Examining the Nature, Origins, and Health Consequences of Attachment-Related Individual Differences in the Emotion Regulation Process

A DISSERTATION
SUBMITTED TO THE FACULTY OF THE
UNIVERSITY OF MINNESOTA
BY

Jennifer Fillo

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

Jeffry A. Simpson
Alexander J. Rothman

July 2014

Acknowledgements

I would like to thank my advisers Dr. Jeffry Simpson and Dr. Alexander Rothman for guiding me through this process. Jeff, thank you for the lab space, equipment, and resources to carry this out, and for always having an open door for my questions, concerns, and panicked moments. Alex, thank you for guiding me in my thinking process and helping to turn my disorganized ideas about attachment and emotion regulation into clear research questions (and a lot of drawings).

To my committee members Dr. W. Andrew Collins and Dr. Traci Mann, thank you for your time, encouragement, enthusiasm, and thoughtful criticism.

Special thanks to those who provided guidance on the collection, cleaning, and/or analysis of the data, including Dr. Michelle Englund, Dr. Christopher Federico, Dr. R. Chris Fraley, and Dr. Glenn Roisman.

I would like to thank my army of undergraduate research assistants for their thousands of hours of work on this research, including Emily Bebler, Carrie Cullen, Ryan Kerber, Xi He, Savannah Ricard, Heather Roesslein, Yekun Qin, Zoe Saathoff, Mardie Shanahan, Melanie Stimac, Robyn Strelau, Kyle Swatfager, and Ee Minh Tee. Special thanks to Shazia Khan, Lizz Koykendall, HoKwan (Jackie) Lok, Bailey Meyer, Alexandra Montes, Stormy Peterson, and Jaclyn Theisen, who played particularly vital roles in the collection, cleaning, coding, and/or analysis of the data. Without your help and dedication, this research would not have been possible.

Finally, I would like to thank my husband Brent for putting up with the last 6 years and for being my best research assistant.

Dedication

This thesis is dedicated to my mom.

Abstract

Individuals vary in their tendency to habitually adopt different emotion-regulation strategies, such as *cognitive reappraisal* and *suppression* (Gross & John, 2003). These strategies have implications for individuals' subjective, expressive, and physiological reactions to emotions, with certain emotional profiles being considered "healthier" than others (John & Gross, 2004). A key direction for research in this area is the identification of individual differences that can explain *how* and *why* individuals develop these tendencies. This information could help researchers and clinicians better predict and potentially curtail the negative consequences associated with some emotion-regulation tendencies. The present research examines individual differences in attachment orientations as one such explanation. According to attachment theory, individuals' histories of interactions with caregivers throughout life shape their relational orientations, as well as their motivations and abilities for coping with stressful events (Bowlby, 1969). Study 1 examined relations between attachment orientations and self-reported emotion-regulation tendencies, as well as experimentally tested attachment-based individual differences in the emotion regulation process by examining subjective, expressive, and physiological emotional responses to an emotion-eliciting film clip. Attachment avoidance and anxiety were associated with a number of similar emotion-regulation difficulties, but specific approaches to regulating emotions. In the experimental portion, the nature and effectiveness of specific emotion-regulation strategies varied across levels of avoidance and anxiety. Additionally, avoidant individuals showed some evidence of spontaneous emotion-regulation attempts, even when they were given no specific emotion-regulation instructions. Study 2 replicates and extends Study 1 by examining the developmental antecedents and long-term health consequences of these individual differences in emotion regulation, using data collected as part of the Minnesota Longitudinal Study of Risk and Adaptation. It examined the potential mediating role of emotion-regulation difficulties in the link between attachment representations and later substance use (i.e., alcohol consumption, tobacco use). There was an indirect effect of attachment representations on later alcohol consumption through impulse control difficulties and limited access to emotion-regulation strategies. Attachment representations directly predicted tobacco use, but this relation was not mediated by difficulties with emotion regulation. As a whole, this research reveals important information about the nature, origins, and health consequences of attachment-based individual differences in emotion regulation.

Table of Contents

List of Tables

List of Figures

Examining the Nature, Origins, and Health Consequences of

Attachment-Related Individual Differences in the Emotion Regulation Process

> "A person's degree of vulnerability to stressors is strongly influenced by the development and current state of his or her intimate relationships."
>
> John Bowlby (1988, p. 1)

Stress is a ubiquitous and inescapable part of life. Every single day people must cope with the emotional impact of meeting work deadlines, negotiating interpersonal conflicts, and fulfilling family commitments. However, research has shown that *how* individuals cope with stress can have a larger effect on their long-term outcomes than the simple *quantity* of stress they experience (e.g., Neff & Broady, 2011). An important aspect of this coping is how individuals regulate their associated emotions, because the specific strategies they use can have profound consequences not only for how they cope with that stress, but also their relationship functioning, psychological well-being, and physical health (Denollet et al., 1996; John & Gross, 2004; Troy, Shallcross, & Mauss, 2013; Troy, Wilhelm, Shallcross, & Mauss, 2010).

Individuals vary in their tendency to habitually adopt different emotion-regulation strategies, and these tendencies can have important short-term and long-term impacts on their health (John & Gross, 2004). However, the existing literature has not provided a clear theoretical explanation for *why* or *how* people develop these individual differences. According to attachment theory individual differences in the sensitivity and responsiveness of caregivers shape individuals orientations toward relationships, as well as their emotion-regulation abilities and motivations (Bowlby, 1969). Thus, secure, anxious, and avoidant individuals tend to experience, express, and regulate their emotions in different ways. Several lines of research have examined attachment-related differences in coping with general distress; however, this research has failed to systematically examine the precise nature (e.g., cognitive, behavioral, physiological responses) of how individuals cope with specific emotions or the specific strategies they use in the emotion regulation process.

The present research aims fill this important gap in the literature by experimentally testing attachment-based individual differences in the emotion-regulation process (Study 1) and by examining the implications these individual differences for health behaviors over time (Study 2). First, I briefly review theory and research on the emotion regulation process, individual differences in emotion regulation tendencies, and the various consequences of these tendencies. Next, I review theory and research on the early-life origins of emotion-regulation capacities in attachment bonds, as well as theory and research on attachment-related individual differences in emotion regulation in adulthood. Finally, I review limitations of the research conducted to date on individual differences in emotion regulation, highlighting gaps filled by the present research. This research aims to further our understanding of the nature of attachment-based individual differences in emotion regulation and their short-term and long-term consequences for health.

Emotion Regulation Theory and Research

"Emotion regulation refers to the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (Gross, 1998a, p. 275). Research on emotion regulation began in developmental psychology, but has proliferated in research on both children and adults over the past 30 years (cf. Gross, 1998a). Current research on emotion regulation in adulthood has its origins in a number of research traditions, including stress and coping (e.g., Skinner, Edge, Altman, & Sherwood, 2003) and self-regulation (e.g., Vohs & Heatherton, 2000). Research in the coping tradition has focused more on the goals underlying specific approaches, with less attention being paid to individuals' subjective and physiological experiences in the process. Research in the self-regulation tradition has focused extensively on the behavioral consequences of emotion regulation, in some cases ignoring the cognitive and physiological processes associated with these behavioral effects. Gross (1998a) has developed an innovative process model that addresses some limitations of these prior approaches and deals with the specific cognitive and behavioral processes involved in emotion regulation.

Emotion regulation process model. Because emotional processes unfold over time, emotion-regulation strategies can be organized and distinguished from one another according to when they occur. Gross's (1998a) model outlines five discrete stages at which emotion regulation can occur (see Figure 1). According to this model, individuals can regulate their emotions by: (1) selecting specific situations, people, or objects to approach or avoid (*situation selection*), (2) purposefully modifying situations in order to change their emotional impact (*situation modification*), (3) directing their attention toward or away from emotion-eliciting stimuli (*attentional deployment*), (4) changing their interpretation or evaluation of a situation or their ability to deal with it (*cognitive* *change*), or (5) trying to alter their expression, subjective experience, and/or physiological responses (*response modulation*). The first four stages entail the use of *antecedent-focused strategies*, because they are enacted before an emotion is experienced. The final stage entails *response-focused strategies*, because they are enacted after an emotion has been felt.

The distinction between antecedent-focused and response-focused strategies is particularly important, because they have distinct short-term and long-term consequences. For example, cognitive reappraisal involves thinking about a situation in a way that changes its emotional impact. Thus, this antecedent-focused strategy is able to influence the emotional sequence *before* emotion response tendencies have been generated. As a results, research has demonstrated that cognitive reappraisal can successfully influence individuals' expressive, subjective, and physiological responses (Gross, 1998b); cognitive reappraisal leads individuals to express and report lower levels of emotion, as well as experience decreased physiological responses. In contrast, suppression involves only inhibiting the outward expression of an emotion once it has already been experienced. This response-focused strategy occurs later in the emotional sequence and primarily influences the behavioral aspect (i.e., expression) of emotion response tendencies. Research suggests that it has no impact on individuals' subjective experience and can actually increase physiological responses when used to regulate certain emotions (Gross, 1998b; Gross & Levenson, 1993). These studies have found that individuals engaging in suppression still report experiencing emotions despite not showing any outward signs of this experience. The differing effectiveness of these strategies was further illustrated in a recent meta-analysis; whereas response modulation strategies (such as suppression) had only a small effect on emotional outcomes (d = .16), attentional deployment strategies (such as cognitive reappraisal) had a larger effect on emotional outcomes (d = .36; Webb, Miles, & Sheeran, 2012).

Emotion-Regulation Tendencies. Individuals differ systematically in their tendency to habitually adopt different emotion-regulation strategies. Gross and John (2003) have developed a self-report measure of emotion-regulation tendencies, known as the Emotion Regulation Questionnaire (ERQ). The ERQ measures individual differences in the habitual use of reappraisal and suppression. Whereas these individual differences have been linked to some related concepts, such as coping styles and mood management, they cannot be explained by personality traits (Gross & John, 2003).

The identification of these individual differences in emotion regulation is important because habitual use of particular strategies has been linked important long-term consequences. The momentary consequences associated with different emotion-regulation strategies may accumulate over time, leading to longer-term consequences for individuals' health and well-being. For example, people who habitually use suppression as an emotion-regulation strategy tend to experience greater negative emotion and less positive emotion in their everyday lives (Gross & John, 2003). The habitual use of suppression has been linked to lower well-being, including greater depressive symptoms, lower self-esteem, and lower satisfaction with life (Gross & John, 2003; John & Gross, 2004; Kashdan & Steger, 2006; Moore, Zoellner, & Mollenholt, 2008). Suppression is also associated with poorer interpersonal functioning (Gross & John, 2003). With respect to physical health, it has been linked to increased risk of death from cardiovascular disease (Denollet et al., 1996) as well as other negative long-term health outcomes (English, John, & Gross, 2013).

In contrast, cognitive reappraisal is associated with a much healthier emotional profile (John & Gross, 2004). For example, people who habitually use cognitive reappraisal as an emotion-regulation strategy tend to experience greater positive emotion and less negative emotion in their everyday lives (Gross & John, 2003). These individuals are more satisfied with their lives, have higher self-esteem, and experience more positive events in their daily lives (Gross & John, 2003; Kashdan & Steger, 2006). Habitual use of reappraisal as an emotion-regulation technique has also been linked to having closer relationships and being liked better by one's peers (Gross & John, 2003). With respect to physical health, regular use of cognitive reappraisal has been linked long-term outcomes for individuals with chronic illnesses, such as preserving quality of life for individuals with multiple sclerosis (Phillips et al., 2009).

Important next steps. The importance of understanding these individual differences in emotion regulation is clear. However, the existing literature has failed to provide a strong theoretical explanation for *why* or *how* individuals develop specific emotion-regulation tendencies, or to adequately examine individual differences that are specifically related to emotion regulation and the potential developmental origins of these tendencies. If we can understand the motivations and experiences that underlie individual differences in emotion-regulation tendencies, researchers and clinicians will be better able to predict and potentially curtail the negative consequences associated with some of them. The present research proposes that an examination of these emotion-regulation tendencies in relation to attachment orientations can answer many of these remaining questions; attachment theory provides one such account of how and why individual differences in emotion regulation develop.

Developmental Origins of Emotion Regulation Individual Differences

Attachment theory (Bowlby 1969, 1973, 1980) is able to address both the normative and individual difference processes related to the generation, perception, and regulation of emotions, particularly in close relationships. Attachment theory conceptualizes humans' capacity to form intimate bonds with particular others. The attachment system is made up of tendencies that help infants maintain proximity to their primary caregivers, something that increases their chances of survival. A major function of attachment bonds is the regulation of negative emotion and arousal (Bowlby, 1969). Seeking proximity to a caregiver relieves the distress associated with separation by giving infants a sense of "felt security" (Sroufe & Waters, 1977b). However, caregivers also help with the regulation of distress from a broad range of sources. Because infants cannot regulate and dissipate distress on their own, the sensitive responding of a caregiver helps them do so. The extent to which infants can rely on caregivers as a consistent source of security influences the quality of attachment bonds (Ainsworth, Blehar, Waters, & Wall, 1978), as well as their motivations and strategies for coping with distress (Kobak & Sceery, 1988).

Early experiences with primary caregivers become internalized in the form of *internal working models* of the self and others (Bowlby, 1973; Main, Kaplan, & Cassidy, 1985). The central components of these internal working models include who attachment figures are, conditional expectations regarding how attachment figures are likely to respond in certain contexts, as well as expectations about the availability of those and other caregivers in the future. The "self" component of these working models includes beliefs about whether the self is worthy of attachment figures' responsiveness. The "other" component of these working models includes whether attachment figures can be relied to provide support in times of need (versus being unreliable and rejecting).

Optimal functioning of the attachment system is dependent upon the consistent and sensitive responsiveness of caregivers to infants' distress. To the extent that caregivers respond promptly, consistently, and sensitively to infants' needs, the more likely infants are to develop secure attachment with those caregivers. However, expectations about the responsiveness of caregivers are not limited to the particular infant-caregiver relationship in which they were developed. Once internal working models are formed, they remain relatively stable, continuing to influence cognition, affect, and behavior in close relationships into adulthood (Bowlby, 1988). Individual differences in attachment styles in adulthood have been conceptualized in terms of two orthogonal dimensions: *anxiety* and *avoidance* (see Figure 2; Bartholomew & Horowitz, 1991; Brennan, Clark, & Shaver, 1998). The anxiety and avoidance dimensions map on to representation of the self and other, respectively, and each can range from high to low. High anxiety reflects a dependence on others' acceptance for the development of positive self-views, whereas low anxiety reflects positive views of the self that do not require external validation by others. High avoidance reflects the degree to which individuals avoid developing intimacy with others due to their expectations of rejection, whereas low avoidance reflects a positive evaluation of others and the expectation that others will be accepting and responsive.

Attachment and emotion regulation in adulthood. Individuals' histories of care and support received from their attachment figures across the lifespan shape their motivations and strategies for coping with distressing events. Because securely-attached adults have learned that caregivers are supportive and responsive when they are distressed, they are able to effectively use the attachment system and turn to others to help dissipate that distress. However, anxious and avoidant individuals perceive that significant others are likely to be unavailable or unresponsive in times of need, so they develop other strategies for dealing with distress. According to Bowlby (1988), these alternative strategies replace the normative attachment response of proximity seeking. Thus, a key component of attachment styles is the ways that individuals habitually go about regulating emotions (Mikulincer & Florian, 2001).

Shaver and Mikulincer's process model (2002; Mikulincer & Shaver, 2003) outlines the activation and operation of the attachment system, as well as the emotion-regulation strategies associated with this activation across different attachment orientations. When threat is perceived and the attachment system is activated, secure individuals' relational histories lead them to perceive that attachment figures will be responsive and available to help them deal with distress. This increases feelings of security, thus deactivating their attachment systems. This allows secure individuals to acknowledge something as potentially threatening and think about it more constructively; they often adopt problem-focused strategies to dealing with distress.

However, when threat is perceived, the attachment system is even more likely to be activated among insecure individuals (anxious or avoidant). Given their relational histories, they are likely to perceive attachment figures as unavailable, typically compounding distress and maintaining activation of the attachment system. This pattern is characteristic of those high in attachment anxiety. Anxious individuals often engage in what is known as *hyperactivating strategies* (Cassidy & Kobak, 1988). This involves intense approach to attachment figures and overdependence on them as a source of comfort. They become hypervigilant to threat-related cues, increasing the likelihood that the attachment system will be activated in the future. Thus, those high in attachment anxiety have difficulty successfully adopting any emotion-regulation strategy, and often exacerbate rather than decrease their own distress.

Those high in attachment avoidance often engage in what is known as *deactivating strategies* (Cassidy & Kobak, 1988); this involves distancing oneself from threat-related cues and attachment figures, as well as the denial of attachment-related thoughts, memories, and emotions. These strategies include things like removing themselves from emotional situations and suppressing the expression of their emotions. The goal of these strategies is to keep the attachment system deactivated in order to prevent further distress due to the unavailability of attachment figures.

Evidence of emotion regulation differences across attachment orientations. A large body of evidence has accumulated documenting the differing nature of secure, anxious, and avoidant individuals' emotional experiences. This research has examined attachment to different figures across the lifespan. These differences are evident in various aspects of individuals' emotional processes.

***Attachment to parents*.** Secure individuals demonstrate more effective emotion regulation than insecure individuals. In infancy, proximity to a caregiver is effective in reducing their distress (Ainsworth et al., 1978). In adolescence, secure individuals show the greatest coherence across different aspects of emotional functioning (Spangler & Zimmerman, 1999; Zimmerman, Maier, Winter, & Grossman, 2001). They also demonstrate better emotion regulation than insecure individuals in problem-solving situations with peers (Zimmerman et al., 2001).

In contrast, anxious and avoidant individuals show consistent difficulties with emotion regulation. Preoccupied (anxious) infants remain distressed even after regaining proximity to a caregiver, whereas dismissing (avoidant) infants do not try to use proximity to a caregiver to regulate their distress (Ainsworth et al., 1978). In adolescence, preoccupied and dismissing individuals show disconnects between their perceptions of emotions in emotional stimuli and their facial expressions (Spangler & Zimmerman, 1999). The same study also found a disconnect between dismissing individuals' behavioral and self-report indicators of emotion.

Whereas dismissing individuals often fail to show expressive or behavioral signs of distress, research has found evidence in their physiological and psychobiological regulation. For example, dismissing infants show increased heart rates (Sroufe & Waters, 1977a) and elevated cortisol levels (e.g., Spangler & Grossmann, 1993) during the “strange situation”, a procedure used to categorize infant-caregiver attachment (Ainsworth et al., 1978). These elevated cortisol levels were also found among insecurely-attached individuals during problem-solving interactions with peers (Zimmerman et al., 2001). Physiological evidence of avoidant individuals’ distress has also been found during the administration of the Adult Attachment Interview (AAI; Main et al., 1985), a semi-structured interview that activates the attachment system in order to evaluate individuals’ current state of mind with respect to their early interactions with their caregivers. Avoidant individuals typically engage in deactivating strategies during the interview, which is accompanied by increased skin conductance (Dozier & Kobak, 1992). This yet another example of physiological reactions that conflict with outward displays of emotion, as well a failure to completely deactivate the attachment system.

Attachment to romantic partners. Differences in emotional memory, encoding, regulation, and expression are also evident across self-reported attachment styles to romantic partners. Individuals of different attachment orientations vary in their ability and speed to retrieve emotional memories (Mikulincer & Orbach, 1995). Both secure and anxious individuals can access emotional memories faster than avoidant individuals, with secure individuals having the most access to positive memories and anxious individuals having the most access to negative ones. This greater difficulty retrieving emotional memories is likely caused by avoidant individuals’ tendency to initially encode less information in emotional contexts (Fraley, Garner, & Shaver, 2000). Additionally, these individuals show working memory deficits with respect attachment-related stimuli (Edelstein, 2006), likely contributing to their decreased encoding. Thus, it appears that avoidant individuals try to pay less attention to stimuli that has the potential to activate the attachment system and cause distress, which makes it even harder for this information to be recalled and cause distress later on.

The different adult romantic attachment styles also vary in their physiological responses to emotional and stressful situations, similar to the patterns found in the research on attachment orientations to parents. For example, vagal tone is an indicator of parasympathetic nervous system reactivity and one's ability to recover quickly and more effectively from emotional arousal. Security to one's specific current partner has been related to better vagal tone, whereas global attachment anxiety has been related to poorer vagal tone (Diamond & Hicks, 2005). This finding makes sense given anxious individuals' tendency to engage in hyperactivating strategies, which elevate their distress, making it even more difficult to regulate their emotions. Additionally, avoidant individuals have shown increasing skin conductance in response to a series of both relational and non-relational tasks, but fail to show corresponding increases in self-reported distress (Diamond, Hicks, & Otter-Henderson, 2006). However, these patterns were not found for anxious individuals, suggesting that it is avoidant individuals' tendency to engage in deactivating strategies that leads to this dissociation rather than attachment insecurity generally.

***Summary*.** This research demonstrates that secure, anxious, and avoidant individuals systematically vary in nature of their emotional processes. Overall, secure individuals have much better emotion-regulation capabilities than anxious and avoidant individuals. Secure individuals are able to acknowledge and constructively manage their distress by adopting problem-focused strategies. They should be more likely to engage in strategies like cognitive reappraisal, which requires acknowledging potentially distressing stimuli, as well as the skills to think about them in ways that makes them less distressing. In contrast, anxious individuals have the greatest difficulty with emotion regulation. They often exacerbate rather than alleviate their distress by turning their focus towards its source. Therefore, these individuals should have difficulty successfully adopting any particular emotion-regulation strategy. Finally, avoidant individuals try to limit the activation of their attachment systems by engaging in deactivating strategies. Thus, when experiencing emotions, they should be more likely to try to regulate them emotions by engaging in strategies that help them control the expressions of their emotions, like suppression. Whereas they are less likely to express their emotions, their distress often remains evident in physiological (e.g., skin conductance) and psychobiological (e.g., cortisol) indicators of distress.

Limitations of Prior Research on Individual Differences in Emotion Regulation

Emotion regulation research in the relationships literature. Despite the large and growing body of research on emotions and the emotion-regulation patterns associated with attachment orientations, this research is limited in a number of important ways. Much of the theory and research on emotion regulation in the context of relationships falls within the stress and coping tradition (e.g., Diamond et al., 2006; Shaver & Mikulincer, 2002). This approach focuses on the higher-order goals associated with specific emotion-regulation strategies (e.g., solving a problem, maintaining proximity), more so than the exact nature of those approaches or how they are enacted (e.g., changing one's appraisals, diverting attention). That is, greater emphasis is placed on *why* a person might have certain regulation tendencies and the final result of their efforts, with less examination of the *processes* in between. As a result, this research has often blurred important distinctions between emotion-regulation strategies enacted at different points in the emotion regulation process. This is particularly problematic given the importance of these temporal distinctions for individuals' emotional tendencies and the long-term consequences associated with their use (e.g., depressive symptoms; see John & Gross, 2004).

Failure to make these temporal distinctions has led to the appearance of contradictory findings in the literature. For example, as discussed above, Diamond et al. (2006) found a disconnect between avoidant individuals' physiological and self-reported emotional responses. These authors concluded that whereas these individuals can make themselves appear like they are not distressed via their self-reported emotion, they are not able to control the evidence of their distress in their physiological reactions. In contrast, Fraley and Shaver (1997) concluded that avoidant individuals *can* control the physiological indicators of their distress. However, these two studies were examining emotion regulation at very different points in the process. By instructing participants to avoid thoughts that would normally activate the attachment system, Fraley and Shaver were instructing participants to engage in antecedent-focused strategies. Therefore, avoidant individuals were able to alter the emotional process *before* emotion response tendencies were activated, and likely prevented physiological reactions before they even began. In contrast, Diamond et al. did not instruct participants to engage in particular emotion-regulation strategies. With no knowledge of what to expect, or ability to avoid the multiple distressing situations in the study, these individuals progressed further in the emotion regulation process, and were likely engaging in response-focused strategies. Thus, these findings are not contradictory; rather, they provide information about avoidant individuals' emotion-regulation abilities and tendencies at different points in the emotion regulation process.

A consideration of these temporal distinctions in future research would help effect a greater understanding of the emotional processes and abilities associated with different attachment orientations and avoid the false appearance of contradictory findings in the literature. Additionally, a more process-focused approach would help clarify and organize the research conducted to date.

Mainstream emotion regulation research. The relative strengths and limitations of the more mainstream emotion regulation literature are the exact opposite of the attachment-related emotion research. In placing such heavy emphasis on process, research in this literature has failed to adequately consider the impact of individuals' motivations related to emotion regulation. These could influence individuals' motivations toward regulating particular emotions, which specific strategies they tend to use, as well as the subjective, behavioral, and physiological nature of those emotion-regulation strategies.

Certain characteristics of specific emotions, such as their associated appraisal dimensions (e.g., Smith & Ellsworth, 1985) and levels of activation (e.g., Thayer, 1989), may influence individuals' motivations toward regulating them and the precise nature of that regulation. Avoidant individuals are strongly motivated to maintain control and autonomy in their close relationships (e.g., Mikulincer, 1998). Therefore, attachment-based differences should be particularly evident in the regulation of emotions characterized by perceptions of situational control and lack of self-control, such as sadness (Smith & Ellsworth, 1985). Sadness is also characterized by much lower levels of activation than disgust (e.g., Thayer, 1989), which Gross (1998b; Gross & Levenson, 1993) used in his early work documenting the response patterns associated with cognitive reappraisal and suppression; sadness is generally associated with decreases in heart rate and skin conductance (Kreibig, Wilhelm, Roth, & Gross, 2007). Thus the physiological effects of regulating these two emotions are likely to be quite different (e.g., Troy et al., 2013). However, research to date has not fully examined these various potential sources of variation in the emotion regulation process.

What little research has examined individual differences in emotion-regulation tendencies has taken a rather narrow approach. The relations between attachment orientations and the tendency to engage in specific strategies have been examined in one study (Gross & John, 2003). However, it used a categorical measure of attachment and only examined security-reappraisal relations and avoidance-suppression relations. Differences in emotion-regulation tendencies across all levels of anxiety and avoidance, including their interaction, have yet to be examined. Additionally, this work relied exclusively on self-reports, and did not examine these tendencies as they unfold. This precludes any comparison of self-reports to actual behavior, as well as the examination of any differences that may exist in the emotional response patterns associated with specific strategies enacted by individuals who do or do not habitually engage in them. Given the differing emotion-regulation abilities and motivations associated with different attachment orientations, their emotional response patterns when enacting the same strategy may also vary.

Thus, individuals' abilities and motivations related to emotion regulation are likely to have a strong influence on not only their likelihood of regulating their emotions in particular ways, but the precise nature of their resulting emotional response patterns as well. A greater consideration of these numerous potential sources of variation would help effect a much more complete understanding of emotion-regulation strategies and their roles in the emotion regulation process.

Present Research

There is consistent evidence in both the attachment and the broader emotion-regulation literatures of individual differences in habitual emotion-regulation tendencies. These tendencies not only affect individuals' subjective, expressive, and physiological emotional responses in the moment, but their effects can compound over time to influence individuals' mental health, physical health, and interpersonal functioning. Important next steps in this area of research include the identification of theoretically-relevant factors that can explain *how* and *why* individuals develop particular emotion-regulation tendencies, as well as an examination of the long-term implications of these tendencies. The present research proposes individual differences in attachment orientations as one such explanation for habitual emotion-regulation tendencies, and it examines the implications of these relations for both short-term emotional response patterns and long-term health behaviors.

The present research is comprised of two studies. Study 1 examined attachment-related individual differences in emotion regulation using both correlational and experimental methods. In addition to examining relations between attachment orientations and self-reported emotion-regulation tendencies, I experimentally tested differences in the subjective, expressive, and physiological emotional reactions associated with specific emotion-regulation strategies across levels of attachment anxiety and avoidance. Study 2 goes a step further to examine the implications of these relations for health behaviors over time. Specifically, I examined the potential mediating role of emotion-regulation difficulties in the relation between attachment orientations and later substance use.

Study 1. In Study 1, participants completed an online survey comprised of self-report measures related to their attachment orientations and emotion-regulation tendencies. These responses allow for the evaluation of relations between attachment orientations and specific emotion-regulation strategies and difficulties. Participants then participated in a laboratory session in which they were randomly assigned to engage in a particular emotion-regulation strategy while watching an emotional film clip. The present research focused on *suppression,* inhibiting the expressions of one's emotions, and *cognitive reappraisal,* thinking about a potentially emotion-eliciting situation in a way that changes its emotional impact. Participants' subjective, behavioral, and physiological emotional responses were recorded as they watched the film clip. These will be compared to the patterns documented in prior research (see Gross, 1998b, Gross & Levenson, 1993).

Goals & Hypotheses. Study 1 has four overarching goals. <u>The first goal is to examine the relations between attachment orientations and self-reported emotion-regulation tendencies</u>. In doing so, the present research fills an important gap in the literature by examining the full range of attachment orientations and how they relate to individuals' self-reported emotion-regulation difficulties and tendencies to engage in specific emotion-regulation strategies. Evaluating these relations will also provide additional information for understanding individuals' responses during the experimental portion of the study. Given their differing motivations and abilities related to emotion and emotion regulation, individuals' tendencies to engage in specific emotion-regulation strategies (i.e., cognitive reappraisal, suppression), as well as the type and extent of their emotion-regulation difficulties (e.g., lack of emotional clarity, limited access to emotion-regulation strategies), should vary as a function of their levels of attachment avoidance and anxiety.

Hypothesis 1. The degree and precise nature of individuals' difficulty with emotion regulation should vary as a function of their degree of attachment avoidance and anxiety. Specifically:

a) higher levels of *attachment avoidance* should be associated with greater difficulty with emotion regulation, particularly non-acceptance of emotional responses, lack of emotional awareness, limited access to emotion-regulation strategies, and lack of emotional clarity.

b) higher levels of *attachment anxiety* should be associated with greater difficulty with emotion regulation, particularly non-acceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, limited access to emotion-regulation strategies, and lack of emotional clarity.

c) *attachment security* (i.e., low avoidance/ low anxiety) should be associated with less emotion-regulation difficulty in general.

Hypothesis 2. Individuals' tendency to engage in suppression should vary as a function of their degree of attachment avoidance and anxiety. Specifically:

a) higher levels of *attachment avoidance* (i.e., dismissing and fearful orientations) should be associated with higher self-reported use of suppression.

b) *preoccupied* (i.e., low avoidance/high anxiety) and *secure* (i.e., low avoidance/low anxiety) orientations should be associated with lower self-reported use of suppression.

Hypothesis 3. Individuals' tendency to engage in cognitive reappraisal should vary as a function of their degree of attachment avoidance and anxiety. Specifically:

a) higher levels of *attachment avoidance* should be associated with lower self-reported use of cognitive reappraisal.

b) higher levels of *attachment anxiety* should be associated with lower self-reported use of cognitive reappraisal.

c) *attachment security* (i.e., low avoidance/low anxiety) should be associated with higher self-reported use of cognitive reappraisal.

<u>The second goal of Study 1 is to examine the nature of the emotional response patterns associated with suppression and cognitive reappraisal, specifically when they are being used to regulate sadness.</u> Gross's (1998b; Gross & Levenson, 1993) work establishing the emotional response patterns (i.e., subjective, behavioral, physiological reactions) associated with cognitive reappraisal and suppression used disgust-eliciting film clips. However, the stability of these response patterns across different emotions has yet to be examined. Sadness differs from disgust in important ways that could impact the response patterns associated with different strategies used to regulate it; the two emotions are characterized by different levels of arousal (Thayer, 1989), result from different appraisals of the environment (Smith & Ellsworth, 1985), and lead to distinct behavioral patterns (e.g., Lerner, Small, & Loewenstein, 2004). Study 1 explores the potential consequences of these differences for participants' subjective (self-report), behavioral (facial expressions), and physiological (skin conductance, heart rate) response patterns while adopting each emotion-regulation strategy.

<u>The third goal of Study 1 is to examine the nature of the emotional response patterns associated with specific emotion-regulation strategies, and their subsequent effectiveness, across attachment orientations.</u> Participants were randomly assigned to

engage in suppression, cognitive reappraisal, or given no instructions for emotion regulation, while watching a potent film clip known to elicit sadness (see Gross & Levenson, 1995). Participants subjective experience of sadness (self-reported), behavioral responses (facial expressions), and physiological responses (skin conductance, heart rate) were recorded. Gross's work to date on suppression and cognitive reappraisal has assumed that they are associated with consistent subjective, expressive, and physiological response patterns across individuals. However, given the differing emotion-regulation abilities and motivations associated with different attachment styles, these individuals' emotional response patterns while using specific strategies, and the relative effectiveness of those strategies, are also likely to vary. There should be main effects of attachment orientations across conditions, and attachment orientations should interact with condition to predict their participants' emotional response patterns.

Certain characteristics of sadness as an emotion, and the context in which it is inducted, may also increase the likelihood of main effects and interactions for attachment. Sadness is associated with perceptions of situational control and lack of self-control (Smith & Ellsworth, 1985). Given that avoidant individuals are strongly motivated to maintain control and autonomy in their close relationships (Mikulincer, 1998), attachment-based differences should be particularly evident in the regulation of sadness. Additionally, the sadness-inducing clip used in the current study deals specifically with loss, a theme that is central to attachment theory (Bowlby, 1980).

Hypothesis 4. Individuals' degree of *attachment avoidance* should influence their emotional response patterns across condition. I make no specific predictions for the main effect of avoidance for expression control, skin conductance, or heart rate; however, higher levels of attachment avoidance should be associated with:

(a) smaller increases in self-reported sadness.

(b) less expressed sadness.

Hypothesis 5. Individuals' degree of *attachment avoidance* should influence their emotional response patterns within specific conditions. Whereas suppression typically does not influence self-reported emotions, higher levels of attachment avoidance should be associated with lower self-reported sadness within the suppression condition. However, I make no specific predictions regarding the interaction of avoidance and condition for expressed sadness, expression control, skin conductance, or heart rate.

<u>The fourth goal of Study 1 is to examine attachment-related differences in the spontaneous adoption of emotion-regulation strategies.</u> Participants in the control condition were given no instructions for how to regulate their emotions during the film clip. Thus, their emotional response patterns reflect their natural responses to this situation, which may contain evidence of particular emotion-regulation tendencies. Individuals with different attachment orientations should vary in their tendency to spontaneously use particular emotion-regulation strategies in the control condition. By documenting these responses as they unfolded, the present research fills an important gap

in the literature; much of the prior work examining individual differences in the use of these strategies has relied solely on self-reports. Additionally, this approach allows me to examine any congruencies or disconnects between participants self-reported tendencies and their actual behavior in response to this emotional stimulus.

Hypothesis 6. Individuals with different attachment orientations should vary in their tendency to spontaneously adopt particular emotion-regulation strategies in the control condition. Specifically, individuals higher in *attachment avoidance* should be more likely than individuals lower in attachment avoidance to spontaneously use suppression as an emotion-regulation strategy. This should be evident in:

(a) less self-reported sadness.

(b) less expressed sadness.

(c) greater expression control.

(d) higher skin conductance.

Study 1 Methods

Participants

Three hundred forty-nine native English speakers (236 women, 111 men, 2 no response) were recruited from the University of Minnesota and surrounding area.[1] University of Minnesota students enrolled in psychology courses participated in exchange for extra credit. All other participants were entered into a drawing for a $25 Amazon gift card (1 per 50 participants) for their participation in the online survey and received $10 for their participation in the laboratory portion of the study. Twenty-eight participants who completed the online survey failed to complete the laboratory portion of the study, resulting in 321 participants completing both portions of the study.[2] Additionally, 34 videos of participants' facial reactions were cut off due to computer malfunction. Videos capturing at least 2 minutes of participants' responses to the emotional film clip (2:40 total) were coded (N = 12); the remaining 22 were not coded, because they captured none or too little of the film clip period. The mean age of participants was 21.83 years (*SD* = 5.26). Approximately 4.0% of participants identified as Hispanic. The majority of participants were White/Caucasian (91.1%), 8.0% were Asian/Asian American, 2.0% were Black/African American, 0.9% were Native American/Alaska Native. Additionally, 4.3% of participants selected more than one racial category.

Design

Participants were randomly assigned to one of three experimental conditions (emotion-regulation instructions: suppression, cognitive reappraisal, no specific emotion-regulation instructions) in a between-subjects design. True randomization (via Random.org) was used to assign participants to condition. The distribution of participants was fairly even across the suppression (N = 110), cognitive reappraisal (N = 105), and control conditions (N = 106).

Procedure

Online survey (Time 1). Participants completed individual difference measures through an online survey, which was administered through the University of Minnesota's secure web servers. This included various measures of emotion-regulation difficulties and tendencies, attachment orientations, and demographic questions. Participants were emailed the study link and instructed to complete it in one sitting.

Laboratory session (Time 2). Participants were scheduled to complete the laboratory portion of the study approximately 1 week after completing the online survey (but no more than 3 weeks). Participants were asked to refrain from smoking or consuming caffeine for 2 hours prior to attending the lab session to minimize the effect of these substances on their physiological responding (verified at the laboratory).

Upon arrival, participants completed consent procedures and were fitted with the physiological monitoring equipment. Participants were then seated in front of a computer. All study instructions and stimuli were programmed in MediaLab research software (Jarvis, 2008), which proceeded at a consistent pace across participants. Participants were first instructed to clear their minds of any thoughts, feelings, and memories while they sat quietly for 5 minutes to get adjusted to the equipment. The final 3 minutes of this relaxation period served as the baseline for the physiological measurements. Participants then reported their baseline state affect, followed by a 1 minute break period. At this point, participants received the emotion-regulation instructions for their condition, followed by the sadness-inducing film clip. Immediately following the film clip, participants completed another measure of state affect and the manipulation check. Participants were debriefed and compensated for their participation. See Figure 3 for a timeline of the procedures and measures involved in Study 1.

Online Survey Measures

Emotion-regulation strategies. Habitual emotion-regulation strategy use was assessed using the Emotion Regulation Questionnaire (ERQ; see Appendix A; Gross & John, 2003). This 10-item scale asks participants about how they regulate and manage their emotions, with particular focus on the two most commonly studied strategies: cognitive reappraisal and suppression. The cognitive reappraisal factor (6 items; α = .836) measures the extent to which individuals manage emotions by construing situations in ways that change their emotional impact. The suppression factor (4 items; α=.788) measures the extent to which individuals manage emotions by inhibiting their expression. Each factor contains at least 1 item about regulating negative emotion and at least 1 item about regulating positive emotion. Each item is rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Scores are averaged within each factor, with higher scores indicating greater tendency to use each emotion-regulation strategy.

Emotion-regulation difficulties. Specific difficulties with different aspects of emotion regulation were measured using the Difficulties with Emotion Regulation Scale (DERS; see Appendix B; Gratz & Roemer, 2004). The DERS is a 36-item multidimensional measure of emotion regulation. It includes six empirically validated factors: non-acceptance of emotional responses (6 items; α = .905), difficulty engaging in goal-directed behavior (5 items; α = .874), impulse control difficulties (6 items; α = .888), lack of emotional awareness (6 items; α = .833), limited access to emotion-regulation strategies (8 items; α = .907), and lack of emotional clarity (5 items; α = .841). Each item is rated on a 5-point scale ranging from 1 (almost never) to 5 (almost always).

Scores are averaged within each factor, with higher scores indicating greater difficulty with each aspect of emotion regulation. A total scale score is calculated by averaging across all items ($\alpha = .944$).

Other emotion regulation measures. Two additional emotion regulation measures were included in the online survey. The Negative Mood Regulation measure (Catanzaro & Mearns, 1990) is a 30-item measure ($\alpha = .930$) designed to assess individuals' ability to regulate negative emotions, specifically. The Emotion Amplification and Reduction Scales (Hamilton et al., 2009) is an 18-item measure designed to assess beliefs about individuals' ability to regulate their emotions using particular strategies. The measure contains 2 factors: emotion amplification (9 items; $\alpha = .862$) and emotion reduction (9 items; $\alpha = .887$). These measures were not relevant to the focal aims of the dissertation and will not be addressed in the current report.

Attachment orientations. Attachment anxiety and avoidance was assessed using the Adult Attachment Questionnaire (AAQ; see Appendix C; Simpson, Rholes, & Phillips, 1996). The AAQ is a well-validated 17-item measure that asks participants to rate how well each item describes their thoughts and feelings toward romantic partners in general (as opposed to their beliefs and feelings about only their current partner/relationship). The measure contains two factors: anxiety (9 items; $\alpha = .825$) and avoidance (8 items; $\alpha = .826$). Each item is rated on a 7-point scale ranging from 1 (I strongly disagree) to 7 (I strongly agree). Scores are averaged within each factor, with higher scores indicating greater anxiety or avoidance.

Laboratory Session Measures & Materials

Physiological Reactions. All physiological measurements were collected using the BioPac MP150 data acquisition system with BioNomadix receivers and wireless amplifiers. Participants' physiological responses were monitored continuously throughout the laboratory session using the AcqKnowledge online data acquisition software at a rate of 1,000 samples per second. The BioNomadix system allows electrodes to be connected by short leads to small receiver packs, which communicate wirelessly with the MP150 system. Electrodermal responses were measured by passing a small voltage between electrodes attached to the palmar surface of the second and fourth digits of participants' non-dominant hand.[3] The resulting skin conductance levels were measured in microsiemens (μS). One receiver pack rested in the palm of the same hand to collect skin conductance data. Cardiovascular activity was measured by attaching electrode stickers to participants' torsos, with one on the right side of the chest under the collar bone and the second on the left second rib (a ground electrode was placed on the sternum). Cardiac interbeat intervals were calculated as the interval (in milliseconds) between successive R-waves. Heart rate was calculated second by second as (1/interbeat interval) x 60,000 ms, and reflects beats per minute. Respiration was measured using a respiration transmitter attached to an elastic band stretched around the ribcage, which measures changes in thoracic circumference as participants breathe.[4] A second receiver pack was attached to the respiration band to collect the respiration and interbeat interval data. Physiological reactivity variables were created by subtracting mean skin conductance and heart rate during the baseline period from mean skin conductance and heart rate during the film clip, such that positive numbers indicate increases from baseline.

Subjective emotional reactions. An adapted version of the Positive and Negative Affect Schedule (PANAS; see Appendix D; Watson, Clark, & Tellegen, 1988) was used to measure state affect at baseline and after the sadness-inducing film clip. In addition to the standard 20 items measuring positive and negative affect, 3 items corresponding to sadness were added: sad, blue, downhearted. Participants rated the extent to which they were experiencing each of the 23 specific affects *right now*. Each item is rated on a 5-point scale ranging from 1 (very slightly or not at all) to 5 (extremely). Change in sadness was computed by subtracting participants' ratings for the "sad" item after the film clip from their baseline ratings for the "sad" item, such that positive numbers indicate increases in sadness.

Emotion-regulation instructions. Participants were randomly assigned to receive one of three sets of emotion-regulation instructions (see Appendix E). These were modeled after standard instructions used in other studies (e.g., Gross, 1998b). Participants in the suppression condition were instructed to suppress any emotions or expressions of emotions that come up as they watch the film clip. Participants in the cognitive reappraisal condition were instructed to think about the film clip in a way that reduces its emotional impact, such as reminding themselves that it is just a fictional movie with paid actors. Participants in the control condition were instructed to simply watch the film clip very carefully.

Emotion-induction stimulus. Sadness was induced using a brief film clip (2:40) from the movie *The Champ* (Lovell & Zeffirelli, 1979). It depicts the death of boy's father after the man suffers a severe beating during a boxing match. This clip has been shown to successfully elicit sadness much more than any other emotion (Gross & Levenson, 1995), and has been used in previous research to elicit sadness across a variety of research domains (e.g., Lerner, Small, & Loewenstein, 2004).

Expressive behavior. A high-definition webcam, placed at the top of the computer screen displaying the study instructions and emotional film clip, recorded participants' expressive behavior throughout the laboratory session. Participants' behavioral responses during the film clip were coded from videotape by 6 coders who were unaware of the stimuli and blind to condition using an adapted version of the Emotion Expression and Suppression Scheme (Overall, 2012). Coders watched each recording twice. The first time they the rated degree of sadness evident in participant's facial expressions and body movements. The second time, they rated evidence of participants' attempts to control their emotional expressions. Sadness and expression control were rated separately on 7-point scales, with higher scores reflecting greater expressed sadness or evidence of expression control. Scores were averaged across coders. Inter-rater reliability was high for both scales (α = .979 for each scale).

Manipulation checks. In order to check whether participants followed the emotion-regulation instructions, they answered a number of questions regarding their thoughts, feelings, and emotion-regulation attempts during the study (see Appendix F). Among these were questions specifically pertaining to the instructions in the cognitive reappraisal condition (e.g., *To what extent did you remind yourself that it was not real, that it was a scene from a fictional movie with paid actors?*) and the suppression condition (e.g., *To what extent did you suppress your reactions or try not to show how you felt?*). Items were rated on 9-point scales ranging from 0 (not at all) to 8 (extremely).

Study 1 Results & Discussion

Goal 1: Relations between Attachment and Self-Reported Emotion-Regulation Tendencies (Hypotheses 1 - 3)

The first goal of Study 1 was to examine the relations between attachment orientations and self-reported emotion-regulation tendencies. Participants' responses to the online survey measures were used to test hypotheses related to this goal. Specifically, hierarchical regressions were used to predict each subscale of the Difficulties with Emotion Regulation Scale (DERS) and Emotion Regulation Questionnaire (ERQ). For each model, the main effects of avoidance and anxiety were included on the first step, and the interaction between the two was included on the second step. Sex was also included as a control variable on the first step. Descriptive statistics and intercorrelations for all variables included in the online survey are presented in Table 1.

Difficulties with emotion regulation (Hypotheses 1a, 1b, 1c). Separate hierarchical regressions were run for each of the 6 DERS subscales, as well as the full scale. The models predicting *non-acceptance of emotional responses*, *difficulty engaging in goal-directed behavior*, *impulse control difficulties*, *limited access to emotion-regulation strategies*, and the *full DERS scale* each revealed main effects of avoidance and anxiety, which were qualified by an interaction between the two (see Table 2). The interaction was marginal for difficulty engaging in goal-directed behavior. For all of these subscales and the full scale, avoidance and anxiety were each associated with greater difficulties in that domain. Follow-up analyses revealed that the effect of avoidance was more pronounced at higher levels of attachment anxiety (see Table 3 for simple slopes). Secure individuals (i.e., low anxiety/low avoidance) reported less emotion-regulation difficulty than dismissing individuals (i.e., low anxiety/high avoidance), and preoccupied individuals (i.e., high anxiety/low avoidance) reported less emotion-regulation difficulty than fearful individuals (i.e., high anxiety/high avoidance); but, the difference between the preoccupied and fearful groups was larger. There were two exceptions to these patterns. The difference between secure and dismissing individuals was not significant for difficulty engaging in goal-directed behavior. For limited access to emotion-regulation strategies, the difference between secure and dismissing individuals was marginal. Figure 4 depicts the interaction for the full DERS scale. The pattern of effects is very similar across the various subscales.

Additional findings included the main effects of anxiety and avoidance for *lack of emotional clarity*, but the interaction was not significant. Anxiety and avoidance were each associated with greater difficulty with emotional clarity. The model predicting *lack of emotional awareness* revealed only a main effect of avoidance.

As a whole, these results support Hypotheses 1a, 1b, and 1c. Higher levels of attachment avoidance were associated with greater difficulty with emotion regulation in general (Hypothesis 1a). All predicted relations between avoidance and specific emotion-regulation difficulties were supported. Results also revealed unpredicted relations between attachment avoidance and both impulse control difficulties and difficulty engaging in goal-directed behavior.

Higher levels of attachment anxiety were also associated with greater difficulty with emotion regulation in general (Hypothesis 1b). All predicted relations between anxiety and specific emotion-regulation difficulties were supported, and no unpredicted relations were found. Importantly, attachment anxiety was *not* related to lack of emotional awareness. Anxious individuals are very aware of their emotional reactions. Indeed, their tendency to direct their attention toward sources of distress often leads to the amplification, rather than reduction, of that distress (Cassidy & Kobak, 1988).

In support of Hypothesis 1c, attachment security (i.e., low avoidance/ low anxiety) was associated with less emotion-regulation difficulty in general; secure individuals reported the least emotion-regulation difficulty with respect to non-acceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, and limited access to emotion-regulation strategies. However, the 2-way interaction between avoidance and anxiety was not present for all DERS subscales. Low avoidance was associated with less emotional awareness problems, but secure individuals cannot be distinguished from preoccupied individuals in this regard. Additionally, low avoidance and low anxiety were each associated with less emotional clarity problems.

Habitual use of suppression (Hypotheses 2a, 2b). This model predicted self-reported use of *suppression*. Results revealed a main effect of avoidance; higher avoidance was associated with higher self-reported use of suppression (see Table 4). There was no main effect of anxiety or interaction between avoidance and anxiety.

These findings support Hypotheses 2a and 2b. Avoidant individuals are more likely to adopt suppression as an emotion-regulation strategy. Lower avoidance was associated with less use of suppression, and there was no interaction between avoidance and anxiety. Therefore, secure and preoccupied individuals are both less likely to engage in suppression.

Habitual use of cognitive reappraisal (Hypotheses 3a, 3b, 3c). This model predicted self-reported use of *cognitive reappraisal*. Results revealed main effects of avoidance and anxiety (see Table 4); higher anxiety and higher avoidance were each associated with lower self-reported engagement in cognitive reappraisal. These effects were qualified by a marginal interaction between the two. Follow-up analyses revealed that the effect of avoidance was only significant at high levels of anxiety (see Figure 5 and Table 3 for simple slopes). There was no difference between secure and dismissing individuals' use of cognitive reappraisal, but fearful individuals were less likely to use cognitive reappraisal than preoccupied individuals.

Both avoidance and anxiety were associated with lower self-reported use of cognitive reappraisal, lending support to Hypotheses 3a and 3b, respectively. However, the interaction between anxiety and avoidance revealed that the emotion-regulation tendencies of fearful individuals appear to be driving the main effect of avoidance. Fearful individuals are the least likely to use cognitive reappraisal, but dismissing individuals could not be distinguished from secure individuals. Thus, Hypothesis 3c was partially supported.

Summary. These results reveal important links between attachment orientations and specific emotion-regulation tendencies commonly studied in the mainstream emotion-regulation literature. Both anxiety and avoidance were associated with many of the same emotion-regulation difficulties; but, these difficulties appeared to be greatest at high levels of both (i.e., fearful individuals). Despite their common association with many specific emotion-regulation difficulties, anxiety and avoidance were associated with distinct approaches (i.e., strategies) toward regulating emotion. The association between suppression and avoidance (but not anxiety) suggests that whether individuals engage in suppression may be driven more by their degree of motivation to restrict their emotional expressions, perhaps to keep the attachment system deactivated (characteristic of avoidant individuals), than by the degree to which they are able to control high levels of emotional arousal (which anxious individuals struggle with). Indeed, anxious individuals' tendency to focus on the source of their distress may explain why they are unlikely to engage in cognitive reappraisal. If they are so intently focused on their emotions, thinking about emotion-eliciting stimuli in a less-emotional way is likely to be difficult. In contrast, dismissing individuals did not differ from secure individuals when it came to engaging in cognitive reappraisal. However, what motivates these different types of individuals to focus on less-emotional aspects of situations are likely quite different.

Goal 2: Emotional Response Patterns Associated with Regulating Sadness

The second goal of Study 1 was to examine the nature of the emotional response patterns associated with suppression and cognitive reappraisal, specifically when they are being used to regulate sadness. Participants' emotional response patterns were compared across conditions to test hypotheses related to this goal. Multiple regression analyses were used to predict each of the 5 emotional response variables: change in self-reported sadness, expressed sadness, expression control, skin conductance, and heart rate. Each model included the main effects of 2 condition dummy code variables. Sex was also included as a control variable. Each analysis was run 3 times, with each condition serving as the reference group, so that all possible comparisons among the conditions could be examined (see Table 5 for a summary of these comparisons). These analyses served as the first step in a set of hierarchical regressions used to evaluate Goals 2, 3 and 4, which are discussed in more detail below. The models in which the control condition served as the reference group are presented in Tables 7 – 11. Descriptive statistics and intercorrelations for all variables included in the laboratory session are presented in Table 6.

Manipulation check. Before conducting planned analyses related to Goal 2, I confirmed that participants complied with the emotion regulation instructions in their given conditions. A series of ANOVAs with planned contrasts were used to compare participants' answers to the manipulation check questions across the three conditions. Results confirmed that participants were complying with the emotion-regulation instructions specific to their conditions. Participants in the suppression condition reported greater attempts to "suppress [their] reactions or try not to show how [they] felt" than participants in the cognitive reappraisal condition (t(318) = 4.09, p = .000) and control condition (t(318) = 7.21, p = .000). Participants in the cognitive reappraisal condition reported greater attempts to "remind [themselves] that it was not real, that it was a scene from a fictional movie with paid actors" than participants in the suppression condition (t(318) = 2.24, p = .025) and control condition (t(318) = 2.43, p = .016).

Subjective emotion. Prior research has demonstrated the effectiveness of the film clip to elicit significant increases in *self-reported sadness* (Gross & Levenson, 1995). However, the effectiveness of the film clip in the current study was tested prior to conducting planned analyses. A repeated samples t-test, within the control condition, confirmed that the film clip successfully induced sadness, t(105) = 13.897, p < .000. Participants in the control condition reported higher levels of sadness after the film clip (M = 2.64, SD = 1.01) than before (M = 1.25, SD = 0.51).

The models predicting changes in self-reported sadness revealed no difference between the suppression and control condition, but there were significant differences between the cognitive reappraisal condition and both the suppression and control conditions (see Step 1 of Table 7 & Figure 6; reappraisal vs. suppression comparison: t(313) = -2.22, p = .027) . Participants in the cognitive reappraisal condition reported the smallest increases in sadness. Therefore, cognitive reappraisal was more successful than suppression at regulating individuals' experience of sadness, in general.

Expressive behavior codes. Participants' behavior during the film clip was evaluated by trained coders for *expressed sadness* and attempts at *expression control*.

The models predicting both of these behavioral codes revealed significant differences among all conditions (see Step 1 of Tables 8 & 9). Participants expressed the most sadness and showed the greatest expression control in the control condition, less sadness and expression control in the cognitive reappraisal condition, and the least sadness and expression control in the suppression condition (see Figures 7 & 8; cognitive reappraisal vs. suppression comparison for expressed sadness: $t(282) = 2.19$, $p = .029$; cognitive reappraisal vs. suppression comparison for expression control: $t(282) = 2.11$, $p = .036$). This finding is congruent with participants' levels of subjective sadness across the conditions, as well as the fact that participants in the suppression condition were explicitly instructed to not show how they were feeling.

Physiological responses. Prior research examining the physiological responses associated with cognitive reappraisal and suppression has done so in the context of regulating disgust (e.g., Gross, 1998b; Gross & Levenson, 1993). Disgust is characterized by increases in heart rate, and trying to suppress the expression of disgust was associated with increases in skin conductance. In order to examine the physiological responses associated with sadness, repeated samples t-tests within the control condition were conducted for *skin conductance* (SCL) and *heart rate* (HR). Results revealed significant increases in skin conductance ($t(71) = 8.58$, $p = .000$; $M_{change} = 2.47$, $SD = 2.48$) and significant decreases in heart rate ($t(96) = -6.71$, $p = .000$; $M_{change} = -3.28$, $SD = 4.81$).

In order to examine the physiological responses associated with sadness across conditions, participants' physiological responses during the baseline relaxation period were subtracted from their responses during the film clip. Therefore, positive numbers for these variables reflect increases in skin conductance and heart rate. The models predicting changes in both skin conductance and heart rate revealed no differences among the conditions (SCL: see Table 10 & Figure 9; HR: see Table 11 & Figure 10).

Summary. These findings revealed both consistencies and important differences with prior research examining the emotional patterns associated with suppression and cognitive reappraisal. At the group level, cognitive reappraisal was more effective than suppression at regulating individuals' subjective experience of sadness in response to the emotional film clip. Suppression was more effective at limiting individuals' expressions of sadness, but did not significantly limit their subjective experiences of sadness. Both of these findings are consistent with prior research examining the regulation of disgust. Expression control has not been examined before in relation to these specific emotion-regulation strategies. It appears that expression control attempts mirrored expressions of sadness across the conditions; the more sadness people expressed, the more they show evidence of trying to control that expression. Finally, there were no differences across the conditions in physiological responding. The general pattern of decreasing heart rate in the sample in line with prior research; however, prior research has shown sadness to be characterized by decreasing skin conductance (e.g., Kreibig et al., 2007). The opposite skin conductance pattern found in the present research, in conjunction with the lack of condition-based differences, make it difficult to draw conclusions about any attachment-related effects that may arise for this variable.

Goal 3: Attachment-Related Differences in Emotional Response Patterns (Hypotheses 4 - 5)

The third goal of Study 1 was examine the nature of the emotional response patterns associated with specific emotion-regulation strategies, and their subsequent effectiveness, across attachment orientations. The main effects of attachment orientations (i.e., avoidance and anxiety levels) in predicting emotional response patterns, as well as interactions with condition, were examined to test hypotheses related to this goal. Specifically, hierarchical regressions were used to predict each of the 5 emotional response variables. These models built upon those reported above to evaluate Goal 2. For each model, the main effects of avoidance, anxiety, and sex (control variable) were included on the first step, 2 condition dummy code variables were included on the second step, 2-way interactions were included on the third step, and 3-way interactions were included on the fourth step. There were no significant 3-way interactions for any of the emotional response variables, so these were dropped from the analyses. Each model was run three times, with each condition serving as the reference group so that all possible comparisons among the conditions could be examined. The models in which the control condition served as the reference group are presented in Tables 7 - 11.

Main effects of attachment orientations (Hypotheses 4a, 4b, 4c). In addition to the condition-related effects reported above, the models predicting changes in *self-reported sadness* revealed a main effect of avoidance (see Step 2 of Table 7). More avoidant individuals showed smaller increases in sadness than less avoidant individuals, in general. This effect was significant within the control condition ($t(313) = -2.18$, p =

.030) and the suppression condition (t(313) = -2.96, p = .004), and it was marginal in the cognitive reappraisal condition (t(313) = -1.84, p = .067, see Figure 6 & Table 5 for predicted values).

There were no main effects of avoidance for expressed sadness, expression control, heart rate, or skin conductance (see Step 2 of Tables 8 - 11). However, there was a significant interaction between anxiety and avoidance for heart rate. Follow-up analyses revealed that the effect of anxiety was only significant at high levels of avoidance (see Figure 11 & Table 12 for simple slopes). Secure and preoccupied individuals showed similar decreases in heart rate. However, dismissing individuals showed the smallest decreases in heart rate, and fearful individuals showed the largest decreases in heart rate.

These results show mixed support for Hypothesis 4. More avoidant individuals did report smaller increases in sadness than less avoidant individuals across all conditions (Hypothesis 4a). However, there were no main effects for avoidance for expressed sadness (Hypothesis 4b). I had no specific predictions for the main effect of avoidance on expression control or changes in heart rate or skin conductance, and none were revealed.

Interactions between attachment and condition (Hypothesis 5). Interactions between attachment and condition were examined in Step 3 of the hierarchical regression analyses. There were no significant interactions between avoidance and condition for changes in sadness (see Step 3 of Table 7). However, results did reveal some support for Hypothesis 5. As reported above, there was a significant main effect of avoidance across all conditions, and the effect was significant within the suppression condition specifically. Additionally, the differences among the conditions for self-reported sadness did vary somewhat at low and high levels of avoidance (see Figure 6, Table 5 for predicted values, &Table 13 for simple slopes). Mirroring the overall condition differences reported above, cognitive reappraisal predicted marginally lower levels of self-reported sadness than suppression at low levels of avoidance. However, there were no differences between these conditions at high levels of avoidance.

Results also revealed a significant interaction between attachment anxiety and the dummy variable comparing the suppression and cognitive reappraisal conditions for changes in sadness, $t(306) = 2.13$, $p = .034$. Follow-up analyses revealed no differences in self-reported sadness among the conditions at low levels of anxiety; the difference between the suppression and cognitive reappraisal conditions was only significant at high levels of anxiety (see Figure 6, Table 5 for predicted values, & Table 13 for simple slopes).

There were no interactions between condition and either anxiety or avoidance for expressed sadness or expression control (see Step 3 of Tables 8 & 9). However, there where were marginal interactions between anxiety and the dummy variable comparing the suppression and cognitive reappraisal conditions for skin conductance ($t(224) = 1.94$, $p = .054$, see Step 3 of Table 10 & Figure 9), as well as between avoidance and the dummy variable comparing the suppression and control conditions for heart rate ($t(281) = -1.77$, $p = .077$, see Step 3 of Table 11 & Figure 10). Follow up analyses revealed that none of the simple slopes were significant for either interaction (see Table 12).

Summary. These results revealed some evidence of attachment-related individual differences in the emotional response patterns associated with cognitive reappraisal and suppression. Avoidance was associated with a consistent tendency to report smaller changes in emotion, regardless of condition. Additionally, changes in self-reported sadness for highly avoidant individuals did not differ between the cognitive reappraisal and suppression conditions. These results suggest that cognitive reappraisal is *not* more effective than suppression at regulating the experience of sadness for highly avoidant individuals.

Given the importance of control for avoidant individuals (e.g., Mikulincer, 1998), I hypothesized that they should also be particularly uncomfortable with sadness, and therefore less likely to express it. Avoidant individuals' tendency to express less emotion is also a robust finding in the literature. However, this hypothesis was not supported in the current research. It is possible that my ability to examine attachment-related differences was limited by a floor effect for expressed sadness; the mean values for expressed sadness for the entire sample was in the low range of the coding scale.

I had no specific predictions regarding the interaction between anxiety and condition. Anxious individuals' tendencies toward hyperactivating strategies suggests that they would have particular difficulty engaging in suppression, but exactly how that would manifest when suppressing sadness was unclear. Results revealed anxiety-related differences in the self-reported sadness experienced by participants across conditions. Whereas suppression typically falls between the other two conditions with respect to self-reported emotion, highly anxious individuals reported nearly identical changes in sadness in the control and suppression conditions. This suggests that suppression was particularly ineffective at helping highly anxious individuals regulate their emotions.

Additionally, I had no specific predictions for the interactions between avoidance and condition for the remaining emotional response variables. However, there were marginal interactions between condition dummy variables and both anxiety and avoidance for physiological responses. However, I am hesitant to interpret these effects due to the lack of any significant simple slopes and the opposite general pattern of skin conductance in the sample.

Goal 4: Spontaneous Emotion Regulation across Attachment Orientations (Hypothesis 6).

The fourth goal of Study 1 was to examine attachment-related differences in the spontaneous adoption of emotion-regulation strategies. Participants' emotional response patterns in the control condition were used to evaluate hypotheses related to this goal because they were given no instructions for how to regulate their emotions during the emotional film clip. These analyses utilized the same hierarchical regressions used to examine Goal 3, focusing on the effects of anxiety and avoidance specifically within the control condition (see Step 3 of Tables 7 - 11).

Effects of avoidance within the control condition (Hypotheses 7a, 7b, 7c, 7d). As reported above, the models predicting changes in self-reported sadness revealed a main effect for avoidance (see Table 7). This effect was also significant within the control condition; higher levels of avoidance were associated with smaller increases in self-reported sadness. There was also a marginal effect of avoidance within the control condition for expression control; higher levels of avoidance were associated with marginally higher levels of expression control, $t(278) = 1.71$, $p = .088$. However, there were no effects of attachment for expressed sadness or skin conductance.

As reported above, there was a also a marginal interaction between avoidance and the dummy variable comparing the suppression and control conditions for heart rate (see Figure 10). Avoidance appears to be associated with smaller decreases in heart rate in the control condition but larger decreases in the suppression condition. However, these simple slopes were not significant (see Table 13).

Summary. These results show mixed support for Hypothesis 6. More avoidant individuals do report smaller changes in self-reported sadness in the control condition (Hypothesis 6a); however, the consistency of this relation across all conditions makes it difficult to consider it evidence of a particular emotion-regulation strategy specifically within the control condition. Hypothesis 6b was not supported; there were no avoidance-related differences in the expression of sadness, but this null result may be affected by the narrow distribution of this variable. Additionally, there was a marginal main effect of avoidance for expression control (Hypothesis 6c). This suggests some attempt on their part to control their emotional responses. Hypothesis 6d was not supported; there was no relation between avoidance and skin conductance in the control condition.

I had no predictions for heart rate within the control condition. Results did reveal a marginal effect of avoidance in the heart rate differences between the suppression and control condition. Once again, I am hesitant to interpret this interaction, due to the lack of any significant simple slopes.

Study 1 General Discussion

The purpose of Study 1 was to examine the nature of attachment-related differences in emotion regulation. These differences were examined at the self-report level (Goal 1) and by experimentally testing attachment-related differences in the emotional response patterns associated with specific emotion-regulation strategies (Goal 3). Because individuals' motivations toward regulating sadness are likely to differ across attachment orientations, evidence of spontaneous emotion-regulation attempts were also examined (Goal 4). Despite similarities between anxious and avoidant individuals' difficulties with emotion regulation, there are important differences in the ways they each go about regulating their emotions. These differences were evident in both their self-reported emotion-regulation strategy use and the emotional response patterns associated with those strategies in response to an emotional film clip. Additionally, there was some evidence of spontaneous emotion-regulation attempts, in the absence of any instructions to do so.

These results make a number of important contributions to our understanding of individual differences in emotion regulation. This research is the first to examine the relations between the full range of adult attachment orientations and habitual tendencies to adopt particular emotion-regulation strategies. In doing so, it demonstrates that individuals' motivations and abilities for emotion regulation go beyond these self-report tendencies to influence some of the emotional response patterns associated with the enactment of these strategies in response to emotional stimuli. Finally, it documents spontaneous emotion-regulation attempts, in the absence of explicit instruction. It is important for future research to acknowledge and continue to examine these potential sources of variation in order to effect a more complete and nuanced understanding of individual differences in the emotion regulation processes.

Study 2

Study 2 was designed to replicate and extend the findings of Study 1. Study 1 demonstrates the implications individual differences in attachment for the nature and effectiveness of specific emotion-regulation strategies; however, these were limited to short-term cognitive, behavioral, and physiological reactions. Study 2 goes a step further by examining the implications of attachment-related emotion-regulation tendencies for health over time. Specifically, I examined the potential mediating role of emotion-regulation difficulties in the relation between attachment representations and later substance use.

Emotion regulation research in the self-regulation tradition places particular focus on the behavioral consequences of emotion-regulation tendencies, such as impulse control (e.g., Tice, Bratslavsky, & Baumeister, 2001), eating (e.g., Vohs & Heatherton, 2000), and substance use (e.g., Carmody, Vieten, & Astin, 2007). Substance use as a means of emotion regulation has had a long history in theories and research on substance use and relapse (e.g., Marlatt & Gordon, 1985; Kassel, Stroud, & Paronis, 2003; Tiffany, 1990), and thus it is a logical health-related outcome to examine in relation to attachment representations and their associated emotion-regulation difficulties. Additionally, these behaviors represent key public health concerns.

The present research improves up prior research and fills important gaps in the literature in multiple ways. Research in emotion regulation field has repeatedly called for more work examining the developmental origins of emotion-regulation tendencies (e.g., Gross & John, 2003; John & Gross, 2004). Whereas emotion regulation research has a rich history in the developmental literature, work is needed to relate the developmental origins of these strategies to the individual differences and associated consequences that are often studied in adulthood. By utilizing data collected as part of a prospective longitudinal study, Study 2 will begin to fill this important gap in the literature. Specifically, the present research utilizes indicators of adults' attachment representations, as measured using the Adult Attachment Interview (AAI; Main et al., 1985), which have their origins in early experiences with attachment figures (Weinfield, Sroufe, & Egeland, 2000).

Additionally, prior research has demonstrated the effects that the habitual use of particular emotion-regulation strategies can have for individuals' relationship functioning, psychological well-being, and physical health (e.g., Denollet et al., 1996; English et al., 2013; Gross & John, 2003; Kashdan & Steger, 2006; Moore et al., 2008; Phillips et al., 2009). However, this research has often relied on contemporaneous measures of emotion-regulation tendencies and the so-called "consequences." This prevents the examination of how these processes unfold over time. In contrast, the present research examines the indirect causal pathway from attachment representations to negative health behaviors 8 years later (i.e., alcohol consumption, tobacco use), via specific emotion-regulation tendencies measured in the interim. By examining these relationships, the present research also integrates the approaches of emotion-regulation research conducted in the developmental literature with that of the mainstream adult emotion-regulation literature.

Overview & Hypotheses

The present research examined a series of models by which attachment representations shape health behaviors via their influence on emotion regulation. More specifically, emotion-regulation difficulties assessed at age 32 were hypothesized to mediate the associations between attachment representations assessed at age 26 and substance use at age 34 (see Figure 12). The present study utilized data from the Minnesota Longitudinal Study of Risk and Adaptation (MLSRA; Sroufe, Egeland, Carlson, & Collins, 2005). The MLSRA has continuously followed approximately 165 participants since infancy. Attachment representations were measured using the Adult Attachment Interview (AAI) when participants were 26 years old. Emotion-regulation difficulties were measured using the Difficulties with Emotion Regulation Scale (DERS) when participants at age 32. Health behaviors were measured in terms of alcohol consumption and tobacco use at age 34.

***Hypothesis 7*.** Attachment representations at age 26 should predict degree of difficulty with emotion regulation at age 32. Specifically:

a) greater Adult Attachment Interview *coherence* should predict less difficulty with emotion regulation at age 32.

b) individuals with *dismissing* (i.e., avoidant) attachment representations should report greater difficulty with emotion regulation at age 32 than individuals categorized as autonomous. In particular, they should report greater non-acceptance of emotional responses, lack of emotional awareness, limited access to emotion-regulation strategies, and lack of emotional clarity.

c) individuals with *preoccupied* (i.e., anxious) attachment representations should report the greatest difficulty with emotion-regulation at age 32 (i.e., greater than dismissing and autonomous individuals). In particular, they should report greater non-acceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, limited access to emotion-regulation strategies, and lack of emotional clarity.

Hypothesis 8. Difficulty with emotion regulation at age 32 should mediate the relation between attachment representations at age 26 and:

a) alcohol consumption at age 34.

b) tobacco use at age 34.

Study 2 Methods

Participants

Data were collected as part of the Minnesota Longitudinal Study of Risk and Adaptation (MLSRA; see Sroufe et al., 2005). Participants are the first-born children of low-income women who were receiving free health care from public health clinics between 1975 - 1977. The project has experienced attrition over the years due to participants moving out of state, loss of contact with participants, and declining to continue participation. The data for this study were collected from 164 participants at age 26, 154 participants at age 32, and 144 participants at age 34.

Procedure

Consent to participate in the study was originally given by the participants' mothers when they were infants. Since age 13, participants have given their own consent to participate. The assessments at age 26 and age 32 involved a series of interviews and questionnaires administered by graduate students and project staff. These assessments were conducted over the phone, in participants' homes, or at the University of Minnesota and lasted approximately 2.5 - 3 hours. The assessment at age 34 consisted of a phone interview, and was considerably briefer than the earlier assessments.

Measures

Attachment representations. Attachment was measured using the Adult Attachment Interview (AAI; Main et al., 1985) at age 26. The AAI is a semi-structured interview designed to assess individuals' "state of mind" regarding attachment. All interviews were transcribed and coded by certified raters. Individuals are classified into one of three major categories based upon the way that they describe earlier relationships with parents and the coherence of the evidence they use to support these descriptions. Individuals classified as *autonomous* are open to examining their attachment experiences, can talk about them in a coherent way, and can provide specific examples to support their characterizations, regardless of whether they talk about their history in positive or negative terms. Individuals classified as *dismissing* are not open to examining their attachment experiences, may claim to lack memory of these early experiences, and cannot provide examples that support their often idealized characterizations of the relationships. Individuals classified as *preoccupied* often talk about their attachment relationships in an incoherent manner, sometimes characterized by ongoing involvement in and anger about past events. Additionally, the interview transcripts can be evaluated with respect to their overall *coherence* (see Roisman, Fraley, & Belsky, 2007). Both the categorical attachment representation distinctions and the overall coherence of mind scores were used. This approach was taken to maximize the statistical power to evaluate the proposed mediation model. The categorical approach will allow for finer distinctions among the different attachment representations. For the purposes of the present research, transcripts scored as “cannot rate” were treated as missing data.

Emotion-regulation tendencies. Emotion-regulation tendencies were measured at age 32 using the Difficulties with Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), which is described above in Study 1. Reliabilities were high for the full scale (α = .93), as well as all subscales (α = .81 - .87) in this sample.

Substance use. Participants’ substance use at age 34 was measured using the Adult Health Survey, which is an adapted version of the Adolescent Health Survey (Blum, Resnick, & Bergeisen, 1989). This self-report questionnaire measures various risk factors for poor mental and physical health. This survey was included as part of a larger phone interview administered at that time point. Participants indicated the frequency with which they used a variety of substances in the past year on a 6-point scale (never = 0, once or twice a year = 1, once a month = 2, 1-2 times a week = 3, 3-4 times a week = 4, 5 or more times a week = 5). Participants' responses regarding their use of cigarettes, chewing tobacco/snuff, beer/wine, and hard liquor were used for the present study. Participants' responses to the cigarettes and chewing tobacco/snuff questions were aggregated; their highest response on either item was used as an indicator of *tobacco use frequency*. Participants' responses to the beer/wine and hard liquor questions were aggregated using the same method to create an indicator of the frequency of their alcohol consumption. Participants also indicated how much alcohol they generally drink at one time (don't drink = 0, one drink = 1, two drinks = 2, three drinks = 3, four drinks = 4, 5 drinks = 5, 6 or more drinks = 6). These responses were used as indicator of the quantity of participants' alcohol consumption. Participants' scores on both alcohol variables (frequency and quantity) were multiplied to create an *overall alcohol consumption* variable.[5]

Study 2 Results

The proposed mediation models were evaluated using participants' coherence of mind scores and attachment representation categories from the Adult Attachment Interview (AAI) at age 26, their responses on the Difficulties with Emotion Regulation Scale (DERS) at age 32, and their responses to substance use questions at age 34. Descriptive statistics and intercorrelations for all variables are presented in Table 14.

Attachment Representations and Emotion-Regulation Difficulties (Hypothesis 7)

I first examined the relations between attachment representations and emotion-regulation difficulties (path *a* in Figure 12). Separate multiple regression analyses were run for each of the 6 DERS subscales, as well as the full scale. Models included the main effects of attachment representations either in the form of coherence of mind scores or 2 attachment representation category dummy variables. Sex was included as a control variable in all models. The models using the categorical attachment representation predictors were each run three times, with each category serving as the reference group so that all possible comparisons among the attachment representation categories could be examined.

Coherence of mind (Hypothesis 7a). The effect of coherence of mind was significant in the model predicting *impulse control difficulties* and marginal in the model predicting *limited access to emotion-regulation strategies* (see Figure 13). Individuals with greater coherence of mind reported less emotion-regulation difficulties in these domains. Coherence of mind was not a significant predictor of any of the other 4 DERS subscales or the full scale score. These results partially support Hypothesis 7a; Adult Attachment Interview coherence was associated with less emotion-regulation difficulty, but only in specific domains.

Attachment representation categories (Hypotheses 7b & 7c). Differences between the attachment representation categories also emerged for *impulse control difficulties* and *limited access to emotion-regulation strategies.* Individuals with preoccupied representations reported marginally greater impulse control difficulties than individuals with autonomous representations (a = 0.27, p = .057). Individuals with preoccupied representations reported more limited access to emotion-regulation strategies than both autonomous individuals (a = 0.30, p = .035) and dismissing individuals (a =

0.26; p = .082), lending support to Hypothesis 7c. Result failed to support Hypothesis 7b; dismissing individuals did not differ from autonomous individuals for either subscale.

Mediating Role of Emotion-Regulation Difficulties (Hypothesis 8)

The mediating role of emotion-regulation difficulties in the relation between attachment representations and substance was tested using ordinary least squares regression analyses, with bootstrapping to estimate the indirect effect of attachment representations on substance use (Hayes, 2009, 2013). Using this approach, the total effect of the predictor variable (path *c* in Figure 12) is subdivided into a direct effect (path *c'* in Figure 12) and an indirect effect (path *ab* in Figure 12) on the outcome variable. The direct effect is the effect of the predictor on the outcome variable, controlling for the effect of the mediator. The indirect effect is the path from the predictor variable to the outcome variable through the mediator. The indirect effect is the product of the main effect of the predictor variable on the mediator and the main effect of the mediator on the outcome variable. Bootstrapping is used to generate a confidence interval for the indirect effect, and its significance is determined by the absence of zero from the confidence interval (see Table 15).

Models were specified with attachment (coherence or representation categories) as the predictor variables, DERS subscales as the mediators, and substance use (i.e., alcohol consumption or tobacco use) as the outcome variables (see Figure 12). Because relations between attachment representations and emotion-regulation difficulties only emerged for *impulse control difficulties* and *limited access to emotion-regulation strategies*, only these subscales were examined as potential mediators. Sex was included as a control variable in all models. The models using the categorical attachment representation predictors were each run three times, with each category serving as the reference group so that all possible comparisons among the attachment representation categories could be examined. Estimates of the indirect effects and associated confidence intervals are presented in Table 15.

Overall alcohol consumption (Hypothesis 8a). Attachment representations did not directly predict overall alcohol consumption; however, they did exert significant indirect effects through *impulse control difficulties* and marginal indirect effects through *limited access to emotion-regulation strategies* (see Table 15). Greater coherence of mind at age 26 predicted less impulse control difficulty at age 32, which in turn predicted less alcohol consumption at age 34 (see Figure 13). Additionally, preoccupied individuals had more impulse control difficulty than autonomous individuals at age 32, which in turn predicted greater alcohol consumption at age 34 (b = 3.03, p = .000). Greater coherence of mind at age 26 predicted marginally less limited access to emotion-regulation strategies at age 32, which in turn predicted marginally less alcohol consumption at age 34 (see Figure 13). Preoccupied individuals had marginally more limited access to emotion-regulation strategies than autonomous individuals at age 32, which in turn predicted marginally greater alcohol consumption at age 34 (b = 1.70, p = .056).

These results support Hypothesis 8a; there is a significant indirect effect of attachment representations on overall alcohol use through impulse control difficulties and a marginal indirect effect through limited access to emotion-regulation strategies.

Tobacco use frequency (Hypothesis 8b). There were significant total effects of attachment representations, coherence of mind and representation categories, on tobacco use (see Table 15 & Figure 14). Greater coherence of mind predicted less frequent tobacco use. Additionally, there was a significant difference between preoccupied and autonomous individuals ($c = 1.58$, $p = .005$) and a marginal difference between preoccupied and dismissing individuals ($c = 1.14$, $p = .055$); preoccupied individuals reported using tobacco products more frequently than autonomous and dismissing individuals.

With DERS subscales added to the models, significant direct effects of attachment representations, coherence of mind and representation categories, on tobacco use remained. However, there were no effects of *impulse control difficulties* or *limited access to emotion-regulation strategies* on tobacco use in either the coherence of mind or attachment category models (see Figure 14). Therefore, these results fail to support Hypothesis 8b. There is a direct effect of attachment on tobacco use frequency, but no indirect effect through difficulties with emotion regulation.

Study 2 Discussion

The purpose of Study 2 was to replicate and extend the findings of Study 1 by examining attachment-related difficulties with emotion regulation and their implications for health over time. The potential mediating role of emotion-regulation difficulties in the relation between attachment states of mind and later substance use was examined using data from a prospective longitudinal study. Alcohol consumption and tobacco use at age 34 were examined in relation to multiple approaches to conceptualizing attachment representations (i.e., coherence of mind, representation categories) measured at age 26. As hypothesized, attachment representations exerted an indirect effect on later alcohol consumption through their influence on particular emotion-regulation difficulties. Attachment states of mind independently predicted later tobacco use, but this effect was not mediated by specific emotion-regulation difficulties.

If the relations between attachment and self-reported emotion-regulation difficulties found in Study 1 are robust, they should also emerge when a different sample and method of conceptualizing attachment orientations are examined. Indeed, there was some consistency in the relations between attachment and emotion-regulation difficulties across the two studies. Attachment security was associated with consistent effects across the two studies; security (low anxiety/low avoidance), coherence of mind, and the autonomous representations category were all associated with the less emotion-regulation difficulty. Anxiety (particularly at high levels of avoidance) and the preoccupied representations category were associated with the greatest emotion-regulation difficulty. Dismissing individuals fell in between, but the significance of the differences among the groups varied somewhat across the two studies and specific difficulties being examined. Significant relations between attachment and emotion-regulation difficulties were found for fewer subscales in Study 2; attachment only predicted impulse control difficulties and limited access to emotion-regulation strategies. However, I had much less power to examine these relations in Study 2; the sample size of Study 1 was over twice as large as Study 2.

As hypothesized, attachment representations were associated with specific emotion-regulation capabilities or problems, which in turn predicted differential amounts of alcohol consumption. Preoccupied individuals reported the greatest difficulty with impulse control and have more limited strategies at their disposal for regulating their emotions. These difficulties, in turn, predicted greater alcohol consumption. Coherence of mind and the autonomous representations category demonstrated the opposite pattern. These were associated with the least emotion-regulation difficulty, which predicted less alcohol consumption. The pathway for dismissing individuals could not be distinguished from autonomous individuals for either emotion-regulation difficulty, but the dismissing representations category was associated with marginally less limited access to emotion-regulation strategies than the preoccupied representations category.

Attachment representations did not directly predict alcohol consumption. Historically, a significant relation between these two variables was considered necessary before potential mediation of that effect could be examined (e.g., Baron & Kenny, 1986); however, this approach has been heavily criticized in recent years (MacKinnon, Lockwood, Hoffman, West & Sheets, 2002; Preacher & Hayes, 2008). A predictor can exert an indirect effect on an outcome variable through a mediating variable, even in the absence of an association between the predictor and outcome variables (Shrout & Bolger, 2002; Hayes 2009, 2013). By adopting a bootstrapping approach to generating estimates and confidence intervals of the indirect effects, this approach avoids the problems associated with the often skewed distributions of indirect effects; these skewed distributions can often lead to drawing spurious conclusions about the presence or absence of indirect effects.

In contrast, attachment representations exerted a direct effect on tobacco use, but this was not mediated by emotion-regulation difficulties. Coherence of mind predicted less frequent tobacco use. With respect to the attachment representation categories, preoccupied individuals used tobacco products more frequently than both dismissing and autonomous individuals, with autonomous individuals using them the least frequently. My ability to examine these relations was somewhat more limited for tobacco than alcohol use. The assessment at age 34 did not include a tobacco quantity measure, parallel to the one for alcohol consumption. By only examining frequency of tobacco use, important distinctions among individuals become blurred. For example, a person who smokes a few cigarettes a day on most days would have given the same response to the frequency question as a person who smokes more than a pack a day. Combining measures of frequency and quantity allowed for a more nuanced assessment of participants' total alcohol consumption. However, this was not possible for tobacco use, and it ultimately limited the variability I was able to predict from the attachment and emotion regulation measures. Further research is needed to examine the precise nature of the relations among attachment representations, emotion-regulation difficulties, and tobacco use.

General Discussion

The goal of the present research was to examine attachment orientations as an explanation for *how* and *why* individuals develop particular emotion-regulation tendencies. Across 2 studies, I examined the relations between attachment orientations and individual differences in emotion-regulation tendencies, the implications of these relations for short-term emotional responses, and the consequences of these relations for health behaviors over time. Study 1 examined relations between attachment orientations and self-reported emotion-regulation difficulties and strategies commonly studied in the emotion-regulation literature (i.e., DERS and ERQ). It also experimentally tested the relative effectiveness of specific emotion-regulation strategies across levels of attachment anxiety and avoidance by examining a variety of emotional response patterns (i.e., subjective, behavioral, physiological reactions). Study 2 examined the consequences of attachment-related emotion-regulation difficulties for substance use longitudinally. The results reveal that attachment avoidance and anxiety (1) are associated with a number of similar emotion-regulation difficulties, but specific approaches (i.e., strategies) to regulating emotions, (2) predict some unique emotional response patterns for specific emotion-regulation strategies, suggesting variability in their effectiveness, and (3) predict future substance use, via their associations with particular emotion-regulation difficulties. This research fills important gaps in both the attachment and mainstream emotion regulation literatures by contributing to a greater understanding of the nature, origins, and health consequences of attachment-related individual differences in emotion regulation.

Individual Differences in Specific Emotion-Regulation Strategies

Study 1 improves upon prior research by more comprehensively examining the attachment-related individual differences in the use of specific emotion-regulation strategies. To my knowledge, it is the first study to examine the full range of the anxiety and avoidance attachment dimensions in relation to the habitual use of specific emotion-regulation strategies often studied in the mainstream emotion regulation literature. Prior research beginning to examine these relations relied on categorical measures of attachment, and failed to examine the tendencies of anxious individuals (see Gross & John, 2003). Indeed, the present research demonstrates the importance of considering interactions between anxiety and avoidance with respect to the use of cognitive reappraisal. High avoidance was negatively related to cognitive reappraisal, but only at high levels of anxiety. There was no difference between secure and dismissing individuals', but fearful individuals were the least likely to use cognitive reappraisal. In line with prior research, avoidance was associated with greater use of suppression.

The present research is novel in its examination of potential individual differences in the nature of specific emotion-regulation strategies. My findings demonstrate that motivations underlying individual differences in the habitual use of specific strategies appear to also influence the emotional response patterns that characterize those strategies, not just the simple tendency to engage in them. The work to date on suppression and cognitive reappraisal has effectively operated under the assumption that these strategies are associated with consistent subjective, expressive, and physiological response patterns across individuals. Some work has examined variations in the effectiveness of certain strategies across different contexts (e.g., Troy, Shallcross, & Mauss, 2013); but, these effects are assumed to be driven by features of the emotion-regulation context, not of the individuals themselves or interactions between the two. The current findings highlight the problems with these assumptions.

Additionally, my findings suggest that these individual differences may actually alter the relative effectiveness of each strategy. At the group level, cognitive reappraisal was more successful at regulating the subjective experience of emotion, but suppression was more effective at regulating the expression of emotion. These findings are consistent with the findings of prior research (see Gross 1998b; Gross & Levenson, 1993). However, a consideration of attachment avoidance and anxiety revealed a different picture. At high levels of avoidance, the difference between cognitive reappraisal and suppression was no longer significant for subjective sadness; cognitive reappraisal is not a more effective than suppression at regulating these individuals' emotions. Anxiety also interacted with condition to predict participants' subjective changes in sadness. Cognitive reappraisal was clearly more effective than suppression, but only for highly anxious individuals. Importantly, changes in self-reported sadness were nearly identical in the suppression and control conditions for these individuals. Thus, the magnitude of the suppression-reappraisal difference was partially driven by the particular ineffectiveness of suppression for altering highly anxious individuals' subjective sadness; they experienced the same increases in sadness as if they were given no emotion-regulation instructions whatsoever. Unfortunately, the explanation for the pattern of results among highly avoidant individuals is less clear. It is unclear whether the effect is driven by cognitive reappraisal's decreased effectiveness for these individuals, or whether highly avoidant individuals are able to use suppression to influence their subjective experience of emotion. It stands to reason that avoidant individuals continue to use suppression because it does exert some influence on their emotional experiences; however, additional research is needed to confirm this conclusion.

Finally, the present studies extend prior research by examining individual differences in emotion-regulation tendencies *as they are being enacted*. To date, research examining individual differences in emotion-regulation tendencies has relied exclusively on self-reported. Spontaneous emotion-regulation choices have been examined in relation to certain contextual factors (e.g., Sheppes, Scheibe, Suri, & Gross, 2011); however, the resulting differences have been assumed to only be a product of the emotion-regulation context, with no acknowledgement of the potential influence of individual differences or interactions between individual differences and context. In contrast, the present research examined the spontaneous emotional responses of individuals for evidence of the emotion-regulation strategies they purport to habitually use. The emotional response patterns of avoidant individuals in the control condition showed some evidence of attempts to regulate their emotions; avoidance was associated with smaller changes in subjective sadness and marginally greater expression control.

Additionally, by ignoring the reasons *why* individuals develop specific emotion-regulation tendencies, prior research in this area has failed to consider that individuals may be inherently motivated to regulate certain emotions more than others or regulate their emotions more in certain contexts. The present research demonstrated some consequences of these motivations for spontaneous emotional response patterns, but attachment orientations are just one of many potential sources of variation in emotion-related motivations. It is important for future research to consider features relevant to the context and emotion being examined that may shape individuals' motivations toward regulating emotions, as well as seek out additional factors that may explain the source of these motivations.

Attachment Representations, Emotion-Regulation Difficulties, and Substance Use

Study 2 replicated and extended the findings of Study 1 by demonstrating that attachment orientations not only predict emotion-regulation tendencies, but go on to indirectly influence health over time via their influence on specific aspects of emotion regulation. Preoccupied individuals report the greatest difficulty with impulse control and have more limited access to emotion-regulation strategies than dismissing or preoccupied individuals. These difficulties, in turn, predict greater alcohol consumption. In contrast, coherence of mind and autonomous representations are associated with the least emotion-regulation difficulty and subsequent alcohol consumption. A direct effect of attachment orientations on the frequency of tobacco use was also found, but emotion-regulation difficulties did not mediate this effect.

This research makes a number of important contributions to the emotion regulation, substance use, and attachment literatures. By examining the predictive role of attachment representations, assessed via the Adult Attachment Interview, Study 2 begins to shed light on the developmental origins of specific emotion-regulation tendencies. Adult emotion researchers have repeatedly called for more work examining the development of particular emotion-regulation abilities and tendencies (e.g., Gross & John, 2003; John & Gross, 2004); however, I am unaware of any attempts by adult emotion regulation researchers to do so. Additionally, by adopting a prospective longitudinal design, the present research improves upon much of the research examining the effects of emotion-regulation tendencies, which has often relied on contemporaneous measures of these tendencies and their supposed "consequences." This approach bolsters confidence in direction of the observed effect. Additionally, by including methods commonly used in both the developmental and mainstream adult emotion-regulation research, I hope that the present research provides a platform for future work bridging these fields. It is only through an integration of their perspectives that a comprehensive understanding of emotion regulation will be achieved.

Substance use as a means of emotion regulation has had a long history in theories and research on substance use (e.g., Marlatt & Gordon, 1985; Kassel et al., 2003; Tiffany, 1990). Indeed, beliefs about the mood regulating effects of alcohol consumption have been found to predict drinking behavior better than individuals' actual moods at the time (Cooper, Frone, Russell, & Mudar, 1995). In conjunction with the present findings, these results suggest different functions that drinking may serve for individuals with emotion-regulation difficulties. They also lend support to the arguments for tailoring substance use interventions (e.g., Webb, Simmons, & Brandon, 2005). There are mixed findings regarding the effectiveness of tailored interventions; however, the specific characteristics being tailored can vary widely from study to study. By knowing an important underlying mechanism that partially drives individuals' substance use (e.g., to make up for emotion-regulation deficits), interventions can be tailored to specifically target those mechanisms. With this information, interventions could focus on strengthening individuals' emotion-regulation capacities in specific ways, which may decrease how frequently they are in a situation to need to turn to substances to attempt to regulate their emotions.

For the attachment literature, these findings provide important information about the health implications of attachment-related emotion-regulation difficulties. They demonstrate that attachment orientations not only shape individuals' psychological well-being or behavior within relationship contexts, but can influence their health-related behavior as well. These findings add to a growing literature on the connection between attachment and health across the lifespan (e.g., Puig, Englund, Simpson, & Collins, 2013; McWilliams & Baily, 2010; Scharfe & Eldredge, 2001).

Unexpected findings

There were a few unexpected findings. There was an interaction between avoidance and anxiety for self-reported cognitive reappraisal. The hypothesized negative relation between avoidance and cognitive reappraisal only held at high levels of attachment anxiety. Fearful individuals were the least likely to report using cognitive reappraisal, but dismissing individuals did not differ from secure in this regard. Cognitive reappraisal requires focusing ones' attention on the emotion-eliciting stimuli, acknowledging that it is potentially distressing, but then purposefully changing ones' thinking about it. Given their motivations to limit activation of their attachment systems, I expected that avoidant individuals would be unlikely to acknowledge their potential emotional responses to particular stimuli, and therefore unlikely to use cognitive reappraisal. In response to emotional stimuli, avoidant individuals often direct their attention away from the sources of distress. Perhaps in situations where emotional stimuli cannot be avoided, dismissing individuals instead focus on less emotional aspects of the stimuli, and thus engage in processes indicative of cognitive reappraisal. Despite this similarity between secure and dismissing individuals, the motivations underlying their use of cognitive reappraisal are likely quite different.

Additionally, no attachment-related effects were found for participants' expressions of sadness in the current research. The tendency for avoidant individuals to express less emotion and anxious individuals to express more emotion is a robust finding in the attachment literature. So, the present results are somewhat surprising. A well-validated film clip was used to induce sadness, and there was clear evidence of its effect in participants' self-reported emotions across all three conditions. Participants displayed levels of sadness spanning the full range of the coding scale, but the overall distribution of scores was positively skewed. A large proportion of the sample (84%) was coded less than a 3 on the 7-point scale, indicating overall low levels of expressed emotion. Additionally, participants in the suppression condition were particularly successful at regulating their expression of emotion displaying only the most minimal traces of sadness, if any at all (M = 1.77). This possibly resulted in too little variance to examine the hypothesized attachment-related differences or interactions between attachment and condition for expressed sadness.

Limitations and Future Directions

Despite making multiple contributions to the attachment, emotion regulation, and substance use literatures, the present research has a number of limitations. In Study 1, I was unable to draw any conclusions regarding participants' physiological responses, which would have provided valuable information about their emotional responses and the relative effectiveness of the specific strategies being examined. There were no differences across conditions or attachment orientations for either skin conductance or heart rate. Additionally, the general trend for skin conductance in the control condition contradicted prior research, which has shown sadness to be associated with decreases in skin conductance (Kreibig et al., 2007). These null and contradictory findings may be the product of very high variance in these variables, which was likely the result of considerable error in the data. Indeed, I experienced ongoing problems with signal quality, equipment failure, and experimenter error in the collection of the physiological data. Complete signal loss and significant interference with the signal was particularly problematic for the measurement of skin conductance; all or part of this data for approximately 20% of participants had to be discarded. These problems may have introduced too much error, which could be drowning out any individual differences that may have existed.

Additionally, the emotional response patterns documented in Study 1 took place in a contrived emotional setting in a laboratory, and only reflect one, specific emotion. This limits the generalizability of these results across individuals' various emotional responses in everyday life. However, this limitation is shared by the vast majority of emotion regulation research. Emotions are complex, and it is very difficult to examine the nuances of the emotion-regulation processes without a certain amount of experimental control. By retaining a high degree of control, Study 1 provides important initial evidence of the variation that can exist in the nature and effectiveness of emotion-regulation strategies across relevant individual differences. Additionally, it contributes important information about the regulation of sadness, which has yet to be examined in relation to specific emotion-regulation strategies. However, the present research only scratches the surface of the potential variation that likely exists in the emotion regulation process. Future research is needed to examine the numerous sources of variability in the emotion regulation process across both controlled and naturalistic settings, including the characteristics of specific emotions, aspects of the surrounding context, and other sources of motivations toward emotion regulation besides attachment. The information provided by such research would help effect a more nuanced understanding of the emotion regulation process.

Even though the hypothesized mediation model was supported in Study 2, there are limitations to this research. The sample size is considerably smaller than Study 1, and the participants' mothers were initially recruited due to their poverty status during pregnancy. Replicating the current findings with a larger, more representative sample would bolster confidence in my conclusions. By examining the relations between attachment representations at age 26 and substance use at age 34, the present research only captures small piece of a much longer and more complex series of process beginning in infancy. However, the prospective longitudinal design of Study 2 lends confidence to my conclusions about the directionality of the relations among attachment, emotion-regulation difficulties, and substance use. Additionally, even this brief snapshot provides valuable information, given the relative dearth of longitudinal research examining the origins and long-term consequences of individual differences in emotion-regulation tendencies.

Conclusion

Prior research has documented a number of physical, psychological, and interpersonal consequences of individual differences in emotion-regulation tendencies. However, the mainstream emotion regulation literature has failed to provide a clear theoretical explanation for *why* or *how* these individual differences develop. The present research begins to fill this important gap in the literature by providing correlational, experimental, and prospective longitudinal evidence for the role of attachment orientations in predicting emotion-regulation tendencies, as well as in explaining the developmental and motivational origins of these individual differences. Anxiety and avoidance not only predict the habitual use of specific emotion-regulation strategies, but they also predict the nature and relative effectiveness of those strategies as they are being enacted. Attachment orientations not only predict a range of emotion-regulation difficulties, but go on to indirectly influence health behaviors over time via their relation with these difficulties. By adopting a multi-method approach, and acknowledging multiple sources of potential variation, this research makes several novel contributions to understanding individual differences in the emotion regulation process.

Table 1

Descriptive Statistics and Correlations among Study 1 Online Survey Variables

	1	2	3	4	5	6	7	8	9	10	11
1. AAQ: Avoidance	-										
2. AAQ: Anxiety	.27***	-									
3. ERQ: Suppression	.41***	.05	-								
4. ERQ: Cognitive Reappraisal	-.21***	-.32***	.13*	-							
5. DERS: Non-Acceptance of Emotional Responses	.37***	.38***	.21***	-.24***	-						
6. DERS: Difficulties Engaging in Goal-Directed Behavior	.21***	.35***	-.05	-.40***	.42***	-					
7. DERS: Impulse Control Difficulties	.32***	.34***	-.01	-.42***	.52***	.58***	-				
8. DERS: Lack of Emotional Awareness	.31***	.12*	.44***	-.14**	.28***	.03	.13*	-			
9. DERS: Limited Access to Emotion-Regulation Strategies	.37***	.48***	.09†	-.47***	.65**	.66***	.77***	.17**	-		
10. DERS: Lack of Emotional Clarity	.40***	.35***	.29***	-.23***	.52***	.32***	.41***	.53***	.49***	-	
11. DERS: Full Scale	.45***	.47***	.22***	-.44***	.79***	.70***	.79***	.45***	.89***	.71***	-
Mean	3.43	3.50	3.47	4.85	2.30	2.99	1.80	2.29	2.17	2.23	2.27
Standard Deviation	1.09	1.04	1.26	1.04	0.95	0.95	0.80	0.78	0.89	0.79	0.64

Note: †*p* < .10. **p* < .05. ***p* < .01. ****p* < .000. AAQ = Adult Attachment Questionnaire. ERQ = Emotion Regulation Questionnaire. DERS = Difficulties with Emotion Regulation Scale.

Table 2

Predicting Difficulties with Emotion Regulation from Attachment Avoidance and Anxiety

DERS: Non-Acceptance of Emotional Responses

	Step 1				Step 2			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	2.29	0.05		.000	2.26	0.05		.000
Sex	-0.05	0.05	-0.05	.326	-0.05	0.05	-0.05	.326
AVD	0.25	0.04	0.29	.000	0.25	0.04	0.29	.000
ANX	0.27	0.05	0.30	.000	0.28	0.05	0.31	.000
AVD x ANX					0.08	0.04	0.10	.033
R^2	0.22				0.23			
F for model	32.67***				25.91***			

DERS: Difficulty Engaging in Goal-Directed Behavior

	Step 1				Step 2			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	2.95	0.05		.000	2.93	0.05		.000
Sex	-0.09	0.05	-0.09	.092	-0.09	0.05	-0.09	.092
AVD	0.10	0.05	0.12	.028	0.10	0.05	0.11	.028
ANX	0.28	0.05	0.31	.000	0.29	0.05	0.32	.000
AVD x ANX					0.07	0.04	0.09	.080
R^2	0.14				0.15			
F for model	18.31***				14.59***			

DERS: Impulse Control Difficulties

	Step 1				Step 2			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	1.80	0.04		.000	1.77	0.04		.000
Sex	0.00	0.04	0.00	.978	0.00	0.04	0.00	.974
AVD	0.18	0.04	0.25	.000	0.18	0.04	0.24	.000
ANX	0.22	0.04	0.28	.000	0.22	0.04	0.29	.000
AVD x ANX					0.08	0.03	0.11	.024
R^2	0.17				0.19			
F for model	24.05***				19.54***			

DERS: Lack of Emotional Awareness

	Step 1				Step 2			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	2.31	0.04		.000	2.33	0.04		.000
Sex	0.06	0.04	0.08	.141	0.06	0.04	0.08	.142
AVD	0.21	0.04	0.30	.000	0.21	0.04	0.30	.000
ANX	0.03	0.04	0.04	.448	0.03	0.04	0.04	.500
AVD x ANX					-0.05	0.03	-0.08	.141
R^2	0.10				0.10			
F for model	12.41***				9.88***			

DERS: Limited Access to Emotion-Regulation Strategies								
	Step 1				Step 2			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	2.16	0.04		.000	2.13	0.04		.000
Sex	-0.05	0.04	-0.05	.294	-0.05	0.04	-0.05	.291
AVD	0.21	0.04	0.25	.000	0.21	0.04	0.25	.000
ANX	0.35	0.04	0.41	.000	0.35	0.04	0.41	.000
AVD x ANX					0.10	0.03	0.13	.003
R^2	0.29				0.31			
F for model	46.12***				37.58***			

DERS: Lack of Emotional Clarity								
	Step 1				Step 2			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	2.24	0.04		.000	2.23	0.04		.000
Sex	0.00	0.04	0.00	.993	0.00	0.04	0.00	.993
AVD	0.25	0.04	0.34	.000	0.25	0.04	0.34	.000
ANX	0.20	0.04	0.26	.000	0.20	0.04	0.26	.000
AVD x ANX					0.00	0.03	0.00	.945
R^2	0.23				0.23			
F for model	33.52***				25.07***			

DERS: Full Scale								
	Step 1				Step 2			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	2.27	0.03		.000	2.25	0.03		.000
Sex	-0.02	0.03	-0.03	.509	-0.02	0.03	-0.03	.510
AVD	0.20	0.03	0.34	.000	0.20	0.03	0.34	.000
ANX	0.23	0.03	0.38	.000	0.23	0.03	0.38	.000
AVD x ANX					0.05	0.02	0.09	.034
R^2	0.33				0.34			
F for model	56.39***				43.85***			

Note. ***$p < .000$. Sex was coded -1 = female, 1 = male.
DERS = Difficulties with Emotion Regulation Scale.
AND = AAQ Avoidance. ANX = AAQ Anxiety.

Table 3

Simple Slopes for Anxiety x Avoidance Interactions Predicting Self-Reported Difficulty with Emotion Regulation and Emotion-Regulation Strategy Use

DERS: Non-Acceptance of Emotional Responses

	Low Avoidance				High Avoidance			
	B	SE(B)	β	p	B	SE(B)	β	p
Intercept	1.99	0.07		.000	2.54	0.07		.000
Slope for Anxiety	0.19	0.06	0.21	.002	0.37	0.06	0.40	.000
	Low Anxiety				High Anxiety			
	B	SE(B)	β	p	B	SE(B)	β	p
Intercept	1.97	0.07		.000	2.55	0.07		.000
Slope for Avoidance	0.17	0.06	0.19	.005	0.34	0.06	0.39	.000

DERS: Difficulty Engaging in Goal-Directed Behavior

	Low Avoidance				High Avoidance			
	B	SE(B)	β	p	B	SE(B)	β	p
Intercept	2.82	0.07		.000	3.04	0.07		.000
Slope for Anxiety	0.21	0.06	0.23	.001	0.37	0.07	0.40	.000
	Low Anxiety				High Anxiety			
	B	SE(B)	β	p	B	SE(B)	β	p
Intercept	2.63	0.07		.000	3.23	0.07		.000
Slope for Avoidance	0.03	0.06	0.03	.676	0.17	0.06	0.20	.005

DERS: Impulse Control Difficulties

	Low Avoidance				High Avoidance			
	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	1.58	0.06		.000	1.97	0.06		.000
Slope for Anxiety	0.14	0.05	0.18	.008	0.30	0.06	0.39	.000
	Low Anxiety				High Anxiety			
	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	1.55	0.06		.000	2.00	0.06		.000
Slope for Avoidance	0.10	0.05	0.14	.048	0.26	0.05	0.35	.000

DERS: Limited Access to Emotion-Regulation Strategies

	Low Avoidance				High Avoidance			
	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	1.90	0.06		.000	2.35	0.06		.000
Slope for Anxiety	0.24	0.05	0.28	.000	0.46	0.06	.054	.000
	Low Anxiety				High Anxiety			
	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	1.76	0.06		.000	2.49	0.06		.000
Slope for Avoidance	0.10	0.05	0.12	.055	0.31	0.05	0.38	.000

DERS: Full Scale								
	Low Avoidance				High Avoidance			
	B	SE(B)	β	p	B	SE(B)	β	p
Intercept	2.03	0.04	0.29	.000	2.47	0.04		.000
Slope for Anxiety	0.18	0.04	0.29	.000	0.29	0.04	0.47	.000
	Low Anxiety				High Anxiety			
	B	SE(B)	β	p	B	SE(B)	β	p
Intercept	2.01	0.04		.000	2.49	0.04		.000
Slope for Avoidance	0.15	0.04	0.25	.000	0.25	0.04	0.43	.000
ERQ: Cognitive Reappraisal								
	Low Avoidance				High Avoidance			
	B	SE(B)	β	p	B	SE(B)	β	p
Intercept	5.06	0.08		.000	4.80	0.08		.000
Slope for Anxiety	-0.19	0.07	-0.19	.006	-0.37	0.07	-0.37	.000
	Low Anxiety				High Anxiety			
	B	SE(B)	β	p	B	SE(B)	β	p
Intercept	5.22	0.08		.000	4.63	0.08		.000
Slope for Avoidance	-0.04	0.07	-0.04	.592	-0.21	0.07	-0.22	.002

Note. DERS = Difficulties with Emotion Regulation Scale.
ERQ = Emotion Regulation Questionnaire.

Table 4

Predicting Self-Reported Emotion-Regulation Strategy Use from Attachment Avoidance and Anxiety

ERQ: Suppression

	Step 1				Step 2			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	3.59	0.07		.000	3.59	0.06		.000
Sex	0.32	0.06	0.23	.000	0.32	0.06	0.23	.000
AVD	0.51	0.06	0.44	.000	0.51	0.06	0.44	.000
ANX	-0.07	0.06	-0.06	.234	-0.07	0.06	-0.06	.234
AVD x ANX					-0.00	0.05	-0.00	.973
R^2	0.23				0.23			
F for model	33.63***				25.15***			

ERQ: Cognitive Reappraisal

	Step 1				Step 2			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	4.90	0.06		.000	4.93	0.06		.000
Sex	0.13	0.06	0.12	.021	0.13	0.06	0.12	.021
AVD	-0.12	0.05	-0.13	.015	-0.12	0.05	-0.13	.015
ANX	-0.28	0.05	-0.28	.000	-0.28	0.05	-0.28	.000
AVD x ANX					-0.08	0.05	-0.09	.067
R^2	0.13				0.14			
F for model	16.93***				13.63***			

Note. ***$p < .000$. Sex was coded -1 = female, 1 = male.
ERQ = Emotion Regulation Questionnaire.
AVD = AAQ Avoidance. ANX = AAQ Anxiety.

Table 5

Predicted Values for Change in Subjective Emotion, Coded Expressive Behavior, and Changes in Physiological Responses by Condition

	Emotion Regulation Condition		
Measure	Suppression	Cognitive Reappraisal	Control
Subjective Emotion			
Change in Sadness	1.19_{a}	0.92_{b}	1.34_{a}
Low Avoidance	$1.50_{b\dagger}$	1.13_{a}	1.57_{b}
High Avoidance	$0.88_{a,b}$	0.72_{a}	$1.11_{b\dagger}$
Low Anxiety	1.05_{a}	1.11_{a}	1.30_{a}
High Anxiety	1.34_{a}	0.74_{b}	1.37_{b}
Expressive Behavior			
Expressed Sadness	1.77_{a}	2.00_{b}	2.46_{c}
Expression Control	2.36_{a}	2.60_{b}	2.88_{c}
Low Avoidance	2.23_{a}	$2.56_{b\dagger}$	2.71_{b}
High Avoidance	2.37_{a}	2.58_{a}	3.04_{b}
Physiological Responses			
Change in Skin Conductance	2.30_{a}	2.38_{a}	2.28_{a}
Low Anxiety	2.05_{a}	2.74_{a}	2.25_{a}
High Anxiety	2.71_{a}	1.85_{a}	2.30_{a}
Change in Heart Rate	-2.82_{a}	-2.73_{a}	-2.87_{a}
Low Avoidance	-2.15_{a}	-2.72_{a}	-3.49_{a}
High Avoidance	-3.50_{a}	-2.73_{a}	-2.24_{a}

Note. Means in a given row with different subscripts differ at $p < .05$.
Means in a given row with different subscripts accompanied by † differ at $p < .10$.
Predicted values for Low Anxiety/Low Avoidance were calculated at 1 standard deviation below the mean for each.
Predicted values for High Anxiety/High Avoidance were calculated at 1 standard deviation below the mean for each.
Values for self-reported sadness and all physiological responses reflect changes from baseline, such that positive numbers indicate increases.
Values for expressive behavior are based on coder ratings during the emotion-eliciting film period.

Table 6

Descriptive Statistics and Correlations among Study 1 Laboratory Session Variables

	1	2	3	4	5
Subjective Emotion					
1. Change in Sadness	-				
Expressive Behavior					
2. Expressed Sadness	.21***	-			
3. Expression Control	.08	.48***	-		
Physiological Reactions					
4. Change in Skin Conductance	.14*	.11†	.05	-	
5. Change in Heart Rate (BPM)	.02	.16**	.06	.04	-
Mean	1.21	2.07	2.61	-3.10	2.47
Standard Deviation	1.09	0.85	0.91	4.76	2.29

Note. †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .000$

Values for self-reported sadness and all physiological responses reflect changes from baseline, such that positive numbers indicate increases.

Values for expressive behavior are based on coder ratings during the emotion-eliciting film period.

Table 7

Predicting Change in Self-Reported Sadness from Baseline

	Step 1				Step 2				Step 3			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	1.36	0.11		.000	1.34	0.10		.000	1.34	0.11		.000
Sex	-0.17	0.07	-0.14	.011	-0.19	0.06	-0.16	.003	-0.19	0.06	-0.16	.003
Condition												
Sup vs. Control	-0.15	-0.15	-0.16	.325	-0.16	0.14	-0.07	.280	-0.15	0.15	-0.06	.316
CR vs. Control	-0.47	0.15	-0.20	.002	-0.43	0.15	-0.18	.004	-0.42	0.15	-0.18	.004
AVD					-0.24	0.06	-0.24	.000	-0.21	0.10	-0.21	.030
ANX					0.02	0.06	0.02	.709	0.03	0.10	0.03	.738
AVD x ANX									-0.01	0.05	-0.01	.929
Condition x AVD												
Sup vs. Control x AVD									-0.07	0.14	-0.04	.608
CR vs. Control x AVD									0.02	0.14	0.01	.867
Condition x ANX												
Sup vs. Control x ANX									0.11	0.14	0.06	.450
CR vs. Control x ANX									-0.21	0.15	-0.10	.169
R^2	0.05				0.11				0.12			
F for model	5.78**				7.36***				4.15***			

Note. ** $p < .01$. *** $p < .000$. Sex was coded -1 = female, 1 = male. AVD = AAQ Avoidance. ANX = AAQ Anxiety. Sup = Suppression Condition. CR = Cognitive Reappraisal Condition.

Table 8

Predicting Expressed Sadness during the Emotional Film Clip

	Step 1				Step 2				Step 3			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	2.41	0.08		.000	2.40	0.09		.000	3.40	0.09		.000
Sex	-0.14	0.05	-0.16	.005	-0.15	0.05	-0.17	.003	-0.16	0.05	-0.17	.003
Condition												
Sup vs. Control	-0.70	0.12	-0.39	.000	-0.71	0.12	-0.39	.000	-0.70	0.12	-0.39	.000
CR vs. Control	-0.45	0.12	-0.25	.000	-0.43	0.12	-0.24	.000	-0.42	0.02	-0.23	.001
AVD					-0.05	0.05	-0.06	.305	0.00	0.08	0.01	.965
ANX					-0.05	0.05	-0.06	.343	-0.08	0.08	-0.10	3.15
AVD x ANX									0.02	0.04	0.02	.713
Condition x AVD												
Sup vs. Control x AVD									-0.02	0.11	-0.02	.853
CR vs. Control x AVD									-0.12	0.12	-0.09	.298
Condition x ANX												
Sup vs. Control x ANX									0.10	0.11	0.07	.394
CR vs. Control x ANX									-0.01	0.13	-0.01	.951
R^2	0.14				0.15				0.15			
F for model	14.97***				9.56***				5.00***			

Note. ***p < .000. Sex was coded -1 = female, 1 = male. AVD = AAQ Avoidance. ANX = AAQ Anxiety. Sup = Suppression Condition. CR = Cognitive Reappraisal Condition.

Table 9

Predicting Expression Control during the Emotional Film Clip

	Step 1				Step 2				Step 3			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	2.84	0.09		.000	2.86	0.09		.000	2.87	0.10		.000
Sex	-0.16	0.16	-0.16	.005	-0.15	0.06	-0.15	.008	-0.16	0.16	-0.16	.006
Condition												
Sup vs. Control	-0.55	0.13	-0.29	.000	-0.56	0.13	-0.29	.000	-0.57	0.13	-0.30	.000
CR vs. Control	-0.29	0.13	-0.15	.026	-0.31	0.13	-0.16	.017	-0.30	0.13	-0.16	.021
AVD					0.08	0.05	0.10	.114	0.15	0.09	0.18	.088
ANX					-0.01	0.05	-0.02	.804	0.03	0.09	0.03	.774
AVD x ANX									-0.01	0.05	-0.02	.789
Condition x AVD												
Sup vs. Control x AVD									-0.09	0.13	-0.06	.471
CR vs. Control x AVD									-0.15	0.13	-0.10	.253
Condition x ANX												
Sup vs. Control x ANX									-0.03	0.12	-0.02	.818
CR vs. Control x ANX									-0.15	0.13	-0.10	.253
R^2	0.09				0.09				0.11			
F for model	8.72***				5.76***				2.46**			

Note. ***p* < .01. ****p* < .000. Sex was coded -1 = female, 1 = male. AVD = AAQ Avoidance. ANX = AAQ Anxiety. Sup = Suppression Condition. CR = Cognitive Reappraisal Condition.

Table 10

Predicting Change in Skin Conductance from Baseline

	Step 1				Step 2				Step 3			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	2.37	0.28		.000	2.37	0.28		.000	2.23	0.30		.000
Sex	-0.33	0.16	-0.13	.045	-0.33	0.17	-0.13	.047	-0.33	0.17	-0.13	.052
Condition												
Sup vs. Control	-0.04	0.37	-0.01	.922	-0.04	0.38	-0.01	.911	0.11	0.39	0.02	.784
CR vs. Control	-0.04	0.37	-0.01	.912	-0.04	0.38	-0.01	.917	0.02	0.38	0.00	.962
AVD					-0.01	0.15	-0.00	.972	-0.34	0.29	-0.16	.232
ANX					-0.04	0.16	-0.02	.827	0.03	0.29	0.01	.927
AVD x ANX									0.09	0.15	0.04	.545
Condition x AVD												
Sup vs. Control x AVD									0.51	0.39	0.13	.197
CR vs. Control x AVD									0.48	0.37	0.14	.198
Condition x ANX												
Sup vs. Control x ANX									0.29	0.38	0.08	.447
CR vs. Control x ANX									-0.46	0.41	-0.11	.262
R^2	0.02				0.02				0.04			
F for model	1.36				0.82				1.02			

Note. Sex was coded -1 = female, 1 = male. AVD = AAQ Avoidance. ANX = AAQ Anxiety. Sup = Suppression Condition. CR = Cognitive Reappraisal Condition.

Table 11

Predicting Change in Heart Rate from Baseline

	Step 1				Step 2				Step 3			
Variable	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*	B	SE(B)	*β*	*p*
Intercept	-3.74	0.50		.000	-3.25	0.50		.000	-2.87	0.51		.000
Sex	0.34	0.30	0.07	.256	0.32	0.30	0.06	.293	0.26	0.30	0.05	.387
Condition												
Sup vs. Control	0.47	0.69	0.05	.495	0.40	0.69	0.04	.558	0.04	0.70	0.00	0.952
CR vs. Control	0.28	0.69	0.03	.689	0.31	0.69	0.03	.653	0.14	0.69	0.01	.841
AVD					-0.03	0.27	-0.01	.912	0.57	0.48	0.13	.232
ANX					-0.38	0.29	-0.08	.187	-0.61	0.49	-0.13	.213
AVD x ANX									-0.72	0.25	-0.17	.005
Condition x AVD												
Sup vs. Control x AVD									-1.19	0.67	-0.15	.007
CR vs. Control x AVD									-0.61	0.67	-0.08	.367
Condition x ANX												
Sup vs. Control x ANX									0.32	0.68	0.04	.635
CR vs. Control x ANX									-0.04	0.73	-0.00	.960
R^2	0.01				0.01				0.05			
F for model	0.56				0.73				1.41			

Note. Sex was coded -1 = female, 1 = male. AVD = AAQ Avoidance. ANX = AAQ Anxiety. CR = Cognitive Reappraisal Condition. Sup = Suppression Condition.

Table 12

Simple Slopes for 2-way Interactions Predicting Changes in Heart Rate and Skin Conductance from Baseline

Heart Rate

	Anxiety x Avoidance							
	Low Anxiety				*High Anxiety*			
	B	SE(B)	β	*p*	B	SE(B)	β	*p*
Intercept	-2.37	0.42		.000	-3.27	0.43		.000
Slope for Avoidance	0.64	0.36	0.15	.079	-0.72	0.37	-0.16	.052
	Low Avoidance				*High Avoidance*			
	B	SE(B)	β	*p*	B	SE(B)	β	*p*
Intercept	-2.78	0.41		.000	-2.86	0.43		.000
Slope for Anxiety	0.28	0.37	0.06	.453	-1.14	0.40	-0.25	.004
	Avoidance x Suppression vs. Control Dummy							
	Low Avoidance				*High Avoidance*			
	B	SE(B)	β	*p*	B	SE(B)	β	*p*
Intercept	-2.24	0.73		.002	-3.50	0.71		.000
Slope for Sup vs. Control	-0.29	0.96	-0.30	.761	0.38	1.02	0.04	.712
Slope for CR vs. Control	0.18	1.04	0.12	.865	0.10	1.00	0.01	.920
	Low Avoidance				*High Avoidance*			
	B	SE(B)	β	*p*	B	SE(B)	β	*p*
Intercept	-2.15	0.68		.002	-3.50	0.75		.000
Slope for CR vs. Sup	-0.54	1.00	-0.05	.591	0.73	1.01	0.07	.468
Slope for Control vs. Sup	-1.34	0.95	-0.13	.161	1.25	1.06	0.12	.240

Skin Conductance

	Anxiety x Suppression vs. Cognitive Reappraisal Dummy							
	Low Anxiety				*High Anxiety*			
	B	SE(B)	β	*p*	B	SE(B)	β	*p*
Intercept	2.74	0.40		.000	1.85	0.40		.000
Slope for Sup vs. CR	-0.69	0.53	-0.14	.196	0.86	0.55	0.18	.120
Slope for Control vs. CR	-0.49	0.59	-0.10	.403	0.46	0.55	0.09	.409
	Low Anxiety				*High Anxiety*			
	B	SE(B)	β	*p*	B	SE(B)	β	*p*
Intercept	2.05	0.37		.000	2.71	0.39		.000
Slope for CR vs. Sup	0.69	0.53	0.14	.196	-0.86	0.55	-0.18	.120
Slope for Control vs. Sup	0.20	0.56	0.04	.726	-0.41	0.55	-0.08	.454

Note. CR = Cognitive Reappraisal Condition. Sup = Suppression Condition

Table 13

Simple Slopes for Anxiety x Condition Dummy Code (Suppression vs. Cognitive Reappraisal) Predicting Change in Self-Reported Sadness

Cognitive Reappraisal Condition as Reference Group

	Low Anxiety				High Anxiety			
	B	SE(B)	β	*p*	B	SE(B)	β	*p*
Intercept	1.11	0.17		.000	0.74	0.16		.000
Slope for Sup vs. CR	-0.06	0.21	-0.03	.783	0.60	0.22	0.26	.006
Slope for Control vs. CR	0.20	0.22	0.09	.370	0.64	0.21	0.28	.003

Suppression Condition as Reference Group

	Low Anxiety				High Anxiety			
	B	SE(B)	β	*p*	B	SE(B)	β	*p*
Intercept	1.05	0.14		.000	1.34	0.15		.000
Slope for CR vs. Sup	0.06	0.21	0.03	.783	-0.60	0.22	-0.26	.006
Slope for Control vs. Sup	0.26	0.20	0.11	.201	0.04	0.21	0.17	.863

Note. Sup = Suppression Condition. CR = Cognitive Reappraisal Condition.

Table 14

Descriptive Statistics and Correlations among Study 2 Variables

	1	2	3	4	5	6	7	8	9	10
1. AAI: Coherence of mind	-									
2. DERS: Non-Acceptance of Emotional Responses	-.10	-								
3. DERS: Difficulties Engaging in Goal-Directed Behavior	.11	.36***	-							
4. DERS: Impulse Control Difficulties	-.19*	.43***	.56***	-						
5. DERS: Lack of Emotional Awareness	.03	.19*	.08	.25**	-					
6 DERS: Limited Access to Emotion-Regulation Strategies	-.15†	.60***	.60***	.59***	.27**	-				
7. DERS: Lack of Emotional Clarity	-.02	.26**	.26**	.37***	.60***	.49***	-			
8. DERS: Full Scale	-.09	.67***	.67***	.74***	.57***	.85***	.72***	-		
9. Tobacco Use Frequency	-.19*	-.06	-.01	.11	.03	-.00	-.00	.01	-	
10. Overall Alcohol Consumption	.02	.01	.19*	.26**	.13	.06	.14†	.18*	.34***	-
Mean	4.44	1.71	2.28	1.59	2.28	1.64	1.85	1.87	1.99	6.46
Standard Deviation	1.86	0.72	0.86	0.61	0.82	0.63	0.67	0.51	2.40	6.37

Note. †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .000$
AAI = Adult Attachment Interview. DERS = Difficulties with Emotion Regulation Scale.

Table 15

Bootstrap Coefficients and Confidence Intervals for the Unstandardized Indirect Effect of Attachment Representations on Substance Use through Difficulties with Emotion Regulation

Overall Alcohol Consumption

	Impulse Control Difficulties				Limited Access to Emotion-Regulation Strategies			
	Indirect		Confidence Interval		Indirect		Confidence Interval	
Attachment Variable	Effect	SE	Lower	Upper	Effect	SE	Lower	Upper
Coherence of Mind	-0.18	0.10	-0.45	-0.04	-0.08	0.06	-0.25	-0.01
Representation Categories								
Dis vs. Auton	0.30	0.39	-0.33	1.31	0.06	0.20	-0.29	0.53
Pre vs. Auton	0.83	0.58	0.10	2.46	0.51	0.38	0.02	1.63

Tobacco Use Frequency

	Impulse Control Difficulties				Limited Access to Emotion-Regulation Strategies			
	Indirect		Confidence Interval		Indirect		Confidence Interval	
Attachment Variable	Effect	SE	Lower	Upper	Effect	SE	Lower	Upper
Coherence of Mind	-0.02	0.02	-0.08	0.02	-0.01	0.02	-0.05	0.03
Representation Categories								
Dis vs. Auton	0.30	0.06	-0.04	0.24	0.00	0.04	-0.06	0.12
Pre vs. Auton	0.09	0.12	-0.07	0.43	0.02	0.11	-0.18	0.29

Note. The mediating role of DERS subscales is significant when the confidence interval does not include zero. Dis = Dismissing. Pre = Preoccupied. Auton = Autonomous.

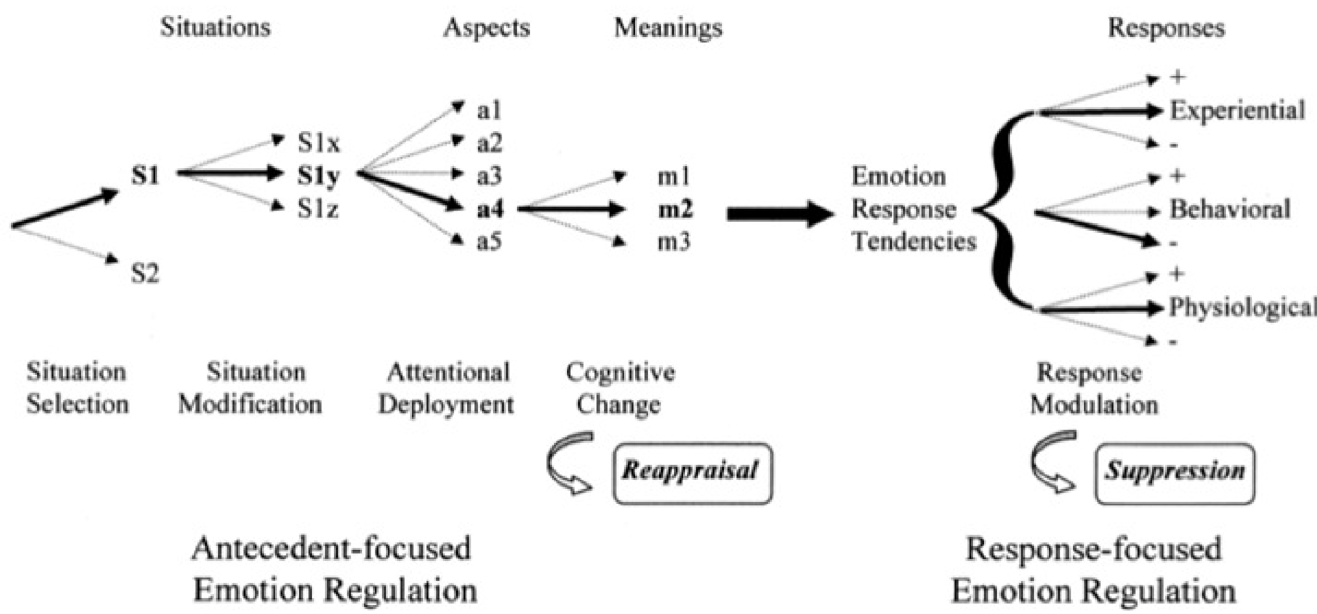

Figure 1. Gross's (1998a) process model of emotion regulation.

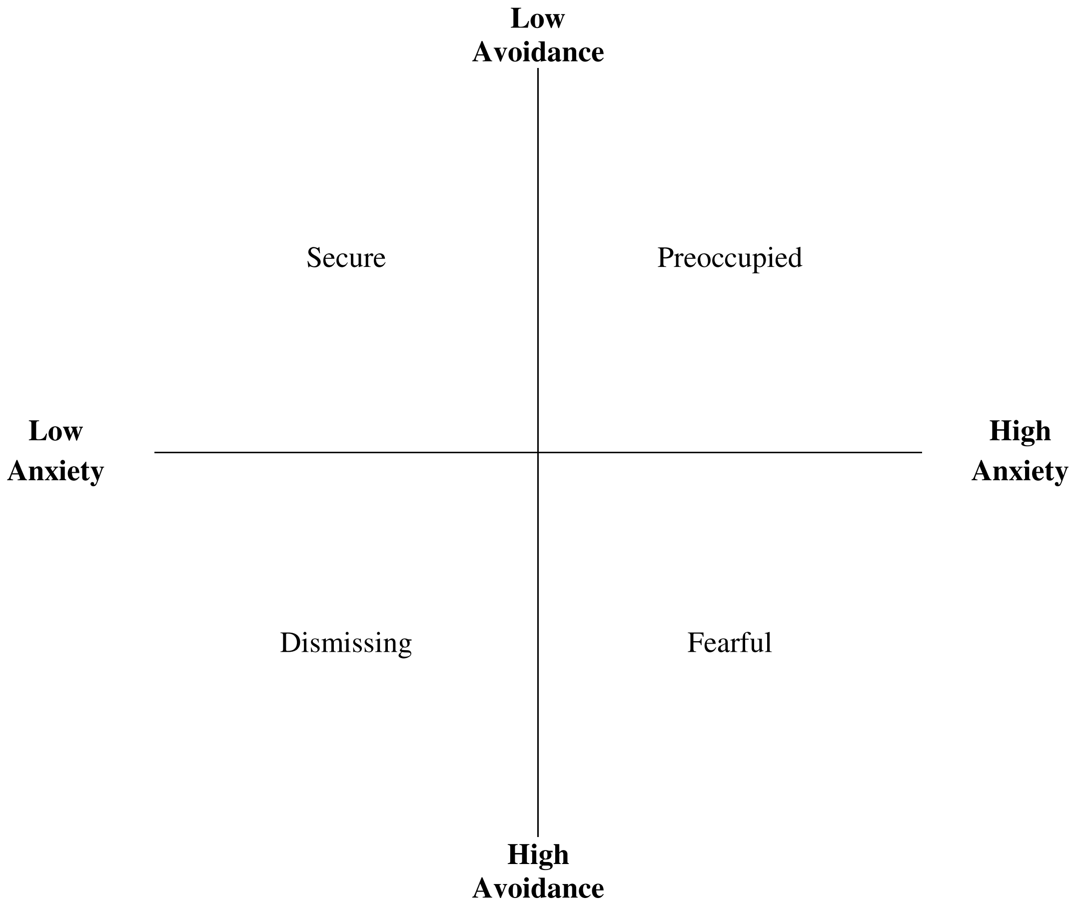

Figure 2. Adult attachment orientations conceptualized as two orthogonal dimensions.

Time 1 Online Survey	**Time 2** Laboratory Session		
Individual Difference Measures	Pre-Emotion Induction	Emotion Induction	Post-Emotion Induction
Emotion Regulation: - Emotion Regulation Questionnaire > suppression > cognitive reappraisal - Difficulties with Emotion Regulation Scale > 6 subscales - Negative Mood Regulation - The Emotion Amplification and Reduction Scales > amplification > reduction **Attachment:** - Adult Attachment Questionnaire > anxiety > avoidance	**Physiological Monitoring:** - Heart Rate - Skin Conductance - Respiration **Baseline:** - Physiological measures > Relaxation period (5:00) > last 3:00 served as baseline - State affect > Positive and Negative Affect Schedule > 3 sadness items **Break Period (1:00)** **Emotion-Regulation Instructions (1:00):** - Suppression - Cognitive Reappraisal - Control	**Emotional film clip (2:40):** - *The Champ* - Coding > Expressed Sadness > Expression Control	**State Affect:** - Positive and Negative Affect Schedule - 3 sadness items **Manipulation check:** - self-reported emotion-regulation attempts during emotional film clip

Figure 3. Study 1 measurement timeline.

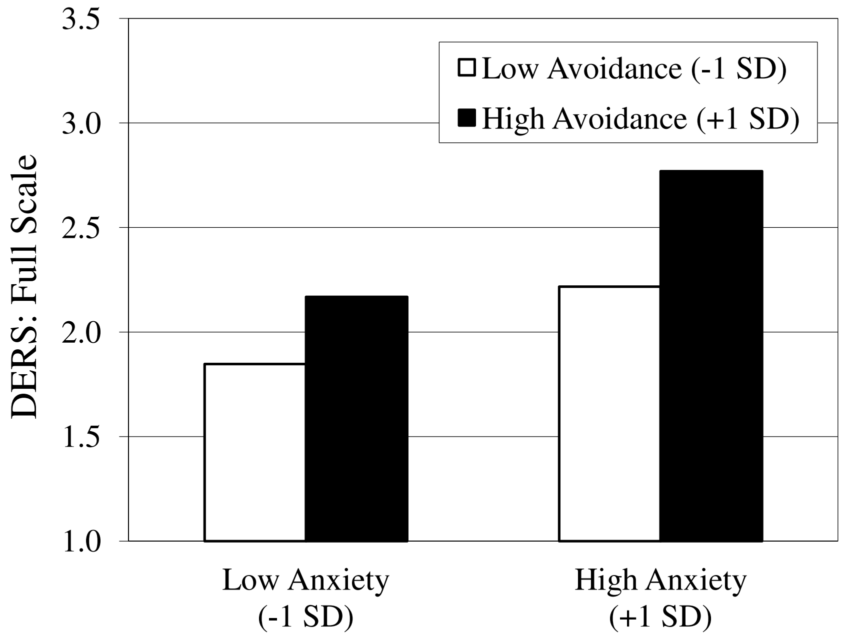

Figure 4. Self-reported difficulties with emotion regulation (DERS full scale), moderated by attachment anxiety and avoidance.

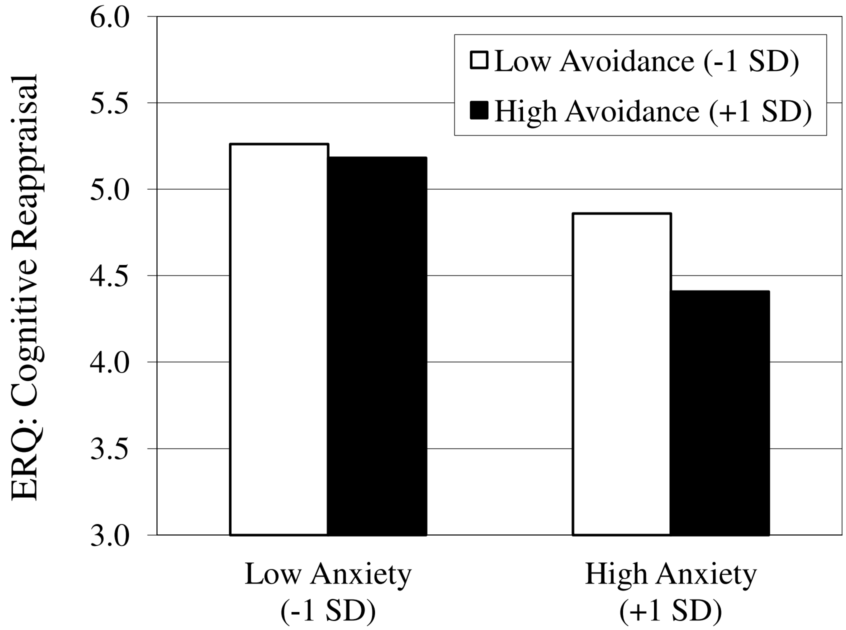

Figure 5. Self-reported use of cognitive reappraisal, moderated by attachment anxiety and avoidance.

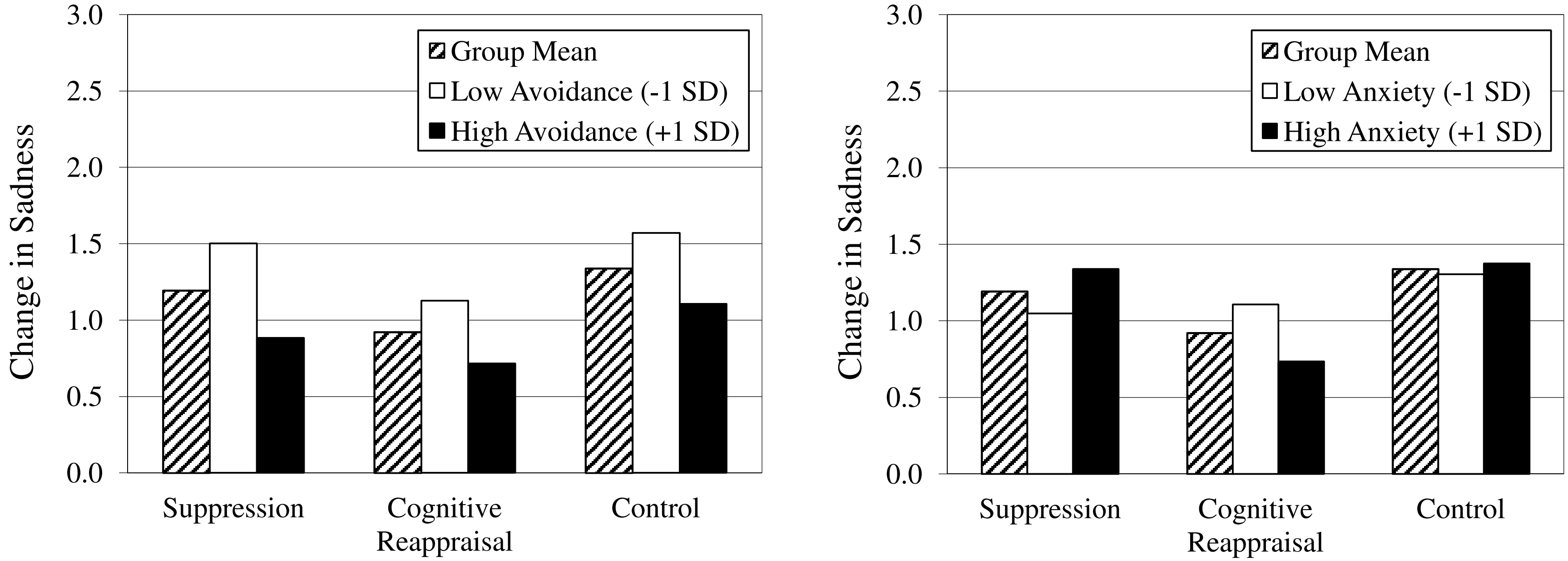

Figure 6. Self-reported change in sadness, moderated by condition and attachment orientations.

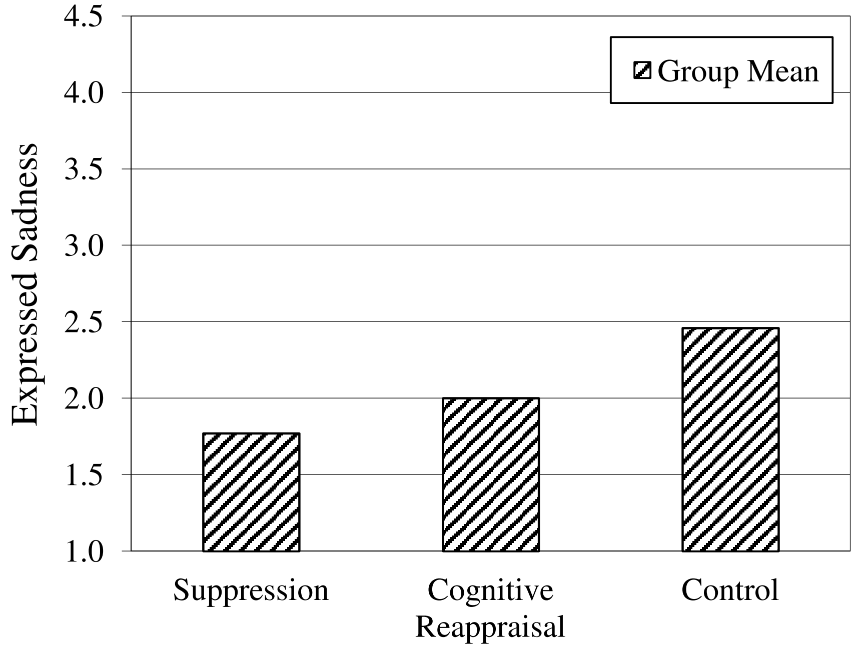

Figure 7. Coded expressed sadness, moderated by condition.

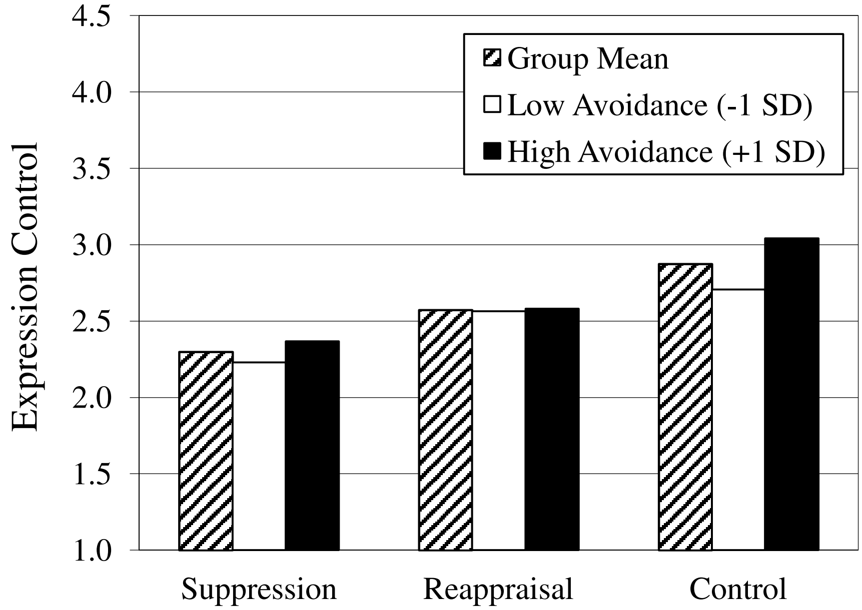

Figure 8. Coded expression control, moderated by condition and attachment avoidance.

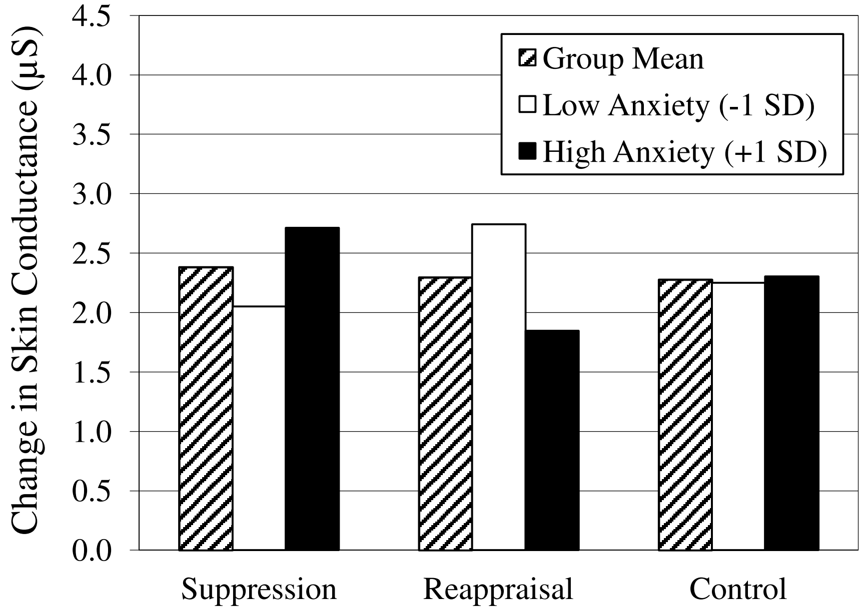

Figure 9. Change in skin conductance, moderated by condition and attachment anxiety.

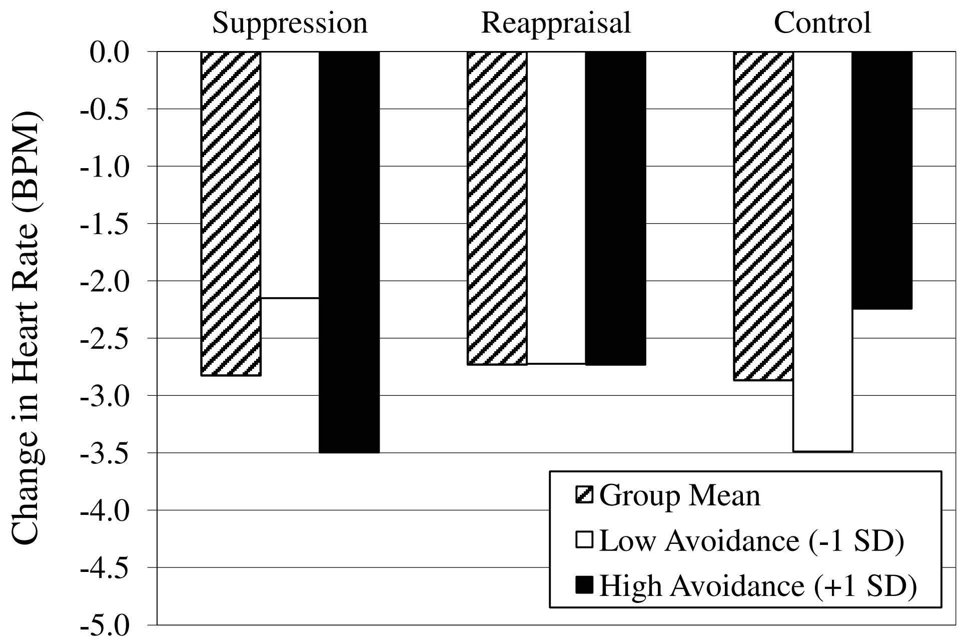

Figure 10. Change in heart rate, moderated by condition and attachment avoidance.

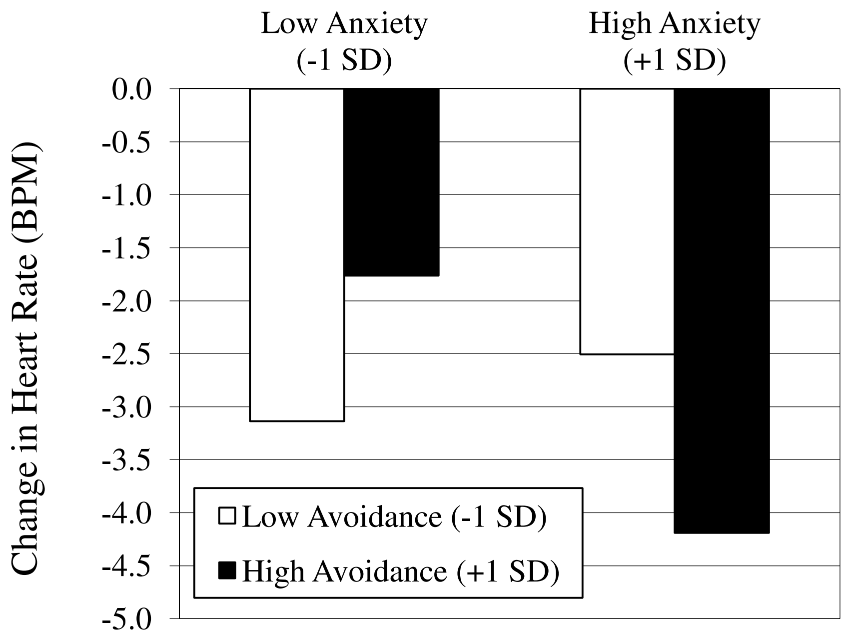

Figure 11. Change in heart rate, moderated by attachment anxiety and avoidance.

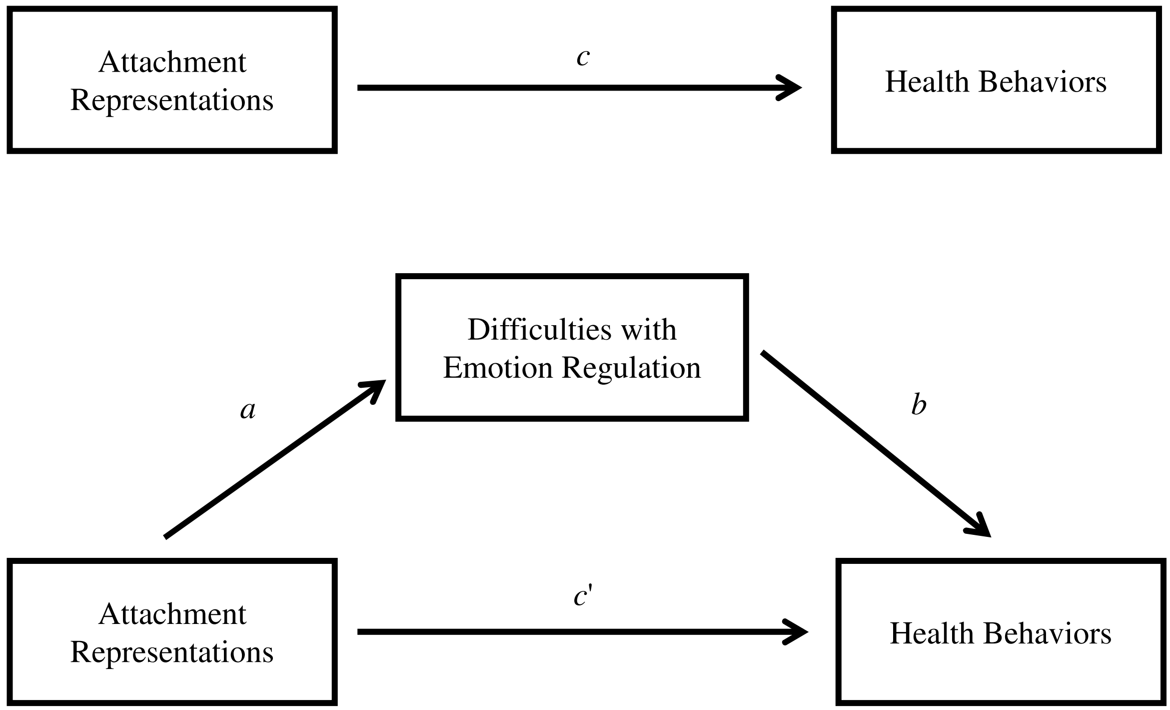

Figure 12. Theoretical model of the indirect effect of attachment representations on later health behaviors through emotion-regulation difficulties.

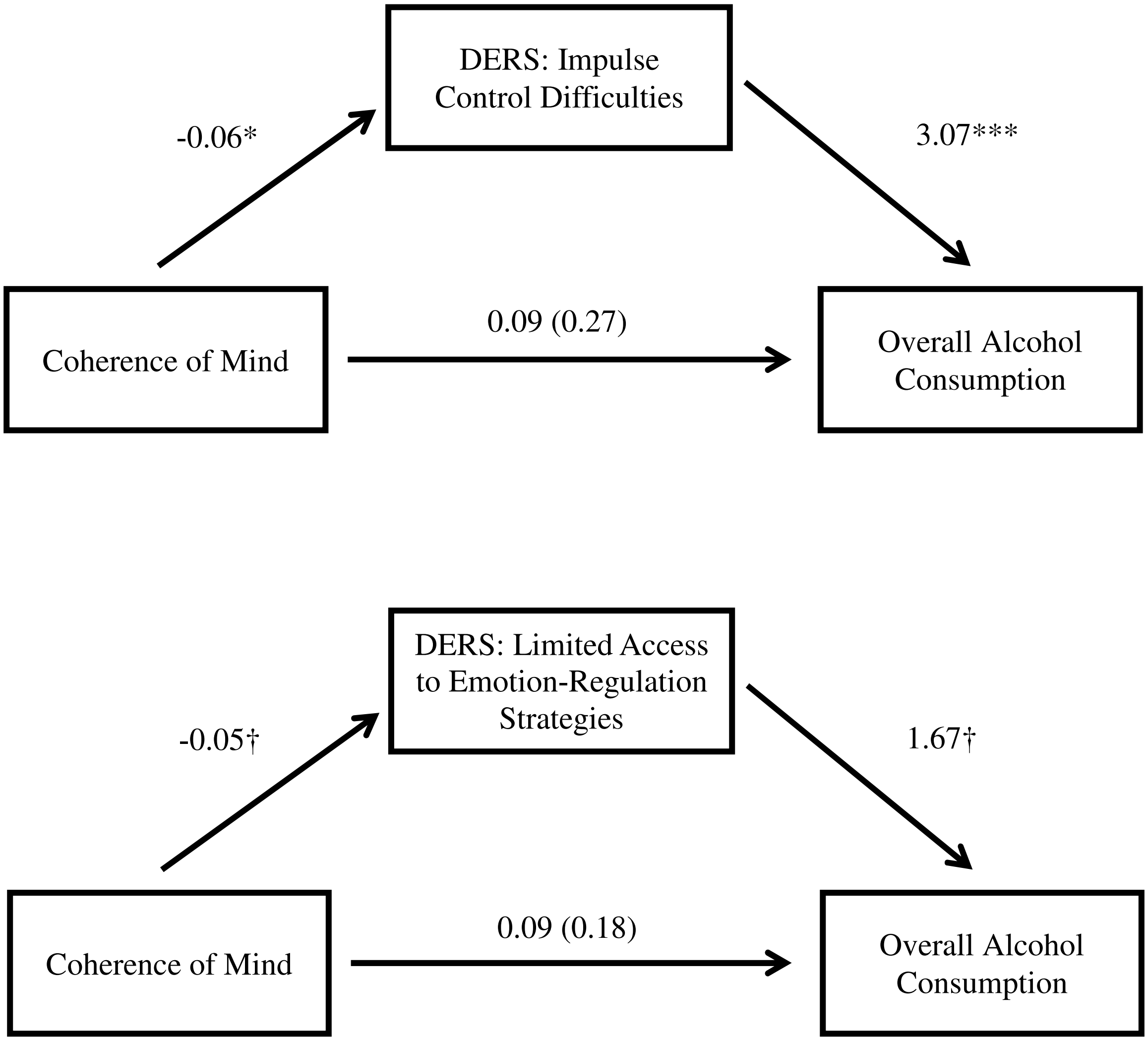

Figure 13. Unstandardized regression coefficients for testing the indirect effects of coherence of mind on overall alcohol consumption through impulse control difficulties and limited access to emotion-regulation strategies.
†$p < .10$. *$p < .05$. ***$p < .001$

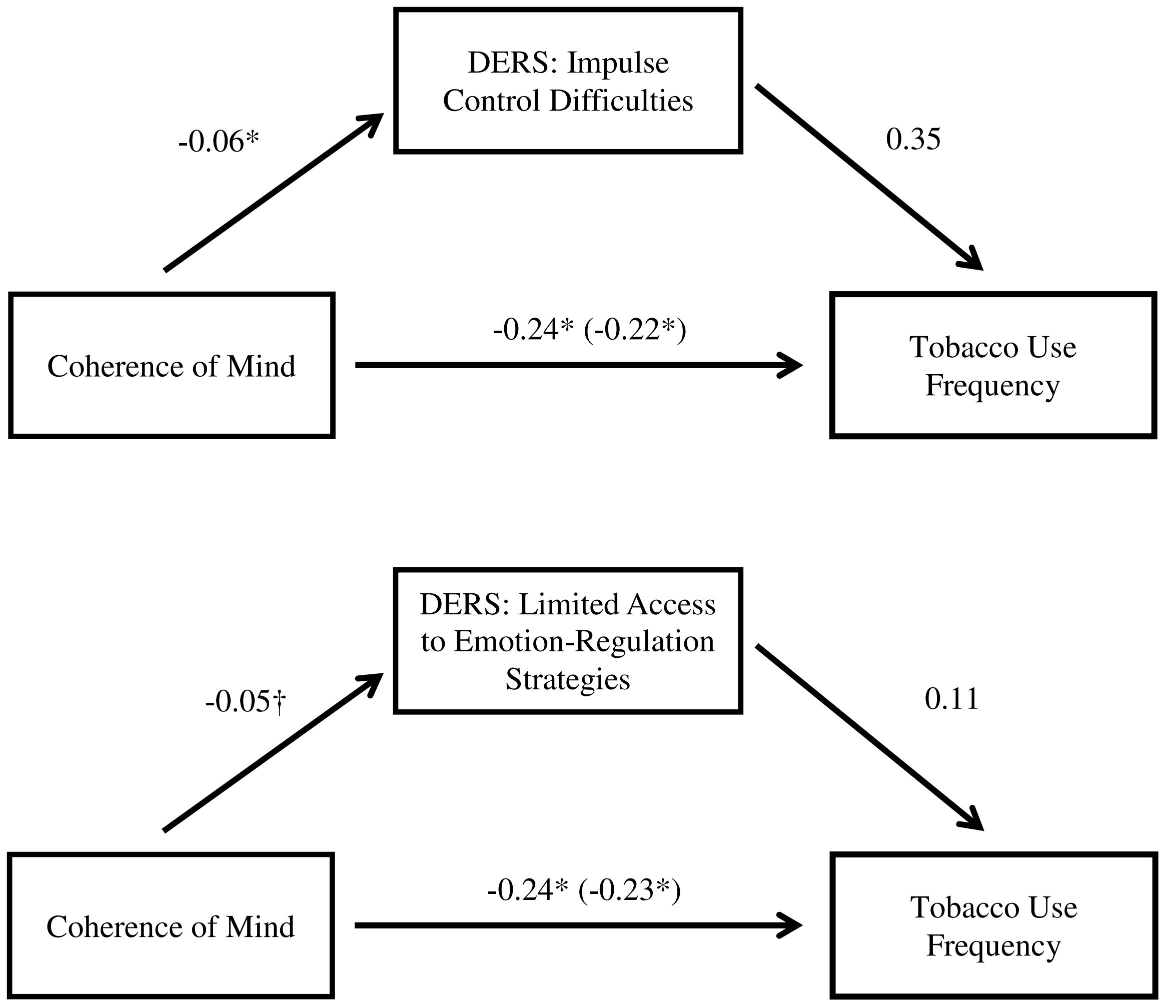

Figure 14. Unstandardized regression coefficients for testing the indirect effects of coherence of mind on tobacco use frequency through impulse control difficulties and limited access to emotion-regulation strategies.
†$p < .10$. *$p < .05$.

References

Ainsworth, M. D. S., Blehar, M., Waters, E., Wall, S. (1978). *Patterns of attachment*. Hillsdale, NJ: Erlbaum.

Baron, R. M, & Kenny, D. A. (1986). The moderator-mediator distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182.

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61(2),* 226-244.

Blum, R. W., Resnick, M. D., & Bergeisen, L. G. (1989). *The state of adolescent health in Minnesota*. University of Minnesota Adolescent Health Program, Minneapolis, MN.

Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment*. New York: Basic Books.

Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation, anxiety, and anger*. New York: Basic Books.

Bowlby, J. (1980). *Attachment and loss: Vol. III. Loss, sadness, depression*. New York: Basic Books.

Bowlby, J. (1988). *A secure base*. New York: Basic Books.

Brennan, K., Clark, C., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J.A. Simpson & W.S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46-76). New York: Guilford Press.

Carmody, T. P., Vieten, C., & Astin, J. A. (2007). Negative affect, emotional acceptance, and smoking cessation. *Journal of Psychoactive Drugs, 39*, 499-508.

Cassidy, J., & Kobak, R. (1988). Avoidance and its relation to other defensive processes. In J. Belsky, & T. Nezworski (Ed.), *Clinical implications of attachment.* Hillsdale, NJ: Erlbaum (pp. 300-323).

Catanzaro, S. J., & Mearns, J. (1990). Measuring generalized expectancies for negative mood regulation: Initial scale development and implications. *Journal of Personality Assessment, 54*, 546-563.

Cooper, M. L., Frone, M. R., Russell, M., & Mudar, P. (1995). Drinking to regulate positive and negative emotions: A motivational model of alcohol use. *Journal of Personality & Social Psychology, 69,* 990-1005.

Denollet, J., Sys, S. U., Stroobant, N., Rombouts, H., Gillebert, T. C., & Brutsaert, D. L. (1996). Personality as independent predictor of long-term mortality in patients with coronary heart disease. *Lancet*, *Feb 17, 347*, 417-421.

Diamond, L. M., & Hicks, A. M. (2005). Psychobiological perspectives on attachment: Implications for health over the lifespan. In J.A. Simpson & W. S. Rholes (Eds.), *Adult attachment: New directions and emerging issues* (pp. 240-263). New York: Guilford Press.

Diamond, L. M., Hicks, A. M., & Otter-Henderson, K. (2006). Psychological evidence for repressive coping among avoidantly attached adults. *Journal of Social and Personal Relationships*, *23(2)*, 205-229.

Dozier, M., & Kobak, R. R. (1992). Psychophysiology in attachment interviews: Converging evidence for deactivating strategies. *Child Development, 63,* 1473-1480.

Edelstein, R. S. (2006). Attachment and emotional memory: Investigating the source and extent of avoidant memory impairments. *Emotion, 6(2)*, 340-345.

English, T., John, O. P. & Gross, J. J. (2013). Emotion regulation in close relationships. In J. A. Simpson & L. Campbell (Eds.), *The Oxford handbook of close relationships*. New York: Oxford University Press.

Fraley, R. C., Garner, J. P., & Shaver, P. R. (2000). Adult attachment and the defensive regulation of attention and memory: Examining the role of preemptive and postemptive defensive processes. *Journal of Personality and Social Psychology, 79*, 816-826.

Fraley, R. C., & Shaver, P. R. (1997). Adult attachment and the suppression of unwanted thoughts. *Journal of Personality and Social Psychology, 73*, 1080-1091.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology & Behavioral Assessment, 26*, 41-54.

Gross, J. J. (1998a). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2,* 271-299.

Gross, J. J. (1998b). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology, 74*, 224-237.

Gross, J.J., & John, O.P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85,* 348-362.

Gross, J. J., & Levenson, R. W. (1993). Emotional suppression: Physiology, self-report, and expressive behavior. *Journal of Personality and Social Psychology*, 64, 940-986.

Gross, J. J., & Levenson, R. W. (1995). Emotion elicitation using films. *Cognition & Emotion, 9,* 87-337.

Hamilton, N. A., Karoly, P., Gallagher, M., Stevens, N., Karlson, C., & McCurdy, D. (2009). The assessment of emotion regulation in cognitive context: The Emotion Amplification and Reduction Scales. *Cognitive Therapy & Research, 33*, 255-263.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analyses in the new millennium. *Communication Monographs, 76,* 408-420.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis*. New York: Guilford Press.

Jarvis, B. G. (2008). MediaLab (Version 2008.1.33) [Computer Software]. New York, NY: Empirisoft Corporation.

John, O.P., & Gross, J. J. (2004). Healthy and unhealthy emotion regulation: Personality processes, individual differences, and life span development. *Journal of Personality, 72,* 1301-1334.

Kashdan, T.B., & Steger, M. (2006). Expanding the topography of social anxiety: An experience sampling assessment of positive emotions and events, and emotion suppression. *Psychological Science, 17*, 120-128.

Kassel, J. D., Stroud, L. R., & Paronis, C. A. (2003). Smoking, stress, and negative affect: Correlation, causation, and context across stages of smoking. *Psychological Bulletin, 129*, 270-304.

Kobak, R. B., & Sceery, A. (1988). Attachment in late adolescence: Working models, affect regulation, and representations of self and others. *Child Development, 59*, 135-146.

Kreibig, S. D., Wilhelm, F. H., Roth, W. T., & Gross, J. J. (2007). Cardiovascular, electrodermal, and respiratory response patterns to fear- and sadness-inducing films. *Psychophysiology, 44,* 787-806.

Lerner, J. S., Small, D. A., & Loewenstein, G. (2004). Heart strings and purse strings. *Psychological Science, 15(5)*, 337-341.

Lovell, D. (Producer), & Zeffirelli, F. (Director) (1979). *The Champ* [motion picture]. United States: Metro-Goldwyn-Mayer.

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7*, 83-104.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. In I. Bretherton & E. Waters (Eds.), Growing points of attachment theory and research. *Monographs of the Society for Research in Child Development, 50,* 66-104.

Marlatt, G. A., & Gordon, J. R. (Eds.). (1985). *Relapse prevention: Maintenance strategies in the treatment of addictive behaviors*. New York: Guilford Press.

McWilliams, L. A. & Baily, S. J. (2010). Associations between adult attachment ratings and health conditions: Evidence from the national comorbidity survey replication. *Health Psychology, 29*, 446-453.

Mikulincer, M. (1998). Attachment working models and the sense of trust: An exploration of interaction goals and affect regulation. *Journal of Personality and Social Psychology, 74,* 1209-1224.

Mikulincer, M., & Florian, V. (2001). Attachment style and affect regulation: Implications for coping with stress and mental health. In Fletcher, G., & Clark, M. (eds.), *Blackwell handbook of social psychology: Interpersonal processes* (pp. 537-557). Oxford, UK: Blackwell Publishers.

Mikulincer, M., & Orbach, I. (1995). Attachment styles and repressive defensiveness: The accessibility and architecture of affective memories. *Journal of Personality and Social Psychology, 68(5)*, 917-925.

Mikulincer, M., & Shaver, P. R. (2003). The attachment behavioral system in adulthood: Activation, psychodynamics, and interpersonal processes. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 35). San Diego, CA: Academic Press.

Moore, S. A., Zoellner, L. A., & Mollenholt, N. (2008). Are expressive suppression and cognitive reappraisal associated with stress-related symptoms? *Behaviour Research and Therapy, 46*, 993–1000.

Neff, L. A., & Broady, E. F. (2011). Stress resilience in early marriage: Can practice make perfect? *Journal of Personality and Social Psychology, 101(5)*, 1050-1067.

Overall, N.C. (2012). Emotional Expression and Suppression Scheme (EESS) Technical Manual. University of Auckland.

Phillips, L. H., Saldias, A., McCarrey, A., Henry, J. D., Scott, C., Summer, F., & Whyte, M. (2009). Attentional lapses, emotional regulation and quality of life in multiple sclerosis. *British Journal of Clinical Psychology, 48*, 101–106.

Preacher, K. J., & Hayes, A. F. (2008). Contemporary approaches to assessing mediation in communication research. In A. F. Hayes, M. D. Slater, & L. B. Snyder (Eds.), *The Sage sourcebook of advanced data analysis methods for communication research* (pp. 13-54). Thousand Oaks, CA: Sage.

Puig, J., Englund, M. M., Collins, W. A., & Simpson, J. A. (2013). Predicting physical illness in adulthood from patterns of attachment in infancy: A prospective longitudinal study. *Health Psychology, 32,* 409-417.

Roisman, G.I., Fraley, R.C., & Belsky, J. (2007). A taxometric study of the Adult Attachment Interview. *Developmental Psychology*, *43*(3), 675-686.

Scharfe, E. & Eldredge, D. (2001). Associations between attachment representations and health behaviors in late adolescence. *Journal of Health Psychology, 6,* 295-307.

Shaver, P. R., & Mikulincer, M. (2002). Attachment-related psychodynamics. *Attachment and Human Development, 4,* 133-161.

Sheppes, G., Scheibe, S., Suri, G., & Gross, J. J. (2011). Emotion-regulation choice. *Psychological Science, 22(11),* 1391-1396.

Shrout, P., E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods, 7,* 422-445.

Simpson, J. A., Rholes, W. S., & Phillips, D. (1996). Conflict in close relationships: An attachment perspective. *Journal of Personality and Social Psychology, 71*, 899-914.

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin, 129,* 216-269.

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal tendencies in emotion. *Journal of Personality and Social Psychology, 48,* 813- 838.

Spangler, G. & Grossmann, K.E. (1993). Biobehavioral organization in securely and insecurely attached infants. *Child Development, 64*, 1439-1450.

Spangler, G., & Zimmermann, P. (1999). Attachment representation and emotion regulation in adolescents: A psychological perspective on internal working models. *Attachment and Human Development, 1,* 270-290.

Sroufe, L. A., Egeland, B., Carlson, E., & Collins, W. A. (2005). *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood.* New York: Guilford Publications.

Sroufe, L. A., & Waters, E. (1977a). Heart rate as a convergent measure in clinical and developmental research. *Merrill-Palmer Quarterly, 23*, 3-27.

Sroufe, L. A., & Waters, E. (1977b). Attachment as an organizational construct. *Child Development, 48*, 1184-1199.

Tice, D. M., & Bratslavsky, E. & Baumeister, R. F. (2001). Emotional distress regulation takes precedence over impulse control: If you feel bad, do it! *Journal of Personality and Social Psychology, 80*, 53-67

Tiffany, S. T. (1990). A cognitive model of drug urges and drug-use behavior: Role of automatic and nonautomatic processes. *Psychological Review, 97,* 147-168.

Thayer, R. E. (1989). *The biopsychology of mood and arousal.* New York: Oxford University Press.

Troy, A. S., Shallcross, A. J., & Mauss, I. B. (2013). A person-by-situation approach to emotion regulation: Cognitive reappraisal can either help or hurt, depending on the context. *Psychological Science, 24 (12)*, 2505-2514

Troy, A. S., Wilhelm, F. H., Shallcross, A. J., & Mauss, I. B. (2010). Seeing the silver lining: Cognitive reappraisal ability moderates the relationship between stress and depressive symptoms. *Emotion, 10,* 783-795.

Vohs, K. D., & Heatherton, T. (2000). Self-regulatory failure: A resource depletion approach. *Psychological Science, 11*, 249-254.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070.

Webb, T. L., Miles, E., & Sheeran, P. (2012). Dealing with feeling: A meta-analysis of the effectiveness of strategies derived from the process model of emotion regulation. *Psychological Bulletin, 138,* 775-808.

Webb, M. S., Simmons, V. N., Brandon, T. H. (2005). Tailored interventions for motivating smoking cessation: Using placebo tailoring to examine the influence of expectancies and personalization. *Health Psychology, 24*, 179-188.

Weinfield, N.S., Sroufe, L.A., & Egeland, B. (2000). Attachment from infancy to early adulthood in a high-risk sample: Continuity, discontinuity, and their correlates. *Child Development, 71,* 695–702.

Zimmerman, P., Maier, M. A., Winter, M., & Grossman, K. E. (2001). Attachment and adolescents' emotion regulation during a joint problem-solving task with a friend. *International Journal of Behavioral Development, 25*, 331-343.

Appendix A

Emotion Regulation Questionnaire (Gross & John, 2003)

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions.

The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave.

Although some of the following questions may seem similar to one another, they differ in important ways.

<u>So, please read each question carefully before responding.</u>

1	2	3	4	5	6	7
I strongly disagree			Neutral			I strongly agree

Cognitive Reappraisal (6 items):

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

Suppression (4 items):

7. I keep my emotions to myself.
8. I control my emotions by not expressing them.
9. When I am feeling positive emotions, I am careful not to express them.
10. When I am feeling negative emotions, I make sure not to express them.

Appendix B

Difficulties with Emotion Regulation Scale (Gratz & Roemer, 2004)

Please indicate how often these statements apply to you in general.

1	2	3	4	5
Almost never	Sometimes	About half the time	Most of the time	Almost always

Non-acceptance of Emotional Responses (6 items):

1. When I'm upset, I feel guilty for feeling that way
2. When I'm upset, I feel ashamed with myself for feeling that way.
3. When I'm upset, I feel like I am weak
4. I become irritated with myself for feeling that way
5. When I'm upset, I become embarrassed for feeling that way.
6. When I'm upset, I become angry with myself for feeling that way

Difficulty Engaging in Goal Directed Behavior (5 items):

7. When I'm upset, I have difficulty concentrating.
8. When I'm upset, I have difficulty focusing on other things.
9. When I'm upset, I have difficulty getting work done.
10. When I'm upset, I have difficulty thinking about anything else.
11. When I'm upset, I can still get things done.(R)

Impulse Control Difficulties (6 items):

12. When I'm upset, I lose control over my behaviors.
13. When I'm upset, I have difficulty controlling my behaviors.
14. When I'm upset, I become out of control.
15. When I'm upset, I feel out of control.
16. I experience my emotions as overwhelming and out of control.
17. When I'm upset, I feel like I can remain in control of my behaviors.(R)

Lack of Emotional Awareness (6 items, all reverse coded):

18. I am attentive to my feelings.
19. I pay attention to how I feel.
20. When I'm upset, I acknowledge my emotions.
21. When I'm upset, I believe that my feelings are valid and important.
22. I care about what I am feeling.
23. When I'm upset, I take time to figure out what I'm really feeling.

Limited Access to Emotion-Regulation Strategies (8 items):

24. When I'm upset, I believe that I'll end up feeling very depressed.
25. When I'm upset, I believe that I will remain that way for a long time.
26. When I'm upset, I believe that wallowing in it is all I can do.
27. When I'm upset, it takes me a long time to feel better.
28. When I'm upset, I believe that there is nothing I can do to make myself feel better.(R)
29. When I'm upset, I know that I can find a way to eventually feel better.
30. When I'm upset, my emotions feel overwhelming.
31. When I'm upset, I start to feel very bad about myself.

Lack of Emotional Clarity (5 items):

32. I have difficulty making sense out of my feelings.
33. I have no idea how I am feeling.
34. I am confused about how I feel.
35. I know exactly how I am feeling.(R)
36. I am clear about my feelings.(R)

Note. (R) denotes reverse-coded items.

Appendix C

Adult Attachment Questionnaire (Simpson, Rholes, & Phillips, 1996)

Please indicate how you typically feel toward romantic (dating) partners in general. Keep in mind that there are no right or wrong answers. Use the 7-point scale provided below and select the appropriate response for each item.

1	2	3	4	5	6	7
I strongly disagree						I strongly agree

Anxiety (9 items):

1. Others often want me to be more intimate than I feel comfortable being. (R)
2. Others often are reluctant to get as close as I would like.
3. I often worry that my partner(s) don't really love me.
4. I rarely worry about my partner(s) leaving me. (R)
5. I often want to merge completely with others, and this desire sometimes scares them away.
6. I'm confident others would never hurt me by suddenly ending our relationship. (R)
7. I usually want more closeness and intimacy than others do.
8. The thought of being left by others rarely enters my mind. (R)
9. I'm confident that my partner(s) love me just as much as I love them. (R)

Avoidance (8 items):

10. I find it relatively easy to get close to others.(R)
11. I'm not very comfortable having to depend on other people.
12. I'm comfortable having others depend on me. (R)
13. I rarely worry about being abandoned by others. (R)
14. I don't like people getting too close to me.
15. I'm somewhat uncomfortable being too close to others.
16. I find it difficult to trust others completely.
17. I'm nervous whenever anyone gets too close to me.

Note. (R) denotes reverse-coded items.

Appendix D

Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988)

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then select the appropriate answer. Indicate to what extent you feel this way right now.

1	2	3	4	5
Very Slightly or not at all	A little	Moderately	Quite a bit	Extremely

1. Interested
2. Distressed
3. Excited
4. Upset
5. Strong
6. Sad*
7. Guilty
8. Scared
9. Hostile
10. Enthusiastic
11. Proud
12. Irritable
13. Alert
14. Ashamed
15. Inspired
16. Nervous
17. Downhearted*
18. Determined
19. Blue*
20. Attentive
21. Jittery
22. Active
23. Afraid

Note. * denotes added items.

Appendix E

Emotion-Regulation Instructions (modeled after Gross, 1998b).

Suppression Condition

You will now be shown a short film clip. It is important that you watch the film clip carefully, but if you find the film too distressing, just say “stop”. If you have any feelings or thoughts as you watch the film clip, please try your best not to let those feelings show. In other words, as you watch the film clip, try to behave in such a way that a person watching you would not know you are feeling anything. Watch the film carefully, but please try to suppress any reactions you may have so that someone watching would not know that you are feeling anything.

Cognitive Reappraisal Condition

You will now be shown a short film clip. It is important that you watch the film clip carefully, but if you find the film too distressing, just say “stop”. If you have any feelings or thoughts as you watch the film clip, please try your best to remind yourself that it is not real by focusing on the technical aspects of the events you observe or reminding yourself that you are watching a scene from a fictional movie with paid actor. Watch the film clip carefully, but please try to think about what you are seeing in such a way that you don’t feel anything at all.

Control Condition

You will now be shown a short film clip. It is important that you watch the film clip carefully, but if you find the film too distressing, just say “stop”.

Appendix F

Manipulation Check Items

1. Overall, how much control did you feel you had over your emotions (how you felt) during the film clip?

0 --------- 1 --------- 2 --------- 3 --------- 4 --------- 5 --------- 6 --------- 7 --------- 8
No control Complete control

2. Overall, how much control did you feel you had over your emotional expressions (facial expressions or what you looked like) during the film clip?

0 --------- 1 --------- 2 --------- 3 --------- 4 --------- 5 --------- 6 --------- 7 --------- 8
No control Complete control

3. During the film, I reacted completely spontaneously.

0 --------- 1 --------- 2 --------- 3 --------- 4 --------- 5 --------- 6 --------- 7 --------- 8
Strongly disagree Strongly agree

4. To what extent did you suppress your reactions or try not to show how you felt?

0 --------- 1 --------- 2 --------- 3 --------- 4 --------- 5 --------- 6 --------- 7 --------- 8
not at all extremely

5. To what extent did you view the film objectively and remain emotionally detached?

0 --------- 1 --------- 2 --------- 3 --------- 4 --------- 5 --------- 6 --------- 7 --------- 8
not at all extremely

6. To what extent did you remind yourself that it was not real, that it was a scene from a fictional movie with paid actors?

0 --------- 1 --------- 2 --------- 3 --------- 4 --------- 5 --------- 6 --------- 7 --------- 8
not at all extremely

7. To what extent did you just notice and observe your reactions, accepting whatever you experienced?

0 --------- 1 --------- 2 --------- 3 --------- 4 --------- 5 --------- 6 --------- 7 --------- 8
not at all extremely

Footnotes

[1]The online survey data from 5 additional participants was discarded because they failed to complete all of the questions on the online survey (i.e., exited the survey early).

[2]The self-reported emotion responses from one participant was discarded because he/she answered “no response” to all of the pre and post state emotion questions. This individual’s online survey responses and coded facial expression data was retained.

[3]Electrodes are attached to the non-dominant hand to allow participants to control the computer mouse with their right hands. However, most left-handed participants opted to have the electrodes attached to their left hands because they typically use their right hands to control the computer mouse. These participants were allowed to unclip the leads connected to the electrodes on their left hand in order to complete the manipulation check, which was administered using a paper and pencil survey.

[4] This measure was not relevant to the focal aims of the dissertation and will not be addressed in the current report.

[5]Participants were not asked about the quantity of their tobacco use (i.e., number of cigarettes per day), so it was not possible to create an overall tobacco use variable.