RECONSTRUING PAST SELVES FOLLOWING
THREATS TO SELF-ESTEEM AND EFFECTS
ON CONSTRUAL LEVEL

A Dissertation
Submitted to
the Temple University Graduate Board

In Partial Fulfillment
of the Requirements for the Degree
DOCTOR OF PHILOSOPHY

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May 2019

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ABSTRACT

Previous research on Temporal Self-Appraisal Theory demonstrated that people make downward comparisons to their past selves. Researchers have discussed this tendency to denigrate past selves as a self-esteem maintenance strategy; however, little research has been done on how people recall their past selves following active threats to their self-esteem. Reconstruing one's past self for self-enhancement may lead to changes in construal level. I conducted three studies in which participants were randomly assigned to either an intelligence self-esteem threat or control condition and then tasked to recall an autobiographical memory, rate attributes of their recalled past self, and complete a measure of construal level. In the pilot study (N = 113), participants were free to recall any memory of their choosing. In Studies 1 and 2, participants recalled and rated two memories from early high-school: pre- and post-threat manipulation. Participants in Study 1 (N = 240) recalled their academic experience, while participants in Study 2 (N = 243) recalled their interpersonal relationships. A pattern emerged across studies suggesting that when people recall autobiographical memories related to the domain in which their self-esteem has been threatened (an academic memory and intelligence threat), threatened participants are more likely to denigrate their past selves (lower endorsement of positive self-attributes post-manipulation than pre-test) than controls in threat-relevant traits (competence, knowledge). This pattern is accompanied by an increased likelihood to recall positive transformations and periods of growth, as opposed to stability. However, a relationship with construal level was not observed. Further, when people recall autobiographical memories unrelated to the domain in which their self-esteem has been threatened (an interpersonal memory and

intelligence threat), threatened participants are more likely to idealize their past selves (higher endorsement of positive self-attributes post-manipulation than pre-test) than controls in threat-irrelevant traits (likeable, attractive). However, this pattern was only observed for those who demonstrated fixed mindsets, emphasizing stability, and was not associated with an impact on construal level.

For Archer and Mila

ACKNOWLEDGMENTS

My dissertation would not have been possible without the help of the diligent undergraduate research assistants who collected and coded all of my data: Samantha Biggs, Abigail Dole, Emily Englert, Emily Grove, Sierra Kalamar, Phiona Tran, Rachel Truitt, and Rachael Santiago.

I thank my advisor, Dr. Andrew Karpinski, my core committee members, Drs. Don Hantula and Vishnu “Deepu” Murty, and Dr. Robert Weisberg who served on defenses of preliminary projects, for their feedback which undeniably led to the improvement of these studies. I also thank Drs. Johanna Jarcho and Ingrid Olson for their support and wisdom, helping me to cross the finish line.

Reaching this point was my greatest challenge to date, and I would be remiss if I did not thank my officemate, Dr. Samantha Moore-Berg, for her continued encouragement and belief in me.

TABLE OF CONTENTS

Page

APPENDICES

LIST OF TABLES

Table Page

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

A person's thoughts are not isolated to their perception of their current environment; thoughts can also involve mental representations of episodes occurring in the past or future. This ability, termed mental time travel, is recognized as an adaptive process, enabling flexibility to adjust to complex changes (Suddendorf & Corballis, 1997). Episodic memory is a form of mental time travel which has been the focus of a wealth of research. Often, because episodic memories are a recollection of one's own first-hand experiences, they can include rich phenomenological details (Grysman, Prabhakar, Anglin, & Hudson, 2013). Nevertheless, people's memories are not always construed with a high degree of detail. It is possible that people sacrifice detail in exchange for more abstract levels of construal because abstraction facilitates the adaptive functions of retrospection. One such function may be self-esteem maintenance. When thinking of the past, people can represent their past selves in ways that enhance their positive self-regard in the present (Wilson & Ross, 2001). In this paper, I will argue that people reconstrue their past selves in ways which mitigate threats to their self-esteem, and that this process produces changes in level of construal. Specifically, I will examine denigration of one's past self as a self-enhancement strategy and its effects on construal level.

Self-Esteem Maintenance Following Threat

Self-esteem refers to a person's subjective evaluation of his or her own worthiness—a judgment of whether or not he or she is "good enough" (Rosenberg, 1965) and is rooted in feelings of self-acceptance and self-respect (Orth & Robins, 2014).

Unsurprisingly, people are highly motivated to maintain high self-esteem, and this desire appears cross-cultural. Although people from collectivist cultures often show lower levels of self-esteem than their individualistic counterparts, a comprehensive study examining individuals from 53 different nations found that people show a positivity bias on self-esteem measures across cultures (Schmitt & Allik, 2005).

Researchers and laypeople alike have emphasized the merit in understanding how to improve self-esteem, and with good reason. Self-esteem is predictive of several important outcomes (but see Baumeister, Campbell, Krueger, & Vohs, 2003), especially when researchers match predictors and outcomes based on whether they are trait or state dependent (Swann, Chang-Schneider, & Mcclarty, 2007). Low self-esteem in adolescence is associated with major depressive disorder, anxiety disorders, tobacco dependence, poor cardiorespiratory health, high waist-to-hip ratio, conviction for crime, dropping out of school, not attending university, and long-term unemployment in adulthood (Trzesniewski et al., 2006), as well as physical aggression, verbal aggression, anger, hostility, delinquency and antisocial behavior in adolescence (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005). In contrast, high self-esteem is associated with fewer symptoms of depression, anxiety and attention problems (Henriksen, Ranøyen, Indredavik, & Stenseng, 2017).

Typically, self-esteem is thought of as a stable trait with individuals either categorized as having persistently high or low self-esteem. Studies have shown that self-esteem is fit better by a trait-like model than a state-dependent model (Donnellan, Kenny, Trzesniewski, Lucas, & Conger, 2012) and increases in stability with age (Trzesniewski, Donnellan, & Robins, 2003). In fact, self-esteem has been shown to have a level of stability comparable to Big 5 personality traits (Fraley & Roberts, 2005). Further, individual differences in self-esteem are maintained across time (Kuster & Orth, 2013). That is, those that are higher in self-esteem maintain higher levels of self-esteem than their peers across time. Nevertheless, various interventions have proven effective in enhancing self-esteem (Murray, Dordevic, & Bonham, 2017; Nosek, Robinson-Whelen, Hughes, & Nosek, 2016; Tirlea, Truby, & Haines, 2016) and self-esteem has been shown to be reactive to the events that people experience in their daily lives (Greenier et al., 1999).

Given the importance of maintaining high self-esteem, it is no surprise that a wealth of research has been dedicated to examining regulatory responses when a person's self-esteem has been threatened. Studies experimentally induce threats to self-esteem in many ways, including social rejection and ostracism, threats to intelligence or competence, and making one's mortality salient (Vandellen, Campbell, Hoyle, & Bradfield, 2011). Meta-analyses have revealed that people typically respond to these threats to their self-esteem with one of three regulatory processes termed compensation, resistance, and breaking (Vandellen et al., 2011). Compensation refers to responses which lead to heightened self-esteem following a threat. This counterintuitive response occurs due to the amount of effort exerted in attempt to maintain high self-esteem. Compensation often involves reconstruing the situation, including denigrating others and making external attributions. In an opposite response, breaking produces decreased self-esteem following a threat. Breaking often involves reconstruing the self, including making upward comparisons to others and internal attributions. Finally, resisting refers to regulatory processes which maintain self-esteem, protecting against decreases without self-enhancing to the degree of compensation. Resisting can involve passive tactics, such as deeming the threatening information not relevant, or active tactics, such as focusing on unrelated positive traits (Vandellen et al., 2011).

To illustrate the differences in the possible responses to self-esteem threats – after having their intelligence threatened by receiving a failing grade, people who compensate could highlight flaws in the exam's construction and experience increased self-esteem after doing so. In contrast, people who respond by breaking could blame their own incompetence and experience decreased self-esteem. Finally, people who respond by resisting could refocus attention on their success in nonacademic extracurriculars, maintaining their initial level of self-esteem.

Although increasing self-esteem (i.e. compensating) may seem like a counterintuitive response to threat, the tendency for people to engage in self-enhancement is prevalent and cross-cultural (Sedikides, Gaertner, & Vevea, 2005). Research has found that when people engage in self-evaluation, they are motivated by self-enhancement more than self-assessment or self-verification (Sedikides, 1993). That is, favorability is more important than accuracy in determining the type of knowledge that people prefer to gain about themselves. This bias towards self-enhancement is also found in the type of memories that people tend to recall. The Mnemic Neglect Model explains that people cognitively avoid threatening information, making positive self-related information more accessible/faster to recall (Sedikides, Green, Saunders, Skowronski, & Zengel, 2016). Moreover, people are particularly likely to engage in self-enhancement when their self-esteem is threatened. fMRI studies have shown that people are actually less likely to show patterns associated with thinking about themselves negatively when they experience threat (Hoefler, Athenstaedt, Corcoran, Ebner, & Ischebeck, 2015).

Much of the literature examining how people respond to self-esteem threat has focused on the moderating role of individual differences. Although a variety of factors have been examined, the most common are individual differences in trait-level of self-esteem, contingent self-worth, and theories of intelligence. Meta-analyses comparing responses between people with high versus low trait self-esteem revealed that people with high self-esteem are more likely to engage in self-enhancement strategies leading to compensation, while those with low self-esteem are more likely to resist (Vandellen et al., 2011). These findings support a “self-esteem as resource” model, proposing that people with high self-esteem are better able to protect against threats because they have more positive thoughts/memories about themselves to recall upon (see Vandellen et al., 2011). However, the majority of studies measure self-enhancement by observing how people engage in social comparisons, and not how people utilize recall of memories about themselves. For example, studies have shown that people with high self-esteem are more likely than those with low self-esteem to make downward comparisons to peers following a threat (Crocker, Thompson, McGraw, & Ingerman, 1987; Vohs & Heatherton, 2004), and that engaging in downward comparison leads to higher state self-esteem (Vohs & Heatherton, 2004). Some have argued that people with high self-esteem are more likely to engage in self-enhancement because the “believability threshold is higher for those with low self-esteem” (Brown & Gallagher, 1992). That is, it is harder for people with low self-esteem to accept that their downward comparisons would be believed, both by others and themselves.

As self-esteem is an evaluation of one's self-worth, people can differ in which domains they emphasize when making their evaluations. In other words, people's determination of their self-worth can be contingent on different external aspects of their lives (Crocker & Wolfe, 2001). People can vary in the degree to which their self-esteem is contingent on external factors, and self-esteem often becomes less contingent as it becomes more stable over time (Meier, Orth, Denissen, & Kühnel, 2011). Crocker, Luhtanen, Cooper and Bouvrette (2003) recognized seven unique domains on which a person's self-worth may be contingent: academic competence, appearance, approval from others, competition, family support, God's love, and virtue. Contingent self-worth can play an important role in self-regulation as people are highly motivated to succeed in the domains their self-worth is contingent on; but, people are also particularly vulnerable to threats to their self-esteem in the areas that their self-worth is contingent on as a consequence (Crocker, Brook, Niiya, & Villacorta, 2006). For example, people who base their self-worth on their academic competence show fluctuations in their self-esteem corresponding to their grades (Crocker, Karpinski, Quinn, & Chase, 2003). Much of the research on threats to self-esteem has utilized threats to one's intelligence and correspondingly has looked at individual differences in academic competence contingent self-worth. People whose self-worth was highly contingent on academic competence both anticipated (Zeigler-Hill, Besser, & King, 2011) and showed greater decreases in their state self-esteem following a performance failure (Niiya & Crocker, 2007).

Many studies which have examined the role of contingent self-worth in responses to self-esteem threats have reported protective effects of growth mindsets. A growth mindset incorporates incremental beliefs about intelligence, beliefs that people can acquire knowledge and improve their intelligence through effort (Dweck, 1999). In contrast, people may also hold fixed mindsets based in entity beliefs about intelligence, beliefs that people inherently are either intelligent or unintelligent and that this baseline is not malleable (Dweck, 1999). While contingent self-worth leads to greater decreases in self-esteem following threat, adopting an incremental belief has been shown to eliminate this effect (Niiya, Crocker, & Bartmess, 2004). Following negative performance feedback, people with growth mindsets are more likely to make situational attributions, whereas people with fixed mindsets are more likely to make dispositional attributions (Hong, Chiu, Dweck, Lin, & Wan, 1999). That is, people with growth mindsets are more likely to focus on factors they could change in the future such as the amount of time or effort they put into studying; while people with fixed mindsets are more likely to attribute their failure to lack of personal ability. These characteristics lead people with growth mindsets to be more likely to engage in upward comparison and genuine self-assessment, while those with fixed mindsets to be more likely to engage in downward comparisons and self-enhancement (Nussbaum & Dweck, 2008; O'Keefe, 2013).

A Role for Past Selves in Self-Esteem Maintenance

Research has shown that people utilize social comparisons—evaluating themselves in contrast to a peer or relevant other (Festinger, 1954)—to maintain their self-esteem. Upward social comparisons can be a source of inspiration, having positive effects on one's self-concept (Burleson, Leach, & Harrington, 2005) while downward social comparisons can increase self-esteem by making one's own current situation seem more favorable (Gibbons & Gerrard, 1989). However, studies prompting participants to provide open-ended descriptions of themselves have shown that people engage in temporal comparisons—evaluating their present selves in contrast to their past selves—more frequently than social comparisons (Wilson & Ross, 2000). Moreover, when people make downward social comparisons, they run a risk of being judged as unlikeable by others (Vohs & Heatherton, 2004); and as such are less likely to use downward comparison as a self-enhancement strategy if they experience a public (as opposed to private) failure (Brown & Gallagher, 1992). In contrast, downward temporal comparisons do not present this risk because others are not denigrated in the process. Therefore, temporal comparisons may serve self-esteem maintenance goals better than social comparisons, yet relatively little research has been conducted on temporal comparisons.

Temporal comparisons to one's past self often are self-enhancing because they frequently take the form of downward comparisons (Summerville & Roese, 2008; Wilson & Ross, 2000; but see Ferring & Hoffmann, 2007). People have a tendency to judge their present selves as superior to their past selves (Kanten & Teigen, 2008), creating a narrative of having improved over time. Notably, people engage in temporal comparisons which support a narrative of improvement even when no actual improvement has occurred (Wilson & Ross, 2001). Temporal Self-Appraisal Theory (Wilson & Ross, 2001) proposes that people facilitate flattering downward comparisons by denigrating their past selves, recalling them as relatively worse than they had actually demonstrated themselves to be at the time.

This false narrative that one has improved across time holds both when evaluating one's skills and attributes, as demonstrated in the literature on Temporal Self-Appraisal Theory, as well as in judgments of life-satisfaction. People report a linear increase in positivity from the distant past to the present (Grysman et al., 2013). Both adults and adolescents indicate being more satisfied with their lives (Garcia, Rosenberg, & Siddiqui, 2011; Gomez, Grob, & Orth, 2013), despite longitudinal data showing that life satisfaction remains relatively stable across the lifespan (Baird, Lucas, & Donnellan, 2010). In essence, the past is disparaged to promote positive self-regard and life-satisfaction in the present.

When people recall their past selves to benefit their present self-esteem, they do not need to think of their past selves as objectively bad; they only need to think of their past selves as relatively worse than their present selves for downward comparison to be effective. In fact, recalling oneself as having been a “bad person” has been shown to lead to negative self-concepts, especially for people with fixed mindsets (Lilgendahl, McLean, & Mansfield, 2013). On the contrary, people who recall positive memories report feeling higher state self-esteem afterwards (Çili & Stopa, 2014). The key to effectively denigrating one’s past self in order to maintain self-esteem seems to rely on belief that one can and has since improved. People have a tendency to remember their past selves as considerably different from their present selves (Hart, Fegley, & Brengelman, 1993; Quoidbach, Gilbert, & Wilson, 2013), promoting the perception that they have changed. Moreover, only people with growth mindsets (whether existing or primed) demonstrate the denigration of past selves that has been observed in previous research (Ward & Wilson, 2015). To this end, well-being has been linked to redemption stories—memories about a negative situation with a positive outcome (Adler & Poulin, 2009), emphasizing themes of overcoming challenges and transformative experiences; although, the link between well-being and narratives of personal development is specific to European cultures (Reese et al., 2017).

Distancing from the Past and the Effects of Abstraction

For denigration of one's past self to be an effective self-enhancement strategy, people must recognize their present selves as having since improved. Therefore, people are motivated to incorporate memories with favorable implications into their present self-concept while discarding unfavorable memories to a past self who they no longer identify with strongly. This process is facilitated by psychological distance. Psychological distance is mentally perceived distance (Lewin, 1951), a subjective judgment of how far away something feels regardless of how objectively recent it occurred (Van Boven & Caruso, 2015). In general, people have a tendency to feel greater psychological distance towards negative memories than positive memories (Demiray & Janssen, 2015). This bias enables them to view the negative memories as less relevant to themselves in the present, as psychological distance reduces identification (Atakan, Bagozzi, & Yoon, 2014).

Psychological distance also reduces the embarrassment and distress that negative memories can evoke (Williams & Bargh, 2008). To this end, people judge past selves with unfavorable implications as more psychologically distant than objectively equidistant past selves with favorable implications (Ross & Wilson, 2002). This tendency is stronger for people high in self-esteem indicating its function as a self-esteem maintenance strategy (Ross & Wilson, 2002). Moreover, people are more likely to engage in denigration of distant past selves than recent past selves (Wilson & Ross, 2001).

Psychological distancing is supported by abstraction. When people engage in retrospection, they can mentally represent the past at varying levels of construal. A low level of construal involves concrete thinking, focusing on context-dependent subordinate characteristics; while a high level of construal involves abstract thinking, focusing on gist, superordinate characteristics, and extracting meaning. Research on level of construal has become increasingly prevalent over the last decade. The primary contribution to this line of research has been Construal Level Theory (CLT), which explains that level of construal becomes increasingly abstract as people consider greater psychological distance (Trope & Liberman, 2010). The inaugural CLT studies demonstrated that considering a distant (as opposed to near) future elicited higher levels of abstraction (Liberman, Sagristano, & Trope, 2002; Liberman & Trope, 1998; Trope & Liberman, 2003). This relationship between temporal distance and abstraction was later shown to occur when considering the past as well (Kyung, Menon, & Trope, 2010, 2014). Since its beginning in temporal distance, the tenet of CLT has been conceptually replicated in other domains (Henderson, Wakslak, Fujita, & Rohrbach, 2011; Liviatan, Trope, & Liberman, 2008; Wakslak, Trope, Liberman, & Alony, 2006).

Research on CLT has used both direct and implicit measures with findings indicating that the relationship between psychological distance and abstraction is strong, bi-directional, and automatic (Bar-Anan, Liberman, & Trope, 2006; Bar-Anan, Liberman, Trope, & Algom, 2007). Therefore, when people psychologically distance themselves from their denigrated past selves, it is likely that they simultaneously adopt higher, more abstract levels of construal. Negative events are construed with fewer contextual and phenomenological details than positive events (D'Argembeau & Van der Linden, 2004). Similarly, perceptions of dissimilarity between people lead to higher levels of construal (Liviatan et al., 2008), suggesting that if denigrated past selves are perceived negatively and as dissimilar from present selves, denigration may heighten abstraction.

Moreover, higher levels of construal could prove beneficial for self-esteem maintenance in several ways. Research has shown that adopting abstract construal eliminates decreases in state self-esteem following self-esteem threat (Vess, Arndt, & Schlegel, 2011). It is possible that this effect occurs because abstraction promotes the acceptance of negative feedback as a means for self-improvement (Belding, Naufel, & Fujita, 2015). In essence, negative feedback may be less threatening with a higher level of construal because abstraction encourages growth. Therefore, abstraction may support denigration as a self-enhancement strategy by promoting interpretation of the denigrated past self as a narrative of improvement. It is also possible that higher levels of construal protect against the negative implications of denigrating oneself because abstract memories are less emotionally evocative (Williams et al., 2007). In fact, depressed and emotionally avoidant individuals have a tendency to recall overly general memories as a defensive strategy (Williams et al., 2007).

However, there are a few reasons why higher levels of construal may be incongruent with the use of denigration as a self-enhancement strategy. First, people who adopt an abstract mindset have been shown to judge past events as more self-relevant and impactful (Boucher & Scoboria, 2015). Second, abstraction emphasizes schematicity and consistency of the self across time (Wakslak, Trope, & Liberman, 2012). Taken together, these findings suggest that adopting an abstract construal could lead people to incorporate the negative implications of their denigrated past selves into their present self-concepts. If denigration is used as a self-enhancement strategy, it is likely that these potential drawbacks are assuaged by psychological distancing to dissociate past selves from present selves.

Hypotheses

A primary objective of this project was to investigate whether people adaptively change their level of construal to facilitate self-enhancement. The level at which a person construes a memory of their past self is likely to vary depending on a multitude of factors; however, people may be particularly likely to construe their past self abstractly following a threat to their self-esteem. Adopting a higher level of construal would support the distancing and dissociation between past and present selves which is necessary to make retrospective denigration an effective self-enhancement strategy. Therefore, I propose the following hypotheses: (1) People will be more likely to denigrate their past selves following a threat to their self-esteem, relative to controls; and (2) People will be more likely to adopt a higher, more abstract level of construal after denigrating their past selves as a self-enhancement strategy, relative to controls.

CHAPTER 2

PILOT STUDY

I have argued that people will adaptively heighten their level of construal following a threat to their self-esteem as a result of denigrating their past selves to self-enhance, which is facilitated by psychological distancing. However, there is an underlying assumption in this argument which has not been directly tested in existing literature: Participants will engage in denigration of their past selves following a threat to their self-esteem. It is possible that denigration occurs as a constant tendency and that people will not denigrate more as a temporary self-esteem maintenance strategy. Therefore, I conducted this pilot study to test whether people are more likely to denigrate their past selves following a threat to self-esteem. I also included measures of psychological distance and abstraction to allow for preliminary analyses testing the effects of self-esteem threat (and subsequent self-enhancement strategies) on distance and level of construal.

I elected to induce a self-esteem threat by manipulating feedback on a measure of intelligence. Because I specifically threatened participants' intelligence, it is likely that the manipulation would be more effective for people whose self-esteem is contingent on their academic competence. Further, previous research has shown that people are particularly likely to denigrate their past selves on attributes that they deem important (Wilson & Ross, 2001). Therefore, people may be more likely to denigrate their past selves on traits related to academic competence following a threat to their intelligence than on other attributes.

Methods

Participants

Prior research on self-concept following threats to self-esteem using an intelligence-threat manipulation found large effects (d = 0.87; Vohs & Heatherton, 2001). To detect the effect with adequate power (β = .8) an analyzable sample of 44 total participants or 22 per condition would be necessary. However, because I intended to conduct exploratory analyses, I elected to collect a larger sample and planned to obtain 100 total participants or 50 per condition. This larger sample size enables the detection of medium effects (d = 0.57) at 80% power.

Participants (N = 113) were undergraduate students recruited from the University's participant pool in exchange for course credit. No demographic data was collected (including age, gender, or ethnicity). Participants were randomly assigned to either the self-esteem threat condition (n = 51) or the control condition (n = 62).

Measures

Contingencies of Self-Worth Scale

The Contingencies of Self-Worth Scale (Crocker, Luhtanen, et al., 2003) is a 35-item measure consisting of seven subscales (family support, competition, appearance, God's love, academic competence, virtue, approval from others), each representing a factor which self-esteem may be contingent on. Participants endorse each item on a 7-point scale from *strongly disagree* to *strongly agree*. Scores are computed for each subscale separately by taking the average scores of each subscale's respective five items. Higher scores indicate higher contingency. For this study, the complete scale was administered but only the academic competence subscale was scored. The academic competence subscale of the Contingencies of Self-Worth Scale showed acceptable internal consistency in this study (α = .81).

State Self-Esteem Scale

The State Self-Esteem Scale (Heatherton & Polivy, 1991) consists of 20 items which participants endorse on a 5-point scale ranging from *not at all* to *extremely*. Items are self-descriptive statements designed to measure both a person's positive and negative self-regard in the present moment. Higher scores indicate more positive self-esteem. The State Self-Esteem Scale showed acceptable internal consistency in this study (α = .92).

Behavior Identification Form

The Behavior Identification Form (BIF; Vallacher & Wegner, 1989) tasks participants to make a forced choice between two definitions for 25 behaviors. One of the choices represents an abstract definition and the other a concrete definition. For example, a person may define recycling as caring for the environment (an abstract definition) or as bagging paper, glass and cans (a concrete definition). Although initially designed to measure individual differences in stable tendencies, the BIF has since been one of the most commonly used measures to capture differences in construal level following experimental manipulation (Burgoon, Henderson, & Markman, 2013). Scores are derived by adding the total number of behaviors for which the participant chose the abstract definition. As such, higher scores indicate a more abstract level of construal.

Remote Associations Test

The Remote Associations Test (RAT; Mednick & Mednick, 1962) is a 30 item measure originally designed to test creative thinking. In each item, participants are given three words and are tasked to generate a fourth word which is related to all three of the given words. Previous studies have established use of the RAT to provide participants with veridical poor performance feedback (McFarlin & Blascovich, 1984). In this study, participants were tasked to complete 10 items varied in difficulty by condition (based on (McFarlin & Blascovich, 1984). Participants in the self-esteem threat condition received 10 difficult items while control participants received a mix of 5 difficult items and 5 easy items (see Appendix A).

Testing Environment

The study was conducted in-person, taking place in three separately configured rooms. The number of participants per session ranged from one to six. In sessions with multiple participants, extra precaution was taken to ensure that participants were unable to see each other's responses or feedback. In the first room, all participants were seated around a large rectangular table and directed to leave at least one empty chair between them. In the second room, each participant was seated at a separate desk facing the wall so that their backs were towards each other. In the third room, participants were seated two per desk and were separated by a cardboard divider.

Procedure

Participants provided informed consent and were then given a paper packet to be completed at the instruction of the experimenter using either a pencil or pen. The study began with the Contingencies of Self-Worth Scale. The experimenter instructed participants to complete the first set of questions and then to wait for further instruction. The Contingencies of Self-Worth Scale was given prior to any other measures (and prior to the manipulation) because it was intended to be used as an individual difference measure, independent from influence of other study tasks.

Next, participants underwent the self-esteem threat manipulation (adapted from Vohs & Heatherton, 2004). Condition was randomly assigned by session, such that all participants within a session were assigned to the same condition. In both conditions, participants were told that they would be completing the Remote Associations Test and that,

> The Remote Associations Test has been found to be a valid and reliable intelligence test used worldwide to predict future success. Past research has demonstrated that scores predict school achievement and future earning potential.

Participants were given four minutes to complete ten RAT questions.

Participants in the self-esteem threat condition were instructed to complete the questions and then had their RAT scored in front of them by the experimenter. The experimenter used a pen with red ink to make a large slash mark through any unanswered or incorrect questions. Past research (Vohs & Heatherton, 2004) has found that participants answer one question correctly on average. However, as the experimenter graded their responses, she told participants that other students typically score an 8 out of 10, making their performance look poor in comparison. As such, scoring on this measure is veridical, but the interpretation of one's score is false. Participants are erroneously led to believe that their poor performance is atypical and below average in comparison to their peers, when in reality their performance is typical. Moreover, while the test is scored accurately, scores are <u>not</u> predictive of intelligence, school achievement or future earning potential as participants were led to believe.

Participants in the control condition were instructed to complete the questions and were then told, "Your test will be scored later for use in an upcoming study." As such, participants in the control condition did not receive any feedback on their performance.

Following the self-esteem threat manipulation, the remaining tasks were identical across conditions. All participants were instructed to complete the rest of the packet at their own speed and to then wait for further instruction once all other participants had finished. The next questionnaire that participants completed was the State Self-Esteem Scale. By completing the State Self-Esteem Scale directly after the threat manipulation, it was intended to serve as a manipulation check.

Participants were then asked to imagine completing the RAT in the past and to indicate whether they believe they would have performed better or worse than they had presently. This question served as an opportunity for participants to denigrate their past selves relative to their present performance.

Next, participants were prompted to spend approximately three minutes writing about a memory of themselves from their past. If questioned for further instruction, the experimenter told participants that they were welcome to write about any memory of their choosing; no restrictions concerning the type of memory were given. After writing about their chosen memory, participants were tasked to think about what they had been like at the time of their memory. They were asked to rate how well the following traits would have described them: competent, knowledgeable, likeable, attractive. They were also asked to mark on a timeline how distant from "now" their memory felt. Finally, participants completed the BIF as a measure of their level of construal.

Data Preparation

Quantitative Measures

All questionnaires were scored according to standard guidelines (see Table 1 for descriptive statistics and Table 2 for correlations). Distance scores were recorded in centimeters by measuring how far away from the "close" endpoint (located on the right) the participant made their marking. Analyses containing contingent self-worth as a variable were conducted based on scores from the Academic Competence Contingent Self-Worth Subscale only. For regression analyses, average scores were computed for the Academic Competence Contingent Self-Worth Subscale and the State Self-Esteem Scale, and then individual scores were mean centered.

Categorical variables were dummy coded. Condition was dummy coded with the control group as 0 and the threatened group as 1. Responses to the question asking participants if they were to have taken the RAT in the past, would their performance in the past have been better or worse than they had performed "today" (referred to as denigration in tables) were dummy coded with "better" as 0 and "worse" as 1.

Table 1

Pilot Data Descriptive Statistics

	N	Overall	Threatened	Control
Academic Contingent Self-Worth (CSW)	113	28.21 (4.59)	28.00 (4.61)	28.39 (4.61)
Remote Associations Test (RAT)	113	1.70 (1.79)	0.55 (0.67)	2.65 (1.87)
State Self-Esteem (SSE)	113	67.39 (14.42)	67.76 (14.71)	67.08 (14.28)
Denigration	98	30.6%	21.4%	37.5%
Competent	113	3.56 (0.97)	3.55 (0.98)	3.56 (0.97)
Knowledgeable	113	3.50 (1.05)	3.35 (1.09)	3.61 (1.01)
Likeable	113	3.73 (1.06)	3.96 (0.89)	3.53 (1.16)
Attractive	113	3.00 (1.17)	3.12 (1.26)	2.90 (1.10)
Distance	112	7.66 (4.57)	7.40 (4.51)	7.87 (4.65)
Behavior Identification Form (BIF)	113	14.82 (5.19)	13.96 (5.71)	15.53 (4.64)

Note. Denigration refers to the proportion of participants who selected worse when asked if their performance on the RAT would have been better or worse in the past.

Table 2

Pilot Data Correlations

	1	2	3	4	5	6	7	8	9	10
1. Cond	-	-	-	-	-	-	-	-	-	-
2. CSW	-.04	-	-	-	-	-	-	-	-	-
3. RAT	-.59**	.01	-	-	-	-	-	-	-	-
4. SSE	.02	-.34**	-.01	-	-	-	-	-	-	-
5. Denigration	-.17	.19	.09	-.17	-	-	-	-	-	-
6. Competent	-.01	.02	.05	.14	.1	-	-	-	-	-
7. Knowledgeable	-.12	.01	.04	.15	.24*	.68**	-	-	-	-
8. Likeable	.20*	-.003	-.26**	.14	-.05	.32**	.36**	-	-	-
9. Attractive	.09	-.09	-.24*	.3**	.02	.35**	.28**	.54**	-	-
10. Distance	-.05	.07	.14	-.18	.02	-.05	-.08	-.09	-.05	-
11. BIF	-.15	.003	.003	.004	.03	.05	-.008	-14	-.08	-.15

Note. Condition was coded as 0=control, 1=threat; a positive correlation with condition indicates higher levels of the variable in the threatened condition. Denigration was coded as 0=better, 1=worse, with worse indicating that the participant believed their past performance would have been worse than their present performance; a positive correlation with denigration indicates higher levels of the variable when the participant did engage in denigration.

* = significant at the .05 level

** = significant at the .01 level

Qualitative Measures

Experimenters coded participants' written descriptions of their memories for the following factors after all data collection was completed: (a) content – academic, social; and (b) mindset – growth, fixed. Experimenters were blind to the participant's condition when coding. Each memory was only coded by one experimenter due to time constraints. Content was coded as academic if the primary focus was on the participant's intelligence or competence, and social if the focus was on an interpersonal relationship. Mindset was coded as growth mindset if the participant discussed an experience involving improving or overcoming a challenge or deficit, and fixed if they did not discuss a transitional experience.

Results

Manipulation check

As expected, participants in the self-esteem threat condition answered significantly fewer Remote Associations Test items correctly than the control condition, $t(111) = 7.62$, $p < .001$, $d = 1.5$. However, both groups performed relatively poorly (less than 30% correct) on average (see Table 1). It is possible that control participants also felt threatened after their relatively poor performance. Control participants did not receive feedback about their performance and therefore could have overestimated how well they had done. Nevertheless, even without feedback, if the questions felt difficult, control participants may have felt inadequate. In attempt to alleviate this concern, I presented control participants with all easy RAT items (based on McFarlin & Blascovich, 1984) in the following studies.

If the Remote Associations Test manipulation successfully threatened participants' self-esteem in the self-esteem threat condition, I would expect to see lower State Self-Esteem Scale scores in the self-esteem threat condition than the control condition. An independent samples t-test did not reveal a significant difference in state self-esteem between the threatened condition and the control condition, $t(111) = -0.25$, $p = .803$, $d = 0.05$ (see Table 1).

The effect of the threat manipulation on state self-esteem was marginally moderated by academic contingent self-worth, $b = -0.996$, $SE = .56$, $t = -1.776$, $p = .079$. State self-esteem did not vary by contingent self-worth in the control condition, $b = -0.62$, $t = -1.63$, $p = .106$. However, having higher academic contingent self-worth was associated with lower levels of state self-esteem in the threatened condition, $b = -1.61$, $t = -3.87$, $p < .001$. Therefore, because the self-esteem threat manipulation was moderated by academic contingent self-worth, I included academic contingent self-worth as a moderator in all subsequent analyses examining the effect of condition.

Denigration

I expected that participants would be particularly likely to denigrate their past selves following a threat to their self-esteem under the assumption that denigration is a self-esteem enhancement strategy. I measured denigration in two ways: (1) selection of the "worse" response when asked to indicate how they believe their past performance would compare to their present performance if they were to have taken the RAT in the past; and (2) low endorsement of the given positive traits—competent, knowledgeable, likeable, attractive—as descriptive of participants' past selves from their recalled memories.

According to a Pearson Chi-Square test, the proportion of participants who denigrated their past self (by indicating a belief that their past performance would have been worse than their present performance) did not vary by condition, $\chi^2(1) = 2.92$, $p = .088$, $\phi = .17$. Moreover, data were not trending in the hypothesized pattern. Fewer participants denigrated in the self-esteem threat condition (21.43%) than in the control condition (37.5%). However, several participants ($n = 15$) did not provide a response to this question. Of those who did not respond, some wrote in their packets that they had not taken the RAT in the past, suggesting that participants may have been misinterpreting the question and not providing meaningful responses.

I reasoned that participants would only denigrate their past selves on traits relevant to the threat; in this case, because participants' intelligence was threatened, that they may denigrate their past competence or knowledge. Contingent self-worth moderated the effect of condition on denigration of past knowledgeability, $b = -.086$, $t = -1.99$, $p = .05$. Participants with high contingent self-worth rated their past selves as significantly less knowledgeable if their self-esteem was threatened compared to the control condition, $b = -.66$, $t = -2.3$, $p = .02$. A difference between conditions was not observed for participants with low academic contingent self-worth, $b = .13$, $t = 0.46$, $p = .64$. These finding suggests that people do engage in denigration of relevant traits following a threat to their self-esteem, but only if their self-worth is contingent on a domain relevant to the threat. Analyses examining the effect of condition on past competence ratings did not produce significant results. Therefore, I only present subsequent a priori hypotheses for knowledgeable ratings.

Unexpectedly, participants who had their self-esteem threatened rated their past selves as more likeable than those in the control condition, $t(111) = -2.17$, $p = .03$, $d = .42$ (see Table 1). In order to better understand participants' self-concepts of their past selves, I examined whether differences in likeable and knowledgeable ratings varied by condition. A 2x2 mixed-model ANOVA with trait (likeable, knowledgeable) as a within-subjects factor and condition (threatened, control) as a between-subjects factor revealed a significant interaction, $F(1, 111) = 10.03$, $p = .002$, $\eta_p^2 = 0.08$. Participants whose self-esteem was threatened remembered their past selves as being more likeable than they were knowledgeable, $t(50) = 3.72$, $p = .001$, $d = 0.07$. This difference in traits was not present in the control condition, $t(61) = -0.56$, $p = .58$, $d = 0.52$. That is, participants in the control condition remembered their past selves as equally likeable and knowledgeable. These results suggest that threatened participants may self-enhance by making downward temporal comparisons to threat-relevant traits (as hypothesized) but also by making upward temporal comparisons to threat-irrelevant traits.

Abstraction

I predicted that engaging in self-enhancement strategies following threats to self-esteem would heighten participants' levels of construal. Accordingly, I hypothesized that participants in the self-esteem threat condition would have higher levels of construal compared to controls, measured as BIF scores. The self-esteem threat manipulation was moderated by academic contingent self-worth, so I included academic contingent self-worth as a moderator when testing the effect of condition on level of construal. I did not find evidence of a significant interaction effect, $b = .356$, $t = 1.68$, $p = .097$. However, analyses of simple slopes revealed that participants with *low* academic contingent self-worth showed more concrete levels of construal in the threatened condition than controls, b = -3.19, t =-2.33, p = .021. Participants with *high* academic contingent self-worth did not show a difference in construal level between conditions, b = 0.08, t =0.06, p = .957.

These results are not in-line with my hypotheses. I would have expected that participants with high academic contingent self-worth would show more abstract construal, because they were the group who engaged in denigration of their past self after experiencing decreased self-esteem. In contrast, I found that participants with low academic contingent self-worth (who showed high state self-esteem following the threat, possibly from upward comparison to past likeability) showed more concrete construal. I present theory supporting upward temporal comparison as a possible self-enhancement strategy in the following discussion section.

Distance

Given previous research showing that past events with unflattering implications feel psychologically more distant than objectively equidistant events with favorable implications (Ross & Wilson, 2002), I hypothesized that participants would feel greater psychological distance if they engaged in denigration following a threat to self-esteem. The effect of condition on distance was marginally moderated by academic contingent self-worth, b = 0.36, t =1.91, p = .059. Participants in the threat condition recalled more psychologically distant memories the higher their academic contingent self-worth, b = 0.26, t =1.92, p = .058. Distance was not associated with contingent self-worth in the control condition, b = -0.10, t = -0.75, p = .45. These results are consistent with past research in that the participants who were more likely to denigrate their past selves (those with high academic contingent self-worth) recalled more psychologically distant memories.

I hypothesized that people would adopt higher levels of construal when engaging in denigration because they would distance from their past selves. Contrary to my prediction, distance was not predictive of construal level, $b = -0.16$, $t = -1.53$, $p = .128$. Therefore, despite there being a connection between denigration and psychological distance, it does not appear that distance is the mechanism by which self-enhancement strategies may affect level of construal. Accordingly, in the following studies, I measured distance but did not examine it as a predictor.

Exploratory Analyses On Written Descriptions Of Autobiographical Memories

In designing this pilot study, participants were tasked to write about an autobiographical memory in order to encourage them to incorporate their past selves into their self-esteem maintenance strategies. I did not make any hypotheses about the content of participants' memories. However, my analyses on participants' ratings of how well different traits described their past selves indicated that denigration was domain-specific; participants whose self-esteem was threatened recalled their past selves as less knowledgeable (a trait relevant to having their intelligence threatened) but more likeable (a trait unrelated to the threat). To further investigate this finding, I coded the content of participants' memories as either academic or interpersonal.

Participants showed a tendency to recall interpersonal memories (control = 65.5%, threat = 71.7%) rather than academic memories (control = 34.5%, threat = 28.3%), and this tendency did not vary by condition, $\chi^2(1) = 0.46$, $p = .498$, $\phi = 0.07$. However, memory content varied depending on whether the participant expressed themes related to a growth mindset or a fixed mindset. Participants in the threat condition were more likely to recall interpersonal memories if they demonstrated a fixed mindset, but were more likely to recall academic memories if they demonstrated a growth mindset, $\chi^2(1) = 12.42$, $p < .001$, $\phi = 0.52$. This pattern did not occur in the control condition. Control participants recalled more interpersonal memories regardless of mindset, $\chi^2(1) = 0.13$, $p = .72$, $\phi = 0.05$. These findings suggest that while people may generally have a tendency to recall interpersonal memories, people whose intelligence has been threatened may instead recall a memory relating to their academic performance if they believe that intelligence is malleable. It is likely that people selectively recall either interpersonal or academic memories following a threat to their self-esteem depending on which content would support self-enhancement according to their theories of intelligence.

I inferred earlier that people may differ in the type of self-enhancement strategy they use (denigration or idealization) depending on whether they are evaluating past attributes that are relevant or irrelevant to the threat domain. Growth mindsets may facilitate denigration of threat-relevant traits, while fixed mindsets may facilitate idealization of threat-irrelevant traits. In the following studies, I tested this inference by assigning participants to recall an academic or interpersonal memory.

If memory content affects which self-enhancement strategy people use, it may also affect their subsequent level of construal. To test for such an effect, I conducted a regression analysis including condition, contingent self-worth, and memory content as predictors of BIF scores. The three-way interaction was significant, $b = 1.35$, $t = 2.48$, $p = .015$, such that construal level only differed between conditions for participants with low academic contingent self-worth who recalled an interpersonal memory (see Figure 1).

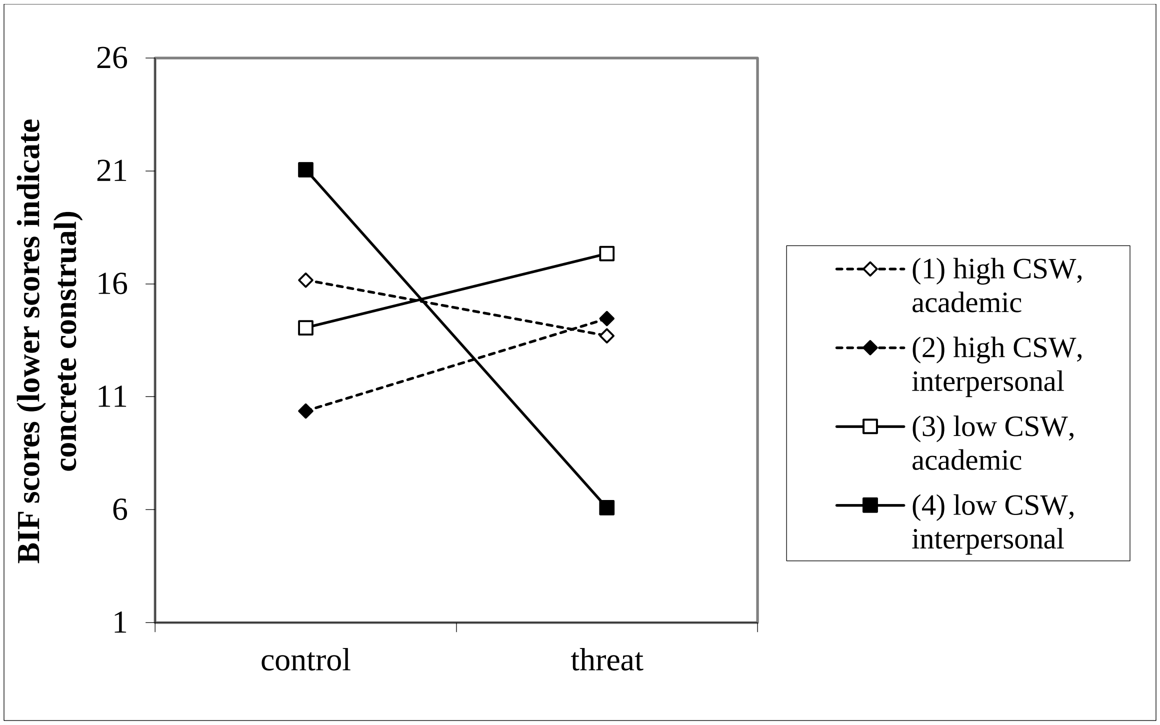

Figure 1. Contingent self-worth and memory content moderate the effect of condition on level of construal.

Participants with low academic contingent self-worth who recalled an interpersonal memory displayed a more concrete level of construal in the threat condition than in the control condition, $b = -5.85$, $t = -3.54$, $p = .001$. In my earlier analyses, I found that people with low academic contingent self-worth (who responded to the threat with high self-esteem and did not denigrate their past selves) showed lower levels of construal. This result builds on those findings, showing that they specifically adopted more concrete construal when recalling interpersonal memories; that is, when the content of their memory was irrelevant to the threat. A relationship between low contingent self-worth, recalling and idealizing threat-irrelevant attributes, and narrowing construal seems likely.

Discussion

A primary goal in conducting the pilot study was to test the underlying assumption that people denigrate their past selves as an active self-enhancement strategy. Prior research established people's tendency to engage in downward comparisons and denigrate their past selves (Wilson & Ross, 2000, 2001), and presented evidence showing that unfavorable past selves are less likely to be incorporated into one's present self-concept (Ross & Wilson, 2002). Nevertheless, a direct test of whether people strategically use denigration as a form of self-regulation when they need to enhance their self-esteem had not been conducted.

My results provide evidence that people are indeed more likely to denigrate their past selves when their present self-esteem has been threatened; but denigration was domain specific. In this study, participants' intelligence was threatened and as expected, they denigrated how knowledgeable they were in the past. However, participants also responded to the threat by recalling their past selves as more likeable. Together, these findings suggest that denigration may only be one possible self-enhancement strategy using temporal comparison. People may utilize their past selves to enhance their self-esteem by making downward comparisons in threat-relevant traits, while simultaneously making upward comparisons in unrelated traits.

When I made my initial hypotheses, I did not anticipate that participants may use upward temporal comparisons to their past selves in order to maintain self-esteem in the present; I only predicted that people would use downward temporal comparisons. Previous research had shown that people are more than twice as likely to make downward temporal comparisons than upward temporal comparisons when providing open-ended descriptions (Wilson & Ross, 2000). Upward comparisons idealizing the past self would not contribute to a self-enhancing narrative of improvement over time. However, idealization of one's past self may enhance present self-esteem in other ways. Nostalgia – longing for one's past – has been shown to protect against self-esteem threat (Vess, Arndt, Routledge, Sedikides, & Wildschut, 2012) and increase positive self-regard (Baldwin & Landau, 2014). Importantly, the positive effects of nostalgia seem to occur when the past self is incorporated into the present self-concept by directing focus to similarities (Baldwin, 2016). Therefore, making upward temporal comparisons favoring the past may enhance self-esteem in the present if the comparisons are made in stable nonthreatened attributes (such as the enduring interpersonal qualities participants in the pilot study recalled). People have also been found to perceive their past selves as more authentic when experiencing nostalgia (Baldwin, Biernat, & Landau, 2015), which could indicate that making an upward comparison to a past self mitigates self-esteem threats because people feel their more favorable past self is more representative of their "true" self.

A second aim of the pilot study was to examine whether engaging in self-enhancement strategies produces differences in level of construal. I hypothesized that participants would adopt higher, more abstract levels of construal following a threat to their self-esteem. I found a construal level effect, but not as predicted. People whose self-worth was not contingent on academic competence did not show decreased self-esteem after receiving negative feedback on their intelligence, nor did they denigrate their past selves. Those people, with low academic contingent self-worth and high state self-esteem following the RAT, held a more concrete level of construal relative to controls.

Building on this finding, I examined the content of participants' memories and found that narrowing of construal level following a self-esteem threat was isolated to those with low academic contingent self-worth who recalled an interpersonal memory. Recalling specific memories (as opposed to more abstract/general memories) is a crucial component to building self-defining memories which shape a person's life narrative (Singer, Blagov, Berry, & Oost, 2013). By recalling specific self-defining memories of threat-irrelevant attributes, participants may have been attempting to establish their favorable interpersonal qualities as more important and stable across time than their intelligence.

To this end, I also found that the content of a participant's memory varied depending on whether they recalled a transformative event, evoking a growth mindset, or they described their attributes as remaining stable, evoking a fixed mindset. Following a threat to their self-esteem, participants who displayed growth mindsets were more likely to recall academic memories. By recalling a time when they had been able to improve their academic performance in the past, participants may have reminded themselves that they would be able to overcome today's failure in order to succeed in the future. In contrast, people with fixed mindsets would not believe that intelligence could be improved, and therefore would not benefit from recalling a time their academic performance has also been poor in the past. Instead, participants with fixed mindsets recalled their interpersonal relationships, perhaps reminding them that they are likeable despite not being intelligent. Therefore, growth mindsets may facilitate denigration as a self-enhancement strategy when evaluating threat-relevant traits. In contrast, fixed mindsets may facilitate idealization as a self-enhancement strategy when evaluating threat-irrelevant traits.

CHAPTER 3

RATIONAL FOR STUDIES

Consistent with my hypotheses, results from my pilot study showed that people do respond to threats to their intelligence by denigrating their past selves' knowledgeability and psychologically distancing. However, this was only true for participants with high academic contingent self-worth. Those with low academic contingent self-worth appear to have maintained their self-esteem by recalling favorable interpersonal memories. Moreover, engaging in distancing and denigration did not lead to more abstract construal. Unexpectedly, the self-esteem maintenance strategy which led to an adaptive level of construal was recalling favorable interpersonal memories, and doing so led to a more concrete construal. Given these findings, Studies 1 and 2 were designed to examine adaptive changes in levels of construal related to self-esteem maintenance strategies but investigated memory content as a mechanism rather than psychological distance.

I propose that people recall past selves in one of two ways to serve self-esteem maintenance goals: past selves are denigrated in threat-relevant attributes to enable downward comparison; or past selves are idealized in threat-irrelevant attributes to enable upward comparison. In the context of threats to intelligence, people would make downward comparisons to past academic performance or knowledgeability and would make upward comparisons to nonacademic attributes, such as interpersonal success or likeability. Further, I propose that denigration leads to more abstract construal whereas idealization leads to more concrete construal.

To test these assertions, I assigned participants to recall either an academic or interpersonal memory. Controlling the content of the participant's memory enabled me to test the effect of recalling threat-relevant vs. threat-irrelevant memories on the type of self-enhancement a person engages in (either denigrating or idealizing their past self), and the subsequent effect on construal level. Participants in Study 1 were instructed to recall memories about their academic experience and participants in Study 2 were instructed to recall memories about their interpersonal relationships.

The studies preserved many elements of the pilot study design, with a few important exceptions. For a depiction of the study designs, see Figure 2. First, a pre-post design was implemented in which participants recalled a memory and then completed a measure of their construal level twice—once before and once after the self-esteem threat manipulation (the BIF was still used as the measure of construal level, but was split into halves with one half given in the pre-test and one half given in the post-test). This change was added to observe directly whether individuals engage in adaptive *switching* of their level of construal as a result of the self-esteem maintenance strategies they use following threats to their self-esteem. Second, the difficulty of the RAT items was adjusted, such that participants in the control condition received easy items. Third, the objective distance of participants' memories was held constant. All participants were instructed to recall memories from their first few years in high school. The median age of participants was 19 years in Study 1 and 20 years in Study 2. By asking them to recall a memory from their first few years of high school, most participants recalled a memory of approximately 5 years in the past. Providing a temporal landmark (such as the period of time a person was in high school) prevents participants from having to do mental arithmetic to recall a memory. Fourth, theories of intelligence (growth vs. fixed mindsets) were included as an individual difference measure to test whether mindset moderates the relationship between memory content and self-enhancement strategy (making denigration of one's past self more prevalent when recalling threat-relevant memories and idealization of one's past self more prevalent when recalling threat-irrelevant memories). Finally, trait self-esteem was included as an additional exploratory individual difference measure.

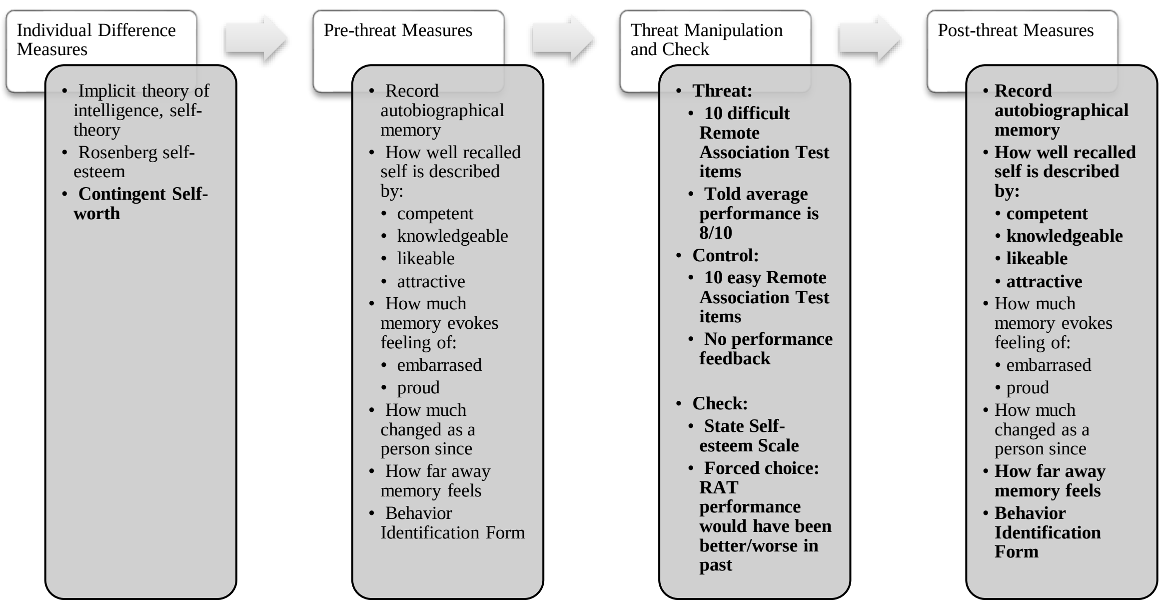

Figure 2. Depiction of study designs. Bold text represents elements of pilot study that were preserved in Studies 1 and 2 (plain text indicates added elements). Participants were free to recall any autobiographical memory of their choosing in the pilot study, but were restricted to memories of their high school academic experience in Study 1 and interpersonal relationships in Study 2.

CHAPTER 4

STUDY 1: ACADEMIC MEMORIES

Hypotheses

I propose the following hypotheses: (1) compared to their pre-test memories, threatened participants will be more likely to denigrate their past selves in their post-test memories, but control participants' pre-test and post-test memories will not differ; (2) compared to pre-test, threatened participants will be more likely to show higher levels of construal post-test, but control participants' pre-test and post-test construal levels will not differ; (3) the effect of condition on construal will be mediated by denigration; (4) the effect of condition will be moderated by academic contingent self-worth such that participants with high academic contingent self-worth will show a larger difference in pre-test and post-test scores in the threat condition, relative to those with low academic contingent self-worth; and (5) the effect of condition will be moderated by theories of intelligence such that participants with growth mindsets will show a larger difference in pre-test and post-test scores in the threat condition, relative to those with fixed mindsets.

Method

Participants

To capture the primary effect of interest, the effect of self-esteem threat on denigration of one's past self, I based my power calculation for Study 1 on the corresponding effect size observed in the pilot study. The effect of self-esteem threat condition on past knowledgeability was moderated by academic contingent self-worth. The regression model including condition, academic contingent self-worth and their interaction term explained 5% of the variance in past knowledgeability ratings. To detect the effect ($f^2 = .053$) with adequate power ($\beta = .8$), I required a total sample size of 210 participants.

Participants (*N* = 240) were recruited from the university research participant pool and compensated with course-credit. All participants were undergraduate psychology students, ranging in age from 18 – 30 years old with a mean age of 19.66 years old. The majority of participants identified as female (82.8%; 16% male; 1.2% other) and White/European-American (40.8%; 16.7% African-American; 11.3% Asian-American; 14.6% Other; 5.4% Latin-American; 3.8% Non-American).

Materials

The same measures (and scoring procedures) were used as in the pilot study. However, participants in the control condition received 10 easy RAT items as opposed to the mix of easy and difficult items that were used in the pilot study (See Appendix A). The following additional measures were also included:

Rosenberg Self-Esteem Scale

The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) is a 10-item measure of global or trait self-esteem. Items describe one's feelings toward themselves, such as "On the whole, I am satisfied with myself," and are rated on a 4-point scale (0 = *strongly disagree* to 3 = *strongly agree*). Scores are summed, with higher scores indicating more positive self-esteem.

Implicit Theories of Intelligence (Self-Theory) Scale

The Implicit Theories of Intelligence (Self-Theory) Scale (De Castella & Byrne, 2015) is based on the original 8-item measure of Implicit Theories of Intelligence

(Dweck, 1999) but re-words each item to measure a first-person account of people's beliefs about their *personal* ability to change their *own* intelligence. The scale contains four items expressing incremental beliefs, such as "I believe I can always substantially improve my intelligence," and four items expressing entity beliefs, such as "I don't think I personally can do much to increase my intelligence." Items are rated on a 6-point scale (1 = *strongly disagree* to 6 = *strongly agree*). Incremental items are reversed scored and then scores are averaged, with higher scores indicating greater endorsement of entity beliefs.

Testing Environment

The study was conducted in-person, with a maximum of six participants per session. In sessions with multiple participants, precaution was taken to ensure that participants were unable to see each other's responses or feedback. Participants were seated at tables facing the wall with two chairs per table and a cardboard divider separating workspaces.

Procedure

After providing informed consent, participants were given a paper packet (See Appendix B for an example of the threat condition) to be completed at the instruction of the experimenter. Participants began by completing the individual differences measures: the Theories of Intelligence (Self-Theory) Scale, the Rosenberg Self-Esteem Scale, and the Contingencies of Self-Worth Scale.

Following the individual difference measures, participants were tasked to write an autobiographical memory from their first few years of high school about their academic experience. Participants rated on a 5-point scale how well a list of traits (competent, knowledgeable, likeable, attractive) describe what they had been like at the time of the event they had just written about. Participants also provided three additional ratings (not included in the pilot study) on a 5-point scale indicating how embarrassed the memory makes them feel, how proud the memory makes them feel, and how much they feel they have changed since that memory. Next, they used the timeline measure to indicate how psychologically distant their memory feels from *today*. Then participants completed 12 items from the Behavior Identification Form.

Participants then underwent the self-esteem threat manipulation using the Remote Associations Test described in the pilot study. Directly after, participants completed the State Self-Esteem Scale as a manipulation check. They then responded to a revised forced-choice question regarding whether their performance on the RAT would have been better or worse in the past:

> Imagine you completed the Remote Associations Test in the past. Do you believe you would have performed better or worse in the past than you did today? My past performance would have been ___ than today's performance.

This question was not scored for analysis. It was only included to prime participants to consider their past and present selves comparatively.

Participants were then tasked to recall another memory from high school about their academic experience, and again rate how well the list of traits would have described themselves at that time, how embarrassing and proud the memory makes them feel, and how much they feel they have changed since. Next, they used the timeline measure to indicate how psychologically distant their memory feels from *today*. Finally, they completed a different set of 12 items from the Behavior Identification Form.

Data Preparation

Participants were excluded prior to analyses if they did not record two (both) memories ($n = 8$), if the experimenter indicated that they had not followed instructions ($n = 10$; e.g. proceeded to a section without waiting for instructions or did not write about a memory regarding academics), and/or if they volunteered an opinion during debriefing which indicated the manipulation was not effective ($n = 3$; e.g. they were aware their performance was not below average). Thus, there was an analyzable sample of 220 participants (control: $n = 105$; threat: $n = 115$).

Quantitative Measures

All questionnaires were scored according to standard guidelines (see Table 3 for descriptive statistics and Tables 4 for correlations). Missing data was dealt with using pairwise deletion. Ratings of past competence and knowledge were strongly correlated, so I averaged the scores to create a new variable, *proficiency*, representing both threat-relevant-traits. Analyses containing contingent self-worth as a variable were conducted based on scores from the Academic Competence Contingent Self-Worth Subscale only. For regression analyses, average scores were computed for the Implicit Theories of Intelligence (Self-Theory) Scale, Rosenberg Self-Esteem Scale, and the Academic Competence Contingent Self-Worth Subscale and then individual scores were mean centered. Condition was dummy coded with the control group as 0 and the threatened group as 1. Mediation analyses were run using the Process version 3.1 macro for SPSS (Hayes, 2017), which estimates regression coefficients using OLS and uses 5000 bootstrap samples to produce percentile bootstrap confidence intervals to estimate indirect effects.

Table 3

Study 1 Descriptive Statistics

	N	Overall	Threatened	Control
Academic Contingent Self-Worth (CSW)	219	28.52 (4.39)	28.31 (4.61)	28.75 (4.14)
Theory of Intelligence	217	17.70 (7.16)	17.62 (7.48)	17.79 (6.82)
Rosenberg Self-Esteem (RSE)	219	19.63 (5.54)	19.83 (5.48)	19.40 (5.63)
Remote Associations Test (RAT)	220	1.92 (2.00)	0.68 (0.84)	3.28 (2.02)
State Self-Esteem (SSE)	207	65.70 (15.68)	65.90 (15.41)	65.47 (16.07)
Competent				
First	219	3.63 (1.06)	3.72 (1.01)	3.53 (1.11)
Second	219	3.47 (1.17)	3.35 (1.13)	3.61 (1.17)
Knowledgeable				
First	220	3.64 (1.05)	3.63 (1.05)	3.65 (1.06)
Second	219	3.52 (1.15)	3.41 (1.17)	3.64 (1.12)
Likeable				
First	219	3.63 (0.92)	3.68 (0.91)	3.58 (0.92)
Second	218	3.57 (1.03)	3.54 (1.04)	3.60 (1.02)
Attractive				
First	219	3.03 (1.15)	3.03 (1.12)	3.03 (1.19)
Second	219	3.05 (1.16)	3.02 (1.11)	3.10 (1.21)
Embarrassed				
First	218	2.51 (1.44)	2.49 (1.39)	2.53 (1.50)
Second	216	2.33 (1.44)	2.32 (1.36)	2.34 (1.53)
Proud				
First	219	3.03 (1.58)	3.14 (1.56)	2.91 (1.58)
Second	219	3.15 (1.54)	3.23 (1.53)	3.06 (1.55)
Changed				
First	220	3.91 (1.09)	3.93 (1.11)	3.89 (1.07)
Second	220	3.81 (1.05)	3.89 (1.03)	3.73 (1.08)
Behavior Identification Form (BIF)				
First	216	7.56 (2.32)	7.29 (2.47)	7.86 (2.13)
Second	218	6.75 (2.69)	6.44 (2.60)	7.09 (2.75)

Table 4

Study 1 Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
First Memory																
1. Competent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Knowledgeable	.72*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Likeable	.30*	.32*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Attractive	.33*	.27*	.54*	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Embarrassed	-.35*	-.47*	-.38*	-.36*	-	-	-	-	-	-	-	-	-	-	-	-
6. Proud	.38*	.54*	.35*	.33*	-.64*	-	-	-	-	-	-	-	-	-	-	-
7. Changed	-.13	-.26*	-.25*	-.16	.21*	-.24*	-	-	-	-	-	-	-	-	-	-
8. BIF	.01	.06	.08	.05	-.02	.03	-.13	-	-	-	-	-	-	-	-	-
Second Memory																
9. Competent	.45*	.29*	.21*	.31*	-.14	.17	-.00	-.11	-	-	-	-	-	-	-	-
10. Knowledgeable	.31*	.34*	.14	.31*	-.15	.24*	-.08	-.12	.76*	-	-	-	-	-	-	-
11. Likeable	.23*	.16	.60*	.47*	-.28*	.29*	-.13	.01	.47*	.47*	-	-	-	-	-	-
12. Attractive	.24*	.17	.47*	.76*	-.27*	.27*	-.11	.10	.46*	.44*	.69*	-	-	-	-	-
13. Embarrassed	-.18	-.19*	-.24*	-.25*	.47*	-.29*	.08	.07	-.52*	-.54*	-.49*	-.38*	-	-	-	-
14. Proud	.18	.21*	.29*	.27*	-.34*	.43*	-.09	-.04	.51*	.62*	.48*	.42*	-.71*	-	-	-
15. Changed	-.03	-.15	-.17	-.16	.09	-.13	.67*	-.09	-.09	-.16*	-.20*	-.16	.16	-.20	-	-
16. BIF	.03	.13	.06	-.12	-.01	.07	-.15	.61*	.02	.06	.10	.21*	-.02	.09	-.24*	-
Measures																-
17. Condition	.09	-.01	.06	.00	-.02	.07	.02	-.12	-.11	-.10	-.03	-.03	-.01	.06	.07	-.12
18. Theory of Intelligence	-.15	-.13	-.22*	-.31*	.11	-.21*	-.02	-.07	-.19*	-.15	-.25*	-.27*	.03	-.06	.01	-.15
19. RSE	.26*	.17*	.44*	.51*	-.35*	.34*	.02	.03	.30*	.17	.46*	.50*	-.31*	.30*	-.07	.08
20. CSW	.02	-.01	-.11	-.05	.18*	-.12	.04	.06	-.01	.03	-.04	-.03	.12	-.06	.05	.08
21. SSE	.22*	.22*	.24*	.45*	-.45*	.39*	-.02	-.05	.20*	.19*	.32*	.44*	-.34*	.25*	-.07	.08

Table 4 Cont.

Study 1 Correlations

Measures	17	18	19	20
17. Condition	-	-	-	-
18. Theory of Intelligence	-.01	-	-	-
19. RSE	.04	-.42*	-	-
20. CSW	-.05	-.06	-.15	-
21. SSE	.01	-.36*	.70*	-.27*

Note. * = significant at the .01 level

Qualitative Measures

After all data collection was completed, each written description of a participant's memory was coded by two trained experimenters who were blind to the participant's condition. Memories were coded for: (a) narrative (κ = .602, $p < .001$) – stable positive, stable neutral/mixed, stable negative, upward transformation, downward transformation; (b) specificity (κ = .317, $p < .001$) – specific, episodic, generic; and (c) meaning (κ = .481, $p < .001$) – integrative, nonintegrative. The experimenters then met to clarify any discrepancies.

Narrative was coded to indicate the emotional tone of participants' memories with respect to its stability. Stable positive or negative memories expressed one consistent emotional tone from beginning to end. Upward transformations were narratives of improvement or personal growth, marked by a more positive resolution than beginning. Conversely, downhill transformations were narratives of change marked by a more negative outcome than beginning. Stable neutral/mixed memories incorporated both positive and negative aspects, but the combination persisted throughout the memory rather than transitioning from one tone to another.

Specificity and meaning were coded based on the Classification System & Scoring Manual for Self-Defining Memories (Singer & Blagov, 2002). This classification system involves coding memories as either specific—referring to a unique occurrence lasting less than one day (e.g. his/her high school graduation ceremony), episodic—referring to general events taking place over a period longer than one day (e.g. his/her senior year of high school), or generic—referring to equivalent events which occurred in multiple separate instances (e.g. the first day of school each school-year). The system also involves coding memories as either integrative or non-integrative. Integrative memories would be those which ascribe meaning to the memory (e.g. this experience taught me…).

Specificity and meaning could be indicative of construal level. Specific memories isolate particular events or experiences and often are rich in context-dependent phenomenological detail, corresponding to concrete construal. In contrast, generic memories focus on the stable features of recurring events or experiences that are not context-dependent, corresponding to abstract construal. Integrative memories extract meaning, emphasizing the event's role in the person's larger life story, corresponding to abstract construal. Conversely, nonintegrative memories are more likely to simply recall the procedural aspects of an event (when did it occur and step-by-step what happened), corresponding to a more concrete construal.

Results

Manipulation Check

As expected, participants in the self-esteem threat condition answered significantly fewer Remote Associations Test items correctly than the control condition, $t(218) = 12.63$, $p < .001$, $d = 1.68$. However, both conditions scored poorly, answering less than 35% correct on average (see Table 3). Despite using easier items for control participants, it is possible that they may have also evaluated their performance as a failure. Participants' state self-esteem following the RAT did not significantly differ between conditions, $t(205) = -0.19$, $p = .846$, $d = 0.03$. Nevertheless, correlations between state self-esteem and trait-level Rosenberg self-esteem scores were significantly stronger for control participants ($r = .79$) than threatened participants ($r = .62$) based on a Fisher's r-to-z transformation, $z = 2.5$, $p = .012$, suggesting threatened participants state self-esteem was impacted. The effect of the threat manipulation on state self-esteem was not moderated by any of the individual difference variables (theory of intelligence, trait-level Rosenberg self-esteem, or academic contingent self-worth), b's < |.497|, t's < |1.78|, $p > .077$.

Past Attributes

I hypothesized that participants would denigrate their past self in threat-relevant traits more following self-esteem threat than control. Consistent with this hypothesis, a 2x2 mixed ANOVA revealed a significant interaction between condition (threat, control) and pre- vs. post-test proficiency scores, $F(1, 218) = 4.47$, $p = .036$, $\eta^2 = .02$. Proficiency scores (average of competent and knowledgeable ratings) significantly decreased following the RAT in the threat condition, $t(114) = 2.63$, $p = .01$, $d = 0.25$, but not in the control condition, $t(104) = -0.28$, $p = .779$, $d = 0.03$.

To test for potential moderators, I conducted three 2x2 ANCOVAs with proficiency scores as a within-subjects factor (pre-, post-test), condition as a between-subjects factor, and an individual difference variable (one model with theory of intelligence, one with trait self-esteem, and one with academic contingent self-worth) as covariates. I did not find evidence that the effect of condition on denigration differed according to the covariates, F's < 2.92, p's > .089.

I also hypothesized that participants would be more likely to recall embarrassing memories following self-esteem threat than control. I did not find support for this hypothesis. Differences in how embarrassed participants were of their pre-test compared to their post-test memory did not differ by condition, $F(1, 212) = 0.003$, $p = .957$, $\eta^2 < .001$.

For completeness, I also tested for an effect of condition on change in the other provided ratings. I did not observe a significant effect of condition on change in participants' ratings of their past likeability, $F(1, 215) = 2.07$, $p = .152$, $\eta^2 = .01$, nor attractiveness, $F(1, 216) = 0.38$, $p = .536$, $\eta^2 = .002$. Likewise, the interaction between condition and change in how proud the participants were of their past was also not significant, $F(1, 216) = 0.16$, $p = .691$, $\eta^2 = .001$.

Abstraction

I hypothesized that threatened participants would increase their level of construal following threat, whereas control participants would not experience a change. I did not find support for this hypothesis, $F(1, 212) = 0.08$, $p = .774$, $\eta^2 < .001$. However, there was a main effect such that participants demonstrated more concrete construal after their second memory than their first, $F(1, 212) = 28.61$, $p < .001$, $\eta^2 = .12$.

I predicted that participants would adopt higher, more abstract levels of construal following threat, assuming that they would engage in denigration and in doing so, view their past and present selves as more distinct. Contrary to my prediction, differences in participants' ratings of how much they had changed since their pre-test compared to their post-test memory did not vary by condition, $F(1, 218) = 0.84$, $p = .36$, $\eta^2 = .004$.

Finally, I hypothesized that an effect of condition on increase in construal following threat would be mediated by denigration. To test this hypothesis, I conducted a regression with condition as the predictor, change in proficiency scores (computed as first memory minus second memory such that higher scores indicate greater denigration following threat) as the mediator, and change in Behavioral Identification Form scores (computed as second memory minus first memory such that higher scores indicate higher construal following threat) as the outcome. Change in proficiency marginally predicted change in construal level, $b = -0.25$, $SE = 0.14$, $t\,(211) = -1.83$, $p = .068$, although not in the expected direction. The indirect effect of condition on change in construal level via change in proficiency was not significant, $b = -0.08$, bootstrap $SE = 0.07$, 95% bootstrap CI [-0.24, 0.01].

Memory Content

Information on the proportion of participants who recalled different types of memories according to narrative, specificity and meaning are shown in Table 5.

The proportion of participants whose narrative code stayed the same between their pre- and post-test memory compared to those who changed to a different code differed according to their threat-manipulation condition, χ^2 (1, N = 220) = 6.93, p = .008. For participants in the control condition, the type of narrative described in the post-test memory was highly dependent on the type of narrative described in the pre-test memory, with participants tending to maintain the same narrative, χ^2 (16, N = 105) = 67.83, p < .001. However, threatened participants did not show the same consistency between pre- and post-test memory, χ^2 (16, N = 115) = 20.87, p = .183.

Table 5

Study 1 Proportions of Types of Memory Content

	Overall		Threatened		Control	
Memory	First	Second	First	Second	First	Second
Narrative						
Stable Positive	26.4	31.4	27.8	28.7	24.8	34.3
Stable Negative	15.5	19.1	13.0	18.3	18.1	20.0
Stable Neutral/Mixed	27.7	23.6	29.6	26.1	25.7	21.0
Uphill Transformation	22.7	20.0	23.5	21.7	21.9	18.1
Downhill Transformation	7.7	5.9	6.1	5.2	9.5	6.7
Specificity						
Specific	8.6	12.3	7.0	8.7	10.5	16.2
Episodic	91.4	86.8	93.0	90.4	89.5	82.9
Generic	-	0.9	-	0.9	-	1.0
Meaning						
Integrative	13.2	6.8	12.2	6.1	14.3	7.6
Nonintegrative	86.8	93.2	87.8	93.9	85.7	92.4

Of the participants who did change to a different narrative, the proportion of participants within the threatened and control conditions who changed to a stable positive memory (28% and 30%, respectively), a stable negative memory (18.7%; 22%), a stable neutral/mixed narrative (22.7%; 20%) or downhill transformation (8%, 12%) were similar. However, threatened participants appeared more likely to change to an uphill transformation (22.7%) than controls (16%).

The proportion of participants whose specificity code stayed the same between their pre- and post-test memory compared to those who changed to a different code did not differ according to their threat-manipulation condition, χ^2 (1, N = 220) = 0.44, p = .507. The amount of participants whose pre-test memory was coded as specific was small (n = 19) which means that analyses on this subset of participants should be interpreted with caution. However, results are in a pattern consistent with hypotheses, such that a larger proportion of participants changed from specific in the pre-test memory to episodic in the post-test memory (suggesting an increase in construal), within the threatened condition (87.5%) than the control (54.5%).

The proportion of participants whose meaning code stayed the same between their pre- and post-test memory compared to those who changed to a different code did not differ according to their threat-manipulation condition, χ^2 (1, N = 220) = 2.04, p = .154.

Discussion

Results from the pilot study indicated that people may engage in both upward and downward temporal comparisons to their past selves following a threat to their present self-esteem. When recalling a past self following threat, attributes relevant to the threat domain were denigrated while irrelevant attributes were idealized. To this end, I hypothesized that if people recalled memories relevant to the threat domain, they would be more likely to adopt denigration of their past self as a self-esteem repair strategy. Study 1 served to test this hypothesis by utilizing a threat to intelligence and restricting participants to recall memories of their academic experience during their early high school years.

My primary hypothesis was supported. Participants whose intelligence was threatened denigrated relevant past-attributes, recalling a memory of a less competent and knowledgeable past self after having their self-esteem threatened than they had prior. In contrast, control participants featured consistently competent and knowledgeable past selves in the two memories they recalled. As expected, the tendency to denigrate one's past self following threat did not extend to attributes which were irrelevant to the threat. That is, neither control nor threatened participants adjusted their memories to recall less likeable or attractive past selves.

Although participants shifted to recall their past selves as less competent and knowledgeable after their intelligence had been threatened, they did not express feeling more embarrassed of that past self or more changed since than the one they had recalled prior. This finding could be taken as evidence against my hypothesis. It is possible that participants were simply primed to think of their selves as less competent and knowledge by the threat, merging their evaluation of their present and past self, rather than denigrating their past to serve self-enhancement.

However, the narratives expressed in the participants' memories suggest that the memories participants recalled after having their intelligence threatened did have characteristics unique in comparison to controls that would be beneficial for self-esteem repair. Experiencing a threat to self-esteem led participants to not only be more likely to recall a different type of narrative than they had initially, but to be more likely to shift to recalling an upward transformation. Upward transformation narratives describe periods of growth, often telling the story of how the person overcame a challenge. This type of narrative mirrors theoretical explanations for denigrating past selves from Temporal Self Appraisal Theory (Wilson & Ross, 2001)—people recall their past selves as deficient to facilitate the impression that they have improved over time. This evidence that threatened participants shifted to recall a memory of their past self as less competent and less knowledgeable but featured in a narrative of improvement, strongly suggests a self-esteem repair strategy—an act to reassure themselves that they have been capable of overcoming similar challenges in the past. This pattern supports the use of downward temporal comparisons for self-enhancement following self-esteem threat.

Contrary to my hypotheses, the tendency to engage in denigration of relevant attributes following self-esteem threat was not moderated by contingent self-worth, implicit theory of intelligence, nor trait-level self-esteem. These null effects could be taken to suggest that the tendency to denigrate after threat is robust, occurring regardless of whether people have self-worth contingent in the threatened domain, have growth/incremental mindsets, or high self-esteem. Nevertheless, it is also possible that I did not observe statistically significant moderation effects simply due to low power leading to Type II errors.

Finally, I hypothesized that the act of denigration following self-esteem threat would produce an increased level of construal. In order for denigrating one's past self to be a successful self-enhancement strategy, the person must perceive themselves as having improved since. This stipulation implies that engaging in denigration involves perceiving dissimilarity between past and present selves, and dissimilarity is associated with abstraction (Liviatan et al., 2008). I found mixed support for this hypothesis. Using

Behavior Identification Form (BIF) scores as a measure of construal level, I did not find evidence that threatened participants were more likely to experience an increase in construal level after recalling their second memory (post-threat) than control participants. Moreover, change in how competent and knowledgeable people recalled their past selves from before to after the threat was marginally predictive of change in BIF scores, but not in the hypothesized direction. Larger decreases in past competence and knowledgeability were associated with narrowing of construal level, becoming more concrete rather than abstract post-threat. However, the content of participants'' memories told a different story. People were more likely to shift from specific memories, involving detailed events isolated to a period of time within 24 hours, to episodic memories, involving events spanning longer than 24 hours, if they experienced the intelligence threat than if they were in the control condition. As concrete memories are characterized as contextualized, shifting to recall longer durations of time could be indicative of shifting to more abstract memories. Nevertheless, other markers of abstraction, such as extracting meaning, were not more likely following self-esteem threat.

CHAPTER 5

STUDY 2: INTERPERSONAL MEMORIES

Hypotheses

I propose the following hypotheses: (1) compared to their pre-test memories, threatened participants will be more likely to idealize their past selves in their post-test memories, but control participants' pre-test and post-test memories will not differ; and (2) compared to pre-test, threatened participants will be more likely to show lower levels of construal post-test, but control participants' pre-test and post-test construal levels will not differ; (3) the effect of condition on construal will be mediated by idealization; (4) the effect of condition will be moderated by academic contingent self-worth such that participants with low academic contingent self-worth will show a larger difference in pre-test and post-test scores in the threat condition, relative to those with high academic contingent self-worth; and (5) the effect of condition will be moderated by theories of intelligence such that participants with fixed mindsets will show a larger difference in pre-test and post-test scores in the threat condition, relative to those with growth mindsets.

Methods

Participants underwent the same procedure (using the same materials) as in Study 1 expect that participants were tasked to recall interpersonal memories rather than academic memories. Participants still had their self-esteem threatened by receiving negative feedback about their intelligence. Accordingly, whereas participants in Study 1 recalled memories relevant to the threat domain, participants in Study 2 recalled threat-irrelevant memories.

Participants

I planned to recruit a sample of 210 participants directly following the completion of data collection for Study 1. As data collection proceeded any analyses of Study 1, I based my required sample size on the effect of self-esteem threat condition on past likeable ratings observed in the pilot study (d = .42). To detect a similar effect with adequate power (β = .8) I would require an analyzable sample of 180 participants. Collecting additional participants provided increased power to detect higher-order effects. Those who participated in either the pilot study or Study 1 were ineligible to participate in Study 2.

Participants (N = 243) were recruited from the university research participant pool and compensated with course-credit. All participants were undergraduate psychology students, ranging in age from 18 – 39 years old with a mean age of 20.12 years. The majority of participants identified as female (84%; 14.8% male) and White/European-American (38.3%; 17.7% African-American; 14% Other; 13.6% Asian-American; 7.4% Latin-American; 3.7% Non-American, 2.1% Native-American).

Data Preparation

Participants were excluded prior to analyses if they did not record two memories (n = 6), if the experimenter indicated that they had not followed instructions (n = 8), and/or if they volunteered an opinion during debriefing which indicated the manipulation was not effective (n = 4). Thus, there was an analyzable sample of 227 participants (control: n = 115; threat: n = 112).

Quantitative Measures

The data were prepared the same as in Study 1 (See Table 5 for descriptive statistics and Table 6 for correlations). Ratings of past competence and knowledge were not as strongly correlated as in Study 1, and therefore were analyzed separately.

Table 6

Study 2 Descriptive Statistics

	N	Overall	Threatened	Control
Academic Contingent Self-Worth (CSW)	221	28.64 (3.83)	28.91 (4.05)	28.39 (3.60)
Theory of Intelligence	225	17.89 (6.49)	17.42 (6.53)	18.35 (6.45)
Rosenberg Self-Esteem (RSE)	223	19.67 (5.22)	19.71 (4.93)	19.63 (5.51)
Remote Associations Test (RAT)	227	2.04 (2.10)	0.60 (0.85)	3.44 (2.00)
State Self-Esteem (SSE)	213	67.14 (14.9)	67.63 (15.4)	66.68 (14.5)
Competent				
First	226	3.56 (0.93)	3.52 (0.93)	3.61 (0.93)
Second	227	3.33 (1.06)	3.27 (1.08)	3.37 (1.04)
Knowledgeable				
First	227	3.48 (0.87)	3.46 (0.89)	3.50 (0.86)
Second	227	3.42 (0.94)	3.47 (0.90)	3.37 (0.98)
Likeable				
First	227	3.69 (1.03)	3.75 (1.04)	3.63 (1.01)
Second	227	3.58 (1.00)	3.58 (1.02)	3.57 (0.99)
Attractive				
First	227	2.96 (1.01)	2.94 (1.09)	2.99 (0.92)
Second	227	3.02 (1.11)	3.00 (1.17)	3.04 (1.06)
Embarrassed				
First	225	2.40 (1.30)	2.39 (1.33)	2.42 (1.27)
Second	225	2.22 (1.37)	2.31 (1.37)	2.12 (1.36)
Proud				
First	227	2.93 (1.47)	2.96 (1.49)	2.90 (1.45)
Second	227	3.00 (1.51)	2.97 (1.50)	3.03 (1.52)
Changed				
First	226	4.29 (0.82)	4.36 (0.86)	4.23 (0.78)
Second	227	4.05 (0.98)	4.05 (1.00)	4.05 (0.96)
Behavior Identification Form (BIF)				
First	226	7.15 (2.47)	7.27 (2.18)	7.03 (2.72)
Second	225	6.43 (2.67)	6.65 (2.70)	6.22 (2.64)

Table 7

Study 2 Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
First Memory																
1. Competent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Knowledgeable	.56*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Likeable	.29*	.30*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Attractive	.27*	.30*	.56*	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Embarrassed	-.32*	-.16	-.41*	-.28*	-	-	-	-	-	-	-	-	-	-	-	-
6. Proud	.30*	.36*	.44*	.34*	-.53*	-	-	-	-	-	-	-	-	-	-	-
7. Changed	.03	-.02	-.01	.02	.02	-.03	-	-	-	-	-	-	-	-	-	-
8. BIF	-.06	-.04	.19*	.02	.00	.00	-.12	-	-	-	-	-	-	-	-	-
Second Memory																
9. Competent	.60*	.37*	.22*	.29*	-.22*	.18*	-.02	-.07	-	-	-	-	-	-	-	-
10. Knowledgeable	.47*	.56*	.25*	.25*	-.22*	.25*	-.01	-.04	.74*	-	-	-	-	-	-	-
11. Likeable	.36*	.28*	.52*	.43*	-.32*	.35*	-.01	.06	.46*	.52*	-	-	-	-	-	-
12. Attractive	.32*	.36*	.49*	.68*	-.27*	.32*	-.05	.03	.44*	.45*	.65*	-	-	-	-	-
13. Embarrassed	-.22*	-.12	-.17	-.14	.36*	-.26*	.13	.01	-.47*	-.42*	-.45*	-.34*	-	-	-	-
14. Proud	.21*	.24*	.24*	.21*	-.28*	.45*	-.13	-.03	.46*	.48*	.52*	.42*	-.67*	-	-	-
15. Changed	.09	.00	.08	.09	-.01	.00	.45*	-.02	-.11	-.09	-.00	-.02	.28*	-.26*	-	-
16. BIF	-.11	-.11	.07	.06	.04	-.07	-.16	.41*	-.10	-.05	.07	-.01	-.02	-.04	.02	-
Measures																-
17. Condition	-.05	-.02	.06	-.03	-.01	.02	.08	.05	-.05	.06	.00	-.02	.07	-.02	.00	.08
18. Theory of Intelligence	-.13	-.13	-.28*	-.16	.20*	-.15	-.01	-.16	-.19*	-.19*	-.16	-.14	.14	-.09	-.11	-.07
19. RSE	.36*	.20*	.38*	.37*	-.32*	.31*	.05	.15	.32	.27*	.35*	.35*	-.22*	.29*	.10	.09
20. CSW	-.11	-.01	.01	.00	.09	.05	.04	-.01	-.08	-.09	.01	.02	.12	-.09	.04	.11
21. SSE	.30*	.19*	.37*	.39*	-.32*	.15	.00	.04	.29*	.26*	.29*	.32*	-.24	.21	.05	.13

Table 7 Cont.

Study 1 Correlations

	17	18	19	20
Measures				
17. Condition	-	-	-	-
18. Theory of Intelligence	-.07	-	-	-
19. RSE	.01	-.37*	-	-
20. CSW	.07	-.08	-.13	-
21. SSE	.03	-.24*	.69*	-.17

Note. * = significant at the .01 level

Qualitative Measures

Participants' written descriptions of their memories were coded using the same procedure as in Study 1. Experimenters coded narrative ($\kappa = .524$, $p < .001$), specificity ($\kappa = .498$, $p < .001$), and meaning ($\kappa = .32$, $p < .001$). Although initial interrater reliability was weak, the experimenters resolved all coding discrepancies before analyses.

Results

Manipulation Check

As expected, participants in the threatened condition answered significantly fewer Remote Association Test items correctly than control participants, $t(225) = 13.87$, $p < .001$, $d = 1.85$. However, as in the previous study, state self-esteem scores did not significantly differ between conditions, $t(211) = -0.46$, $p = .645$, $d = 0.06$. Nevertheless, a Fisher's r-to-z transformation indicated that the correlation between state self-esteem scores and trait-level Rosenberg self-esteem scores was stronger for control participants ($r = .80$) than threatened participants ($r = .58$), $z = 2.99$, $p = .003$.

The effect of the threat manipulation on state self-esteem was moderated by academic contingent self-worth, $b = -1.49$, $SE = .53$, $t(204) = -2.82$, $p = .005$. State self-esteem did not vary by contingent self-worth in the control condition, $b = 0.15$, $t(105) = 0.38$, $p = .703$. However, having higher academic contingent self-worth was associated with lower levels of state self-esteem in the threatened condition, $b = -1.34$, $t(99) = -3.82$, $p < .001$. The effect of condition on state self-esteem was not moderated by the other individual difference variables (theory of intelligence, trait-level Rosenberg self-esteem), b's < |.251|, t's < |0.86|, $p > .389$.

Past Attributes

I hypothesized that participants would idealize their past selves in threat-irrelevant-traits more following threat than control. Contrary to my hypothesis, a 2x2 mixed ANOVA did not reveal a significant interaction between condition (threat, control) and pre- vs. post-test likeable scores, $F(1, 225) = 0.78$, $p = .378$, $\eta^2 = .003$.

However, an ANCOVA with likeable scores (pre-, post-test) as a within-subjects variable, condition (control, threat) as a between-subjects variable and theory of intelligence as a covariate revealed the effect of condition on change in likeable ratings was marginally significant after controlling for theory of intelligence, $F(1, 221) = 3.71$, $p = .055$, $\eta^2 = .017$. Theory of intelligence did not predict change in likeable ratings for control participants, $b = -.0002$, $t(113) = -.01$, $p = .989$. However, threatened participants were more likely to increase their likeable ratings following the RAT the lower their incremental beliefs, $b = -0.04$, $t(108) = 2.65$, $p = .009$. That is, participants were more likely to idealize their past self following threat the less they displayed a growth mindset[i] (see Figure 1). The effect of condition on change in likeable ratings was not moderated by contingent self-worth or trait-level Rosenberg self-esteem, *F*'s < .61, *p*'s > .436.

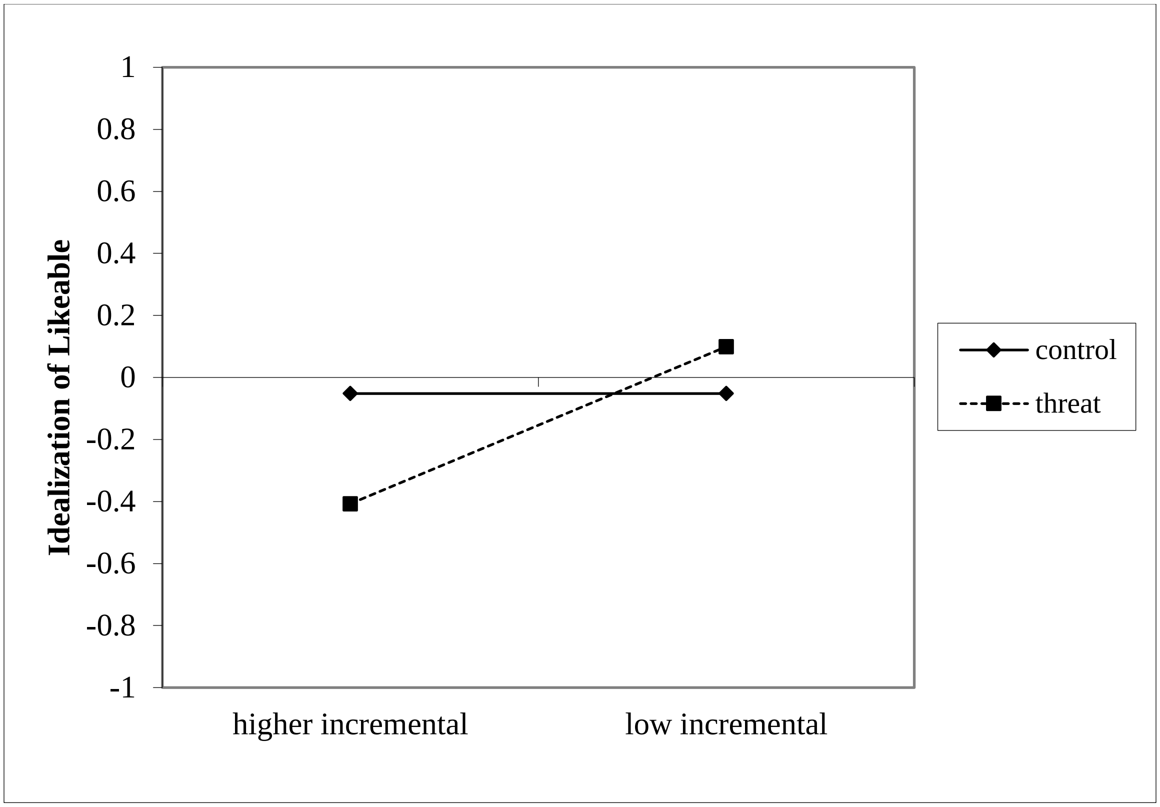

Figure 3. Theory of intelligence moderates the effect of condition on change in likeable ratings.

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[i] Theory of intelligence scores ranged from strong incremental (growth) beliefs to weak entity (fixed) beliefs. Therefore, it is more accurate to discuss this effect as moderated by more vs. less incremental, than as incremental vs. entity.

Similarly, the effect of condition on change in attractive ratings was not significant, $F(1, 225) = 0.01$, $p = .928$, $\eta^2 < .001$. However, the effect became significant after controlling for Rosenberg self-esteem, $F(1, 219) = 6.45$, $p = .012$, $\eta^2 = .03$. Threatened participants were more likely to increase their attractiveness ratings from their pre- to post-test memory the lower their trait-level self-esteem, $b = -0.03$, $t(108) = -1.86$, $p = .066$, whereas control participants were more likely to increase their attractiveness ratings from their pre- to post-test memory the higher their trait-level self-esteem, $b = 0.03$, $t(111) = 1.80$, $p = .075$ (see Figure 2).

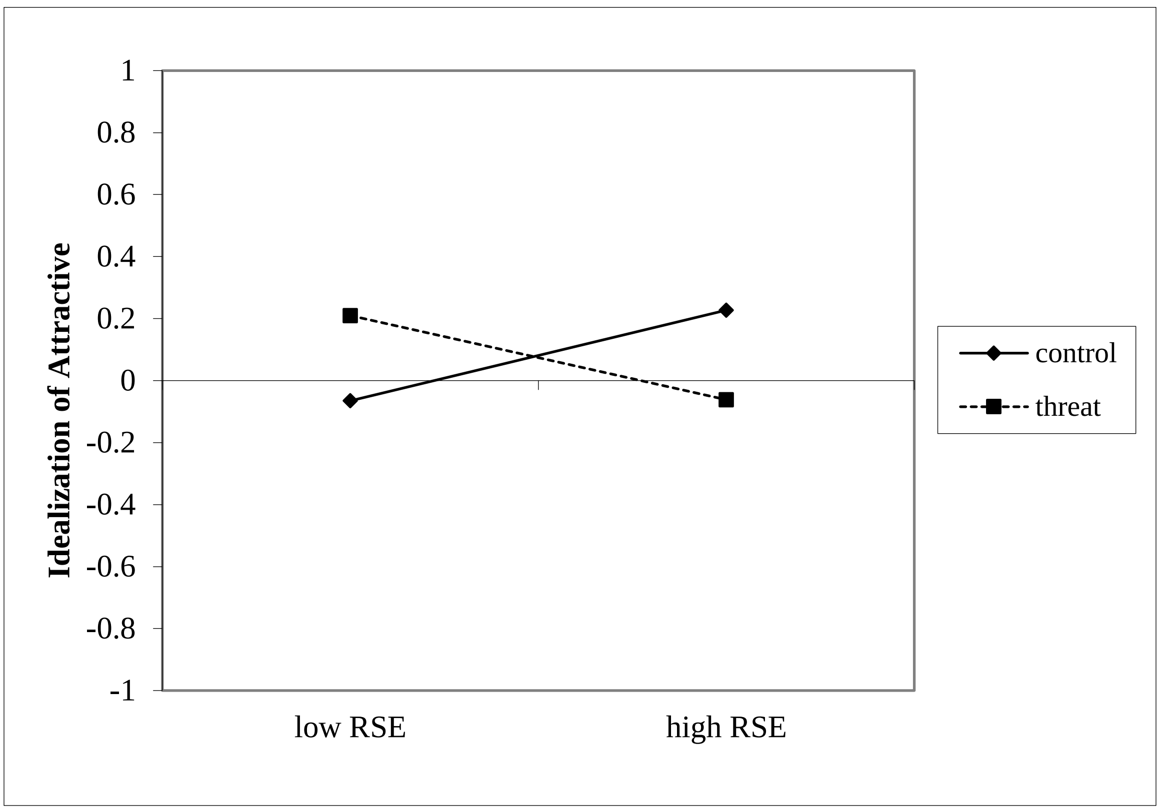

Figure 4. Trait-level Rosenberg Self-Esteem moderates the effect of condition on change in attractive ratings.

The effect of condition on change in attractive ratings was also marginally significant after controlling for Theory of Intelligence, $F(1, 221) = 3.69$, $p = .056$, $\eta^2 = .02$. Theory of intelligence did not significantly predict change in attractive ratings for control participants, $b = -0.02$, $t(113) = -1.16$, $p = .248$, nor threatened participants, $b = 0.02$, $t(108) = 1.65$, $p = .103$ (see Figure 3). However, the pattern of results suggests that threatened participants are more likely to idealize their past attractiveness the lower their incremental beliefs. The effect of condition on change in attractive ratings was not moderated by academic contingent self-worth, $F(1, 217) = 1.73$, $p = .189$, $\eta^2 = .01$.

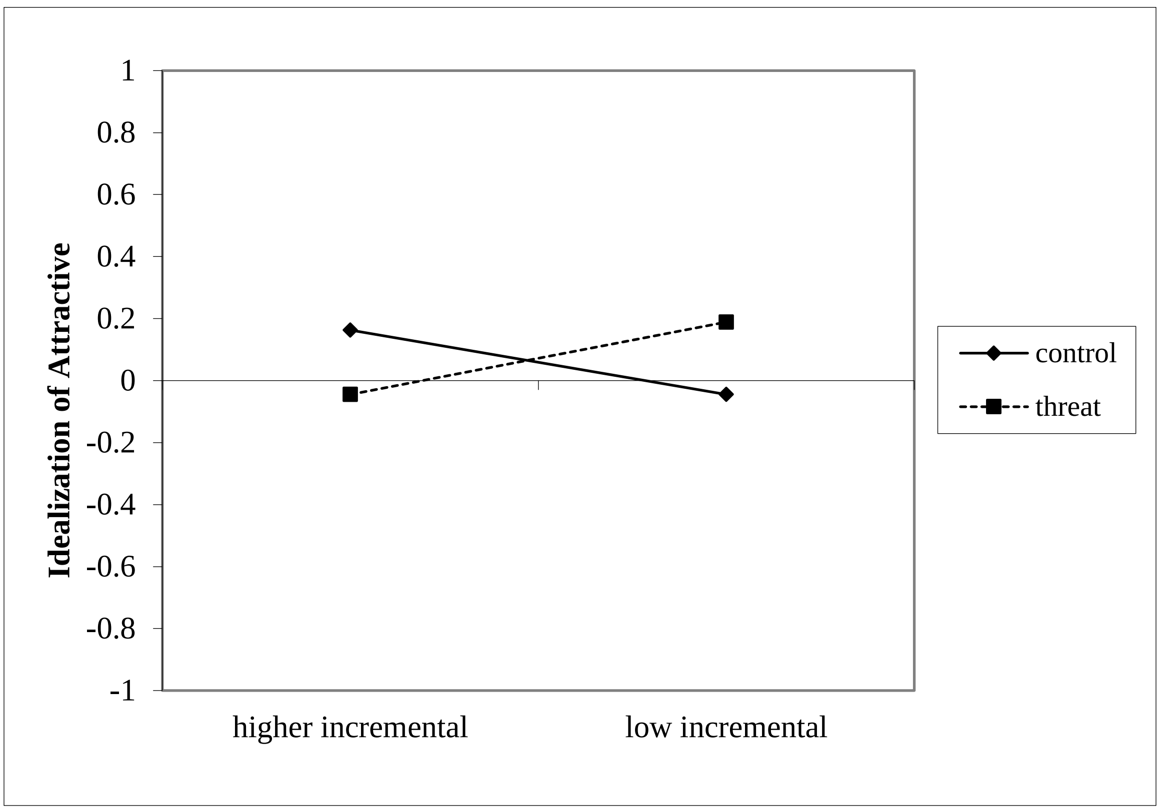

Figure 5. Theory of intelligence moderates the effect of condition on change in attractive ratings.

I also hypothesized that participants would be more likely to recall proud memories following self-esteem threat than control. I did not find support for this hypothesis. Differences in how proud participants were of their pre-test compared to their post-test memory did not differ by condition, $F(1, 225) = 0.34$, $p = .56$, $\eta^2 = .002$.

For completeness, I also tested for an effect of condition on change in the other provided ratings. I did not observe a significant effect of condition on change in participants' ratings of their past competence, $F(1, 224) < 0.01$, $p = .971$, $\eta^2 < .001$; but, there was a significant main effect such that participants recalled their past selves as less competent in their post-test than pre-test memory, $F(1, 224) = 17.07$, $p < .001$, $\eta^2 = .07$. There was not evidence of an effect of condition on change in participants' ratings of their past knowledge, $F(1, 225) = 1.51$, $p = .22$, $\eta^2 = .01$. Likewise, the interactions between condition and change in how embarrassed the participants were of their past was also not significant, $F(1, 222) = 1.13$, $p = .288$, $\eta^2 = .005$.

Abstraction

I hypothesized that threatened participants would decrease their level of construal following threat, whereas control participants would not experience a change. I did not find support for this hypothesis, $F(1, 222) = 0.29$, $p = .591$, $\eta^2 = .001$. However, there was a main effect such that participants demonstrated more concrete construal after their post-test memory than their pre-test, $F(1, 222) = 14.45$, $p < .001$, $\eta^2 = .06$.

I predicted that participants would adopt lower, more concrete levels of construal following threat, assuming that they would engage in idealization and therefore view their past and present selves as similar. Contrary to my prediction, differences in participants' ratings of how much they had changed since their pre- and post-test memory did not vary by condition, $F(1, 224) = 1.17$, $p = .281$, $\eta^2 = .005$. Overall, participants viewed their present selves as having changed less since their post-test than their pre-test memory, $F(1, 224) = 13.75$, $p < .001$, $\eta^2 = .06$.

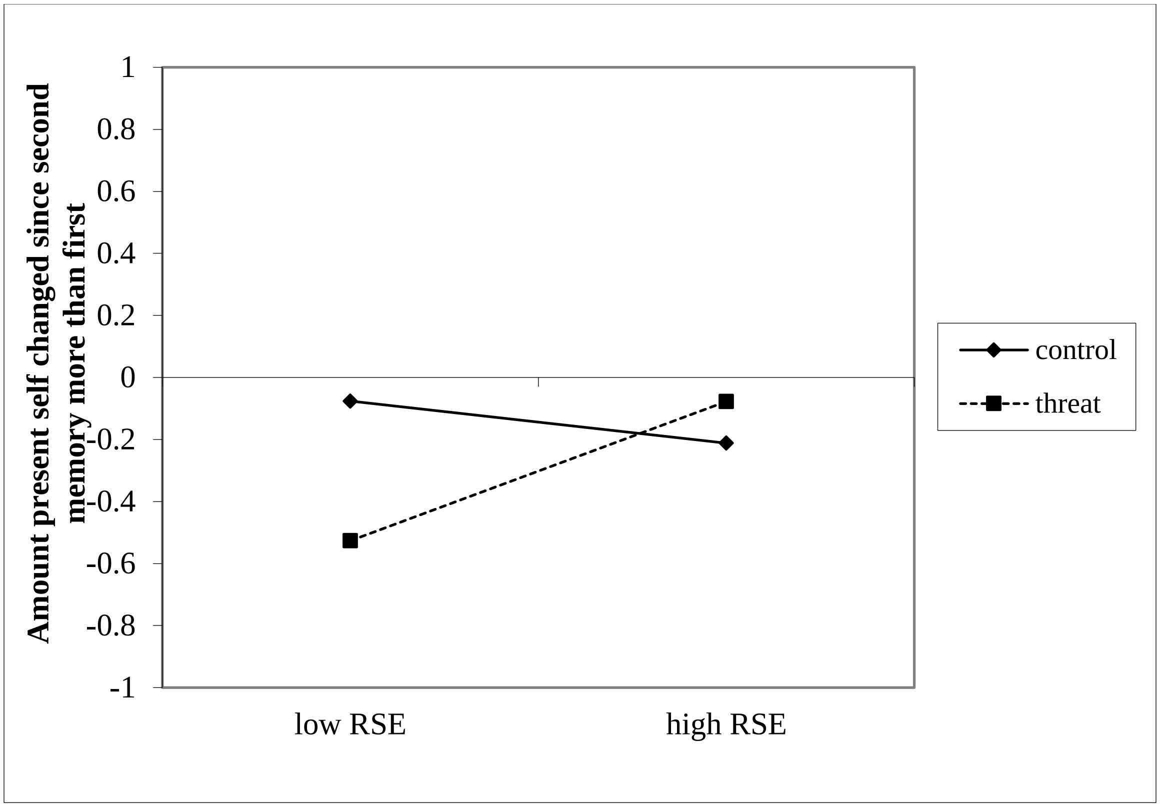

Figure 6. Rosenberg Self-esteem moderates the effect of condition on amount present self changed since second memory more than first.

However, after controlling for trait-level Rosenberg self-esteem, the threat manipulation did have a significant effect on differences in participants' ratings of how much they had changed since their pre- and post-test memory, $F(1, 218) = 5.17$, $p = .024$, $\eta^2 = .02$ (see Figure 4). Rosenberg self-esteem did not predict differences in change ratings for control participants, *b* = -0.01, *t*(110) = -0.84, *p* = .401. However, threatened participants were more likely to view their present self as having changed less since their post-test memory, in comparison to their pre-test memory, the lower their trait self-esteem, *b* = 0.04, *t*(108) = 2.22, *p* = .028. In other words, threatened participants became more likely to recall a past self as similar to their present following threat the lower their self-esteem.

Finally, I hypothesized that an effect of condition on decrease in level of construal following threat would be mediated by idealization. To test this hypothesis, I conducted a regression with condition as the predictor, change in likeable scores (computed as second memory minus first memory such that higher scores indicate greater idealization following threat) as the mediator, and change in Behavioral Identification Form scores (computed as first memory minus second memory such that higher scores indicate lower construal following threat) as the outcome. Change in likeability did not significantly predict change in construal level, *b* = -0.31, *SE* = 0.19, *t* = -1.67, *p* = .096; nor was the indirect effect of condition on change in construal level via change in likeability significant, *b* = 0.04, *SE* = 0.06, 95% CI [-0.06, 0.18].

Memory Content

Information on the proportion of participants who recalled different types of memories according to narrative, specificity and meaning are shown in Table 8.

The proportion of participants whose narrative code stayed the same between their pre- and post-test memory compared to those who changed to a different code did not differ according to their threat-manipulation condition, χ^2 (1, *N* = 226) = 0.06, *p* = .813. Of the participants who did change to a different narrative, the proportion participants within the threatened and control conditions who changed to a stable positive memory (39.3% and 35.4%, respectively), a stable negative memory (19.7%; 21.5%), or an uphill transformation (11.5%, 9.2%) were similar. However, threatened participants appeared more likely to change to a downhill transformation (14.8%) than controls (7.7%); whereas, control participants were more likely to change to a stable neutral/mixed narrative (26.2%) than threatened participants (14.8%).

Table 8

Study 2 Proportions of Types of Memory Content

	Overall		Threatened		Control	
Memory	First	Second	First	Second	First	Second
Narrative						
Stable Positive	34.1	43.8	33.3	45.9	34.8	41.7
Stable Negative	16.8	19.0	17.1	17.1	16.5	20.9
Stable Neutral/Mixed	28.8	20.8	28.8	17.1	28.7	24.3
Uphill Transformation	12.4	9.3	12.6	10.8	12.2	7.8
Downhill Transformation	8.0	7.1	8.1	9.0	7.8	5.2
Specificity						
Specific	9.3	19.0	6.3	18.0	12.2	20.0
Episodic	90.7	78.8	93.7	81.1	87.8	76.5
Generic	-	2.2	-	0.9	-	3.5
Meaning						
Integrative	2.7	2.2	4.5	2.7	0.9	1.7
Nonintegrative	97.3	97.8	95.5	97.3	99.1	98.3

The proportion of participants whose specificity code stayed the same between their pre- and post-test memory compared to those who changed to a different code did not differ according to their threat-manipulation condition, χ^2 (1, N = 226) = 1.02, p = .312. Moreover, the proportion of participants who changed from an episodic pre-test memory to a specific post-test memory (suggesting more concrete construal) did not depend on condition, χ^2 (1, N = 205) = 0.01, p = .928 (15.4% of threatened; 15.8% of control).

Likewise, the proportion of participants whose meaning code stayed the same between their pre- and post-test memory compared to those who changed to a different code did not differ according to their threat-manipulation condition, χ^2 (1, N = 226) = 1.16, p = .282.

Discussion

Results from the pilot study indicated that following a self-esteem threat, people idealize their past selves in attributes that are irrelevant to the threat. This finding was unexpected, as it is relatively uncommon for people to make upward comparisons to their past selves (Wilson & Ross, 2000). However, it is possible that participants were attempting to repair the self-esteem through use of nostalgia by recalling favorable memories of their past selves that they could incorporate into their present self-concept (Baldwin, 2016). To this end, I hypothesized that if people recalled memories unrelated to the threat domain, they would be more likely to adopt idealization of their past self as a self-esteem repair strategy. Study 2 served to test this hypothesis by utilizing a threat to intelligence and restricting participants to recall memories of their interpersonal relationships during their early high school years.

My primary hypothesis was not supported. Participants who had their intelligence threatened were not more likely than controls to idealize irrelevant past-attributes. However, as expected, I did observe the hypothesized effect when controlling for theory of intelligence. Threatened participants were more likely to recall a memory of a more likeable or attractive past self after having their self-esteem threatened than they had prior, the less they endorsed an incremental theory of intelligence. In other words, threatened participants did shift their memories to recall more idealized past selves following threat if they had fixed mindsets. I hypothesized that this would be the case given that idealizing a past self is most beneficial to present self-esteem if the person is able to view the idealized attributes as stable, persisting into the present. Therefore, people with fixed mindsets hold beliefs that attributes are immutable, which are more compatible with making upward temporal comparisons to past selves as a self-enhancement strategy.

Consistent with the interpretation of idealization of past attributes as a self-enhancement strategy which is based in nostalgia, I found that threatened participants more were likely than controls to shift the narrative of their memory to a downhill transformation. Downhill transformations were characterized as narratives which began with more positive emotional tone than they ended. For example, memories recalling a romantic relationship ending with its dissolution. This pattern is compatible with longing for "the way things used to be" and remembering the past more favorably than the present. In the context of self-esteem maintenance, generating feelings of nostalgia could serve to increase positive self-regard (Baldwin & Landau, 2014).

For exploratory purposes, I also examined whether trait self-esteem moderated the effect of experiencing threat on idealization of past attributes. Threatened participants were more likely to recall a memory of a more attractive past self after having their self-esteem threatened than they had prior, the lower their trait level self-esteem. This is consistent with previous literature which found that people with low self-esteem are more likely than their high self-esteem counterparts to react to self-esteem threats by resisting, a response which can involve turning attention to unrelated positive attributes rather than engaging in more direct self-enhancement (Vandellen et al., 2011).

As expected, the tendency to idealize one's past self following threat did not extend to attributes which were relevant to the threat. That is, neither control nor threatened participants adjusted their memories to recall more competent or knowledgeable past selves. In fact, both sets of participants recalled less competent past selves in their second memory. This finding could be taken as further evidence that participants were motivated to recall past selves which were integrated with their present self-concept. To this end, both threatened and control participants regarded their present selves as having changed less since the past self they recalled in their second memory than their first memory; but this tendency was stronger for threatened participants who had low trait-level self-esteem.

I hypothesized that the act of idealization following self-esteem threat would produce a lower, more concrete level of construal. Idealization of a past self could be an effective self-enhancement strategy when past and present selves are regarded as similar, and similarity is associated with lower levels of construal (Liviatan et al., 2008). However, despite finding evidence that participants did view their present selves as more similar to their idealized past selves than the past selves they recalled prior to being threatened, I did not find evidence of an impact on construal level. Using Behavior Identification Form (BIF) scores as a measure of construal level, I did not find evidence that threatened participants were more likely to experience a decrease in construal level after recalling their second memory (post-threat) than control participants. Moreover, change in how likeable people recalled their past selves from before to after the threat was not predictive of change in BIF scores. Further, threatened and control participants were equally likely to shift from episodic memories, representing more abstract construal, to specific memories, representing more concrete construal.

CHAPTER 6

GENERAL DISCUSSION

I designed these studies to identify the conditions under which people may be more or less likely to use upward or downward temporal comparisons as strategies for self-esteem maintenance following self-esteem threats. I hypothesized that people would use downward temporal comparisons—denigrating their past selves relative to their present selves—when recalling memories relevant to the domain of the threat; but, would use upward temporal comparisons—idealizing their past selves relative to their present selves—when recalling memories irrelevant to the domain of the threat. I tested this hypothesis by conducting two studies. All participants provided two autobiographical memories from their early high school years: one prior and one following a self-esteem threat manipulation in which participants in the threat condition experienced a failure on a test framed as predictive of their intelligence. The two studies differed only in that participants were prompted to recall memories of their academic experience in Study 1, but of their interpersonal relationships in Study 2.

One notable difference in results between Studies 1 and 2 was in the effectiveness of the intelligence threat manipulation on reducing state self-esteem. Study 1 produced a null effect, with no statistical difference in state self-esteem between the threatened and control participants. (Although, there was some evidence that the manipulation did have an impact, as there was a stronger association between trait and state self-esteem for control participants than those who were threatened.) In contrast, in Study 2, threatened participants did show lower levels of state self-esteem following the threat manipulation when controlling for their academic competence contingent self-worth. It's difficult to speculate what caused the difference in effectiveness of the threat manipulation between studies as participants were not randomly assigned; however, one possible explanation is that recalling either academic or interpersonal memories prior to the threat differentially effected participants. By having all participants recall memories of their academic experience prior to the threat in Study 1, academic performance may have been made salient for all. Then, especially because the control participants also had difficulty producing answers on the test used in the threat manipulation, both control and threatened participants may have been vulnerable to threats to their intelligence, minimizing differences in the impact on the two conditions. In contrast, because participants recalled memories that were not relevant to the threat domain in Study 2, academic performance was not made salient; and therefore, only participants who were naturally high in academic competence contingent self-worth had their self-esteem effectively threatened by the manipulation. It would be fruitful for future studies to test this explanation empirically. I expand on this idea in the future directions section.

The results of Study 1 provide evidence that after receiving a threat to their self-esteem, people do engage in denigration of their past selves in threat-relevant attributes when recalling memories relevant to the domain of the self-esteem threat. Further, these downward temporal comparisons occur within narratives which facilitate self-esteem maintenance by serving as reminders that the person has overcome similar challenges in the past. Meanwhile, the results of Study 2 provide evidence that after receiving a threat to their self-esteem, people will engage in idealization of their past selves in non-threat-relevant attributes when recalling memories irrelevant to the domain of the self-esteem threat; but this tendency is limited to people who view their past and present selves as similar. In this way, upward temporal comparisons facilitate self-esteem maintenance by serving as reminders that the person has other positive attributes to take pride in despite their current failing. These two complimentary responses to self-esteem threat are consistent with Self-Affirmation Theory, which explains that people may respond to threats in two ways: directly by reframing the event, such as reconstruing failure as an opportunity for growth; or indirectly by affirming alternative sources of self-worth (see Sherman & Cohen, 2006). However, these studies are novel in their demonstration of how people selectively recall attributes of their past (as opposed to present) selves to achieve self-affirmation.

Contrary to my predictions, evidence that actively engaging in upward or downward temporal comparisons following a threat to self-esteem alters construal level was weak. In Study 1, a greater number of threatened participants than controls switched from recalling an isolated memory to a memory of a more general period of time. This finding could indicate that engaging in downward temporal comparisons following threat results in more abstract construal. In Study 2, threatened participants with low self-esteem had a higher likelihood of viewing their past and present as similar following threat than prior. This finding could indicate that engaging in upward temporal comparisons following threat results in more concrete construal. Nevertheless, neither of these findings were supported by more direct measures of construal level. It is possible that I did not detect changes in construal level because a more sensitive measure is necessary to support repeated measures designs. Studies which examine differences in construal level as a result of manipulations most commonly use between-subject designs

(Burgoon, Henderson, & Markman, 2013). Rather than using a separate self-report measure of construal level following recall and ratings of autobiographical memories, it may be advantageous to measure construal level during recall more directly. For example, researchers could use qualitative data analysis software to objectively code linguistic abstraction, or they could use neural imaging. There is some evidence that the medial prefrontal cortex is active during high-level construal, whereas the activity in the precuneus is associated with low-level construal (Stillman, Lee, Deng, Unnava, Cunningham & Fujita, 2017).

Limitations

These studies offer a promising first look at the role of temporal comparison in self-esteem maintenance, but they are not without some limitations. To begin, all participants were undergraduate psychology students, a sample which previous literature has identified as relatively homogeneous and possibly unrepresentative of the general population (Henrich, Heine, & Norenzayan, 2010). It is possible that using a threat to academic competence would be more relevant to this student sample than the general population. On the other hand, psychology students may have been more skeptical of and less susceptible to the deception used in the threat manipulation. Moreover, in all three studies, both threatened and control participants performed relatively poorly on the Remote Associations Test, used in the threat manipulation, and did not show differences in their state self-esteem during the manipulation check. Although I did observe some hypothesized statistical differences between threatened and control participants, it is possible that these differences were not produced by the threat manipulation and instead were caused by another unobserved differences between the groups. Of course, it is also possible that the threat manipulation was minimally effective, and differences between the threatened and control participants would have been even more robust if control participants had more successful performance on the Remote Associations Test. Finally, the experimenters who coded participants' written memories did not achieve high interrater reliability in their initial codes. Analyses were conducted on codes that were produced after the experimenters met to resolve discrepancies, but the lack of initial agreement suggests that many responses may have been ambiguous.

Future directions

In this set of studies, I only utilized threats to intelligence as an avenue to threaten participants self-esteem. A logical next step for this line of research would be to test whether similar patterns of results occur when participants are threatened in a different domain, such as having their interpersonal skills threatened through the use of a social exclusion manipulation. If my results extend to other domains, I would hypothesize that following social exclusion, participants who recalled interpersonal memories (relevant to the threat domain) would denigrate their past selves in relevant attributes (such as likeability) while participants who recalled academic memories (irrelevant to the threat domain) would idealize their past selves in irrelevant attributes (such as competence or knowledge).

After observing differences in the effectiveness of the threat manipulation in reducing state self-esteem between studies, I wondered whether recalling interpersonal memories prior to situations which could be threatening to one's intelligence may have protective effects. If recalling memories of past academic performance led participants to be more vulnerable to threats to their intelligence, it would be valuable to know whether recalling interpersonal memories can make participants more resilient (as opposed to having no impact on the effectiveness of the threat manipulation beyond not recalling any memories prior to the threat). If recalling interpersonal memories does have protective effects against threatening information, future studies could examine remembering attributes of past selves as an intervention to reduce the negative impact of academic failure on students' self-esteem. Some studies have found that recalling positive autobiographical memories attenuate rises in cortisol and negative affect following a physical stressor (Speer & Delgado, 2017). Interpersonal memories could be a form of positive autobiographical memories which reduce negative impact from social in addition to physical stressors.

Conclusion

The studies described in this dissertation were the first to empirically test whether people utilize temporal comparisons to past selves as a mechanism for self-esteem maintenance following threat. Together, they elucidate an adaptive function of autobiographical memory. By selectively recalling memories which feature one's past self as having been deficient in an attribute, people may view their present selves as capable of continued improvement in a relevant domain (e.g. recalling one's past self as less knowledgeable may promote beliefs that one can continue improving academically). Conversely, by selectively recalling memories which feature one's past self as having been proficient in an attribute, people may view their present selves as valued in an alternative domain (e.g. recalling one's past self as likeable may promote beliefs that one has interpersonal competence, even if their academics are lacking).

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APPENDIX A

REMOTE ASSOCIATIONS TEST ANSWER KEY

Question Difficulty	Items	Correct Answer
Difficult		
	Bass Complex Sleep	Deep
	Chamber Staff Box	Music
	Desert Ice Spell	Dry
	Base Show Dance	Ball
	Inch Deal Peg	Square
	Soap Shoe Tissue	Box
	Blood Music Cheese	Blue
	Skunk Kings Boiled	Cabbage
	Jump Kill Bliss	Joy
	Shopping Washer Picture	Window
Control		
	Hot Butterflies Pump	Stomach
	Head Street Dark	Light
	Stalk Trainer King	Lion
	Bald Screech Emblem	Eagle
	Room Saturday Salts	Bath
	Surprise Line Birthday	Party
	Widow Bite Monkey	Spider
	Red Go Car	Stop
	Mouse Sharp Blue	Cheese
	Cherry Time Smell	Blossom
Easy		
	Athletes Web Rabbit	Foot
	Shelf Read End	Book
	Sea Home Stomach	Sick
	Car Swimming Cue	Pool
	Board Magic Death	Black
	Walker Main Sweeper	Street
	Cookies Sixteen Heart	Sweet
	Chocolate Fortune Tin	Cookie
	Lounge Hour Drink	Cocktail
	Kneel Show Row	Boat

Note. Participants in the control condition in the pilot study received the *control* items. Participants in the control condition in Studies 1 and 2 received the *easy* items.

APPENDIX B

EXAMPLE OF BLANK STUDY PACKET

Subject ID: ________ A

Memories of the Self

Questionnaire Packet

Page 1 of 18

Page 2 of 18

The following questions are exploring students' beliefs about their personal ability to change their intelligence level. There are no right or wrong answers. We are just interested in your views.

Please indicate the extent to which you agree or disagree with the following statements by circling your answer using the scale:
"1 = strongly disagree" to "6 = strongly agree"

		Strongly Disagree	Disagree	Mostly Disagree	Mostly Agree	Agree	Strongly Agree
1	I don't think I personally can do much to increase my intelligence.	1	2	3	4	5	6
2	My intelligence is something about me that I personally can't change very much.	1	2	3	4	5	6
3	With enough time and effort, I think I could significantly improve my intelligence level.	1	2	3	4	5	6
4	I believe I can always substantially improve my intelligence.	1	2	3	4	5	6
5	To be honest, I don't think I can really change how intelligent I am.	1	2	3	4	5	6
6	Regardless of my current intelligence level, I think I have the capacity to change it quite a bit.	1	2	3	4	5	6
7	I can learn new things, but I don't have the ability to change my basic intelligence.	1	2	3	4	5	6
8	I believe I have the ability to change my basic intelligence level considerably over time.	1	2	3	4	5	6

Page 3 of 18

Below is a list of statements dealing with your general feelings about yourself.

If you strongly disagree, circle SD.
If you disagree, circle D.
If you agree with the statement, circle A.
If you strongly agree, circle SA.

		Strongly Disagree	Disagree	Agree	Strongly Agree
1	On the whole, I am satisfied with myself.	SD	D	A	SA
2	At times, I think I am no good at all.	SD	D	A	SA
3	I feel that I have a number of good qualities	SD	D	A	SA
4	I am able to do things as well as most other people.	SD	D	A	SA
5	I feel I do not have much to be proud of.	SD	D	A	SA
6	I certainly feel useless at times.	SD	D	A	SA
7	I feel that I'm a person of worth, at least on an equal plane with others.	SD	D	A	SA
8	I wish I could have more respect for myself.	SD	D	A	SA
9	All in all, I am inclined to feel that I am a failure.	SD	D	A	SA
10	I take a positive attitude toward myself.	SD	D	A	SA

Page 4 of 18

Please respond to each of the following statements by circling your answer using the scale "1 = strongly disagree" to "7 = strongly agree."

If you haven't experienced the situation described in a particular statement, please answer how you think you would feel if that situation occurred.

		Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree
1	When I think I look attractive, I feel good about myself.	1	2	3	4	5	6	7
2	My self-worth is based on God's love.	1	2	3	4	5	6	7
3	I feel worthwhile when I perform better than others on a task or skill.	1	2	3	4	5	6	7
4	My self-esteem is unrelated to how I feel about the way my body looks.	1	2	3	4	5	6	7
5	Doing something I know is wrong makes my lose my self-respect.	1	2	3	4	5	6	7
6	I don't care if other people have a negative opinion about me.	1	2	3	4	5	6	7
7	Knowing that my family members love me makes me feel good about myself.	1	2	3	4	5	6	7
8	I feel worthwhile when I have God's love.	1	2	3	4	5	6	7
9	I can't respect myself if others don't respect me.	1	2	3	4	5	6	7
10	My self-worth is not influenced by the quality of my relationships with my family members.	1	2	3	4	5	6	7
11	Whenever I follow my moral principles, my sense of self-respect gets a boost.	1	2	3	4	5	6	7
12	Knowing that I am better than others on a task raises my self-esteem.	1	2	3	4	5	6	7
13	My opinion about myself isn't tied to how well I do in school.	1	2	3	4	5	6	7
14	I couldn't respect myself if I didn't live up to a moral code.	1	2	3	4	5	6	7
15	I don't care what other people think of me.	1	2	3	4	5	6	7

Page 5 of 18

16	When my family members are proud of me, my sense of self-worth increases.	1	2	3	4	5	6	7
17	My self-esteem is influenced by how attractive I think my face or facial features are.	1	2	3	4	5	6	7
18	My self-esteem would suffer if I didn't have God's love.	1	2	3	4	5	6	7
19	Doing well in school gives me a sense of self-respect.	1	2	3	4	5	6	7
20	Doing better than others gives me a sense of self-respect.	1	2	3	4	5	6	7
21	My sense of self-worth suffers whenever I think I don't look good.	1	2	3	4	5	6	7
22	I feel better about myself when I know I'm doing well academically.	1	2	3	4	5	6	7
23	What others think of me has no effect on what I think about myself.	1	2	3	4	5	6	7
24	When I don't feel loved by my family, my self-esteem goes down.	1	2	3	4	5	6	7
25	My self-worth is affected by how well I do when I am competing with others.	1	2	3	4	5	6	7
26	My self-esteem goes up when I feel that God loves me.	1	2	3	4	5	6	7
27	My self-esteem is influenced by my academic performance.	1	2	3	4	5	6	7
28	My self-esteem would suffer if I did something unethical.	1	2	3	4	5	6	7
29	It is important to my self-respect that I have a family that cares about me.	1	2	3	4	5	6	7
30	My self-esteem does not depend on whether or not I feel attractive.	1	2	3	4	5	6	7
31	When I think that I am disobeying God, I feel bad about myself.	1	2	3	4	5	6	7
32	My self-worth is influenced by how well I do on competitive tasks.	1	2	3	4	5	6	7
33	I feel bad about myself whenever my academic performance is lacking.	1	2	3	4	5	6	7
34	My self-esteem depends on whether or not I follow my moral/ethical principles.	1	2	3	4	5	6	7
35	My self-esteem depends on the opinions others hold of me.	1	2	3	4	5	6	7

Page 6 of 18

Please take the next three minutes and write about a memory of your academic performance during your first few years of high school.

Page 7 of 18

Please think about yourself from the memory that you wrote about. Consider what you were like at the time of that memory. Please rate how well you think the following traits would have described you using the scale:

"1 = not at all" to "5 = extremely."

	Not at All	A Little Bit	Somewhat	Very Much	Extremely
Competent	1	2	3	4	5
Knowledgeable	1	2	3	4	5
Likeable	1	2	3	4	5
Attractive	1	2	3	4	5

When you think about the memory of your past, how does it make you feel?
Please rate how well the different emotions listed below describe the way that your memory makes you feel about what you were like in the past using the scale:

"1 = not at all" to "5 = extremely."

	Not at All	A Little Bit	Somewhat	Very Much	Extremely
Embarrassed	1	2	3	4	5
Proud	1	2	3	4	5

Please rate how much you feel like you have changed as a person since the time of the memory that you wrote about using the scale:

"1 = not at all" to "5 = extremely."

	Not at All	A Little Bit	Somewhat	Very Much	Extremely
I feel like I have changed since that time.	1	2	3	4	5

Memories can feel close or distant from us, regardless of when they actually occurred. Please use the timeline below to indicate how far away from now your memory feels.

Distant ⟷ Close

Page 8 of 18

In the following 12 questions, you will be presented with an action and two choices for a definition. Please circle the choice which you believe best defines the action.

1. Making a list
   a. Getting organized
   b. Writing things down
2. Reading
   a. Gaining knowledge
   b. Following lines of print
3. Joining the Army
   a. Helping the Nation's defense
   b. Signing up
4. Washing clothes
   a. Removing odors from clothes
   b. Putting clothes into the machine
5. Picking an apple
   a. Getting something to eat
   b. Pulling an apple of a branch
6. Chopping down a tree
   a. Getting firewood
   b. Wielding an axe
7. Measuring a room for carpeting
   a. Getting ready to remodel
   b. Using a yardstick
8. Cleaning the house
   a. Showing one's cleanliness
   b. Vacuuming the floor
9. Painting a room
   a. Making the room look fresh
   b. Applying brush strokes
10. Paying the rent
    a. Maintaining a place to live
    b. Writing a check
11. Caring for houseplants
    a. Making the room look nice
    b. Watering plants
12. Locking a door
    a. Securing the house
    b. Putting a key in the lock

Below you will see ten different items. Each item consists of three words which are linked together by a fourth word, which is the correct answer. Your task is to write down the fourth word.

For example:

Word 1	Word 2	Word 3	Answer
Cottage	Swiss	Cake	Cheese
Cream	Skate	Water	Ice

Test Questions:

Word 1	Word 2	Word 3	Answer
Bass	Complex	Sleep	
Chamber	Staff	Box	
Desert	Ice	Spell	
Base	Show	Dance	
Inch	Deal	Peg	
Soap	Shoe	Tissue	
Blood	Music	Cheese	
Skunk	Kings	Boiled	
Jump	Kill	Bliss	
Shopping	Washer	Picture	

This is a questionnaire designed to measure what you are thinking at this moment. There is, of course, no right answer for any statement. The best answer is what you feel is true of yourself at this moment. Be sure to answer all of the items, even if you are not certain of the best answer. Again, answer these questions as they are true for you RIGHT NOW.

Please respond to each of the following statements by circling your answer using the scale "1 = not at all" to "5 = extremely."

		Not at All	A Little Bit	Somewhat	Very Much	Extremely
1	I feel confident about my abilities	1	2	3	4	5
2	I am worried about whether I am regarded as a success or failure	1	2	3	4	5
3	I feel satisfied with the way my body looks right now	1	2	3	4	5
4	I feel frustrated or rattled about my performance	1	2	3	4	5
5	I feel that I am having trouble understanding things that I read	1	2	3	4	5
6	I feel that others respect and admire me	1	2	3	4	5
7	I am dissatisfied with my weight	1	2	3	4	5
8	I feel self-conscious	1	2	3	4	5
9	I feel as smart as others	1	2	3	4	5
10	I feel displeased with myself	1	2	3	4	5
11	I feel good about myself	1	2	3	4	5
12	I am pleased with my appearance right now	1	2	3	4	5
13	I am worried about what other people think of me	1	2	3	4	5
14	I feel confident that I understand things	1	2	3	4	5
15	I feel inferior to others at this moment	1	2	3	4	5
16	I feel unattractive	1	2	3	4	5
17	I feel concerned about the impression I am making	1	2	3	4	5
18	I feel that I have less scholastic ability right now than others	1	2	3	4	5
19	I feel like I'm not doing well	1	2	3	4	5
20	I am worried about looking foolish	1	2	3	4	5

Imagine you completed the Remote Associations Test in the past, do you believe you would have performed better or worse in the past than you did today?
My past performance would have been ___ than today's performance.

Circle one:

BETTER WORSE

Please take the next three minutes and write about a memory of your academic performance during your first few years of high school.

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Please think about yourself from the memory that you wrote about. Consider what you were like at the time of that memory. Please rate how well you think the following traits would have described you using the scale:

"1 = not at all" to "5 = extremely."

	Not at All	A Little Bit	Somewhat	Very Much	Extremely
Competent	1	2	3	4	5
Knowledgeable	1	2	3	4	5
Likeable	1	2	3	4	5
Attractive	1	2	3	4	5

When you think about the memory of your past, how does it make you feel?
Please rate how well the different emotions listed below describe the way that your memory makes you feel about what you were like in the past using the scale:

"1 = not at all" to "5 = extremely."

	Not at All	A Little Bit	Somewhat	Very Much	Extremely
Embarrassed	1	2	3	4	5
Proud	1	2	3	4	5

Please rate how much you feel like you have changed as a person since the time of the memory that you wrote about using the scale:

"1 = not at all" to "5 = extremely."

	Not at All	A Little Bit	Somewhat	Very Much	Extremely
I feel like I have changed since that time.	1	2	3	4	5

Memories can feel close or distant from us, regardless of when they actually occurred. Please use the timeline below to indicate how far away from now your memory feels.

Distant ⟷ Close

In the following 12 questions, you will be presented with an action and two choices for a definition. Please circle the choice which you believe best defines the action.

1. Climbing a tree
   a. Getting a good view
   b. Holding on to branches

2. Filling out a personality test
   a. Revealing what you're like
   b. Answering questions

3. Toothbrushing
   a. Preventing tooth decay
   b. Moving a brush around in one's mouth

4. Taking a test
   a. Showing one's knowledge
   b. Answering questions

5. Greeting someone
   a. Showing friendliness
   b. Saying hello

6. Resisting temptation
   a. Showing moral courage
   b. Saying "no"

7. Eating
   a. Getting nutrition
   b. Chewing and swallowing

8. Growing a garden
   a. Getting fresh vegetables
   b. Plating seeds

9. Traveling by car
   a. Seeing countryside
   b. Following a map

10. Having a cavity filled
    a. Protecting your teeth
    b. Going to the dentist

11. Talking to a child
    a. Teaching a child something
    b. Using simple words

12. Pushing a doorbell
    a. Seeing if someone is home
    b. Moving a finger

Page 17 of 18

Please answer the questions below by making a checkmark in the box which best describes yourself. You may checkmark multiple boxes if more than one description applies.

My gender is:

☐ Female

☐ Male

☐ Transgender

☐ Other

My ethnicity is:

☐ African-American

☐ Asian-American

☐ European-American

☐ Latin-American

☐ Native-American

☐ Non-American/Foreign

☐ Other

English is my first/native language:

☐ True

☐ False

My academic status in school is:

☐ First-Year

☐ Sophomore

☐ Junior

☐ Senior

☐ Other

My age is: ______ (in years)

You have now completed all of the questions.

Please flip your packet back to the cover page and wait quietly for the experimenter.

DO NOT look back through your packet or change your answers.

Page 18 of 18