THE ROLE OF SELF-REGULATION IN ADULT ATTACHMENT RELATED PROCESSES

by

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Abstract

The present study tests whether activation of the attachment system among dismissing individuals will contribute to both self-regulation depletion and a subsequent breakdown of deactivating strategies (demonstrated by greater accessibility of negative emotional experiences). Utilizing a mixed experimental/correlational design, the present study represents a replication and extension of Kohn, Rholes, and Schmeichel (2012). Unlike previous studies, the present study focuses on assessing attachment styles using multi-item measures such as Experiences in Close Relationships (Brennan, Clark, & Shaver, 1998) and the Relationship Questionnaire (Bartholomew & Horowitz, 1991). Participants were randomly assigned to one of three writing conditions: the first activates the attachment system, the second depletes self-regulatory resources, and the third represents a control condition. Significant simple effects revealing that dismissing individuals who write either essays about attachment or essays that deplete self-regulatory resources have increased accessibility for positive and negative emotional memories, compared to dismissing participants in the control condition and participants with other attachment styles in all experimental conditions. These data support the hypothesis that dismissing participants show increased accessibility of emotional memories after assignment to the attachment essay condition or the self-regulation depletion essay condition. This suggests that both activation of the attachment system and self-regulation depletion depletes dismissing participants' self-regulatory resources leading to an increase in the accessibility of childhood emotional experiences and memories.

Dedication

I dedicate this thesis to Dr. Aspelmeier. I would not be where I am today if not for your constructive criticism and brutal honesty.

Acknowledgements

I would like to express my sincere appreciation to my advisor, Dr. Aspelmeier, for his guidance, encouragement, and endless patience throughout this project, as well as my committee members, Dr. Christensen, Dr. Steele, and Dr. Riding-Malon, for their observations and suggestions. I would also like to thank Shameka Hylton, Jessica Compton, Rachel Marble, Abby Vandivier, Theresa Leasure, Deb Goodnow, Jamie Reumont, and Bryan Healy for assisting me throughout the stages of my research. I would also like to dedicate this thesis to my niece, Madison, you are my inspiration.

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Chapter 1: Purpose of Study

The purpose of the present study is to demonstrate that the activation of the attachment system among dismissing individuals will contribute to both self-regulation depletion and a breakdown of deactivating strategies (demonstrated by greater accessibility of negative emotional experiences). Previous studies have relied on a single item categorical measure of attachment; therefore, this study will focus on assessing attachment styles using multi-item measures. This study is a mixed experimental/correlational design, and it will consist of a replication and extension of Kohn, Rholes, and Schmeichel (2012), applying a more developed measure of attachment ECR.

Chapter 2: Origins of Attachment Theory

Attachment theory, credited to Bowlby, was a response to the psychoanalytic object relations theory, which suggested that the mother's breast as a source of food was the primary cause of parent-child attachment. Thereafter, the bond was generalized to the mother, but not necessarily through meeting the need for food. Although Bowlby was a psychoanalyst, he noted that psychoanalytic theory could not provide a solid explanation for why children, living in an environment where they received adequate food but limited physical contact with their caregivers, were less likely to survive (Bowlby, 1973; Kirkpatrick, 2004). Rather than accepting the psychoanalytic view, Bowlby proposed his theoretical and methodological approach—attachment theory—to investigate an explanation for this occurrence.

Drawing from ethological theory, Bowlby proposed that the attachment results from an evolutionarily evolved behavioral system designed to maintain proximity to a caregiver. When a child perceives a threat from the external environment or internal stressors such as illness, the child will attempt to increase proximity with their primary caregiver with active behaviors (crying, grabbing, and reaching; Bowlby, 1973). When the caregiver acts as a secure base and provides an effective response to the child's attachment needs, the child's levels of fear and anxiety will be reduced, which deactivates the attachment system and pushes toward homeostasis.

Through the activation and deactivation of the attachment system, a child develops a healthy internal working model (IWM) of attachment. The IWM provides a child with protection against threat when their primary care giver cannot immediately respond to their attachment needs. The attachment behavioral system overrules the other behavioral systems (i.e., exploration, feeding, social, and sexual), and deactivating the attachment behavioral system

allows other behavioral systems to operate freely. When a child feels secure, the exploratory behavior system is free to operate and the child can openly interact with and learn about the environment (Bowlby, 1988).

Ainsworth

In contrast to Bowlby's normative approach, Mary Ainsworth was interested in individual differences in attachment. To identify different styles of attachment, Ainsworth developed a structured observation procedure called the Strange Situation Task (SST; Ainsworth, Blehar, Waters, & Wall, 1978). The SST examines how a child interacts with and explores a novel environment, and responds to a series of separation-reunion episodes.

Ainsworth was able to classify children into three distinct attachments styles (Avoidant, Secure, and Anxious Ambivalent) based on how easily children were consoled by their mothers, patterns of environmental exploration, stranger anxiety, and separation protest (Ainsworth et al., 1978). Secure attachment is characterized by separation and stranger anxiety and using the attachment figure as a secure base from which to explore. The avoidant attachment style includes children who openly explore their environment in the presence of the attachment figure, show minimal distress when the attachment figure leaves the room, and then quickly go back to exploring the environment. Among avoidant children, reunions with the attachment figure appear uncomfortable for mother and child. An anxious ambivalent attachment is marked by extreme separation protests and stranger anxiety and poor secure base behavior. When presented with the novel environment, the anxious ambivalent child will express fear and anxiety by clinging to the caregiver or protesting separation from an attachment figure.

Differences in attachment styles are thought to arise from differences in the responsiveness and consistency of their attachment figures (Ainsworth et al., 1978). Children are

likely to have a secure attachment when the mother is consistently and effectively responsive to their children's attachment needs. Children are likely to display an avoidant attachment when the mother is consistently physically and emotionally unavailable to their child. The child may even become more emotionally responsive to a stranger or someone other than their attachment figure (Weinfield, Sroufe, Egeland, & Carlson, 2008). Children are likely to display an anxious ambivalent attachment when the mother inconsistently responds to their children's attachment needs. The mother fluctuates between excessive emotional availability and becoming emotionally distant from the child. In order for the child to compensate for their mother's inconsistencies, these children are thought to constantly attempt to maintain close proximity to their attachment figures; therefore obtaining the adequate attention they need.

Main and Solomon (1990) identified a fourth pattern of attachment in childhood (Disorganized Attachment) which arises as a result of abuse and or neglect. Specifically, these children, many of whom were once labeled secure by the SST, display behavior characterized as disoriented and confused along with approach-avoidance and stereotyped behavior. During the SST, disoriented/disorganized children may show similar traits as anxious children and become distressed during the separation episode; however, during the reunion episode, the child may continue to display distress, as well as display depression, confusion, disorientation, and fearful behavior of the parent (Main & Solomon, 1990).

Adult Attachment Theory

By conceptualizing love as an attachment process, Hazan and Shaver (1987) applied the concept of the attachment system to the study of adult romantic relationships. Hazan and Shaver (1987) identified three specific attachment styles, which are based on those identified by Ainsworth et al. (1978): Secure, Avoidant, and Ambivalent, thereby developing a single-item

measure of the three attachment styles for adult romantic relationships. Subsequently, Bartholomew and Horowitz (1991) offered a four category model of adult attachment (see Figure 1) classifying individuals as secure, dismissing avoidant (which parallels avoidant attachment), preoccupied (which parallels anxious-ambivalent attachment), or fearful (which parallels disorganized-disoriented attachment). The attachment categories were thought to be organized along two separate dimensions reflecting IWM of self (positive vs. negative view of self) and IWM of others (positive vs. negative view of others). Subsequent research has suggested that the dimensions of working models of self and others actually reflect broader dimensions of Anxiety and Avoidance, respectively (e.g., Brennan, Clark, & Shaver, 1998).

		Internal Working Model of Self (Anxiety)	
		Positive Self (Low Anxiety)	**Negative Self** (High Anxiety)
Internal Working Model of Others (Avoidance)	**Positive Other** (Low Avoidance)	**SECURE:** Individual is comfortable in relationships.	**PREOCCUPIED:** Individual is preoccupied with relationships.
	Negative Other (High Avoidance)	**DISMISSING:** Individual is dismissing of relationships. Counter-dependent	**FEARFUL:** Individual is fearful of relationships and socially avoidant.

Figure 1. Four Factor Model of Adult Romantic Attachment

Because of their positive view of the self (low anxiety) and a positive view of the other (low avoidance), an individual with a secure attachment is believed to find themselves worthy of and responsive to the love of others. An individual with a preoccupied attachment is thought to have a negative view of the self (high anxiety) and a positive view of the other (low avoidance); therefore, they rely on others to give them a sense of self-worth (Bartholomew & Horowitz,

1991). Individuals labeled with a dismissing avoidant attachment are expected to have a positive view of the self (low anxiety) and a negative view of the other (high avoidance). As a result, dismissing individuals tend to emotionally distance themselves from their partners (Bartholomew & Horowitz, 1991). An individual with a fearful avoidant attachment is thought to have a negative view of the self and the other (high anxiety and avoidance). These individuals will avoid romantic relationships in order to protect themselves from inevitable rejection (Hazan & Shaver, 1987).

Psychodynamics of Adult Attachment

In an effort to provide a more reliable measure of adult romantic attachment, Brennan et al. (1998) created the Experiences in Close Relationships (ECR) which includes two attachment dimension scales (avoidance and anxiety). Although attachment classifications can be extracted from this model, the primary emphasis is on the dimensions. These attachment dimensions are extracted from previously developed self-report measures (e.g., Hazan & Shaver, 1987; Bartholomew & Horowitz, 1991; Shaver, 1995; Simpson, 1990; Griffin & Bartholomew, 1994a; Griffin & Bartholomew, 1994b; Feeney, Noller, & Hanrahan, 1994) in order to identify the important individual differences in adult romantic attachment along two-dimensions.

Expanding on early models of adult attachment, Shaver and Mikulincer (2002) have outlined a theoretical model of attachment systems, which explains how the different attachment styles represent primary or secondary strategies for responding to attachment related threats (Main & Solomon, 1990). The model consists of three major components: The first module monitors and appraises a threatening situation and is responsible for the activation of the attachment system, the second module appraises the availability and responsiveness of attachment figures to their attachment needs during a threatening situation, and the third module

is responsible for the individual differences in proximity-seeking behavior and emotion regulation represented by the hyperactivation or deactivation secondary strategies (see Figure 2).

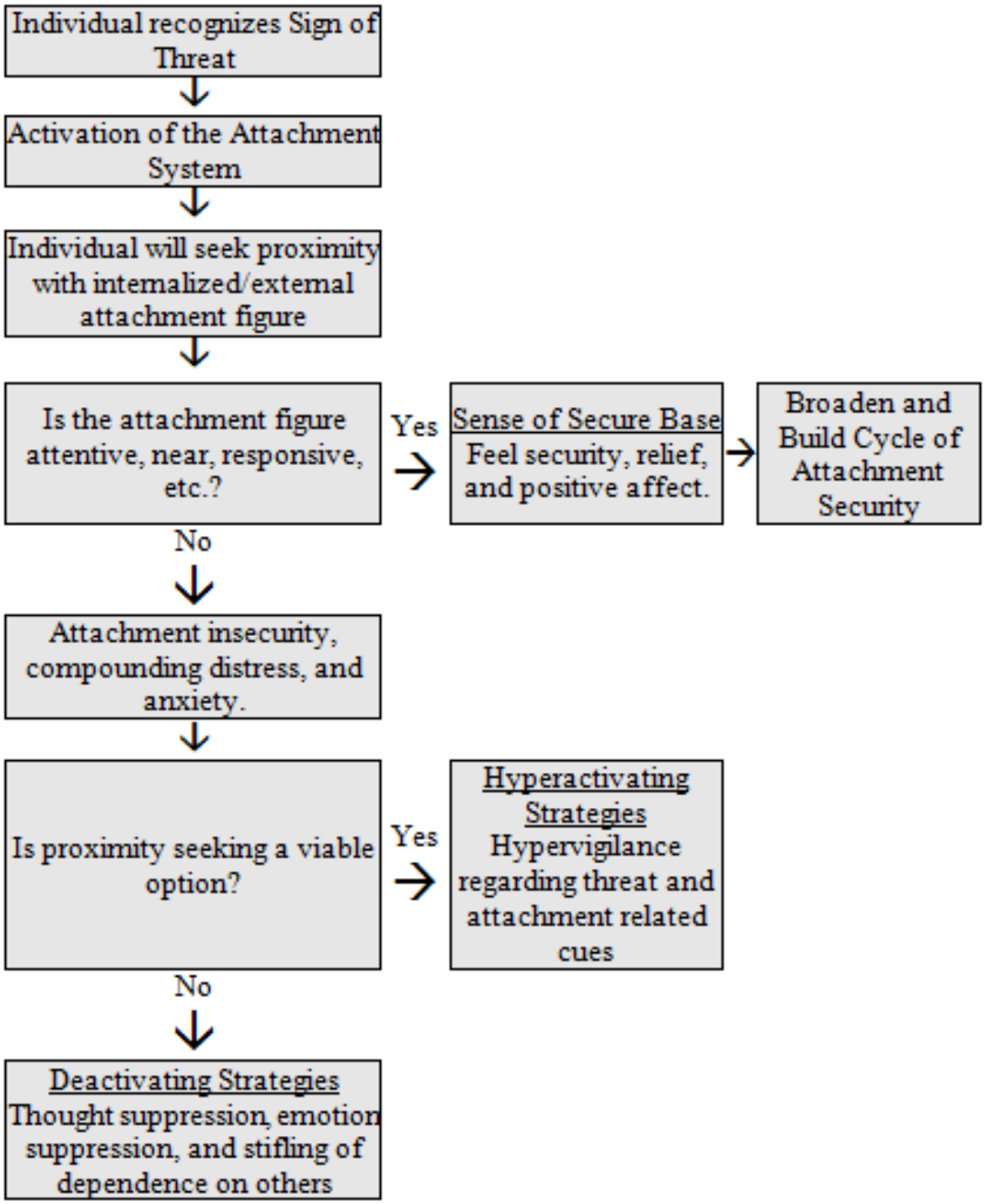

Figure 2. Shaver and Mikulincer Model of Attachment

After a threat activates the attachment system, an individual will try to increase proximity with his or her attachment figure. Secure individuals with responsive and available caregivers experience relief from the threatening situation through increased proximity or by activating mental representations of their attachment figure. If the individual does not perceive their attachment figure as attentive and responsive, their attachment anxiety will be regulated with secondary strategies. When increased proximity seeking and hypervigilance is perceived to be a viable option for increasing the attachment figure's attentiveness to the individual's needs, an individual will use an up-regulating/hyperactivating strategy (Shaver & Mikulincer, 2002; Hazan & Shaver, 1987; Bartholomew & Horowitz, 1991). Up-regulating/hyperactivation strategies are seen in individuals who score high on attachment-anxiety and tend to concentrate on negative thoughts and emotions related to their own distress, which can elevate their distress (Shaver & Mikulincer, 2002).

When increased proximity seeking is not seen as a viable option, an individual will cope with the threatening situation by maximizing the distance between themselves and their attachment figure with down-regulating/deactivating strategies. Down-regulating/deactivating strategies are seen in individuals who score high on attachment avoidance and tend to remove themselves physically and cognitively from the source of their distress (Shaver & Mikulincer, 2002). The down-regulation strategies used by dismissing individuals filters incoming information in order to prevent activation of the attachment system (Fraley, Waller & Brennan, 2000; Mikulincer & Shaver, 2008). Dismissing individuals are able to significantly reduce the amount of negative relationship-related thoughts; however, these strategies can be impaired under high cognitive load (Mikulincer, Dolev, & Shaver, 2004).

Social Cognition

According to Fiske and Taylor (1991), social cognition refers to the encoding, storing, and application of information about other people. Central within many social cognitive theories is the idea that information is represented in the brain as abstract elements such as cognitive schemas (Greenwald & Banaji, 1995; Mikulincer & Orbach, 1995). A variety of information processing outcomes are associated with the use of schemas (Baldwin, 1992; Markus & Zajonc, 1985). Schema relevant information is more likely to capture attention and it is usually processed faster and more efficiently. Schematic processing may also serve as a guide when individuals attempt to make sense of ambiguous information. Schemas can also cause information processing errors. The increased likelihood of using chronically accessible schemas can result in the misinterpretation of information. Similarly, schema relevant intrusions may negatively affect memory recall. People may remember something that never really happened, but is schema consistent.

Attachment and Social Cognition

Cognitive schemas and other mental representations are thought to play an important role in the regulation of the attachment system (Shaver & Mikulincer, 2012). Individuals tend to organize their attachment systems based on their IWMs, which included conscious and unconscious features obtained through their experiences with their attachment figures (Shaver & Mikulincer, 2012). According to Mikulincer and Orbach (1995), the relationship between individuals' cognitive schemas and their attachment experiences influence how they cope with stressful situations and the positive and/or negative expectations of others' availability to their attachment needs (Mikulincer & Orbach, 1995).

In their study on attachment related differences in the accessibility of emotion-related memories, Mikulincer and Orbach (1995) examined how individuals with different attachment

styles regulate the cognitive processing of negative emotional experiences. To evaluate the individual attachment style differences in processing emotional experiences, Mikulincer and Orbach (1995) assessed each participant's attachment style with Hazan and Shaver's (1987) three paragraph measure. The participants' repressive defensiveness was then assessed with two self-report measures: the Taylor Manifest Anxiety (TMA; Taylor, 1953) scale and the Marlowe-Crowne Social Desirability (MCSD; Crowne & Marlowe, 1964) scale.

The early emotional memory task was used to measure the proportion of episodes recalled and the episode retrieval latency (the interval between the point when a stimulus is presented and the moment a response occurs). The response time for the retrieval of each memory was recorded as a measure of participants' accessibility to each emotionally primed episode (Mikulincer & Orbach, 1995). The early emotional memory task evaluated the participants' speed of memory retrieval after the presentation of each of the four target emotions (anger, sadness, anxiety, happiness; Mikulincer & Orbach, 1995). The participants were then asked to clearly visualize each experience in their mind and indicate the intensity of arousal triggered by each experience by rating each experience on multiple emotional dimensions (angry, sad, embarrassed, fearful, anxious, disgusted, ashamed, depressed, surprised, and happy; Mikulincer & Orbach, 1995).

The results of this study showed a significant interaction between the primed emotional target emotion and attachment style (Mikulincer & Orbach, 1995). Secure individuals had higher latency when retrieving memories for anger and sadness than for happiness and anxiety. When retrieving the emotional experiences for sadness and anxiety, avoidant individuals showed the lowest accessibility for emotional experiences involving sadness and anxiety, compared with secure and ambivalent individuals (Mikulincer & Orbach, 1995). Ambivalent individuals showed

the highest accessibility (lower latency) for memories of negative emotions compared to secure and avoidant individuals; however, ambivalent individuals had significantly higher latency for retrieving emotional experiences related to happiness, compared to the amount of time it took to retrieve negative emotional experiences, (Mikulincer & Orbach, 1995).

Self-Regulation

Self-regulation represents the conscious effort an individual exercises in order to bring his or her thoughts and actions in line with social and environmental demands, along with setting, managing, and upholding personal goals (e.g., dieting, academics). Self-regulation reflects persistence and tenacious control over habitual or automatic responses (Vohs, Baumeister, & Ciarocco, 2005). Self-regulation is a tool individuals can use to assist in improving their quality of life. In the presence of temptations (e.g., alcohol, drugs, fattening food, overspending), an individual can use self-regulation to override initial impulses that could be hazardous to their health. Self-regulation can be a tool for developing a tradeoff between personal and social benefits (e.g., sacrificing self-indulgence for safety; Baumeister & Alquist, 2009). Tangney, Baumeister, and Boon (2004) suggest that self-regulation can predict positive outcomes such as academic achievement, and interpersonal success. Individuals more likely to self-regulate report fewer problems with relationships, fewer instances of mental health instability, and less substance abuse (Baumeister & Alquist, 2009).

Although self-regulation is seen as a beneficial tool for everyday life throughout the life-span, poor self-regulation can result from limited or depleted resources Baumeister & Alquist, 2009). Muraven, Tice, and Baumeister (1998) demonstrated that self-regulation has muscle-like qualities which function in a limited capacity. Like a muscle, self-regulation can become temporarily depleted after strenuous use. Self-regulation, like other mental processes, relies on a

broad construct of mental energy. Mental processes involved in self-regulation, such as decision making, self-control, and thought suppression, become severely affected once cognitive resources have been depleted (Muraven et al., 1998; Baumeister & Alquist, 2009; Vohs et al., 2005). Thereafter, subsequent self-regulation becomes severely impaired.

Attachment and Self-Regulation

Self-regulatory processes, such as controlling emotional expressions and thought suppression may appear conceptually similar to the deactivating strategies of those with a dismissing avoidant attachment style. If deactivating/down-regulation strategies are dependent on self-regulatory processes, dismissing individuals may be susceptible to failure of the deactivating strategy when self-regulatory resources have been depleted. That is, they may become overwhelmed by attachment-related emotions in the face of a broad range of threats when self-regulation resources are limited.

In order to identify the role of self-regulation in deactivating/down-regulation strategies, Kohn et al. (2012) randomly assigned participants into one of two writing conditions. One condition served to deplete the self-regulatory resources by instructing participants to write a story about a trip they had taken, but they were also instructed to not use the letters *a* or *n* anywhere throughout their story. The other condition served as a control condition, where participants were only instructed to write a story about a trip they had taken.

The participants' attachment style was assessed using the four paragraph Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991), which classifies participants as either secure, preoccupied, fearful avoidant, or dismissing avoidant. In order to measure the participants' accessibility to memories related to positive and negative emotions, Kohn et al., (2012) used the memory task procedure from Mikulincer and Orbach (1995). Participants'

reaction time was measured based on their recall of specific childhood memories when presented with each of four target emotion words (Mikulincer & Orbach, 1995; Kohn et al., 2012). In the self-regulating depletion writing condition, participants with a dismissing avoidant attachment style had a significant reduction in operating their deactivating strategies; therefore, participants with a dismissing avoidant attachment style could access negative emotions in comparison to participants with a dismissing avoidant attachment style who were not exposed to the self-regulation depletion writing condition (Kohn et al., 2012).

Renz, Aspelmemer, Lessard, McChesney, and Lewis (2014) have also shown that activation of the attachment system among individuals who have a dismissing avoidant attachment style may utilize self-regulatory resources. In this study, participants' attachment styles were assessed with the Revised Experiences in Close Relationships (ECR-R; Fraley, Waller, & Brennan, 2000) and the RQ (Bartholomew & Horowitz, 1991), and they were subsequently randomly assigned to one of three writing conditions (attachment essay, depletion essay, control). Following the writing task, participants completed a self-regulatory task which measured participants' persistence on an unsolvable anagram task.

In the attachment essay condition, dismissing individuals give up on the anagram task significantly faster than secure and fearful participants, which suggests that activation of the attachment system contributed to the depletion of dismissing individuals' ability to use self-regulatory resources. Though time spent on solving anagrams was not significantly different among dismissing individuals across the three writing conditions, the pattern of means was consistent with the study hypothesis and represented a large effect ($\eta^2 = .45$). A larger sample of dismissing individuals may provide significant results. These results are consistent with previous

findings that individuals high in attachment-related avoidance actively suppress their attachment systems (Shaver & Mikulincer, 2002; Kohn et al., 2012).

Study Purpose

The purpose of the present study is to demonstrate that activation of the attachment system among dismissing individuals contributes to both self-regulation depletion and a subsequent breakdown of deactivating strategies (demonstrated by greater accessibility of negative emotional experiences). Previous studies have relied on a single item categorical measure of attachment; therefore, this study focuses on assessing attachment styles using multi-item measures. This study is a mixed experimental/correlational design, and it represents a replication and extension of Kohn et al. (2012).

Participant attachment styles were evaluated with a battery of self-report measures including the ECR (Brennan et al., 1998) and the RQ (Bartholomew & Horowitz, 1991). Thereupon, participants were randomly assigned to one of three essay conditions. The first essay is designed to activate the attachment system. The second essay is designed to deplete self-regulatory resources. The third essay functions as a control. The main dependent variable represents the accessibility of early emotion-related memories and will be assessed by measuring participants' reaction time for retrieval of specific childhood experiences related to emotion-related words.

A Mixed Between-Within 4 x 3 x 2 design for attachment style (secure, fearful, preoccupied, dismissing; between subjects), essay condition (Attachment, self-regulation depletion, and control; between subjects), and emotion (positive vs. negative; within subjects/repeated measures) was used to test memory reaction time. A significant main effect for attachment was expected, with dismissing avoidants showing greater accessibility in general.

The main effect for experimental (essay) condition was not expected to be significant. A significant main effect was expected for the type of emotion, where negative emotions have greater accessibility than positive emotions. A significant three-way interaction was expected between attachment style, essay condition, and emotion type (See Figure 3). The central prediction was that dismissing participants will show increased accessibility of negative emotions in the attachment essay and self-regulation depletion essay conditions, compared to dismissing participants in the control conditions and compared to secure participants in all other conditions.

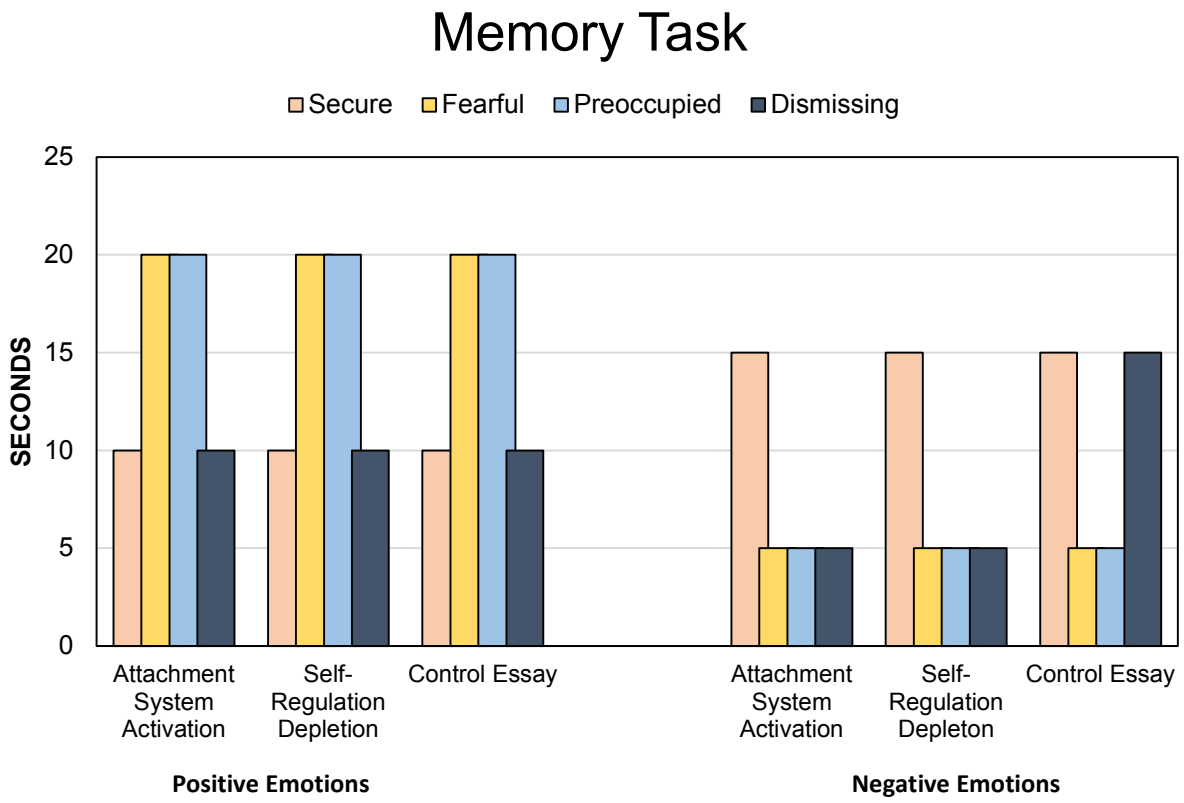

Figure 3. Expected Memory Task Interaction between Attachment Style and Essay Condition

Chapter 3: Method

Participants

The sample consists of 119 introductory to psychology undergraduates between the ages of 17 and 29 (M = 19.55, SD = 1.97) from Radford University. Participants were given course credit for their participation. The sample consists of 28 male and 91 female freshmen (49.2%), sophomores (25%), juniors (17.5%), and seniors (7.5%). The majority of participants were Caucasian/European American/White (63.3%), followed by African American (16.7%). Other ethnic identifiers, such as East/Southeast-Asian American (1.7%), Hispanic, Latino/a, Chicano/a American (6.7%), Pacific-Islander American (.8%), Caribbean American (.8%), and other multiple ethnicities range between 6.7 and less than 1%. An estimated GPA variable (M = 3.00, SD = .570) was computed for each participant based on either current college GPA or high school GPA, which was utilized for those participants who do not currently have an established college GPA.

The majority of the sample (49.2%) reported their relationship status as single, 41.7% reported being in a relationship but not cohabitating, 5.8% reported being in a relationship and cohabitating, and 2.5% reported being engaged. Participants reported their childhood living situation as 58.3% living with both biological parents, 13.3% living with one biological parent, 10.8% living with one biological parent and a step parent, 8.3% living with each parent separately, but at different times, 4.2% living with adopted parents, and 4.2% living in an "other" situation.

Measures

Three measures were used to assess participant attachment style. The Experiences in Close Relationships (ECR; Brennan et al., 1998) and the Revised Experiences in Close

Relationships (ECR-R; Fraley et. al., 2000) were administered conjointly, and they are followed by the Relationship Questionnaire (RQ). The ECR-R was included as part of a larger study and it is not included in the analyses of the present study. The Experiences in Close Relationships (ECR) was used to assess participant attachment related anxiety and avoidance. Participants were scored across 36 items consisting of two 18-item subscales, anxiety and avoidance. Participants reported their level of agreement with each statement on a 7-point numerical rating scale ranging from 1 (Disagree Strongly) to 7 (Agree Strongly). Examples of subscale items of attachment related anxiety and attachment related avoidance are "I worry about being abandoned" and "I prefer not to show how I feel deep down," respectively. A mean score for all even numbered items was calculated for an individual's score for the anxiety subscale. A mean score for all odd numbered items was calculated for an individual's score for the avoidance subscale. The means, standard deviations, and ranges for the avoidance ECR subscale and the anxiety ECR subscale were $M = 2.92$, $SD = 1.05$, $range = 5.28$, $\alpha = .94$, and $M = 3.98$, $SD = 0.93$, $range = 4.78$, $\alpha = .87$, respectively.

The Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991) is a measure of attachment style which consists of four short essays describing the feelings one may experience in close relationships. Of the four short essays, participants selected the one that best describes themselves, after which they rate their level of agreement for each of the four essays as it corresponds to their general relationship style. Of the four short essays 35% of participants reported having a secure attachment, 15% as having a preoccupied attachment, 31.7% as having a fearful avoidant attachment, and 18.3% report having a dismissing avoidant attachment. Participants also rated the degree to which each paragraph is descriptive of them on a 7-point numerical rating scale ranging from 1 (Very Undescriptive of Me) to 7 (Very Descriptive of Me).

Participants' average rating for the short essay associated with a secure attachment was 4.63 (*SD* = 1.84), 3.34 (*SD* = 1.99) for the short essay associated with a preoccupied attachment, 4.47 (*SD* = 1.99) for the short essay associated with a fearful avoidant attachment, and 4.54 (*SD* = 1.79) for the short essay associated with a dismissing avoidant attachment.

The Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) was used as a delay task between the experimental writing condition and persistence task, as well as used to rule out mood as a confounding variable. The PANAS consists of an inventory of 20 items containing two lists of 10 adjectives assessing each participant's positive and negative affect. Participants indicated the extent to which they felt each affect adjective during that present time on a 5-point numerical rating scale ranging from 1 (very slightly or not at all) to 5 (extremely). The average of all positive adjectives (interested, excited, strong, etc.) was computed to obtain a participant's score for positive affect. The average of all negative adjectives (distresses, upset, nervous, etc.) was computed to obtain a participant's score for negative affect. The positive and negative affect scores resulted in *M* = 3.03; *SD* = 0.82, *range* = 3.80, α = .87, and *M* = 1.68; *SD* = 0.69, *range* = 3.00, α = .85, respectively.

Procedures

Overview. Participants were recruited through SONA (a research participation scheduling system; Sona Systems Ltd., Tallin, Estonia), where they signed up for one hour individual sessions. All of the data collection (survey responses), the essay completion, and persistence assessment were recorded using an online survey system (Qualtrics Inc., Provo, UT). All reaction time data collection and open ended responses (early emotional memory retrieval task) were recorded with reaction time software (Superlab 5.0.1, 2013; Cedrus, San Pedro, California).

After the experimenter informed the participant of the nature of the study and their rights as participants; the participant read the informed consent forms (Appendix A), after which the participant and the experimenter signed two identical copies (one for the participant's records and one for the experimenter records) of the informed consent if the participant wished to participate in the study. Students who agreed to participate completed two measures of attachment styles (ECR/ECR-R, RQ). Following the attachment measure, participants were randomly assigned to one of three experimental manipulation essay conditions (attachment system activation, self-regulation depletion, or control condition; described in detail below).

To serve as a delay task between the experimental writing condition and the persistence task, participants completed the PANAS. After taking the PANAS, participants proceeded to an anagram task, from which their level of persistence was measured. This task was part of a larger study and the results will not be reported here. After the anagram task, participants transitioned to the early emotional memory task. The early emotional memory task measured participants' reaction time between the recall of an experience primed by each of the presented emotional memory words.

After the experimenter reconnected the participant to Qualtrics to continue with the remainder of the experiment, the participant answered a manipulation check questionnaire to assess the amount of effort they put into the writing task and the persistence task. Following the manipulation check (Appendix B), participants completed a series of demographic questions (Appendix C). At the end of the experiment, the experimenter conducted a post-study interview containing five questions to inquire for suspicion about the anagram task and make sure participants were not told anything about the experiment before their participation (Appendix D).

Finally, the participants were given a copy of the debriefing form (Appendix E), briefed on the purpose of the study, and thanked for their participation.

Experimental conditions. Participants were randomly assigned to one of the three possible essay conditions (Appendix F): attachment essay, self-regulation depletion essay, control essay. The Attachment Essay is based on a portion of the Adult Attachment Interview (AAI; Main & Goldwyn, 1984), and asks participants to list five adjectives that describe their relationship with their mother/attachment figure. After participants list the five adjectives, the participants were asked to elaborate on why they chose that particular adjective to describe the relationship. Theoretically, the retrieval of attachment related memories should activate the attachment behavioral system and prompt insecure participants to engage in primary or secondary (hyperactivating or deactivating) attachment strategies.

The self-regulation depletion essay task is based on procedures used in other self-regulation studies (e.g., Schmeichel, 2007). In this task, participants were asked to write a story about a recent trip they had taken; however, participants were instructed to avoid using the letters "a" and "n." Participants were told that they can use words that contain these letters, but the participants should refrain from typing those letters when they type the word. The control condition asked participants to write a story about a recent trip they have taken. Unlike the self-regulation depletion task, the participants were free to use the letters "a" and "n" within their essay.

Persistence task. Participants' persistence on an unsolvable anagram task (Appendix G) evaluated self-regulation depletion. Again, this task was part of a larger study and the results will not be presented here. Before beginning the anagram task, participants were informed that they should complete the word scrambles to the best of their ability until they have either finished all

the word scrambles or they feel like they can no longer continue. To prevent the participant from feeling pressure to persist on the anagram task, the experimenter left the room while participants worked on the anagrams. Of the 48 word scrambles in the anagram task, only a few are solvable (OEFSWLR = FLOWERS), and the remaining are unsolvable (LENPTAE, UOLDIBE). Because the majority of word scrambles are unsolvable, no participant was expected to complete all of the scrambles. A 20 min. time limit was set, but participants were not told about the limit. If participants did not manually advance to the next section, then the system automatically advanced participants to the next section of the study. The amount of time participants persisted on the anagram task indicated their present amount of self-regulatory resources; therefore, if a participant persisted longer on the anagram task, he or she was expected to have a larger amount of self-regulatory resources available before the task began.

Early emotional memory task. The early emotional memory retrieval task (based on Mikulincer & Orbach, 1995) measures participants' reaction time between the presentation of six emotion target words (anger, sadness, anxiety, happiness, excitement, warmth) and the retrieval of an early emotional memory associated with each emotion. Table 1 shows the directions and the order of events for a given emotion trial. In the first set of directions (slide 1), participants were asked to think back to their childhood (up until 12 years of age) and think of experiences in which they felt each of the six different emotions. After each section of directions, participants pressed the space bar to move on to the next section. Each emotion trail was preceded by directions that informed the participants that they would be asked to press the space bar once they think of an experience associated with the emotion. These directions appeared for 10 seconds before each orienting stimulus is displayed. Before presenting the target emotion words, participants were shown the sentence "Think of an early experience associated with …" as an

orienting stimulus. The orienting stimulus appeared for five seconds before the presentation of the target emotion. In order to calculate participants' reaction time, each participant pressed the "spacebar" once they recalled an emotional memory following the presentation of the target emotion word. Reaction time software (Superlab 5.0.1, 2013: Cedrus, San Pedro, California) recorded participant reaction time in milliseconds. Faster reaction times indicated higher accessibility of emotional memories.

Table 1. Early Emotional Memory Task Summary

	Event	Timing	Response Type
1.	We would like for you to think back to your own childhood (up until you were 12 years of age) and think of experiences, situations, or events in which you felt a particular emotion. We would like for you to recall experiences with six different emotions. For each part of the task we will tell you which emotion to think of. Press the SPACE BAR to continue.		Press space bar
2.	On the next screen you will be asked to think of an early experience associated with a specific emotion. When an experience comes to mind, PRESS THE SPACE BAR AS QUICKLY AS POSSIBLE.	10 seconds	
3.	Think of an early experience associated with…	5 seconds	
4.	Emotion (anger, anxiety, sadness, happiness, excitement, warmth)		Reaction time calculated between the presentation of emotion and the participants pressing of the space bar.
5.	At what age did this experience happen?		Open-ended response.
6.	Briefly describe this experience.		Open-ended response.
7.	In your recalled experience, to what extend did you feel _____? (anger, sad, embarrassed, fearful, anxious, disgusted, ashamed, depressed, surprised, happy) Please indicate how intense you felt this emotion during this experience by pressing the appropriate number on the keyboard. 1. Not at all 2. 3. 4. 5. 6. Very much		6-point rating scale.

After observing positive and negative emotional reaction times, eleven reaction time outliers, more than three standard deviations from the mean, were removed from the study. Positive and negative emotion reaction times (RT) were computed by averaging the reaction times for positive target emotions (*M* = 5333.04, *SD* = 3731.33, *range* = 18908.33, α = .32, happiness, excitement, warmth) and negative target emotion (*M* = 5110.99, *SD* = 3385.53, *range* = 15900.67, α = .61, angry, anxiety, sadness). Item analysis indicated that two of the target emotions, warmth and anxiety, performed poorly in their respective scales. Warmth was dropped from the positive emotion RT (*M* = 4692.09, *SD* = 3269.76, *range* = 14360.00, α = .48) and anxiety was dropped from the negative emotion RT (*M* = 5062.89, *SD* = 3930.00, *range* = 20570.50, α = .64).

Following the presentation of each of the emotion target words, participants' were asked to give a brief description of their recalled emotional experience, and record how old they were at that time. After the participants provide a brief description of their experience, they were asked to indicate the intensity with which they felt each of ten emotions (*angry, sad, embarrassed, fearful, anxious, disgusted, ashamed, depressed, surprised,* and *happy*) during that experience. Participants were asked to indicate how intensely they felt each of the 10 emotions on a 6-point numerical rating scale ranging from 1 "Not at all" to 6 "Very much." Emotional intensity was computed by averaging across the ten emotions for each of the six target emotions. Emotional intensity for each of the six target emotions resulted in angry emotion intensity (*M* = 3.45, *SD* = 0.97, *range* = 4.10), anxiety emotion intensity (*M* = 3.04, *SD* = 0.8, *range* = 4.00), sadness emotion intensity (*M* = 3.06, *SD* = 0.85, *range* = 4.00), happiness emotion intensity (*M* = 1.96, *SD* = 0.34, *range* = 1.60), excitement emotion intensity (*M* = 2.13, *SD* = 0.34, *range* = 1.70), and warmth emotion intensity (*M* = 1.87, *SD* = 0.54, *range* = 3.00). Cronbach's alpha for

anger, anxiety, sadness, happiness, excitement, and warmth emotion intensity is .76, .62, .31, .31, .25, and .55, respectively. Once participants have recalled, described, and rated the intensity level of their experiences[1], they move on to the next part of the study.

Manipulation check. A three question manipulation check (Appendix B) was administered to participants to determine if they put effort on the self-regulation task. The manipulation check asked participants to think about and rate how much effort they put into the writing task using a 9-point numerical rating scale (1 = minimal effort, to 9 = maximal effort). If participants reported putting minimal effort (≤ 3) on selected essay conditions (item 2), then they are dropped from the study. Only one participant from the control essay condition and one participant from the self-regulation depletion essay condition were thrown out of the study based on this criterion.

Data Analysis Plan

The data analysis in this study is conducted in three steps: demographic analysis, preliminary analysis, and main analysis. The demographic analysis compares the demographic variables (gender, age, ethnicity, etc.) with the main variables of interest (ECR anxiety and avoidance, RQ classifications, essay condition, times spent on persistence task, and emotional experience/memory retrieval reaction times) to identify potential confounding relationships. A series of Pearson's product moment correlations test the association between continuous variables and Pearson's chi-square tests evaluate the associations between categorical variables. One-way ANOVAs and independent sample *t*-tests evaluate the associations between categorical

[1] This measure was recorded in the original Mikulincer and Orbach (1995) and Kohn et at. (2012). It was included in the present study for comparison purposes only.

predictors and continuous outcomes. Running a series of one-way ANOVAs ensures that the short writing tasks are not affecting to participants' mood state.

This study utilizes a 4 (attachment style; between subjects) x 3 (essay condition; between subjects) x 2 (emotion type; repeated measures) mixed between-within repeated-measures ANOVA to test emotional memory reaction time. Post hoc tests using either the Ryan (REGWF) or LSD procedures are used to probe significant main effects. Significant interactions are decomposed into simple effects and post hoc tests are conducted to examine differences between pairs of means where appropriate.

Chapter 4: Results

Demographic Analysis

In order to identify associations between the demographic variables (age, gender, ethnicity, relationship status, GPA, and class standing) and the main variables in interest (attachment styles, experimental writing conditions, positive emotion RT, and negative emotion RT, and PANAS), a series of preliminary analyses were conducted. Results indicate that gender is not significantly associated with attachment classifications or the avoidance and anxiety dimensions. Significant gender differences were identified in reaction times for the target emotion warmth. Men (M = 9818.79, SD = 13170.76) recalled experiences involving emotional warmth significantly more slowly than women (M = 5623.13, SD = 5597.88), $t(117) = 2.42$, p = .017, d = 0.45. There were no significant differences between men and women's accessibility of positive and negative emotions.

Results indicate that relationship status was significantly associated with the attachment avoidance [ECR; $F(3, 115) = 5.14$, p = .002, η^2 = .12] dimension. Results of Fisher LSD post-hoc tests revealed that participants who reported being single expressed significantly higher levels of attachment related avoidance. Results indicate that participant relationship status was not significantly associated with attachment style classifications.

A one-way ANOVA was computed to determine if relationship status was associated with participants' accessibility of early childhood memories for each target emotional memory. Results indicate that relationship status was significantly associated with reaction time for target emotions angry, anxiety, sadness, and excitement (Table 2). Participants who reported their relationship status as living together retrieved a memory of an angry emotional experience significantly more slowly than single, dating, and engaged participants. Those who reported their

relationship status as living together also retrieved sadness, excitement, and negative emotional memories significantly more slowly than single and dating participants (Table 2).

Although there were no significant differences between means of participant relationship status and retrieval of positive emotional memories, participants retrieval of positive emotional experiences was slower and different from single and dating participants if participants reported their relationship status as living together. There were no differences between participants' retrieval of positive emotional experiences when they reported their relationship status as living together or engaged (Table 2). Participants who reported their relationship status as single, retrieved a memory of an emotional experience related to anxiety significantly faster than engaged participants, but single and engaged participants' retrieval of an anxious memory was not significantly different from anxious experience retrieved from dating and living together participants (Table 2).

One-way ANOVAs were computed to determine if relationship status was associated with the PANAS positive and negative affect scale scores. There was a significant difference between the means for participant relationship status and PANAS positive affect scale scores. Participants who reported their relationship status as dating had significantly higher scores for positive affect than participants who reported their relationship status as single. Separately, single and dating relationship status was not significantly different from the other relationship statuses (living together, engaged; Table 2).

Table 2. Emotion Reaction Time and PANAS Scale Scores for Relationship Status

	Relationship Status					
	Single	Dating, but not living together	Living together	Engaged	F	η^2
Emotion Reaction Time in Milliseconds						
Angry	4163.56_{a} (3042.15)	4825.36_{a} (4729.49)	11757.00_{b} (8649.29)	5177.67_{a} (4514.71)	6.53^{***}	.15
Anxiety	4527.46_{a} (3428.86)	5378.64_{ab} (5043.76)	7912.86_{ab} (5119.51)	10024.67_{b} (5022.22)	2.68^{*}	.07
Sadness	5084.03_{a} (4743.59)	4571.48_{a} (3768.16)	10575.00_{b} (6326.83)	7943.00_{ab} (2373.95)	4.17^{**}	.10
Happiness	4544.31_{a} (4187.62)	3464.26_{a} (3801.24)	5588.57_{a} (3481.56)	3422.67_{a} (2953.24)	1.01	.03
Excitement	4985.56_{a} (3820.11)	4690.32_{a} (3834.66)	9509.71_{b} (5997.62)	6147.67_{ab} (2631.97)	3.16^{*}	.08
Warmth	5907.81_{a} (6580.98)	7072.56_{a} (10315.34)	9165.86_{a} (3248.67)	6760.33_{a} (1744.66)	.42	.01
Positive Emotions	4764.93_{a} (3299.73)	4077.29_{a} (3053.90)	7549.14_{b} (3206.97)	4935.17_{ab} (2537.21)	2.51	.06
Negative Emotions	4623.80_{a} (3228.63)	4698.42_{a} (3906.78)	11166.00_{b} (5361.94)	6560.33_{ab} (2997.21)	7.09^{***}	.16
PANAS Scale Scores						
Positive Affect	2.78_{a} (.86)	3.26_{b} (.66)	3.21_{ab} (.89)	3.04_{ab} (1.36)	3.44^{*}	.08
Negative Affect	1.76_{a} (.72)	1.59_{a} (.63)	1.60_{a} (.79)	1.27_{a} (.25)	.93	.02

Note. $^{*} = p \leq .05$, $^{**} = p \leq .01$, $^{***} = p \leq .001$. Standard deviations appear in parentheses below means. Means with different subscripts within rows are significantly different at the $p \leq .05$ based on Fisher's LSD post-hoc paired comparisons.

To determine if there were significant associations between age and GPA among attachment style classifications and positive and negative emotional reaction times, a series of statistical analyses were computed (one-way ANOVA, Pearson's Correlation). The results indicated that there were no significant associations for participant age and GPA among participant attachment style classifications or among participants' accessibility of early childhood memories for each target emotional memory and accessibility of positive and negative emotions. A significant negative correlation was found between participant age and scores on the PANAS negative affect scale $r(117) = -.26$, $p = .005$, $d = -.53$. Older participants reported lower levels of negative affect.

Due to underrepresentation of some ethnic groups, ethnicity was recoded into a dichotomous variable representing European American (63.3%, Caucasian/European American/White) and other ethnicities (36.7%, African American, East/Southeast – Asian American, Pacific-Islander-American, Hispanic, Latino/a, Chicano/a American, Caribbean American, Multi-Ethnic, Other). Ethnicity was only significantly associated with one of the main variables of interest. There was a significant association between the ethnicity dichotomy and PANAS negative affect scale, $F(1, 118) = 6.04$, $p = .015$, $\eta^2 = .05$, but not for positive affect PANAS scale. European American participants ($M = 1.57$, $SD = .57$) had significantly lower scores on the PANAS negative affect scale compared to other participants ($M = 1.88$, $SD = .84$).

Due to the large number of associations between relationship status and the main variables of interest, relationship status was included as a covariate in the main analyses in order to eliminate potentially confounding effects.

Preliminary Analyses

Attachment categories based on ECR scores were generated using a mean split of the avoidance and anxiety scales. Fourteen percent of participants were classified as having a secure attachment, 11.7% were classified as having a dismissing avoidant attachment style, 44.2% were classified as having a preoccupied attachment style, and 30% were classified as having a fearful avoidant attachment style. However, the ECR derived attachment categories did not consistently match the classification obtained using the RQ measure, resulting in an extremely low Cohen's Kappa (.08). Therefore the ECR attachment categories were dropped from the main analyses.

In order to rule out change in mood as an alternative explanation for results of the experimental manipulation, two one-way ANOVAs were computed to determine if the experimental essay condition contributed to participant mood. The results indicate that the experimental essay conditions did not have a significant effect on participant scores for PANAS positive affect and negative affect scales, $F(2, 117) = 1.04$, $p = .357$, $\eta^2 = .02$, and $F(2, 117) = 0.27$, $p = .764$, $\eta^2 = .005$, respectively.

After participants completed the early emotional memory task, they completed a three question manipulation check to determine if participants put effort on the experimental writing task. Independent samples *t*-tests were computed to determine whether participants in the self-regulation depletion essay condition worked harder than participants in the control essay condition (Table 3). Only one participant from the control essay condition and one participant from the self-regulation depletion essay condition were removed of the study based on this criterion. For manipulation check questions one and two, the results suggest that there were no significant differences, and a small effect, in participant effort between participants in the self-regulation depletion essay condition and participants in the control essay condition. There were

no significant difference between manipulation check question three and participant effort in the self-regulation depletion and the control condition essay, with a negative small/medium effect.

Table 3. Manipulation Check Questions Means for Depletion and Control Essay Conditions

	Essay Condition				
	Depletion	Control	*t* (*df*)	*p*	*d*
1. How hard did you try on the previous short essay activity?	7.08 (1.78)	6.76 (1.48)	0.84 (75)	.404	.19
2. How much effort did you exert on the word scramble activity we asked you to complete?	5.99 (2.25)	5.08 (2.26)	0.80 (75)	.429	.18
3. How many distracting thoughts did you have while working on the word scrambles?	4.58 (2.41)	5.42 (2.26)	-1.57 (74)	.121	.36

Note. Standard deviations appear in parentheses below means.

Main Analyses

After running the mixed-model repeated-measures ANCOVA including relationship status as a covariate, the results were not considerably different from the basic ANOVA model excluding relationship status. For simplistic interpretation only a 4 x 3 x 2 mixed-model, repeated-measures ANOVA for attachment style (4 levels), essay condition (3 levels), and emotion (2 levels within subjects) in reported here to test the hypothesis that activation of the attachment system among dismissing individuals contributes to both self-regulation depletion and the subsequent increase in accessibility of negative emotional experiences. It was hypothesized that there would be significant main effects for emotional memory condition, RQ attachment category, and experimental essay condition. It was also hypothesized that there would be a significant three-way interaction among emotional memory condition, attachment

categories, and essay condition. There was no significant interaction effect between emotional memory condition and essay condition, and there were no significant main effects for the emotional memory condition, RQ attachment categories, or essay condition (Table 4). Because significance testing is often dependent upon sample size, and this study examined effects using a small sample size, effect sizes were reported to emphasize the influence of the experimental manipulation among groups independent of sample size. Given the non-significant moderate effect size for the three-way interaction, exploratory analyses we conducted to fully break down the three-way interaction (Table 5 and Table 6).

Table 4. Main Effects of Attachment Style and Experimental Essay Condition on Emotional RT

Source	*df*	*F*	η^2	*p*
(A) Emotional Memory Condition	1	1.73	.016	.192
(B) RQ Attachment Categories	3	1.42	.038	.242
(C) Essay Condition	2	.73	.013	.485
A x B	3	2.48†	.064	.065
A x C	2	.40	.007	.669
A x B x C	6	.79	.042	.577
Error (Between-Subjects)	108			
Error (Within-Subjects)	108			

Note. † = $p \leq .10$.

Table 5. Simple Effects of Attachment Style and Experimental Condition on Positive Emotion RT

	Attachment Style					
Essay Condition	Secure	Fearful	Preoccupied	Dismissing	F_{simple} (*df*)	η^2
Attachment Essay Condition	5375.63 (3644.87) *n* = 12	4398.54 (3428.23) *n* = 13	5433.15 (3311.69) *n* = 10	2777.71 (1624.71) *n* = 7	.75 (3, 108)	.09
Self-Regulation Essay Condition	4290.87_{ab} (3059.67) *n* = 15	6663.33_{b} (3374.65) *n* = 9	5059.00_{ab} (4078.18) *n* = 3	2210.13_{a} (986.25) *n* = 12	2.07^{*} (3, 108)	.28
Control Essay Condition	3836.00 (2188.11) *n* = 15	6612.84 (4312.23) *n* = 16	4655.10 (2597.10) *n* = 5	4978.18 (2411.16) *n* = 3	1.22 (3, 108)	.14
F_{simple} (*df*)	.49 (2, 108)	1.27 (2, 108)	.06 (2, 108)	.55 (2, 108)		
η^2	.05	.08	.01	.33		

Note. * = $p \leq .05$. Standard deviations appear in parentheses below means

Table 6. Simple Effects of Attachment Style and Experimental Condition on Negative Emotion RT

	Attachment Style					
Essay Condition	Secure	Fearful	Preoccupied	Dismissing	F_{simple} (*df*)	η^2
Attachment Essay Condition	6505.08_{bc} (6000.62) *n* = 12	3681.65_{ab} (2276.54) *n* = 13	7921.50_{c} (5064.66) *n* = 10	2376.00_{a} (4616.16) *n* = 7	3.58* (3, 108)	.21
Self-Regulation Essay Condition	4566.80 (3084.54) *n* = 15	6166.33 (4598.75) *n* = 9	4273.17 (4186.89) *n* = 3	3330.67 (3379.69) *n* = 12	.83 (3, 108)	.08
Control Essay Condition	5307.67 (3054.90) *n* = 15	4544.47 (2627.33) *n* = 16	7103.20 (5488.23) *n* = 5	7049.83 (5202.59) *n* = 3	.68 (3, 108)	.08
F_{simple} (*df*)	.08 (2, 108)	.98 (2, 108)	.92 (2, 108)	1.40 (2, 108)		
η^2	.04	.09	.07	.20		

Note. * = $p \leq .05$. Standard deviations appear in parentheses below means

A significant simple effect for attachment classification on positive emotion RT in the self-regulation essay condition was observed (Table 5). Post-hoc tests revealed that among participants who wrote the essay designed to deplete self-regulatory resources, dismissing participants retrieved memories of positive emotional experiences significantly faster than fearful participants. Consistent with the hypothesis, though not significant, secure participants retrieved memories of positive emotional experiences faster than fearful and preoccupied participants, and preoccupied participants retrieved memories of positive emotional experiences faster than fearful participants. Among participants who wrote the essay defined to activate the attachment system, dismissing participants retrieved memories of positive emotional experiences faster that fearful, secure, and preoccupied participants. This result is consistent with the hypothesis, however not significant, that dismissing participants will have greater accessibility to emotional experiences after they had written an essay designed to activate their attachment system, which subsequently depleted their self-regulatory resources, compared to the other secure, preoccupied, and fearful, participants who wrote the attachment essay, and other dismissing participants who did not write the attachment essay.

Albeit not significant, large differences among dismissing participants' ($\eta^2 = .33$, Table 5) accessibility of positive emotional memories were observed across the three essay conditions. In the control condition, dismissing participants' accessibility and retrieval of positive emotional memories is slower than that of their accessibility and retrieval of positive emotional memories in the experimental conditions. Dismissing participants retrieved memories of positive experiences faster in the self-regulation essay condition than in the attachment essay condition (Table 5).

Although the effects of attachment essay condition and control essay condition were not significant across attachment classifications for positive emotion RT, in the attachment essay condition, dismissing participants had the greater accessibility for positive emotional memories, followed by fearful, secure, and preoccupied participants. Within the control condition no significant differences in reaction times were observed between the four attachment categories; however, a large effect ($\eta^2 = .14$, Table 5) was observed where secure participants retrieved experiences involving positive emotions faster than other participants. These results are in support of the hypothesis that secure participants will have greater accessibility of emotional memories in the control essay condition compared to fearful, preoccupied, and dismissing participants. This suggests that dismissing participants have lower accessibility to emotional memories in the control essay condition, when compared to the emotional accessibility of other dismissing participants in the attachment and self-regulation essay conditions.

With respect to the accessibility of negative emotion, in the attachment essay condition a significant simple effect for attachment classification was observed (Table 6). Post-hoc tests revealed that, in line with the hypothesis, among participants who wrote the essay designed to activate the attachment system, dismissing participants retrieved memories of negative emotional experiences faster than secure and preoccupied participants; however, dismissing participants' retrieval of memories of negative experiences was faster but not significantly different from fearful participants' retrieval of negative emotional experiences after writing the attachment essay. With respect to the hypothesis that dismissing participants will have greater accessibility to emotional experiences than other participants with different attachment styles after writing an essay designed to activate the attachment, this result was found; however, dismissing participants' greater accessibility to negative emotional experiences was not significantly

different from fearful participants'. Furthermore, after writing the attachment essay, fearful participants' retrieval of negative emotional experiences was found to be significantly different from and faster than preoccupied participants' negative emotional experiences retrieval time. After writing the attachment essay, secure participants retrieved memories of negative emotional experiences faster than preoccupied participants.

Although not significant, large differences among dismissing participants' ($\eta^2 = .20$, Table 6) accessibility of negative emotional memories were observed across all essay conditions. Consistent with the hypothesis, after writing the control essay condition, dismissing participants' retrieval of negative emotional experiences was slower than dismissing participants' retrieval of negative emotional experiences after writing the attachment essay. Dismissing participants' retrieval of negative emotional experiences after writing the self-regulation depletion essay was slower than the retrieval of negative emotional experiences of dismissing participants after writing the attachment essay.

Among participants who wrote the depleting essay or the control essay, the speed of recalling negative emotional experiences did not significantly differ across the four attachment styles. However, moderate effect sizes were observed for attachment style in both the depletion and control essay conditions. ($\eta^2 = .08$, Table 6). After writing the depletion essay, dismissing participants retrieved memories of negative emotional experiences faster than preoccupied, secure, and fearful participants; preoccupied participants retrieved memories of negative emotional experiences faster than secure and fearful participants; and secure participants' retrieval of negative emotional experiences was faster than that of fearful participants. After writing the control essay, fearful participants retrieved memories of negative emotional experiences faster than secure, preoccupied, and dismissing participants; secure participants

retrieved memories of negative emotional experiences faster than preoccupied and dismissing participants; and dismissing participants' retrieval of negative emotional experiences was faster than that of preoccupied participants.

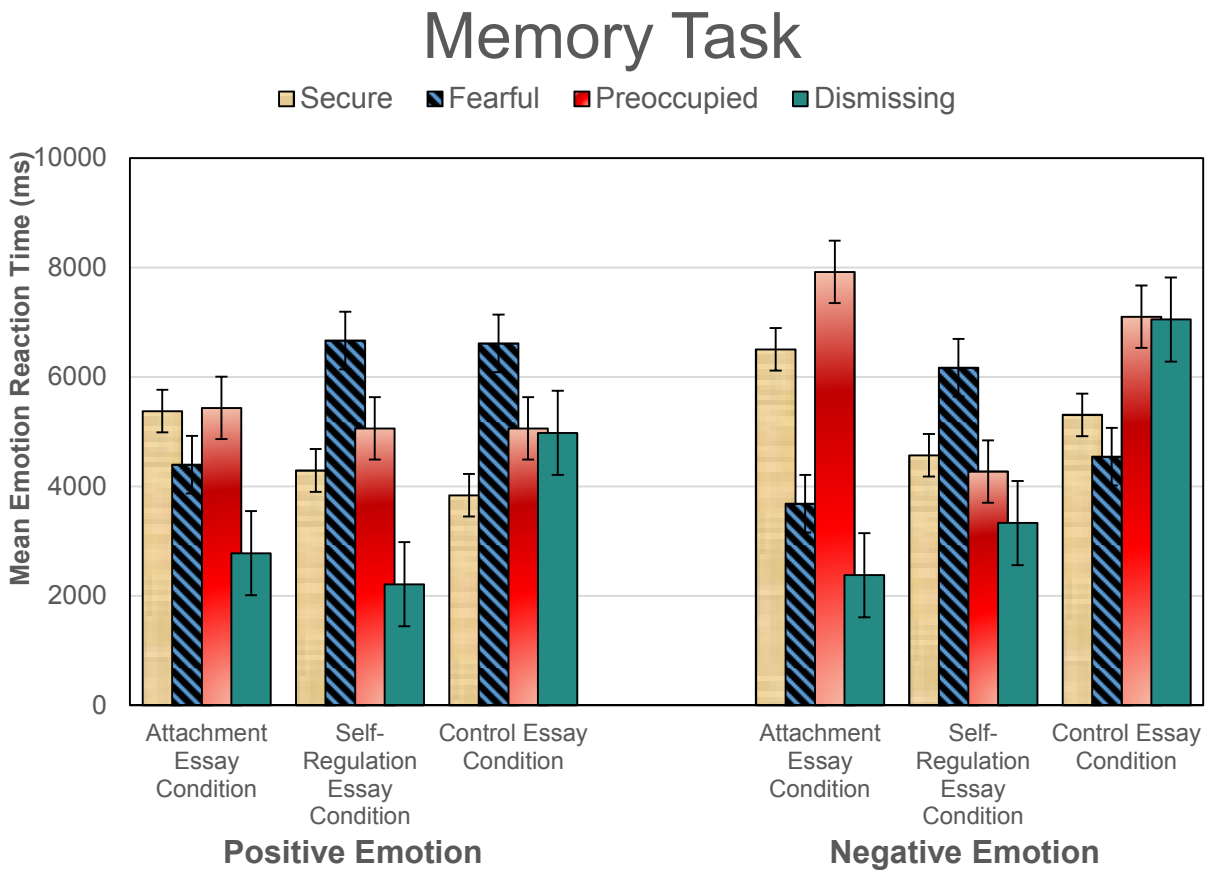

Figure 4. Memory Task Interaction between Attachment Style and Essay Condition

Chapter 5: Discussion

The present study hypothesized that activation of the attachment system among dismissing individuals contributes to both self-regulation depletion and, subsequently, greater accessibility of negative emotional experiences. Among the participants randomly assigned to write about a recent trip with no restrictions (the control essay condition), preoccupied and fearful participants were expected to have greater accessibility of negative childhood emotional memories/experiences (angry, sadness, anxiety) during the early emotional memory task than participants classified with a secure or dismissing participants.

Evidence for this expected pattern of results came from Mikulincer and Orbach's (1995) finding that anxious-ambivalent (preoccupied) people have the shortest retrieval times for negative emotional memories compared to secure and avoidant (dismissing avoidant) people who have moderate retrieval times or the longest retrieval times, respectively, for negative emotional memories. The findings regarding the accessibility of negative early emotional memories among the participants who wrote about a recent trip in the control essay condition were partially consistent with the data found by Mikulincer and Orbach (1995). Secure participants had greater accessibility of negative memories than dismissing participants, and lower accessibility of negative memories than fearful participants. Unexpectedly, preoccupied participants had very low accessibility for negative emotional experiences.

Among the participants assigned to the attachment essay condition and the self-regulation depletion essay condition, participants classified as having a secure attachment style were expected to have lower accessibility to negative emotional memories than other participants in the attachment essay and self-regulation depletion essay condition. Participants with either a

fearful, preoccupied, or dismissing attachment style were expected to have greater accessibility to negative emotional memories compared to participant with a secure attachment style.

Partial support for this hypothesis was found in the attachment essay condition, suggesting that fearful and dismissing participants had greater accessibility to negative emotional memories than preoccupied participants. Dismissing participants also had significantly greater accessibility to negative emotional memories than secure participants. Although not significant, dismissing participants who wrote the self-regulation depletion essay recalled negative emotional experiences more quickly than other participants in the same condition.

It was hypothesized that, across the three essay conditions, secure and dismissing participants would have greater accessibility to positive emotional memories, and fearful and preoccupied participants would have lower accessibility to positive emotional experiences; however, significant differences among participants' accessibility of positive emotional memories in the self-regulation essay condition was an unexpected finding. In the self-regulation depletion essay condition, dismissing avoidant participants had significantly greater accessibility to positive emotional memories in comparison to fearful participants who had significantly lower accessibility to positive emotional memories within the same condition. There were no significant differences between the positive emotional reaction times of dismissing and secure participants, or dismissing and preoccupied participants.

Limitations

Although, this study only partially supports the hypothesis that dismissing participants use self-regulation resources to support the deactivating attachment strategies, the present study possesses several limitations. The present study's number one limitation was the small sample size. A larger sample size can increase the chance of significance; however, due to irregularities

in participants' responses thirty-five of the initial 154 participants were removed from the study. In regard to external validity, the use of convenience sampling of the relatively homogenous sample of college students potentially limits the generalizability of these findings. Because the present study's sample is made up of college students, 18 – 19 years of age, who, according to Sears (1986), hold weak self-definitions, a strong desire for peer approval, and high egocentrism, the homogeneity of their education and age based beliefs and feelings limit generalizability to other populations. Replication with other populations is necessary to compensate for factors such as education level, cultural background, and developmental period in order to significantly evaluate the relationships observed in this study.

One strength of the present study was the measurement reliability of the PANAS (Watson, Clark, & Tellegen, 1988). Although this measure was used as a delay task between the essay condition and the persistence task, the PANAS was consistent in assessing participants' positive and negative affect. Hence, participants' mood after the essay condition was not found to be a confounding variable. A limitation of the present study was the measurement reliability of the early emotional memory task. To assess positive and negative emotional accessibility accurately, two positive target emotions (warmth, excitement) were added. Partial responsibility for the low reliability for positive emotions was the inclusion of the emotional target word "warmth." Participants seemed to find it difficult to define "warmth" in terms of positive early emotional memories/experiences, which may have delayed their reaction time. When warmth was dropped from the study there was a modest the increase in measurement reliability.

Although the reliability for negative emotions increased slightly when "anxiety" was dropped from the study, the reliability remained relatively low. Analysis of the written descriptions of emotional experiences revealed that participants did not seem to fully understand

the difference between emotions relating to anxiety and emotions relating to excitement. For example, a few participants associated waiting for presents on Christmas Eve, being around childhood crushes, and the death of a distant relative or neighbor as emotional experiences of anxiety. Based on participants' brief descriptions of emotional experiences associated with anxiety and excitement, participants appeared to have a better idea of how to define and label an emotional experience associated with excitement. Because participants seem to identify anxiety emotions and excitement emotions interchangeably, in the future other negatively associated target words, such a jealousy or fear could be used as a substitute.

Evidence for the validity of the accessibility measure (early emotional memory task) is limited. Concerning face validity, the early emotional memory task appears to assess participants' accessibility of positive and negative emotions by measuring emotional memory reaction time. Nevertheless, the participants' inability to accurately label their emotional experiences based on the presented emotion target word make it difficult to determine the degree to which the present study is measuring what it is supposed to measure.

Although this study suggests that the activation of the attachment system in dismissing participants, subsequently depleting self-regulatory resources, increases dismissing participants' accessibility to emotional childhood experiences/memories, the internal validity of this study is limited and causal links cannot be established. An uncontrolled third variable (persistence on the unsolvable anagram task) may be confounding these results. Attempting to solve the anagrams may trigger depletion and affect how participants respond on subsequent portions of the study. It may be that participants who persist longest on the anagram task (regardless of experimental condition) were significantly depleted of self-regulation resources. Though it is beyond the scope

of this report, an internal analysis including persistence on anagrams as a main variable may reveal meaningful results.

Writing an essay designed to activate the attachment system does not commonly occur in the real world, and can therefore negatively affect this study's mundane realism. This study cannot assume generalizability to the real world due to its low ecological validity. Using more realistic interactions that activate the attachment system could increase ecological validity. With naturalistic observation, the activation of the attachment system could be achieved through the interactions within adult romantic relationships. However, utilizing a broader range of research methods including large scale survey approaches, naturalistic observation, and case studies could help with establishing that the psychological processes assessed in this study are equivalent with the underlying processes that drive dismissing participants' accessibility of emotional in daily life.

Future Research

In conclusion, the present study provides partial evidence that self-regulatory resources underlie the use of deactivating strategies. To better identify whether participants with a dismissing avoidant attachment style are able to have a greater access to negative emotional memories after random assignment to the attachment essay condition, future research should exclude the unsolvable anagram persistence task before replication of this study. The removal of the persistence task would also be ideal for future research to determine whether the self-regulation essay condition did deplete self-regulatory resources.

Future research should include a more effective manipulation check. The manipulation check used in the present study found no difference in effort exerted by participants in the

control and depletion condition. A more sensitive manipulation check may indicate whether the current lack of difference represents a failure of the manipulation or a failure of measurement.

Concerning participants labeled as fearful avoidant, future research should evaluate and assess fearful participants' increase in the retrieval of positive emotional memories and the significant increase in the retrieval of negative emotional memories after completing the essay designed to activate their attachment system. Fearful participants who completed the attachment essay condition were able to access emotional memories faster than other fearful participants who completed the self-regulation depletion essay or control essay condition.

Final Statement

This line of research is crucial to developing our understanding of the dismissing avoidant attachment style and the deactivating strategies used by those people labeled as such. This research provided evidence of the activation of the attachment system in dismissing individuals, as well as how activating the attachment system is related to the increase of positive and negative emotional accessibility of these individuals.

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Appendix A: Consent/Assent Form

Title of Research: The Role of Self-Regulation in Adult Attachment Related Processes

Researcher(s): Dr. Jeff Aspelmeier & Amanda Lessard

We ask you to be in a research study designed to: examine how individual's attitudes about relationships influence your thinking processes. We are asking for your participation because you are at least 17 years of age and currently enrolled as a student at Radford University. If you decide to be in the study, you will complete questionnaires measuring your attitudes about relationships. Next, you will complete a 5-minute writing session. Following that, you will complete a measure assessing your current feelings and then you will complete several word scrambles. You will then complete a short task involving your memories of past experiences. Finally, we will ask you to provide general information about yourself (e.g., age, sex, GPA, relationship status, family history, and other similar information). We are recruiting approximately 150 – 300 students for this study.

This study has no more risk than you may find in daily life.

You may receive course credit or extra credit for participating in this study. Your Psychology instructor will determine the amount of credit.

No direct physical, health, psychological, or social benefits to participants are expected to result from this study. However, the research will help improve our understanding of the nature of interpersonal processes in adult relationships.

You can choose not to be in this study. If you decide to be in this study, you may choose not to answer any questions or not be in certain parts of this study.

If you decide to be in this study, what you tell us will be kept private unless required by law to tell. If we present or publish the results from this study, your name will not be linked in any way to what we present.

If at any time you want to stop being in this study, you may stop being in the study without penalty or loss of benefits by contacting Dr. Aspelmeier, Box 6946, Department of Psychology, Radford University, Radford, VA 24142. jaspelme@radford.edu, (540)831-5520.

If you have questions now about this study, ask before you sign this form.

If you have any questions later, you may talk with Dr. Jeff Aspelmeier, Box 6946, Department of Psychology, Radford University, Radford, VA 24142. jaspelme@radford.edu, (540)831-5520.

This study has been approved by the Radford University Institutional Review Board for the Review of Human Subjects Research. If you have questions or concerns about your rights as a research subject or have complaints about this study, you should contact Dr. Dennis Grady,

Dean, College of Graduate and Professional Studies, Radford University, dgrady4@radford.edu, (540) 831-7163.

It is your choice whether or not to be in this study. What you choose will not affect any current or future relationship with Radford University.

If all of your questions have been answered and you would like to take part in this study, then please sign below

_____	_____	_____
Signature	Printed Name(s)	Date

I/We have explained the study to the person signing above, have allowed an opportunity for questions, and have answered all of his/her questions. I/We believe that the subject understands this information.

_____	_____	_____
Signature of researcher(s)	Printed Name(s)	Date

Appendix B: Manipulation Check Items

Please answer the following question without looking back to earlier parts of the stud – it is essential that we get an accurate measure of what you really remember. Looking back would invalidate the results of the study.

1. How much effort did you exert on the writing activity we asked you to complete?
<---1 (Minimum Effort) ---2---3---4---5 (Moderate Effort) ---6---7---8---9 (Maximal Effort)--->

2. How hard did you try on the writing activity?
<---1 (Minimum Effort) ---2---3---4---5 (Moderate Effort) ---6---7---8---9 (Maximal Effort)--->

3. How many distracting thoughts did you have while working on the writing activity?
<---1 (Minimum Effort) ---2---3---4---5 (Moderate Effort) ---6---7---8---9 (Maximal Effort)--->

Note: all items are completed using a 1-9 rating scale.

Appendix C: Demographic Questions

Below is a list of questions pertaining to general information about yourself. Some questions will require that you "fill in the black" and some will require that you select from a list of options. Please answer each question as truthfully as possible. Remember that this information will be held confidential.

Gender: Male Female

Class Standing:

1. Freshman
2. Sophomore
3. Junior
4. Senior
5. Other – please specify: _____

What is your Ethnicity?

1. Caucasian/European American/White
2. African American
3. East/Southeast-Asian American
4. Pacific-Islander American
5. South-Asian American (e.g., from India, Pakistan, Burma, Nepal, etc.)
6. Middle-Eastern/North-African American
7. Hispanic American (Latino/a, Chicano/a)
8. Caribbean American
9. American Indian/Native American
10. Multi Ethnic – please specify: _____
11. Other – please specify: _____

What is your age?

What is your current GPA?

What was your graduating high school GPA?

Please indicate your current relationship status:

1. Single
2. Dating but not living together
3. Living together
4. Married
5. Separated
6. Divorced
7. Widowed
8. Engaged (How long have you been engaged?)

Were you adopted/fostered?

1. Yes (If yes, at what age were you adopted/fostered?)
2. No

Which best described your living situation while growing up?

1. I lived with both biological parents together.
2. I lived with one biological parent. (Please specify which one _____)
3. I lived with one biological parent and one step-parent. (Please specify which biological parent _____)
4. I sometimes lived with one biological parent and sometimes lives with the other.
5. I lived with adopted parents.
6. Other (What was your living situation while growing up?)

Please indicate the educational status of your mother.

1. Did not complete high school
2. Completed high school
3. Attended college but did not graduate
4. Completed a 2 year college degree (Associated Degree)
5. Completed a 4 year graduate degree (Bachelors Degree)
6. Earned a Post Graduate Degree (e.g., Masters or Doctoral Degree)
7. Do not know

Please indicate the educational status of your father.

1. Did not complete high school
2. Completed high school
3. Attended college but did not graduate
4. Completed a 2 year college degree (Associated Degree)
5. Completed a 4 year graduate degree (Bachelors Degree)
6. Earned a Post Graduate Degree (e.g., Masters or Doctoral Degree)
7. Do not know

Is your mother alive?

1. Yes
2. No (What age were you when she died?)

Is your father alive?

1. Yes
2. No (What age were you when he died?)

Appendix D: Closing Interview Data Sheet

Participant Number: _____

Researcher Initials: _____

We just want to ask you a few questions about your honest impression of the study you just completed. There are no right or wrong answers to these questions, we are just interested in what you think. (Note: during the interview, if necessary, remind them that there are no right or wrong answers)

Did anyone besides the researchers tell you anything about this study before you came in today?
(If yes, ask them what they heard)

What do you think the goal of this study was?

What do you think the purpose of the essay writing task was?

What do you think the purpose of the word scramble task was?

Did you think any of the word scrambles really couldn't be solved?
- If so, how many did you think couldn't be solved?

Appendix E: Debriefing Form

The Role of Self-Regulation in Adult Attachment Related Processes

Thank you for participating in our study. As a reminder this study investigated the influence that certain types of attitudes can have on ones thinking. Specifically, we are interested in knowing whether people who are most optimistic about relationships benefit from this optimism after thinking about certain topics. In the past we have found that people with negative attitudes about relationships tend to feel more mentally tired after thinking about their relationships, compared to people with more positive attitudes. In this study, we tested this finding by having you write about your parental relationships, asking other people to write about a mentally challenging topic, and asking some people to write about whatever they wanted. Afterwards, we assessed how mentally tired you were by having you solve some word scrambles. We then assessed your emotional memory reaction times for each of the six emotions, from which you provided a brief description and level of intensity of each experience. We expected people with more optimistic relationship attitudes to be able think of positive experiences faster than less optimistic individuals.

Please remember that this is an ongoing study, and that the quality of our results depends on people knowing very little about the study when they participate. Please do not discuss the procedures we use here with other people who may be legible to participate.

If you have any questions or concerns about your participation here today, please inform the researcher at this time.

If in the future you have questions, concerns or complaints, you may contact any of the individuals listed below.

Dr. Jeff Aspelmeier, Box 6946, Department of Psychology, Radford University, Radford, VA 24141. (540) 831-5520. jaspelme@radford.edu

If you have any complaints or concerns about your rights as a research participant, please contact Dr. Dennis Grady, Dean, College of Graduate and Professional Studies, Radford University, dgrady4@radford.edu, (540)831-7163.

Again, thank you for your participation.

Appendix F: Writing Tasks

Preliminary Instructions (Will be seen before essay condition): You are about to begin the writing portion of the survey. Please read the instructions very carefully. We would like you to write for five minutes. The computer will keep track of the time and when the time is up you will automatically advance to the next portion of the survey. It is very important that you write for the whole five minutes or else it could invalidate the results of this study.

Condition 1: Attachment Essay

- We would like you to choose five adjectives or words that reflect your relationship with your mother (or the person in your life who has served as your mother figure) starting from as far back as you can remember in early childhood--as early as you can go, but say, age 5 to 12 is fine.
- Then we would like to ask you why you chose the adjective. Write each adjective down and why that adjective describes your relationship with your mother in the space bellow.
- Again, you have 5 minutes to write. Please write for the entire time.

Adjective 1:
Why:
Adjective 2:
Why:
Adjective 3:
Why:
Adjective 4:
Why:
Adjective 5:
Why:

Condition 2: Depletion Essay

- We would like you to write a story about a recent trip you have taken. It may be a trip to the store, to Ohio, or to another country – wherever!
-Very important! When you are typing, **please do not type the letters a or n anywhere** in your story.
-You **can use words** that contain these letters, **but you can't type the letters**. For example this sentence would look like this:
You c use words th t co t i these letters, but you c 't type the letters.
-Don't worry about anyone seeing what you write; your name won't be on this document, so no one will ever know what you wrote.
- Again, you have 5 minutes to write. Please write for the entire time.

Condition 3: Free Writing

- We would like you to write a story about a recent trip you have taken. It may be a trip to the store, to Ohio, or to another country – wherever!
- Don't worry about anyone seeing what you write; your name won't be on this document, so no one will ever know what you wrote. We would like you to write for exactly 5 minutes.
- Again, you have 5 minutes to write. Please write for the entire time.

Appendix G: Unsolvable Anagram Task

You have now reached the word scramble portion of the survey. Please complete the word scrambles that follow to the best of your ability. Work on these scrambles until you are either finished with all of the word scrambles or you feel like you can't try any more. When you are finished, please click the >> button at the bottom of the page.

LTEUBLA	OETKPCH
GROADNE	CSEDOLA
LENPTAE	LEYPSET
UOLDIBE	CABLHED
FSNAITE	PLECINA
OECARDE	OMCNMOT
TRAETCR	POSTSGI
MRBTHUE	EMKOONY
AEDRNOM	GLUAERR
ARVHTEL	IIDVEDE
SHMCUEL	OEFSWLR
THATROE	ROFAVSL
RPSEONH	CMBHAOT
KECUBEL	CTWSIHT
RATSIID	GAWHEIT
DNOWIWE	TETLELI
SCUREED	EODCMYN
TNHRCIE	URAHHCC
LODLANE	OERIRFPM
NPGRISA	ONTCUESL
AICOLST	LSLIMNOI
MBYLSOA	SIVTION
ONADESN	LEKHPIC
ENELGTD	NORCGEA