SRMR = .05). Hope had a moderate, statistically significant direct effect on experiential avoidance ($B = -.37$; $-.51 : -.22$; $\beta = -.47$; $p < .001$) and experiential avoidance had a very small, statistically non-significant direct effect on positive affect ($B = -.04$; $-.19 : .11$; $\beta = -.04$; $p = .611$). Hope had a very small, statistically non-significant, indirect effect on higher positive affect as mediated by lower experiential avoidance, which is a smaller effect than expected ($ab = .01$; $-.04 : .07$; $p = .612$). This means that the effect of hope on positive affect is largely a direct effect rather than mediated by the effect of experiential avoidance on positive affect. Hope by itself accounted for a large, statistically significant, amount of variance in positive affect ($R^2 = .50$, $p < .001$) and a moderate to large, statistically significant, amount of variance in cognitive reappraisal ($R^2 = .21$, $p < .01$).

Hope Predicting Negative Affect as Mediated by Cognitive Reappraisal

The model demonstrated good fit on all indices (χ^2 (df = 110) = 163.18, $p < .001$, RMSEA = .04, CFI = .97, TLI = .97, SRMR = .06). Hope had a large, statistically significant direct effect on cognitive reappraisal ($B = .48$; $.30 : .67$; $\beta = .56$; $p < .001$) and cognitive reappraisal had a small, statistically non-significant direct effect on negative affect ($B = -.10$; $-.26 : .07$; $\beta = -.13$; $p = .240$). Hope had a very small, statistically non-significant, indirect effect on lower negative affect as mediated by higher cognitive reappraisal, which is a weaker effect than expected ($ab = -.05$; $-.12 : .03$; $p = .234$). This means that the effect of hope on negative affect is largely a direct effect rather than mediated by the effect of cognitive reappraisal on negative affect. Hope by itself accounted for a moderate, statistically

significant, amount of variance in negative affect ($R^2 = .17, p < .05$) and a large, statistically significant, amount of variance in cognitive reappraisal ($R^2 = .31, p < .01$).

Hope Predicting Negative Affect as Mediated by Experiential Avoidance

The model demonstrated good fit on all indices (χ^2 (df = 110) = 171.81, $p < .001$, RMSEA = .05, CFI = .97, TLI = .96, SRMR = .06). Hope had a large, statistically significant direct effect on experiential avoidance ($B = -.37; -.52 : -.23; \beta = -.47; p < .001$) and experiential avoidance had a large, statistically significant direct effect on negative affect ($B = .38; .23 : .54; \beta = .47; p < .001$). As expected, hope had a small, statistically significant, indirect effect on lower negative affect as mediated by lower experiential avoidance ($ab = -.14; -.21 : -.07; p < .001$). This means that the effect of hope on negative affect is partially mediated by the effect of experiential avoidance on negative affect. Hope by itself accounted for a large, statistically significant, amount of variance in negative affect ($R^2 = .33, p < .001$) and a moderate to large, statistically significant, amount of variance in cognitive reappraisal ($R^2 = .22, p < .01$).

Hope Predicting Satisfaction with Life as Mediated by Cognitive Reappraisal

The model demonstrated good fit on all indices (χ^2 (df = 223) = 430.41, $p < .001$, RMSEA = .06, CFI = .93, TLI = .93, SRMR = .06). Hope had a large, statistically significant direct effect on cognitive reappraisal ($B = .48; .30 : .66; \beta = .55; p < .001$) and cognitive reappraisal had a negligible, statistically non-significant direct effect on satisfaction with life ($B = -.004; -.27 : .26; \beta = -.003; p = .974$). Hope had a negligible, statistically non-significant, indirect effect on lower satisfaction with life as mediated by higher cognitive reappraisal, which is a much weaker effect than expected ($ab = -.002; -.13 : .12; p = .974$). This means that the effect of hope on satisfaction with life is largely a direct effect rather than mediated

by the effect of cognitive reappraisal on satisfaction with life. Hope by itself accounted for a large, statistically significant, amount of variance in satisfaction with life ($R^2 = .50, p < .001$) and a large, statistically significant, amount of variance in cognitive reappraisal ($R^2 = .30, p < .01$).

Hope Predicting Satisfaction with Life as Mediated by Experiential Avoidance

The model demonstrated good fit on all indices ($\chi^2 (df = 223) = 411.70, p < .001$, RMSEA = .06, CFI = .94, TLI = .93, SRMR = .06). Hope had a large, statistically significant direct effect on experiential avoidance ($B = -.37; -.51 : -.22; \beta = -.46; p < .001$) and experiential avoidance had a very small, statistically non-significant direct effect on satisfaction with life ($B = -.04; -.30 : .23; \beta = -.02; p = .789$). Hope had a negligible, statistically non-significant, indirect effect on higher satisfaction with life as mediated by lower experiential avoidance, which is a much weaker effect than expected ($ab = .01; -.08 : .11; p = .787$). This means that the effect of hope on satisfaction with life is largely a direct effect rather than mediated by the effect of experiential avoidance on satisfaction with life. Hope by itself accounted for a large, statistically significant, amount of variance in satisfaction with life ($R^2 = .51, p < .001$) and a moderate to large, statistically significant, amount of variance in experiential avoidance ($R^2 = .21, p < .01$).

In sum, when hope was mediated by cognitive reappraisal, hope had small indirect effects on higher positive affect, higher anxiety, and lower negative affect, however, none of these associations were statistically significant (Table 5). When hope was mediated by experiential avoidance, hope had statistically significant indirect effects on lower anxiety and negative affect.

DISCUSSION

The present study examined the impact of hope on the longitudinal course of anxiety and well-being in a community sample starting a year after Hurricane Harvey and continuing for 15 months. Previous studies of hope and anxiety were either conducted cross-sectionally or had an inconsistent or incomplete examination of mechanisms in longitudinal studies. The purpose of this study was to examine whether cognitive reappraisal and experiential avoidance functioned as potential mechanisms in the relationship between higher hope and the outcomes of lower anxiety and negative affect and higher positive affect and satisfaction with life. The analyses were conducted in three stages.

First, due to the lack of intraindividual variability in outcomes across time, I used intercept-only latent growth curve models to quantify the magnitude of the effects of baseline hope on cognitive reappraisal, experiential avoidance, anxiety, positive affect, negative affect, and satisfaction with life as measured over three time points. Hope was a strong predictor of higher cognitive reappraisal, lower experiential avoidance, lower anxiety, higher positive affect, and higher satisfaction with life. Hope was a moderate to strong predictor of lower negative affect. In addition, hope accounted for a large amount of variance in positive affect and satisfaction with life, a moderate amount of variance in cognitive reappraisal, experiential avoidance, and anxiety, and a small amount of variance in negative affect. These associations are in line with what I hypothesized and indicate that hope is a strong predictor of lower mental illness and higher mental well-being.

Second, I used parallel process latent growth curve models to quantify the magnitude of the effects of cognitive reappraisal and experiential avoidance on anxiety, positive affect, negative affect, and satisfaction with life. Each variable was measured over three time points

and intercept-only models were constructed so that average levels of each mechanism across time predicted average levels across time of each outcome. Cognitive reappraisal accounted for much more variance and had a much stronger effect on positive affect and satisfaction with life than experiential avoidance. On the other hand, experiential avoidance accounted for much more variance and had a much stronger effect on anxiety and negative affect than did cognitive reappraisal. In other words, when the mediator and outcome had the same valence, i.e., both in the direction of higher mental health, the associations were stronger, whereas when they had opposite valences, the associations were weaker. These results are generally what would be expected from the literature although the effects of cognitive reappraisal on anxiety and negative affect are weaker than expected.

Third, I tested whether baseline levels of cognitive reappraisal and experiential avoidance mediated the effect of hope on anxiety, positive affect, negative affect, and satisfaction with life measured over three time points. Experiential avoidance emerged as a statistically significant mediator in the relationship between hope and lower anxiety and negative affect. The presence of this mediating effect is encouraging and merits further exploration. In support of my hypothesis, it seems that behavioral coping strategies such as experiential avoidance can indeed mediate the effect of hope on mental health and well-being.

This study was able to make use of longitudinal data to contribute to the well-established literature on hope as a resilience factor. I found that hope was strongly associated with lower anxiety and higher SWB, as measured by positive affect, negative affect, and satisfaction with life. Furthermore, the study contributed to the growing literature on cognitive reappraisal and experiential avoidance as longitudinal predictors of anxiety and

SWB over time. Specifically, cognitive reappraisal was associated with lower anxiety and higher SWB, and experiential avoidance was associated with higher anxiety and lower SWB. Finally, I tested the novel hypothesis of hope as an indirect predictor of lower anxiety and higher SWB through the mediators of cognitive reappraisal and experiential avoidance. Hope had an indirect effect on higher positive affect as mediated by higher cognitive reappraisal. Hope had an indirect effect on lower anxiety and lower negative affect as mediated by lower experiential avoidance. Taken together, this study does more to reinforce the strong history of association findings in the published literature between hope and mental health. The current study provides limited data on the mechanisms of action with only weak support for cognitive reappraisal and experiential avoidance as mediators of the effect of hope on anxiety and well-being.

Limitations

The lack of observed change over time for all the study variables limited my ability to measure how change in mediators relates to change in outcomes. The lack of change could be due to the latency in the onset of data collection from the time of the stressor. Data collection began one year after Hurricane Harvey, and the greatest change in scores may have occurred during the year immediately following Hurricane Harvey. That said, trauma severity was still quite high in this community sample, with 36.3% of participants meeting likely PTSD diagnosis at wave one according to the recommended cutoff for the PCL-5 of 33 as anchored to Hurricane Harvey as the traumatic event (Bovin et al., 2016).

Data collection may also have been affected by the steep drop-out after wave one and increased length of wave two due to adding a replacement wave. Specifically, wave one spanned 9 weeks with a 10 week break until wave two. Then wave two spanned 11 weeks

with an additional 9 weeks for the replacement wave. Finally, there was a 10 week break until wave three began, which lasted 13 weeks. Rolling recruitment allowed for a similar time between each wave for individuals. The overall amount of missing data led me to use a smaller sample of participants who completed at least two waves of the study. As a result, the study was underpowered for predicting change across time due to how stable outcomes were found to be across the three waves of data collection. However, because the study utilized multiple waves of data, even the intercept-only models were more powered than a cross-sectional study with the same sample size would be, and the data were robust for predicting average levels of outcomes across the three waves.

Another limitation was the lack of model fit for the SWB construct. Despite the theoretical and empirical support for SWB as a higher-order construct, for this study, I had to break SWB down into the three component constructs of positive affect, negative affect, and satisfaction with life to have an adequate model fit (Diener et al., 2017). Finally, there was a potential limitation of not accounting for multiple tests when setting statistical significance at $p < .05$. However, I endeavored to emphasize effect size magnitude rather than merely statistical significance when interpreting results.

The study may also have been influenced by response set bias meaning that certain individuals may have tended to endorse scale items whereas others had a tendency not to endorse scale items (Paulhus, 1991). Sampling bias may have been present in that those high in experiential avoidance may have been less likely to participate in the study and more likely to drop out.

CONCLUSIONS

This study was designed to examine cognitive reappraisal and experiential avoidance functioned as mediators in the relationship between higher hope and the outcomes of lower anxiety and higher SWB. The limited change over time for all the study variables limited my ability to test how change in mediators relates to change in outcomes. Nevertheless, the study was able to make a unique contribution by using longitudinal data to contribute to the well-established literature on hope as a resilience factor. As expected, this study showed that hope was strongly associated with lower anxiety and higher SWB. Furthermore, the study contributed to the growing literature on cognitive reappraisal and experiential avoidance as longitudinal predictors of anxiety and SWB over time. Specifically, cognitive reappraisal was associated with lower anxiety and higher SWB, and experiential avoidance was associated with higher anxiety and lower SWB.

Although positive effects of hope on mental health have been well established (Snyder, 2000; Gallagher & Lopez, 2018), there is much to work to be done in understanding the mediators in the relationship between hope and positive outcomes after a stressor. Future studies might capture more change over time if the data are collected immediately following the stressor or during an experience likely to evoke change (e.g., therapy). Furthermore, using measures that avoid response sets or restriction of range may increase variance and make the measurement of mediation more feasible. In addition, for the integrity of the longitudinal analyses, it is helpful to have a large, representative sample with adherence through all waves of data collection. Finally, future studies could look at the moderating impact of trauma or subgroups of participants. For example, there may be more change in both positive and negative outcomes for those who experienced greater trauma. Similarly,

there may be different patterns of results based on diagnosis, gender, race, ethnicity, education, and income.

With these limitations in mind, this study made novel contributions to the literature by measuring the effect of hope on anxiety and well-being over time as mediated by cognitive reappraisal and experiential avoidance. Hope had a small indirect effect on higher positive affect as mediated by higher cognitive reappraisal. Hope had statistically significant indirect effects on lower anxiety and negative affect as mediated by lower experiential avoidance. This is noteworthy because mediating effects are hard to find and require unique designs and statistical analysis (Kazdin and Nock, 2003). These results indicate that other mechanisms of action should be tested.

Future studies can control for response bias to verify the finding in this study that positive factors such as cognitive reappraisal are stronger mediators of positive outcomes, whereas negative factors such as experiential avoidance are stronger mediators of negative outcomes. Future studies could also explore the extent to which the findings vary based on subgroups such as trauma level or psychological diagnosis. We know natural disasters like Hurricane Harvey cause great disruptions to people's lives and contribute to mental illness (i.e., increasing mental illness symptoms and decreasing SWB). The current study findings support the notion that research using a positive psychology framework that examines both symptoms and well-being can provide the most information on how resilience factors like hope lead to greater mental health and well-being even after a major stressor.

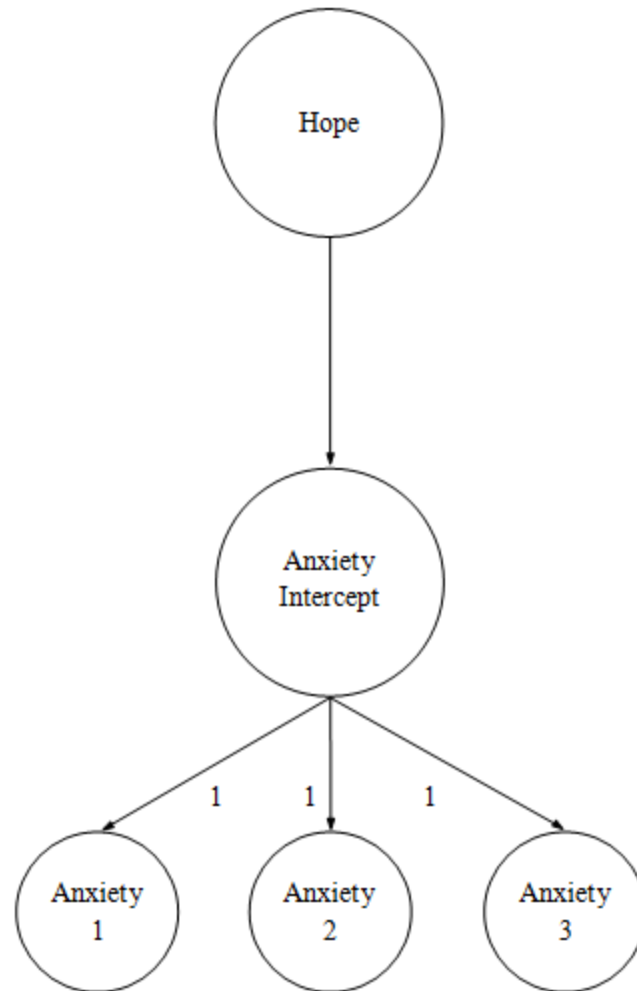


Figure 1.

Six intercept-only latent growth curve models were constructed with baseline hope as a predictor of the two study mediators (cognitive reappraisal and experiential avoidance) and the four study outcomes (anxiety, positive affect, negative affect, and satisfaction with life). For each model, a loading factor of 1 was specified for each of the three time points to model stability in levels of the outcome over time rather than change over time. The variances of the intercept factors were freely estimated.

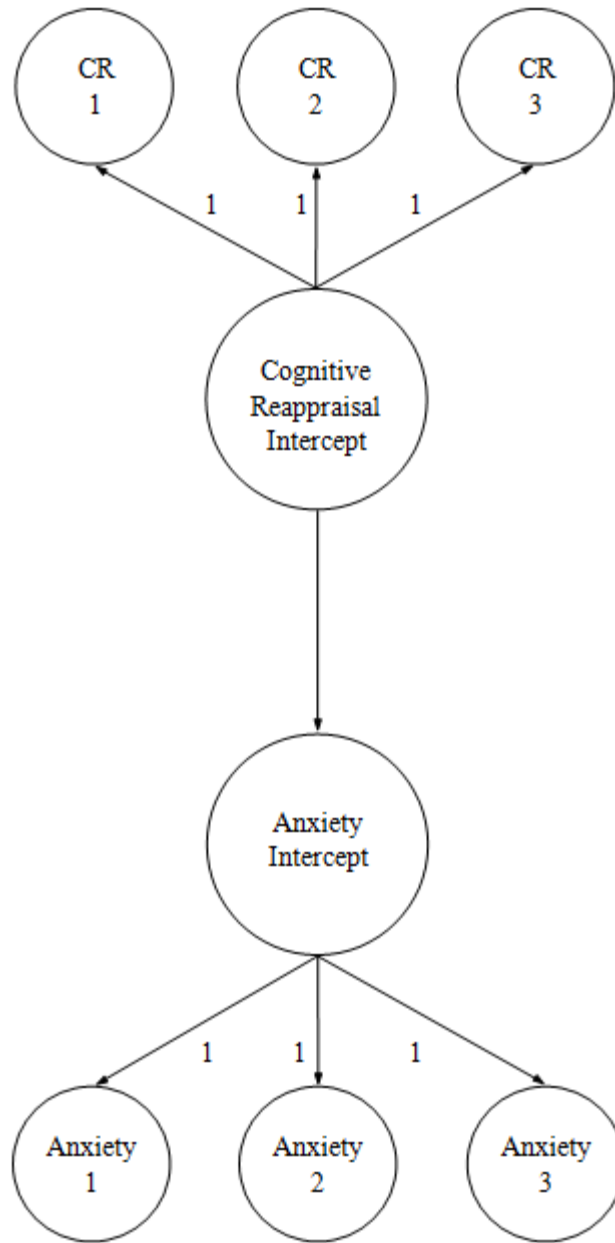


Figure 2.

Eight parallel process intercept-only latent growth curve models were used to examine to what extent study mediators (cognitive reappraisal and experiential avoidance) predicted study outcomes (anxiety, positive affect, negative affect, and satisfaction with life). For both mediators and outcomes, a loading factor of 1 was specified for each time point to model stability of level across time. The variances of the intercepts were freely estimated.

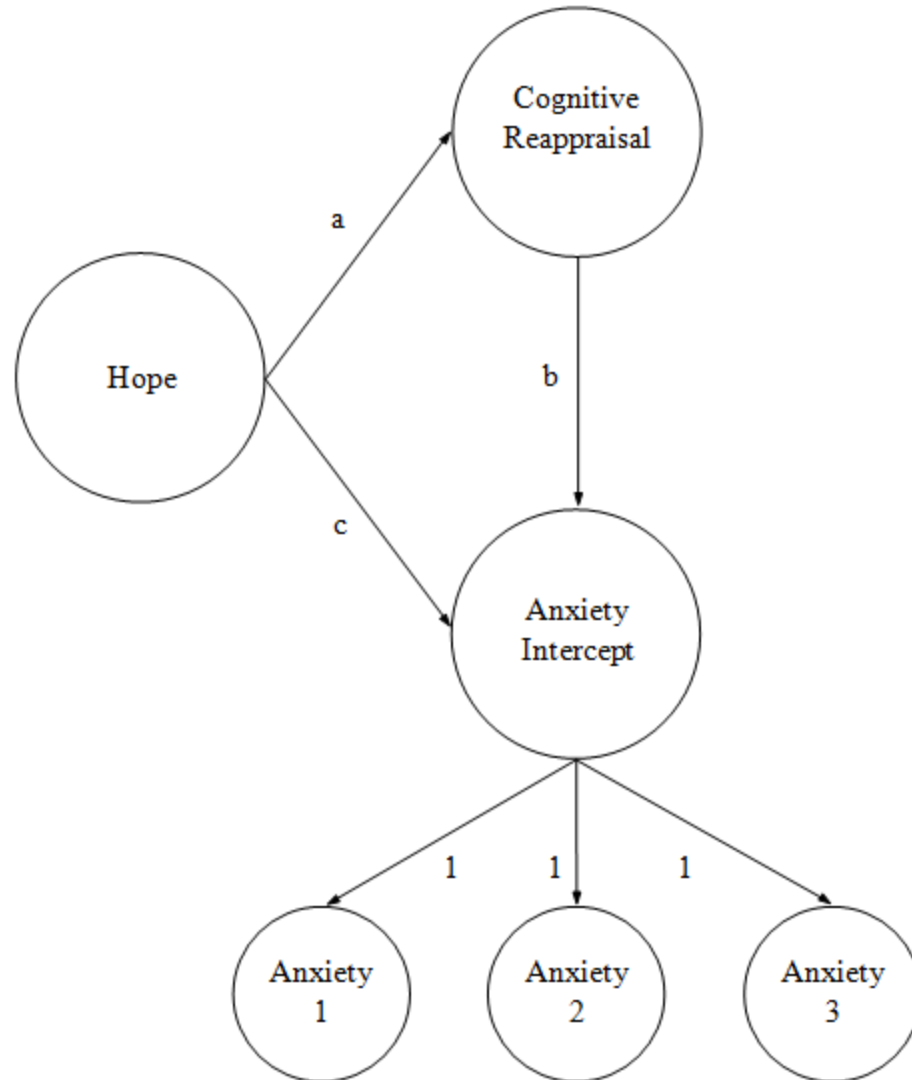


Figure 3.

Eight parallel process intercept-only latent growth curve models were used to examine how hope predicted outcomes (anxiety, positive affect, negative affect, and satisfaction with life) via mediators (cognitive reappraisal and experiential avoidance). Baseline hope was specified as a predictor of baseline levels of each mediator as well as a predictor of individual-level means of each outcome. A loading factor of 1 was specified for each time point of each outcome to model the stability of level across time. The variances of the intercepts were freely estimated.

Table 1.*Means, Standard Deviations, and Correlations of Study Variables*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Hope	45.9	10.1								
2. W1 Anxiety	6.2	4.0	-.46**							
3. W2 Anxiety	6.0	5.0	-.27**	.61**						
4. W3 Anxiety	5.5	4.7	-.30**	.62**	.67**					
5. W1 Positive Affect	30.6	9.8	.61**	-.51**	-.38**	-.39**				
6. W2 Positive Affect	29.7	10.4	.54**	-.36*	-.31**	-.40**	.77**			
7. W3 Positive Affect	30.4	10.1	.49**	-.42**	-.28**	-.45**	.67**	.63**		
8. W1 Negative Affect	20.4	9.0	-.36**	.69**	.44**	.47**	-.34**	-.26**	-.35**	
9. W2 Negative Affect	20.3	9.0	-.19	.38**	.59**	.45**	-.24*	-.13	-.15	.64**
10. W3 Negative Affect	20.5	9.3	-.21*	.50**	.54**	.52**	-.19	-.15	-.24**	.73**
11. W1 Satisfaction with Life	20.3	8.7	.61**	-.52**	-.39**	-.44**	.58**	.57**	.50**	-.48**
12. W2 Satisfaction with Life	21.0	8.5	.61**	-.40**	-.42**	-.45**	.61**	.60**	.52**	-.36**
13. W3 Satisfaction with Life	21.5	8.3	.56**	-.36**	-.31**	-.45**	.45**	.48**	.58**	-.35**
14. W1 Cognitive Reappraisal	30.4	7.4	.48**	-.16*	-.08	-.06	.38**	.52**	.27**	-.25**
15. W2 Cognitive Reappraisal	29.3	7.2	.29**	-.15	-.08	-.14	.37**	.50**	.28**	-.27**
16. W3 Cognitive Reappraisal	29.9	7.4	.45**	-.23*	-.03	-.18*	.28**	.31**	.29**	-.30**
17. W1 Experiential Avoidance	49.1	14.5	-.41**	.46**	.35**	.40**	-.31**	-.18	-.27**	.42**
18. W2 Experiential Avoidance	51.0	14.3	-.45**	.34**	.44**	.40**	-.30**	-.23**	-.16	.33**
19. W3 Experiential Avoidance	51.4	14.7	-.41**	.41**	.52**	.42**	-.36	-.14	-.16*	.42**

Note. ** indicates $p < .01$. * indicates $p < .05$. Hope measured by the Adult Hope Scale. Anxiety measured by the Overall Anxiety Severity and Impairment Scale. Positive Affect and Negative Affect measured by the Positive and Negative Affect Scale. Satisfaction with Life measured by the Satisfaction with Life Scale. Cognitive Reappraisal measured by the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. Experiential Avoidance measured by the Brief Experiential Avoidance Questionnaire.

Table 1 ctd.

Variable	9	10	11	12	13	14	15	16	17	18
1. Hope										
2. W1 Anxiety										
3. W2 Anxiety										
4. W3 Anxiety										
5. W1 Positive Affect										
6. W2 Positive Affect										
7. W3 Positive Affect										
8. W1 Negative Affect										
9. W2 Negative Affect										
10. W3 Negative Affect	.70**									
11. W1 Satisfaction with Life	-.30**	-.41**								
12. W2 Satisfaction with Life	-.32**	-.32**	.83**							
13. W3 Satisfaction with Life	-.17*	-.24**	.79**	.78**						
14. W1 Cognitive Reappraisal	-.10	-.24*	.32**	.43**	.36**					
15. W2 Cognitive Reappraisal	-.14	-.08	.32**	.38**	.33**	.59**				
16. W3 Cognitive Reappraisal	-.06	-.13	.34**	.19*	.37**	.50**	.69**			
17. W1 Experiential Avoidance	.42**	.43**	-.31**	-.26**	-.19	-.11	-.02	-.12		
18. W2 Experiential Avoidance	.50**	.54**	-.29**	-.27**	-.20*	-.21*	-.01	-.13	.62**	
19. W3 Experiential Avoidance	.49**	.48**	-.22*	-.21*	-.19*	-.04	.001	-.08	.66**	.68**

Note. ** indicates $p < .01$. * indicates $p < .05$. Hope measured by the Adult Hope Scale. Anxiety measured by the Overall Anxiety Severity and Impairment Scale. Positive Affect and Negative Affect measured by the Positive and Negative Affect Scale. Satisfaction with Life measured by the Satisfaction with Life Scale. Cognitive Reappraisal measured by the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. Experiential Avoidance measured by the Brief Experiential Avoidance Questionnaire.

Table 2.*Results of Measurement Invariance Models*

Variable	Model	<i>df</i>	χ^2	RMSEA	90% CI	CFI	TLI
Hope	Configural	2	6.58	.077	.016 : .146	.993	.979
Anxiety	Configural	87	253.05	.055	.047 : .063	.937	.924
	Weak	95	269.44	.054	.046 : .061	.934	.927
	Strong	103	283.68	.053	.045 : .060	.932	.931
Positive Affect	Configural	24	28.77	.018	.000 : .039	.997	.996
	Weak	28	32.81	.017	.000 : .036	.997	.996
	Strong	32	43.62	.024	.000 : .040	.993	.992
Negative Affect	Configural	24	63.11	.051	.036 : .066	.975	.962
	Weak	28	72.74	.05	.036 : .065	.971	.963
	Strong	32	77.38	.047	.034 : .061	.971	.967
Satisfaction with Life	Configural	87	224.94	.05	.042 : .058	.952	.942
	Weak	95	236.11	.049	.041 : .056	.951	.946
	Strong	103	248.16	.047	.040 : .055	.949	.948
Cognitive Reappraisal	Configural	24	35.30	.027	.000 : .045	.991	.986
	Weak	28	39.48	.025	.000 : .043	.991	.988
	Strong	32	45.85	.026	.000 : .042	.989	.987
Experiential Avoidance	Configural	24	111.53	.076	.062 : .090	.937	.906
	Weak	28	119.58	.072	.059 : .085	.934	.916
	Strong	32	124.25	.067	.055 : .080	.934	.926

Note. Hope measured by the Adult Hope Scale. Anxiety measured by the Overall Anxiety Severity and Impairment Scale. Positive Affect and Negative Affect measured by the Positive and Negative Affect Scale. Satisfaction with Life measured by the Satisfaction with Life Scale. Cognitive Reappraisal measured by the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. Experiential Avoidance measured by the Brief Experiential Avoidance Questionnaire.

Table 3.*Standardized Mean Gain Scores of Longitudinal Variables*

Variable	<i>ES</i>	95% CI
W1-W2 Anxiety	-0.04	-.20 : .12
W2-W3 Anxiety	-0.10	-.23 : .03
W1-W2 Positive Affect	-0.12	-.25 : .01
W2-W3 Positive Affect	0.04	-.11 : .19
W1-W2 Negative Affect	0.06	-.10 : .21
W2-W3 Negative Affect	0.03	-.10 : .16
W1-W2 Satisfaction with Life	0.01	-.10 : .11
W2-W3 Satisfaction with Life	0.01	-.09 : .11
W1-W2 Cognitive Reappraisal	-0.15	-.32 : .01
W2-W3 Cognitive Reappraisal	0.08	-.04 : .21
W1-W2 Experiential Avoidance	0.13	-.03 : .29
W2-W3 Experiential Avoidance	0.03	-.10 : .15

Note. Negative value indicates decrease, positive value indicates increase. Hope measured by the Adult Hope Scale. Anxiety measured by the Overall Anxiety Severity and Impairment Scale. Positive Affect and Negative Affect measured by the Positive and Negative Affect Scale. Satisfaction with Life measured by the Satisfaction with Life Scale. Cognitive Reappraisal measured by the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. Experiential Avoidance measured by the Brief Experiential Avoidance Questionnaire.

Table 4.*Direct Effects of Study Variables*

Predictor	β (95% CI)
Hope → Cognitive Reappraisal	.61 (.42 : .80)
Hope → Experiential Avoidance	-.57 (-.71 : -.43)
Hope → Anxiety	-.51 (-.68 : -.33)
Hope → Positive Affect	.71 (.60 : .81)
Hope → Negative Affect	-.39 (-.56 : -.22)
Hope → Satisfaction with Life	.71 (.61 : .82)
Cognitive Reappraisal → Anxiety	-.22 (-.39: -.04)
Experiential Avoidance → Anxiety	.63 (.51: .75)
Cognitive Reappraisal → Positive Affect	.58 (.42: .74)
Experiential Avoidance → Positive Affect	-.35 (-.50: -.20)
Cognitive Reappraisal → Negative Affect	-.26 (-.42: -.09)
Experiential Avoidance → Negative Affect	.67 (.57: .78)
Cognitive Reappraisal → Satisfaction with Life	.46 (.29: .62)
Experiential Avoidance → Satisfaction with Life	-.35 (-.49: -.21)

Notes. This table includes results from multiple separate models. All effects are statistically significant at $p < .05$. Completely standardized solution. Hope measured by the Adult Hope Scale. Anxiety measured by the Overall Anxiety Severity and Impairment Scale. Positive Affect and Negative Affect measured by the Positive and Negative Affect Scale. Satisfaction with Life measured by the Satisfaction with Life Scale. Cognitive Reappraisal measured by the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. Experiential Avoidance measured by the Brief Experiential Avoidance Questionnaire.

Table 5.*Indirect Effects of Hope on Study Outcomes through Mediators*

Hope → Mediator → Outcome	<i>ab</i> (95% CI)
Hope → Cognitive Reappraisal → Anxiety	.06 (-.03 : .15)
Hope → Experiential Avoidance → Anxiety	-.13* (-.19 : -.06)
Hope → Cognitive Reappraisal → Positive Affect	.05 (-.02 : .12)
Hope → Experiential Avoidance → Positive Affect	.01 (-.04 : .07)
Hope → Cognitive Reappraisal → Negative Affect	-.05 (-.12 : .03)
Hope → Experiential Avoidance → Negative Affect	-.14* (-.21 : -.07)
Hope → Cognitive Reappraisal → Satisfaction with Life	-.002 (-.13 : .12)
Hope → Experiential Avoidance → Satisfaction with Life	.01 (-.08 : .11)

Note. This table includes results from multiple separate models. Asterisk indicates statistical significance at $p < .05$. Hope measured by the Adult Hope Scale. Anxiety measured by the Overall Anxiety Severity and Impairment Scale. Positive Affect and Negative Affect measured by the Positive and Negative Affect Scale. Satisfaction with Life measured by the Satisfaction with Life Scale. Cognitive Reappraisal measured by the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. Experiential Avoidance measured by the Brief Experiential Avoidance Questionnaire.

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APPENDIX A: List of Measures

Hope (AHS; Snyder et al., 1991)

Directions: Read each item carefully. Using the scale shown below, please select the number that best describes YOU and put that number in the blank provided.

Pathways

1. I can think of many ways to get the things in life that are most important to me
2. I can think of many ways to get out of a jam
3. Even when others get discouraged, I know I can find a way to solve the problem
4. There are lots of ways around any problem

Agency

5. I've been pretty successful in life
6. I energetically pursue my goals
7. I meet the goals that I set for myself
8. My past experiences have prepared me well for my future

1 = Definitely False

2 = Mostly False

3 = Somewhat False

4 = Slightly False

5 = Slightly True

6 = Somewhat True

7 = Mostly True

8 = Definitely True

Anxiety (OASIS; Norman et al., 2006)

The following items ask about anxiety and fear. For each item, select the number for the answer that best describes your experience over the past week.

1. In the past week, how often have you felt anxious?

0 = No anxiety in the past week.

1 = Infrequent anxiety. Felt anxious a few times.

2 = Occasional anxiety. Felt anxious as much of the time as not. It was hard to relax.

3 = Frequent anxiety. Felt anxious most of the time. It was very difficult to relax.

4 = Constant anxiety. Felt anxious all of the time and never really relaxed.

2. In the past week, when you have felt anxious, how intense or severe was your anxiety?

0 = Little or None: Anxiety was absent or barely noticeable.

1 = Mild: Anxiety was at a low level. It was possible to relax when I tried. Physical symptoms were only slightly uncomfortable.

2 = Moderate: Anxiety was distressing at times. It was hard to relax or concentrate, but I could do it if I tried. Physical symptoms were uncomfortable.

3 = Severe: Anxiety was intense much of the time. It was very difficult to relax or focus on anything else. Physical symptoms were extremely uncomfortable.

4 = Extreme: Anxiety was overwhelming. It was impossible to relax at all. Physical symptoms were unbearable.

3. In the past week, how often did you avoid situations, places, objects, or activities because of anxiety or fear?

0 = None: I do not avoid places, situations, activities, or things because of fear.

1 = Infrequent: I avoid something once in a while, but will usually face the situation or confront the object. My lifestyle is not affected.

2 = Occasional: I have some fear of certain situations, places, or objects, but it is still manageable.

My lifestyle has only changed in minor ways. I always or almost always avoid the things I fear when I'm alone, but can handle them if someone comes with me.

3 = Frequent: I have considerable fear and really try to avoid the things that frighten me. I have made significant changes in my lifestyle to avoid the object, situation, activity, or place.

4 = All the Time: Avoiding objects, situations, activities, or places has taken over my life. My lifestyle has been extensively affected and I no longer do things that I used to enjoy.

4. In the past week, how much did your anxiety interfere with your ability to do the things you needed to do at work, at school, or at home?

0 = None: No interference at work/home/school from anxiety

1 = Mild: My anxiety has caused some interference at work/home/school. Things are more difficult, but everything that needs to be done is still getting done.

2 = Moderate: My anxiety definitely interferes with tasks. Most things are still getting done, but few things are being done as well as in the past.

3 = Severe: My anxiety has really changed my ability to get things done. Some tasks are still being done, but many things are not. My performance has definitely suffered.

4 = Extreme: My anxiety has become incapacitating. I am unable to complete tasks and have had to leave school, have quit or been fired from my job, or have been unable to complete tasks at home and have faced consequences like bill collectors, eviction, etc.

5. In the past week, how much has anxiety interfered with your social life and relationships?

0 = None: My anxiety doesn't affect my relationships.

1 = Mild: My anxiety slightly interferes with my relationships. Some of my friendships and other relationships have suffered, but, overall, my social life is still fulfilling.

2 = Moderate: I have experienced some interference with my social life, but I still have a few close relationships. I don't spend as much time with others as in the past, but I still socialize sometimes.

3 = Severe: My friendships and other relationships have suffered a lot because of anxiety. I do not enjoy social activities. I socialize very little.

4 = Extreme: My anxiety has completely disrupted my social activities. All of my relationships have suffered or ended. My family life is extremely strained.

Positive Affect (PANAS, Watson et al., 1988)

In the following you will find a number of words that describe different feelings and emotions. Please indicate to what extent you have felt this way during the past few months.

1. Enthusiastic
2. Excited
3. Strong
4. Interested
5. Proud
6. Alert
7. Inspired
8. Determined
9. Attentive
10. Active

1 = Very slightly or not at all

2 = A little

3 = Moderately

4 = Quite a bit

5 = Extremely

Negative Affect (PANAS, Watson et al., 1988)

In the following you will find a number of words that describe different feelings and emotions. Please indicate to what extent you have felt this way during the past few months.

1. Distressed

2. Upset

3. Guilty

4. Scared

5. Hostile

6. Irritable

7. Ashamed

8. Nervous

9. Jittery

10. Afraid

1 = Very slightly or not at all

2 = A little

3 = Moderately

4 = Quite a bit

5 = Extremely

Satisfaction with Life (Pavot & Diener, 1993)

1. In most ways my life is close to my ideal

2. The conditions of my life are excellent
3. I am satisfied with my life
4. So far I have gotten the important things I want in life
5. If I could live my life over, I would change almost nothing

1 = Strongly Disagree

2 = Disagree

3 = Slightly Disagree

4 = Neither Agree nor Disagree

5 = Slightly Agree

6 = Agree

7 = Strongly Agree

Cognitive Reappraisal (Gross & John, 2003)

1. When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.
2. When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.
3. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
4. When I want to feel more positive emotion, I change the way I'm thinking about the situation.
5. I control my emotions by changing the way I think about the situation I'm in.
6. When I want to feel less negative emotion, I change the way I'm thinking about the situation

1 = 1 Strongly Disagree

2 = 2

3 = 3

4 = 4 Neutral

5 = 5

6 = 6

7 = 7 Strongly Agree

Experiential Avoidance (BEAQ; Gamez et al., 2014)

Please indicate the extent to which you agree or disagree with each of the following statements

1. The key to a good life is never feeling any pain
2. I'm quick to leave any situation that makes me feel uneasy
3. When unpleasant memories come to me, I try to put them out of my mind
4. I feel disconnected from my emotions
5. I won't do something until I absolutely have to
6. Fear or anxiety won't stop me from doing something important
7. I would give up a lot not to feel bad
8. I rarely do something if there's a chance that it will upset me
9. It's hard for me to know what I'm feeling
10. I try to put off unpleasant tasks for as long as possible
11. I go out of my way to avoid uncomfortable situations
12. One of my big goals is to be free from painful emotions
13. I work hard to keep out upsetting feelings
14. If I have any doubts about doing something, I just won't do it
15. Pain always leads to suffering

1 = Strongly Disagree

2 = Moderately Disagree

3 = Slightly Disagree

4 = Slightly Agree

5 = Moderately Agree

6 = Strongly Agree

APPENDIX B: Results of Originally Proposed Analyses

Aim 1: Hope as a Predictor of All Variables

In the first set of analyses, six latent growth curve models were constructed with baseline hope as a predictor of the intercepts and slopes of the two study mediators, cognitive reappraisal and experiential avoidance, and the four study outcomes, anxiety, positive affect, negative affect, and satisfaction with life (Figure 1). For each model, a loading factor of 1 was specified for the intercept, and loading factors of 0, 1.0, and 2.0 were specified for the slope to model change over time in the outcomes as a linear process. The variances of the intercept and slope factors were freely estimated unless otherwise noted.

Hope on Cognitive Reappraisal

The model demonstrated good fit on all indices (χ^2 (df = 69) = 102.03, $p < .001$, RMSEA = .04, CFI = .97, TLI = .97, SRMR = .07). As expected, baseline hope was a strong, statistically significant predictor of higher baseline cognitive reappraisal ($\beta = .63$; .41 : .85; $p < .001$). Contrary to my hypothesis, baseline hope was a weak predictor of lower cognitive reappraisal over time, although the association was not statistically significant ($\beta = -.11$; -.40 : .17; $p = .433$). Given that the variance of the cognitive reappraisal slope in the unconditional model did not reach statistical significance either, the association between hope and lower cognitive reappraisal over time may be an artifact of limited variation in cognitive reappraisal over time.

Hope on Experiential Avoidance

The planned model yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of experiential avoidance from wave two to wave three. I ran a second model which

constrained the covariances and residuals of experiential avoidance, but the error persisted. Therefore, I chose an intercept-only model. This model demonstrated good fit on all indices (χ^2 (df = 70) = 125.25, $p < .001$, RMSEA = .06, CFI = .96, TLI = .96, SRMR = .06). As expected, baseline hope was a strong, statistically significant predictor of experiential avoidance as measured by individual level means across time ($\beta = -.57$; $-.73 : -.42$; $p < .001$).

Hope on Anxiety

The model demonstrated good fit on all indices (χ^2 (df = 164) = 358.14, $p < .001$, RMSEA = .07, CFI = .92, TLI = .91, SRMR = .07). As expected, baseline hope was a strong, statistically significant predictor of lower baseline anxiety ($\beta = -.53$; $-.71 : -.36$; $p < .001$). Contrary to my hypothesis, baseline hope was a moderate predictor of higher anxiety over time, although this association did not reach statistical significance ($\beta = .23$; $-.11 : .58$; $p = .187$). Given that the variance of the anxiety slope in the unconditional model did not reach statistical significance either, the association between hope and higher anxiety over time may be an artifact of limited variation in anxiety over time.

Hope on Positive Affect

The planned model yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of positive affect. I ran a second model which constrained the covariances of positive affect, and the error was resolved. The model demonstrated good fit on all indices except the chi-square test of model fit (χ^2 (df = 60) = 66.65, $p = .259$, RMSEA = .02, CFI = .99, TLI = .99, SRMR = .04). As expected, baseline hope was a strong, statistically significant predictor of higher baseline positive affect ($\beta = .68$; $.56 : .79$; $p < .001$). Contrary to my hypothesis, baseline hope was a weak predictor of lower positive affect over time, although the

association was not statistically significant ($\beta = -.23; -1.17 : .70; p = .624$). Given that the variance of the positive affect slope in the unconditional model did not reach statistical significance either, the association between hope and lower positive affect over time may be an artifact of limited variation in positive affect over time.

Hope on Negative Affect

The planned model yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the negligible change in trajectory of negative affect. I ran a second model which constrained the covariances of negative affect, but the error persisted. Therefore, I chose an intercept-only model. The model demonstrated good fit on all indices (χ^2 (df = 70) = 110.87, $p = .001$, RMSEA = .05, CFI = .97, TLI = .97, SRMR = .05). As expected, baseline hope was a moderate to strong, statistically significant predictor of lower negative affect as measured by individual level means across time ($\beta = -.43; -.60 : -.26; p < .001$).

Hope on Satisfaction with Life

The model demonstrated good fit on all indices (χ^2 (df = 164) = 339.53, $p < .001$, RMSEA = .06, CFI = .93, TLI = .93, SRMR = .06). As expected, baseline hope was a strong, statistically significant predictor of higher baseline satisfaction with life ($\beta = .70; .58 : .83; p < .001$). Contrary to my hypothesis, baseline hope was a weak predictor of lower satisfaction with life over time, although this association was not statistically significant ($\beta = -.19; -.72 : .34; p = .486$). Given that the variance of the satisfaction with life slope in the unconditional model did not reach statistical significance either, the association between hope and lower satisfaction with life over time may be an artifact of limited variation in satisfaction with life over time.

Aim 2: Parallel Process Latent Growth Curve Models

In the second set of analyses, eight parallel process latent growth curve models were used to examine how change in the study mediators predicted change in the study outcomes over time (Figure 2). Specifically, the slope of each mediator (cognitive reappraisal and experiential avoidance) was used to predict the slope of each outcome (anxiety, positive affect, negative affect, and satisfaction with life). Again, for each model, a loading factor of 1 was specified for the intercept, and loading factors of 0, 1.0, and 2.0 were specified for the slope to model change over time in the outcomes as a linear process. The variances of the intercept and slope factors were freely estimated unless otherwise noted.

Cognitive Reappraisal and Anxiety

The model demonstrated good fit on all indices (χ^2 (df = 268) = 499.85, $p < .001$, RMSEA = .06, CFI = .92, TLI = .92, SRMR = .06). As expected, a greater increase in cognitive reappraisal was moderately associated with a greater decrease in anxiety ($\beta = -.37$; -1.01 : .27; $p = .260$). Contrary to expectation, the effect was not statistically significant, likely because of the limited change in cognitive reappraisal and anxiety over time.

Experiential Avoidance and Anxiety

The model demonstrated good fit on all indices (χ^2 (df = 268) = 545.44, $p < .001$, RMSEA = .06, CFI = .91, TLI = .91, SRMR = .06). As expected, a greater increase in experiential avoidance was strongly associated with a greater increase in anxiety ($\beta = .63$; -2.48 : 3.74; $p = .693$). Contrary to expectation, the effect was not statistically significant, likely because of the limited change in experiential avoidance and anxiety over time.

Cognitive Reappraisal and Positive Affect

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of cognitive reappraisal and positive affect. I ran a second model which constrained the residuals and covariances of cognitive reappraisal and positive affect, and the error was resolved. This model demonstrated good fit on all indices with the exception of the chi-square test of model fit (χ^2 (df = 130) = 153.57, $p = .077$, RMSEA = .03, CFI = .99, TLI = .99, SRMR = .07). As expected, a greater increase in cognitive reappraisal was moderately associated with a greater increase in positive affect ($\beta = .31$; -2.98 : 3.59; $p = .856$). Contrary to expectation, the effect was not statistically significant, likely because of the limited change in cognitive reappraisal and positive affect over time.

Experiential Avoidance and Positive Affect

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of experiential avoidance and positive affect. I ran a second model which constrained the residuals and covariances of experiential avoidance and positive affect, but the error persisted. Therefore, I chose an intercept-only model. This model demonstrated good fit on all indices (χ^2 (df = 152) = 210.04, $p = .001$, RMSEA = .04, CFI = .98, TLI = .98, SRMR = .06). Experiential avoidance, as measured by individual level means across time, was a moderate, statistically significant, predictor of lower positive affect, as measured by individual level means across time ($\beta = -.35$; -.50 : -.20; $p < .001$), and accounted for a small amount of variance in the latter did not reach statistical significance ($R^2 = .12$, $p = .022$). These results align with the literature although I would expect the variance predicted to be

statistically significant. The lack of statistical significance could be due to the limited change in experiential avoidance and positive affect over time.

Cognitive Reappraisal and Negative Affect

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of cognitive reappraisal and negative affect. I ran a second model which constrained the residuals and covariances of cognitive reappraisal and negative affect, but the error persisted. Therefore, I chose an intercept-only model. The model demonstrated good fit on all indices (χ^2 (df = 152) = 244.72, $p < .001$, RMSEA = .05, CFI = .96, TLI = .96, SRMR = .07). Cognitive reappraisal, as measured by individual level means across time, was a moderate, statistically significant, predictor of lower negative affect, as measured by individual level means across time, ($\beta = -.26; -.42; -.09; p = .002$) and accounted for a small, statistically non-significant, amount of variance in the latter ($R^2 = .07, p = .123$). These results align with the literature although I would expect the variance predicted to be statistically significant. The lack of statistical significance could be due to the limited change in cognitive reappraisal and negative affect over time.

Experiential Avoidance and Negative Affect

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of experiential avoidance and negative affect. I ran a second model which constrained the residuals and covariances of experiential avoidance and negative affect, but the error persisted. Therefore, I chose an intercept-only model. The model demonstrated good fit on all indices (χ^2 (df = 152) = 260.01, $p < .001$, RMSEA = .05, CFI = .95, TLI = .95, SRMR = .05).

As expected, experiential avoidance, as measured by individual level means across time, was a large, statistically significant, predictor of higher negative affect, as measured by individual level means across time ($\beta = .67; .57: .78; p < .001$), and accounted for a large, statistically significant, amount of variance in the latter ($R^2 = .45, p < .001$).

Cognitive Reappraisal and Satisfaction with Life

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. I ran a second model which constrained the residuals and covariances of both variables, and the error was resolved. The model demonstrated good fit on all indices ($\chi^2 (df = 249) = 350.44, p < .001, RMSEA = .04, CFI = .97, TLI = .97, SRMR = .06$). As expected, a greater increase in cognitive reappraisal was strongly associated with a greater increase in satisfaction with life ($\beta = .88; -.06: 1.83; p = .067$). Contrary to expectation, the effect did not reach statistical significance, likely because of the limited change in cognitive reappraisal and satisfaction with life over time.

Experiential Avoidance and Satisfaction with Life

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of experiential avoidance and satisfaction with life. I ran a second model which constrained the residuals and covariances of experiential avoidance and satisfaction with life, but the error persisted. Therefore, I chose an intercept-only model. The model demonstrated good fit on all indices ($\chi^2 (df = 277) = 499.38, p < .001, RMSEA = .06, CFI = .93, TLI = .93, SRMR = .06$). Experiential avoidance, as measured by individual level means across time, was a moderate, statistically significant, predictor of lower satisfaction with life, as measured by individual level means across time ($\beta = -.35; -.49: -.21; p < .001$), and accounted for a small,

statistically non-significant, amount of variance in the latter ($R^2 = .12, p < .017$). These results align with the literature although I would expect the variance predicted to be statistically significant. The lack of statistical significance could be due to the limited change in experiential avoidance and satisfaction with life over time.

Aim 3: Hope Predicting Parallel Process Latent Growth Curve Models

In the third set of analyses, eight parallel process latent growth curve models were used to examine how baseline hope predicted change in anxiety, positive affect, negative affect, and satisfaction with life over time via change in cognitive reappraisal and experiential avoidance over time (Figure 3). To measure the indirect effect of hope on the study outcomes, hope was specified as a predictor of the slope of each mediator (cognitive reappraisal and experiential avoidance) as well as a predictor of the slope of each outcome (anxiety, positive affect, negative affect, and satisfaction with life). The indirect effect (ab) was measured by computing the product of the effect of hope on change in the mediator (a) and the effect of change in each mediator on change in each outcome (b). The statistical significance of the indirect effects were calculated with the Mplus MODEL INDIRECT command. Again, for each model, a loading factor of 1 was specified for the intercept, and loading factors of 0, 1.0, and 2.0 were specified for the slope to model change over time in the outcomes as a linear process. The variances of the intercept and slope factors were freely estimated unless otherwise noted.

Cognitive Reappraisal and Anxiety

The model demonstrated good fit on all indices (χ^2 (df = 363) = 649.41, $p < .001$, RMSEA = .06, CFI = .92, TLI = .92, SRMR = .07). Contrary to expectation, hope had a negligible, statistically non-significant, indirect effect on change in anxiety over time as

mediated by change in cognitive reappraisal over time ($B = .01; -.01 : .03; p = .436$). This means that the effect of hope on change in anxiety was largely a direct relationship rather than mediated by change in cognitive reappraisal over time. However, the limited mediation effect could be due to a lack of change in cognitive reappraisal over time.

Experiential Avoidance & Anxiety

The model demonstrated good fit on all indices ($\chi^2 (df = 363) = 695.72, p < .001$, RMSEA = .06, CFI = .91, TLI = .91, SRMR = .07). Contrary to expectation, hope had a negligible, statistically non-significant, indirect effect on change in anxiety over time as mediated by change in experiential avoidance over time ($B = -.01; -.40 : .37; p = .436$). This means that the effect of hope on change in anxiety was largely a direct relationship rather than mediated by change in experiential avoidance over time. However, the limited mediation effect could be due to a lack of change in experiential avoidance over time.

Cognitive Reappraisal and Positive Affect

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of the variables. I ran a second model which constrained the residuals and covariances of cognitive reappraisal and positive affect, but the error persisted. Therefore, I chose an intercept-only model. The model demonstrated good fit on all indices ($\chi^2 (df = 224) = 319.45, p < .001$, RMSEA = .04, CFI = .97, TLI = .97, SRMR = .07). Hope had a small, statistically non-significant, indirect effect on positive affect, as measured by individual level means across time, when mediated by cognitive reappraisal, as measured by individual level means across time ($B = .10; .01 : .19; p = .024$). This means that the effect of hope on positive affect was somewhat mediated by cognitive reappraisal. This is in accord with my

hypotheses although I would have expected the relationship to be statistically significant. The lack of statistical significance could be due to the limited change of cognitive reappraisal and positive affect over time.

Experiential Avoidance and Positive Affect

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of the variables. I ran a second model which constrained the residuals and covariances of experiential avoidance and positive affect, but the error persisted. Therefore, I chose an intercept-only model. The model demonstrated good fit on all indices (χ^2 (df = 224) = 309.15, $p < .001$, RMSEA = .04, CFI = .97, TLI = .97, SRMR = .06). Contrary to expectation, hope had a negligible, statistically non-significant, indirect effect on positive affect, as measured by individual level means across time, when mediated by experiential avoidance, as measured by individual level means across time ($B = -.01$; $-.07 : .06$; $p = .898$). This means that the effect of hope on positive affect was largely a direct relationship rather than mediated by experiential avoidance. However, the limited mediation effect could be due to a lack of change in experiential avoidance and positive affect over time.

Cognitive Reappraisal and Negative Affect

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of the variables. I ran a second model which constrained the residuals and covariances of cognitive reappraisal and negative affect, but the error persisted. Therefore, I chose an intercept-only model. The model demonstrated good fit on all indices (χ^2 (df = 224) = 338.76, $p < .001$, RMSEA = .05, CFI = .96, TLI = .95, SRMR = .08). Contrary to

expectation, hope had a negligible, statistically non-significant, indirect effect on negative affect, as measured by individual level means across time, when mediated by cognitive reappraisal, as measured by individual level means across time ($B = -.03; -.12 : .05; p = .448$). This means that the effect of hope on negative affect was largely a direct relationship rather than mediated by cognitive reappraisal. However, the limited mediation effect could be due to a lack of change in cognitive reappraisal and negative affect over time.

Experiential Avoidance and Negative Affect

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of the variables. I ran a second model which constrained the residuals and covariances of experiential avoidance and negative affect, but the error persisted. Therefore, I chose an intercept-only model. The model demonstrated good fit on all indices (χ^2 (df = 224) = 362.22, $p < .001$, RMSEA = .05, CFI = .95, TLI = .95, SRMR = .06). As expected, hope had a moderate, statistically significant, indirect effect on negative affect, as measured by individual level means across time, when mediated by experiential avoidance, as measured by individual level means across time ($B = -.25; -.34 : -.15; p < .001$). This means that the effect of hope on negative affect was mediated by experiential avoidance.

Cognitive Reappraisal and Satisfaction with Life

The model demonstrated good fit on all indices (χ^2 (df = 344) = 484.96, $p < .001$, RMSEA = .04, CFI = .96, TLI = .96, SRMR = .06). Hope had a small, statistically non-significant, indirect effect on change in satisfaction with life over time as mediated by change in cognitive reappraisal over time ($B = -.09; -.25 : .08; p = .291$). This means that the effect of hope on change in satisfaction with life was somewhat mediated by change in cognitive

reappraisal over time. This result is consistent with my hypotheses, although I would have expected the relationship to be statistically significant. The lack of statistical significance could be due to a lack of change in cognitive reappraisal and satisfaction with life over time.

Experiential Avoidance and Satisfaction with Life

The planned analysis yielded a PSI error indicating the latent variable covariance matrix was not positive definite. This error was likely due to the limited change in trajectory of the variables. I ran a second model which constrained the residuals and covariances of experiential avoidance and satisfaction with life, but the error persisted. Therefore, I chose an intercept-only model. The model demonstrated good fit on all indices (χ^2 (df = 373) = 606.34; $p < .001$, RMSEA = .05, CFI = .94, TLI = .94, SRMR = .07). Contrary to expectation, hope had a negligible, statistically non-significant, indirect effect on satisfaction with life, as measured by individual level means across time, when mediated by experiential avoidance, as measured by individual level means across time ($B = -.03$; $-.15 : .10$; $p = .684$). This means that the effect of hope on satisfaction with life was largely a direct relationship rather than mediated by experiential avoidance. However, the limited mediation effect could be due to a lack of change in experiential avoidance over time.

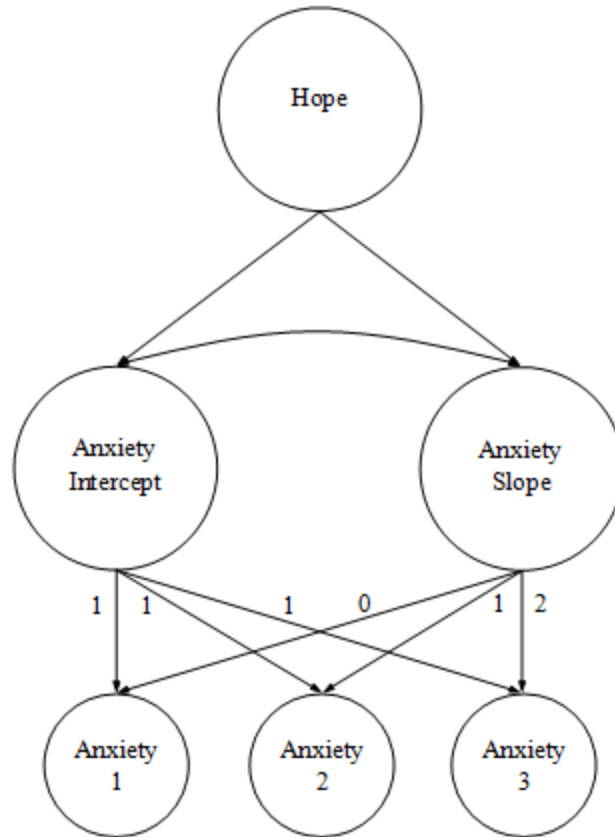


Figure 1.

Four latent growth curve models were used to measure the effect of baseline hope on change in anxiety, subjective well-being, cognitive reappraisal, and experiential avoidance over time. Anxiety and subjective well-being are the primary study outcomes, while cognitive reappraisal and experiential avoidance are proposed as mediators.

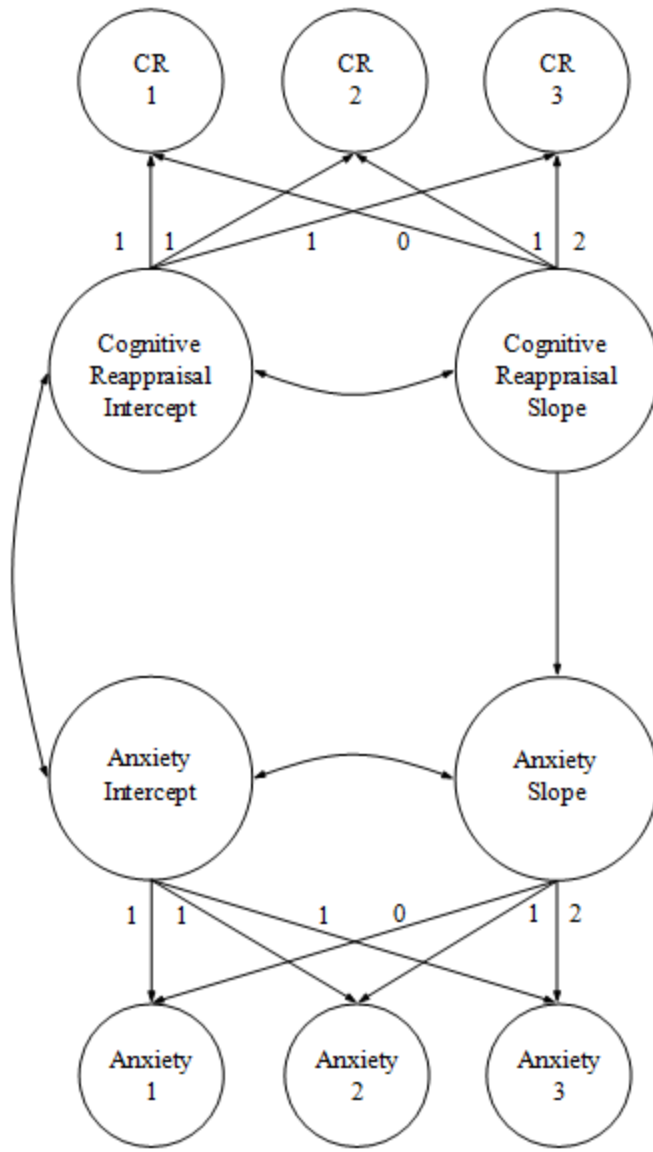


Figure 2.

Four parallel process latent growth curve models examined how the proposed mediators influence change in each of the study outcomes over time. The proposed mediators are cognitive reappraisal and experiential avoidance, while the study outcomes are anxiety and subjective well-being.

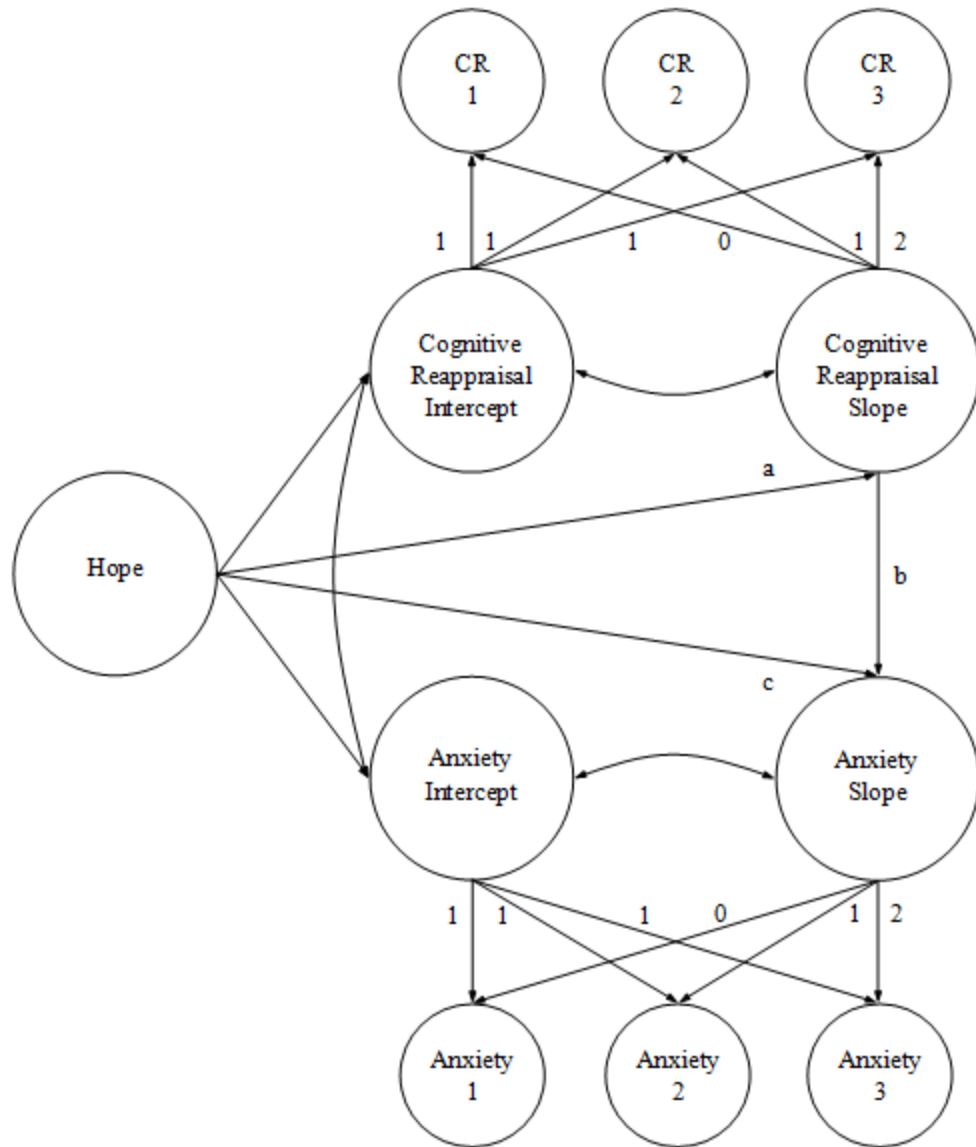


Figure 3.

Four parallel process latent growth curve models examined whether hope predicts change in outcomes over time through change in the mediators over time. The study outcomes are anxiety and subjective well-being, while the proposed mediators are cognitive reappraisal and experiential avoidance.