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By Amanda Marie Shea

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Is approved by the final examining committee:

Kevin Rand, Ph.D.
Chair

Jesse Stewart, Ph.D.

Melissa Cyders, Ph.D.

Leslie Ashburn-Nardo, Ph.D.

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Approved by Major Professor(s): Kevin Rand, Ph.D.

Approved by: Nicholas Grahame 10/28/2013
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ATTACHMENT AVOIDANCE AND DEPRESSIVE SYMPTOMS: A TEST OF MODERATION BY COGNITIVE ABILITIES

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For Bella, always my inspiration.

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ABSTRACT

Shea, Amanda Marie. Ph.D., Purdue University, December 2013. Attachment Avoidance and Depressive Symptoms: A Test of Moderation by Cognitive Abilities. Major Professor: Kevin L. Rand.

The substantial interpersonal and economic costs of depression make it imperative to better understand the predictors and moderators of depressive symptoms. The ability to use social support protects people from depressive symptoms, but individuals high in attachment avoidance tend not to use others as sources of support. Research has found that attachment avoidance is related to depressive symptoms in some samples but not in others (Mikulincer & Shaver, 2007; Shea, 2011). Thus, there appear to be factors that moderate the relationship between attachment avoidance and depressive symptoms. The present study examined if cognitive abilities that facilitate effective emotion regulation strategies moderate the relationship between attachment avoidance and depressive symptoms. Using a sample of college students, attachment avoidance, cognitive abilities, depressive symptoms, and other indices of psychological distress and well-being were measured and examined for evidence of moderation via hierarchical linear regression. The hypothesis that cognitive abilities moderate the relationship between attachment avoidance and depressive symptoms was not supported ($\Delta R^2 = 0.02$, $p = .68$). Factors contributing to the null findings are discussed and conceptual and methodological suggestions are offered for future research.

INTRODUCTION

Depression is prevalent in the general population and has significant negative outcomes for those with depression, their loved ones, and society. The lifetime prevalence of major depression is between 4.6%-16.2% (Richards, 2011). Depression has been linked to a variety of other mental health problems, such as Posttraumatic Stress Disorder (PTSD) and other anxiety disorders (Brown, Campbell, Lehman, Grisham, & Mancill, 2001), personality disorders (Reichborn-Kjennerud et al., 2010), and substance use disorders (Fergusson, Boden, & Horwood, 2011). Furthermore, depression is associated with negative physical health outcomes, such as cardiovascular problems (Celano & Huffman, 2011), coronary heart disease-related death (Brown, Stewart, Stump, & Callahan, 2011), diabetes complications (Lin et al., 2009), and increased risk of obesity (Luppino et al., 2010).

The costs of depression are great. The indirect and direct financial costs of depression place a significant economic burden on society (Luppa, Heinrich, Angermeyer, Konig, & Riedel-Heller, 2007). Indeed, in the year 2000, the economic costs of depression, which included costs of healthcare, loss of workplace productivity, and suicide-related costs, were estimated to be greater than 83 billion dollars in the United States (Greenburg et al., 2003). Additionally, depression is associated with negative interpersonal costs. For example, children of depressed mothers are more likely to experience mental health problems themselves (Goodman, Connell, & Hall, 2011). Furthermore, spouses of those with depression report significant practical and emotional burdens associated with having a depressed partner (Benazon & Coyne, 2000).

Given the myriad negative outcomes associated with depression, it is important to understand the correlates of depression to aid in prevention and treatment. One important predictor of depressive symptoms is insufficient social support. Research has shown that people who perceive greater social support are less likely to be depressed (e.g., Cohen &

Willis, 1985; Grav, Hellzen, Romild, & Stordal, 2012). Alternatively, some people who do not rely on others for support do not experience high levels of depressive symptoms (Shea, 2011). Theoretically, it is important to understand what makes some people unusually undisturbed by a lack of close emotional relationships. Attachment theory, which explains the ability to use others as sources of emotional support, has been given a great deal of attention as a model for explaining the development of depressive symptoms and other types of psychopathology (Mikulincer & Shaver, 2007). The present study seeks to develop a greater understanding of factors that may moderate the relationship between attachment avoidance, an individual difference posited by attachment theory, and depressive symptoms. Understanding which individuals are at heightened risk for depressive symptoms may lead to a better allocation of prevention and intervention resources.

Attachment Theory

Attachment theory is the result of John Bowlby's (1969/1982) conception that infants form bonds with their caregivers because they depend on them for psychological and physical comfort and protection. Bowlby posited that humans have an *attachment behavioral system* that, when optimal, facilitates the maintenance of developmentally-appropriate psychological and physical proximity between the infant and his or her attachment figure. The infant uses distress signals, such as crying, to motivate caregiving behaviors in the attachment figure. The attachment behavioral system is optimized by the attachment figure's consistent and warm responses to the infant's expressions of distress (Bowlby, 1969/1982). Through this consistent responsiveness, the infant develops attachment security, the belief that others will provide him or her assistance when necessary.

The optimal attachment relationship allows an attachment figure to strike a balance between acting as a secure base and a safe haven for the child (Ainsworth, Blehar, Waters, & Wall, 1978). The secure-base function allows the child to explore his or her environment with the assurance that the attachment figure is available and supportive should he or she need support. The safe-haven function is the sense of warmth

and comfort provided by the attachment figure should the environment become threatening. Insecurity develops in children whose attachment figures are incapable or unwilling to provide warm and responsive care on a consistent basis (Ainsworth et al., 1978). Underlying attachment security and insecurity are called *internal working models* of the self and others.

Internal working models are mental representations of how people expect close others to perceive them. Internal working models also influence how people perceive themselves and others. These internal working models evolve and are maintained by interactions with attachment figures and usually are preserved through adulthood (Grossman, Grossman, & Waters, 2005). Thus, the attachment system functions in adult relationships as well (Hazan & Shaver, 1987). Research has shown that adults, like infants and children, seek support from attachment figures when they encounter situations that elicit distress (Hazan & Zeifman, 1999). Although they are relatively stable, attachment styles can change in some circumstances. Secure individuals can develop attachment insecurity after an experience of attachment-related trauma, such as abuse, neglect, or attachment figure death (e.g., Sternberg, Lamb, Guterman, Abbott, & Dawud-Noursi, 2005). Yet, there is also evidence that the promotion of attachment security in insecure individuals is possible through therapy (Zuroff & Blatt, 2006), relationships with secure individuals (Volling, Nataro, & Larsen, 1998), and, in the short-term, via laboratory interventions, such as the priming of attachment security (Mikulincer, Herschberger, Nachmias, & Gillath, 2001).

Attachment Security

Although attachment is conceptualized as a fundamental human need, there are variations in individuals' styles of attachment, which arise from different internal working models. At the most basic distinction, people may be securely or insecurely attached. Securely-attached individuals are comfortable relying on close others in times of need but do not need to do so excessively (Ainsworth et al., 1978). Attachment security is initiated and sustained by sensitive and positive interactions with an attachment figure (Mikulincer & Shaver, 2007). These experiences teach individuals that

other people may be relied on as sources of support and care, which is evident in secure individuals' abilities to effectively regulate their emotions via the support of their attachment figures. Despite their comfort in turning to attachment figures for emotional support, secure individuals do not excessively seek the assistance of others because, through their interactions with attachment figures, they have learned that they are capable and competent in managing minor stressors. It is thought that children incorporate their positive concepts of their attachment figures into their own self-concepts, which allows them, as adults, to derive strength during adversity despite the physical absence of attachment figures (Bowlby, 1969/1982). For secure individuals, these internalized representations provide secure-base and safe-haven functions, allowing them to balance needs for exploration and safety. Secure individuals, in a sense, carry with them mental representations of safety and confidence that they and others are essentially good. Thus, attachment figures need not be present; secure individuals are able to relieve distress by simply imagining their attachment figures (Solomon, Ginzburg, Mikulincer, Neria, & Ohry, 1998). When significant stressors arise, however, they can use attachment figures to help them to regulate their emotions.

Adaptive and effective emotion-regulation abilities provide a wealth of psychological benefits to secure individuals. Secure individuals experience significantly lower rates of psychopathology than insecure individuals (Mickelson, Kessler, & Shaver, 1997; Mikulincer & Shaver, 2007). In addition to their aforementioned adaptive coping styles, secure individuals have high self-esteem and high perceptions of self-efficacy. These internal resources allow securely-attached people to effectively cope, even in dire situations (Bonanno et al., 2002). For example, securely-attached ex-prisoners-of-war reported being less psychologically distressed during imprisonment via the utilization of adaptive coping behaviors, such as imagining supportive encounters with loved ones (Solomon et al., 1998). Experimental studies have also found resilience in secure individuals. For example, Mikulincer and Shaver (2004) gave participants negative performance feedback on various cognitive tasks. Following the failure manipulation, secure individuals reported lower levels of psychological distress than their insecure counterparts. Therefore, attachment security seems to provide a buffer against life's

stressors and reduces the likelihood of experiencing depressive symptoms (Mikulincer & Shaver, 2007). In contrast, attachment insecurity has been empirically linked to depressive symptoms (e.g., Morganska, Gallagher, & Miranda, 2013).

Attachment Insecurity

Bowlby (1980) argued that the absence of a warm and reliable attachment figure due to parental insensitivity, death, illness, neglect, or abuse leads to attachment insecurity. Attachment insecurity, however, is not unidimensional; it is best conceptualized in terms of two orthogonal dimensions: attachment avoidance and attachment anxiety (Brennan, Clark, & Shaver, 1998). Insecurity is defined as being high on attachment anxiety and/or attachment avoidance.

Attachment anxiety is characterized by a heightened activation of the attachment system and excessive dependency on attachment figures (Hazan & Shaver, 1987). Anxiously-attached people have negative internal working models of the self. That is, they have a fundamental sense of being unlovable and ineffective. People high in attachment anxiety are highly expressive of negative affectivity and frequently seek to be near attachment figures. Thus, people high in attachment anxiety have highly-activated attachment systems. Alternatively, *attachment avoidance* is characterized by the tendency to de-activate the attachment system (Fraley & Shaver, 1997). Avoidantly-attached people have negative internal working models of others; they believe that others are essentially bad. They view others as being untrustworthy and unable to meet their needs for security. Not surprisingly then, avoidantly-attached people tend to have difficulty tolerating emotional intimacy (Brennan et al., 1998). Instead, avoidantly-attached people prefer to be highly autonomous and find discomfort in turning to others for support (Bartholomew, 1990).

Styles of insecurity (i.e., anxious vs. avoidant) develop as a result of particular parenting practices. Attachment anxiety arises when the attachment figure is inconsistent in his or her availability or warmth (Ainsworth et al., 1978; Hazan & Shaver, 1987). This variable schedule of reinforcement of attachment needs promotes clinginess and vigilance toward the attachment figure. The anxiously-attached infant learns that prolonged

expression of distress eventually may elicit attention from an inconsistent caregiver. Alternatively, avoidant individuals are thought to have had attachment figures that consistently failed to provide warmth and protection. Avoidant individuals learned that expressing distress and asking for support are futile because past attachment figures did not provide effective assistance. Normal expressions of the need for attention and care from the attachment figure become extinguished. Because avoidant individuals have not learned to tolerate distress independently and cannot rely on attachment figures to aid in their emotion regulation, they attempt to suppress negative affect and avoid attending to stimuli that may elicit it. Some people may be high in both attachment anxiety and attachment avoidance and have been referred to as having a *fearful style* (Bartholomew & Horowitz, 1991). These individuals are disorganized in their responses to attachment figures, alternating between typically anxious and typically avoidant behaviors. The fearful style has been related to reported childhood experiences of trauma and abuse (e.g., Aspelmeier, Elliott, & Smith, 2007) and has been found to be common in people with borderline personality disorder (Levy, 2005). Attachment anxiety, attachment avoidance, and their combination have been associated with negative psychological outcomes (e.g., Morganska et al., 2013).

Attachment Insecurity and Depressive Symptoms

Attachment insecurity has been associated with psychological distress, including various forms of psychopathology. Insecure individuals have more depressive symptoms, more anxiety, lower self-esteem, lower self-efficacy, more hopelessness, and are more likely to employ maladaptive coping behaviors (Burnette, Davis, Green, Worthington, & Bradfield, 2009; Mikulincer & Shaver, 2007; Shaver, Schachner, & Mikulincer, 2005). Furthermore, insecure individuals report greater suicidal ideation compared to secure individuals, and this relationship appears to be mediated by depressive symptoms (DiFilippo & Overholser, 2000).

Attachment Anxiety and Depressive Symptoms

People high in attachment anxiety attempt to elicit attention and support from attachment figures, even in low-stress situations, by heightening the expression of their distress (Lopez, Mauricio, Gormley, Simko, & Berger, 2001). Unfortunately, the hyperactivation of the attachment system in order to cope with distress appears to increase the frequency, intensity, and duration of distress. There is robust relationship between attachment anxiety and depressive symptoms in a variety of populations, including both outpatients and inpatients being treated for clinical depression, college students, married couples, new parents, postpartum mothers, HIV-positive patients, and caregivers of children with chronic pain (e.g., Besser, Priel, & Wiznitzer, 2002; Burnette et al., 2009; Carmichael & Reis, 2005; Ciesla, Roberts, & Hewitt, 2004; Mikulincer & Shaver, 2007; Simpson, Rholes, Campbell, Tran, & Wilson, 2003; Wei, Heppner, & Mallinckrodt, 2003; Whiffen, 2005; Williamson, Waters, & Shaffer, 2002). Less understood, however, is the relationship between attachment avoidance and depressive symptoms and the possible moderators of this relationship.

Attachment Avoidance and Depressive Symptoms

Researchers have examined the relationship between attachment avoidance and depressive symptoms, but the results are inconsistent. Many researchers have found a significant positive relationship between attachment avoidance and depressive symptoms (e.g., Berlin et al., 2011; Cantazaro & Wei, 2010; Carnelley, Pietromonaco, & Jaffe, 1994; Difilippo & Overholser, 2002; Duggan, Berlin, Cassidy, Burrell, & Tandon, 2009; Lo et al., 2010; McMahon, Barnett, Kowalenko, & Tennant, 2005; Shorey, Snyder, Yang, & Lewin, 2003; Sutin & Gillath, 2009; Wei & Ku, 2007). Others, however, have found that higher attachment avoidance is related to *fewer* depressive symptoms (e.g., McBride, Zuroff, Bacchiochi, & Bagby, 2006; Sochos & Tsalta, 2008; Treboux, Crowell, & Waters, 2004). There are also several studies that have found no significant relationship between attachment avoidance and depressive symptoms (e.g., Besser & Priel, 2005; Ciesla et al., 2004; Permuy, Merino, & Fernandez-Rey, 2010; Wei, Russell, & Zakalik, 2005; Wilkinson & Mulcahy, 2010). This finding may be due to an actual absence of

association. Alternatively, the inconsistent findings suggest that there may be important moderators of the relationship between attachment avoidance and depressive symptoms.

In attempting to understand the inconsistent findings, I conducted a meta-analysis of the relationship between attachment avoidance and depressive symptoms (Shea, 2011). This random-effects analysis revealed a significant, medium, mean point-estimate effect of .258 (95% CI: .220-.296) between attachment avoidance and depressive symptoms. The effect sizes of the included studies were significantly heterogeneous. The majority of the studies reported positive effects of the relationship between attachment avoidance and depressive symptoms. Several studies, however, reported null or negative results. I attempted to account for this heterogeneity via several factors, including attachment anxiety, gender, significant life stressors, and study design features. None of these factors moderated the association between attachment avoidance and depressive symptoms.

Thus, it is necessary to further explore factors that may lead to divergent findings regarding the relationship between attachment avoidance and depressive symptoms. In addition, the directionality of the relationship between attachment avoidance and depressive symptoms remains unclear. That is, it may be that people experiencing depressive symptoms report higher rates of attachment avoidance due to mood effects. Although studies with longitudinal designs did not have significantly lower weighted effect sizes compared to cross-sectional studies, there were fewer longitudinal studies, which may have left the comparison underpowered to detect differences (Shea, 2011).

Bowlby (1969/1982) proffered attachment theory as an explanation of psychopathology, rather than an outcome of psychopathology. It is conceivable, however, that prolonged psychopathology can influence the attachment system, leading to attachment avoidance (Mikulincer & Shaver, 2007). That is, the relationship between attachment avoidance and depressive symptoms may be bidirectional. For example, experiencing a depressive episode, a securely-attached individual may reach out to his or her attachment figure at greater frequency than during times of stable mood, which could lead to expressions of annoyance by the attachment figure. Should the depressed individual perceive that his or her attachment figure is consistently unresponsive or cold, attachment avoidance may develop.

In the short-term, however, mood-related effects do not seem to influence the reporting of individual differences in attachment style. For example, Haaga and colleagues (Haaga et al., 2002) manipulated affect and found that attachment styles were stable and not artifacts of current mood state. Furthermore, other researchers have found that neuroticism, or general negative affectivity, cannot fully account for the relationship between attachment avoidance and depressive symptoms (Safford, Alloy, Crossfield, Morocco, & Wang, 2004).

Attachment Avoidance and Emotion Regulation

Avoidant individuals' emotion-regulation tendencies may explain some of the divergence in findings on the relationship between attachment avoidance and depressive symptoms. One widely-studied model of emotion regulation is Gross' process model (Gross, 1998; Gross, 2001). In this temporal model, people can influence their emotions through situation selection, situation modification, attentional deployment (e.g., cognitive control, distraction), cognitive change (e.g., reappraisal), and response modulation (e.g., suppression). Researchers have found that attachment avoidance is related to the response modulation strategy of suppression and attentional deployment strategies, such as cognitive control (e.g., Caldwell & Shaver, 2012; Fraley & Shaver, 1997).

Certain avoidant people may be able to employ emotion-regulation strategies (e.g., suppression) more effectively than others. In order to minimize the activation of the attachment system, which in the past has resulted in disappointment, avoidant people attempt to suppress their experience and expression of negative thoughts and emotions (Caldwell & Shaver, 2012; Edelstein & Gillath, 2008; Fraley & Shaver, 1997). Because of this tendency to suppress negative thoughts and emotions, avoidant individuals may not experience depressive symptoms in some situations. However, this suppression seems to require cognitive resources (Edelstein & Gillath, 2008); therefore, when cognitive resources are unavailable, depressive symptoms may emerge. Indeed, research suggests that the use of suppression as an emotion regulation technique may be related to greater depressive symptoms (e.g., Gross & John, 2003). Depressive symptoms are likely related to suppression of negative thoughts because suppression can result in an "ironic rebound"

of the very thoughts that are suppressed (Beevers, Wenzlaff, Hayes, & Scott, 1999). Nonetheless, some studies have not found suppression to be related to depressive symptoms (e.g., Kelly & Kahn, 1994), which may be due to individual differences in the efficacy of suppression. Certain cognitive abilities may aid effective suppression. For example, one study found that the ability to effectively suppress negative thoughts is related to better working memory and greater fluid intelligence (Brewin & Beaton, 2002).

Avoidant individuals may be adept in suppressing negative thoughts and feelings. With adequate cognitive resources, avoidant individuals seem better able to exclude negative information from their awareness. For example, Fraley and Shaver (1997) asked participants to suppress thoughts about a painful event from their awareness. They found that avoidant individuals were able to accomplish this defensive exclusion. Moreover, during the suppression, positive self-traits of avoidant individuals became more accessible. Thus, rather than thinking about a painful event, the avoidant individual is able to suppress negativity and experience greater cognitive access to his or her own strengths. However, when researchers asked avoidant individuals to remember a 7-digit number, thereby applying cognitive load, the ability to suppress unpleasant thoughts and increase awareness of the positive aspects of the self deteriorated. Avoidant individuals also employ other emotion regulation strategies to avoid negative affect, but, like suppression, these abilities may be attenuated under instances of cognitive load.

Avoidant individuals have been found to avoid attending to information that may activate the attachment system (Gillath, Giesbrecht, & Shaver, 2009; Mikulincer, Dolev, & Shaver, 2004). This attentional deployment emotion regulation strategy is evident even when the effects of neuroticism, anxiety, behavioral inhibition, and behavior activation are controlled for. In one study, researchers asked those high and low in attachment avoidance to listen to material related to a negative attachment-related experience (Fraley, Garner, & Shaver, 2000). Participants were asked to recall details from the audio material immediately after its presentation and then, again, throughout the following three weeks. Although the forgetting curves of avoidant individuals were similar to those of nonavoidant ones, the initial recall of avoidant individuals was inferior. This finding suggests that avoidant individuals may encode fewer negative details in their

environments by averting attention away from threatening stimuli. Although this ability is well-developed and useful even in tasks unrelated to the activation of the attachment system, it appears to require cognitive control (Gillath et al., 2009). As with effective suppression, cognitive control may deteriorate during periods of high stress, leading to more depressive symptoms in avoidant individuals. Identifying the factors that increase efficacy in cognitive control may explain why some avoidant individuals experience depressive symptoms and others do not.

Emotion Regulation and Cognitive Abilities

Avoidant individuals employ suppression as a coping mechanism (Caldwell & Shaver, 2012). Suppression, however, is often ineffective and has been found to mediate the relationship between attachment avoidance and depressive symptoms (Lopez et al., 2001; Wei, Heppner, Russell, & Young, 2006). This finding may be due to depressed individuals' tendency to suppress a negative thought by replacing it with a new negative thought (Wenzlaff, Wegner, & Roper, 1988). However, suppression has not been consistently linked to depressive symptoms (Lopez et al., 2001). Examples presented above illustrate that avoidant individuals' emotion-regulation strategies may be contingent upon their abilities that facilitate the control of thoughts and emotions. Individual differences in cognitive abilities may specifically influence the effectiveness of emotion-regulation strategies. Basic related cognitive abilities that facilitate these coping skills, including cognitive control, working memory and short-term memory span, may moderate the relationship between attachment avoidance and depressive symptoms.

Cognitive Control

Cognitive control, also referred to in the literature as attentional or mental control, has been found to influence emotion-regulation abilities (Rueda, Posner, & Rothbart, 2011). *Cognitive control* is the ability to focus on goal-relevant information and exclude non-relevant information that may compete for the individual's attention. Cognitive control may aid in effective emotion regulation (i.e., suppression, diversion of attention from negative information) for avoidant individuals.

Avoidant individuals, having a goal of excluding negative thoughts and emotions, may be more successful in reaching their goals when their ability to allocate attention is better controlled. There is some evidence that cognitive control is moderately related to attachment avoidance. Gillath and colleagues (2009) found that avoidant individuals are generally better able to avoid being distracted by goal-irrelevant information. Other research, however, has not found avoidant individuals to be superior in allocating attention away from stimuli (Dewitte, De Houwer, Koster, & Buysse, 2007). This difference in findings may be due to be differences in ability to exert cognitive control, despite motivation to avoid certain stimuli. Avoidant individuals with better cognitive control may use it to exclude negative thoughts from awareness and avoid further negative thoughts and feelings. Alternatively, avoidant individuals with poor cognitive control may be unable to direct their attention away from stimuli, despite motivation to do so.

There is also evidence that the ability to exercise cognitive control is related to working memory (Heitz, Unsworth, & Engle, 2005). That is, in order to focus cognitions on goal-relevant information to the exclusion of goal-irrelevant information, individuals must keep the goal in working memory. Additionally, because cognitive control requires behavioral responses to assess, individuals must also keep the appropriate behavioral responses to various stimuli in working memory.

Working Memory

Working memory is the ability to engage in active manipulation of information while holding additional information in memory (Hofmann, Friese, Schmeichel, & Baddeley, 2011). Tasks requiring individuals to hold information in memory while simultaneously manipulating the information can provide indices of working memory. In addition to having to remember information and manipulate that information, individuals must maintain the goal of the manipulation task in awareness. Working memory may be used in maintaining awareness of goal-relevant information in everyday tasks as well (Hofmann et al., 2011). Avoidant individuals have an overarching goal of evading emotional intimacy with others and avoiding negative affectivity. However, studies have

found that when working memory is taxed, goal-relevant information is necessarily excluded (Kavanagh, Andrade, & May, 2005). When this occurs, top-down influences (e.g., attention allocation and activation of biases; Miller & Cohen, 2001) of individuals' goals for emotion regulation may be hampered.

In addition to allowing people to retain goal-relevant information in awareness, the ability to effectively manipulate the contents of working memory appears to aid in specific emotion regulation strategies. Working memory can be used to focus away from distressing information, such as in suppression and distraction, thereby inhibiting the intensity and experience of negative affectivity (Hofmann et al., 2011; Van Dillen & Koole, 2007). Nevertheless, suppression of thoughts and emotional experience is highly taxing (Vohs & Heatherton, 2000). People with better working memory have greater resources at their disposal, which may lead to greater efficacy in suppression. Indeed, researchers have found that those with better working memories are more skillful in their ability to suppress negative thoughts and emotions after exposure to distressing stimuli (Geraerts, Merckelbach, Jelicic, & Habets, 2007; Schmeichel, Volokhov, & Demaree, 2008). Higher working memory capacity may be of even greater importance for avoidant individuals compared to less avoidant individuals, because avoidant individuals do not employ social coping skills (e.g., joint problem-solving). Thus, for the avoidant individual, better working memory may aid in effective emotion regulation, facilitating avoidance of depressive symptoms.

Short-term Memory Span

Cognitive control and working memory require the more basic ability of holding information in short-term memory. Short-term memory is limited, and people vary in the amount of information that they can hold in their short-term memories. This individual difference is called *short-term memory span*. Short-term memory span refers to the number of bits of information that an individual is able to keep in memory for a brief period of time. The greater the short-term memory span, the greater the amount of information that can be held. Cognitive control and working memory require individuals to hold pieces of information in memory in addition to being able to manipulate the

information. However, short-term memory span may account for any moderation between attachment avoidance and cognitive control and working memory. As discussed above, previous research has found that the ability-y of avoidant individuals to effectively avoid negative thoughts deteriorates when they are asked to remember a 7-digit number (Fraley & Shaver, 1997). Thus, simply having a larger short-term memory span may buffer against depressive symptoms among avoidant individuals.

Attachment Avoidance and Secondary Outcomes of Interest

Psychological Distress

The main objective of this project was to examine the potential cognitive moderators of the relationship between attachment avoidance and depressive symptoms. Of secondary interest, however, was the relationship between attachment avoidance and other related indicators of psychological distress, such as anxiety symptoms, anger, and negative affect. A recent narrative review of the relationship between attachment avoidance and neuroticism, or the tendency to experience negative affectivity, revealed that only two-thirds of the studies reviewed reported a significant positive relationship (Mikulincer & Shaver, 2007). As with depressive symptoms, the relationship between attachment avoidance and negative affect may be moderated by cognitive factors, such as cognitive control, working memory, and short-term memory span.

Anxiety Symptoms

As with depressive symptoms and general negative affect, attachment avoidance has been inconsistently associated with anxiety symptoms. In their review of the extant published studies, Mikulincer and Shaver (2007) found that less than two-thirds of studies reported significant, positive relationships between attachment avoidance and anxiety symptoms. The remaining studies reported nonsignificant associations between attachment avoidance and anxiety symptoms. As with depressive symptoms, cognitive factors may moderate the relationship between attachment avoidance and anxiety symptoms.

Anger

Bowlby described anger as a central reaction to unmet attachment needs (Bowlby, 1973). Despite its theoretical importance to attachment theory, the relationship between attachment avoidance and anger in adults has received relatively less attention compared to depressive and anxiety symptoms. Findings regarding the association between attachment avoidance and anger have been inconsistent. In one study of clinically depressed men, attachment avoidance was moderately related to anger (Troisi & D'Argenio, 2004). In another study that sampled people with borderline personality disorder, however, there was no relationship between attachment avoidance and anger (Critchfield, Levy, Clarkin, & Kernberg, 2008). Likewise, Consedine and Magai (2003) found no relationship between attachment avoidance and anger in a geriatric population. Mikulincer (1998) conducted a series of studies to explore the relationship between attachment styles and facets of anger. He found that avoidant individuals did not report greater anger compared to secure individuals, but they did show greater physiological arousal (i.e., increased heart rate) and attributed greater hostility toward others in neutral contexts. It was unclear from the design of these studies whether the physiological arousal can be attributed to suppressed anger or anxiety as a result of their perception of hostility in others. Additional research examining the possible association between attachment avoidance and anger and its possible moderation by cognitive factors is warranted.

Subjective Well-being

An additional secondary aim of this project is to examine the possible moderators of the relationship of attachment avoidance and subjective well-being. Subjective well-being is the experience of general life satisfaction and positive affect, and as such, it is more than the mere absence of negative affect or depressive symptoms (Diener, 1984; Diener, Suh, Lucas, & Smith, 1999). Indeed, research has revealed separate underlying biological mechanisms for negative versus positive affect (Cacioppo, Gardner, & Berntson, 1999). In addition to positive affectivity, subjective well-being comprises cognitions. Specifically, appraisal of the quality of one's life, or satisfaction with life, is

an important facet of subjective well-being (Diener, 2000). Although there is a wide body of research linking social connectedness and perceptions of belonging to positive affect and satisfaction with life (Ryan & Deci, 2001), there has been less exploration of the relationship between attachment avoidance and positive factors. Studies examining positive factors have linked greater attachment avoidance to less positive affect (Shorey et al., 2003) and less satisfaction with life (Hinnen, Sanderman, & Sprangers, 2009). The relationship between attachment avoidance and positive factors has received far less attention than the relationship between attachment avoidance and negative factors (i.e., depressive symptoms, negative affect, and anxiety symptoms). Therefore, replication of the few previous findings is needed. Additionally, exploration of possible cognitive moderators of the relationship between attachment avoidance and positive factors is warranted.

Research Questions

Primary Research Questions

Do cognitive variables, such as cognitive control, working memory, or short-term memory span, moderate the relationship between attachment avoidance and depressive symptoms? Do the interactions between attachment avoidance and cognitive control, working memory, and memory span explain unique variance in change in depressive symptoms while controlling for other facets of intelligence?

Secondary Research Questions

Do cognitive variables, such as cognitive control, working memory, or short-term memory span, moderate the relationship between attachment avoidance and negative affect, anxiety symptoms, and anger? Do the interactions between attachment avoidance and cognitive control, working memory, and memory span explain unique variance in change in these negative states while controlling for other facets of intelligence?

Are the previous findings linking greater attachment avoidance to lower levels of subjective well-being (i.e., positive affect and life satisfaction) replicable? If so, do

cognitive variables, such as cognitive control, working memory, or short-term memory span, moderate the relationship between attachment avoidance and the reduction of subjective well-being? Do the interactions between attachment avoidance and cognitive control, working memory, and memory span uniquely explain changes in subjective well-being while controlling for other facets of intelligence?

Hypotheses

Primary Hypotheses

I hypothesized that cognitive abilities would moderate the relationship between attachment avoidance and change in depressive symptoms. That is, I predicted that avoidant individuals with greater cognitive control, better working memory, and greater short-term memory span would have fewer depressive symptoms at Time 2 while controlling for Time 1 depressive symptoms. I hypothesized that these specific cognitive abilities would account for unique variance in the relationship between attachment avoidance and changes in depressive symptoms, controlling for other facets of intelligence.

Hypothesis 1: I predicted that the cognitive variables, cognitive control, working memory, and short-term memory span, would moderate the relationship between attachment avoidance and depressive symptoms when controlling for the effects of previous depressive symptoms and other facets of intelligence.

Hypothesis 1a: I predicted that greater cognitive control, working memory, and short-term memory span would be associated with fewer depressive symptoms at Time 2 among those with high attachment avoidance.

Secondary Hypotheses

I hypothesized that cognitive abilities would moderate the relationship between attachment avoidance and Time 2 anxiety symptoms, anger, and negative affect. In other words, I predicted that avoidant individuals with greater cognitive control, better working memory, and greater short-term memory span would have fewer anxiety symptoms and less anger or negative affect. I hypothesized that these specific cognitive abilities would

account for unique variance in the relationship between attachment avoidance and change in negative affect, state anxiety, and anger while controlling for other facets of intelligence.

Hypothesis 2: I predicted that the cognitive variables, cognitive control, working memory, and short-term memory span, would moderate the relationship between attachment avoidance and anxiety symptoms when controlling for the effects of previous anxiety symptoms and other facets of intelligence.

Hypothesis 2a: I predicted that greater cognitive control, working memory, and short-term memory span would be associated with fewer anxiety symptoms at Time 2 among those with high attachment avoidance.

Hypothesis 3: I predicted that the cognitive variables, cognitive control, working memory, and short-term memory span, would moderate the relationship between attachment avoidance and anger when controlling for the effects of previous levels of anger and other facets of intelligence.

Hypothesis 3a: I predicted that greater cognitive control, working memory, and short-term memory span would be associated with less anger at Time 2 among those with high attachment avoidance.

Hypothesis 4: I predicted that the cognitive variables, cognitive control, working memory, and short-term memory span, would moderate the relationship between attachment avoidance and negative affect when controlling for the effects of previous negative affect and other facets of intelligence.

Hypothesis 4a: I predicted that greater cognitive control, working memory, and short-term memory span would be associated with less negative affect at Time 2 among those with high attachment avoidance.

I expected to replicate previous findings revealing an inverse relationship between attachment avoidance and indices of subjective well-being (i.e., positive affect and satisfaction with life). I hypothesized that cognitive abilities would moderate the relationship between attachment avoidance and changes in subjective well-being. That is, I expected that avoidant individuals with greater cognitive control, working memory, and short-term memory span would have greater subjective well-being. I hypothesized that

these specific cognitive abilities would account for unique variance in the relationship between attachment avoidance and changes in subjective well-being while controlling for other facets of intelligence.

Hypothesis 5: I predicted that the cognitive variables, cognitive control, working memory, and short-term memory span, would moderate the relationship between attachment avoidance and positive affect when controlling for the effects of prior positive affect and other facets of intelligence.

Hypothesis 5a: I predicted that greater cognitive control, working memory, and short-term memory span would be associated with greater positive affect at Time 2 among those with high attachment avoidance.

Hypothesis 6: I predicted that the cognitive variables, cognitive control, working memory, and short-term memory span, would moderate the relationship between attachment avoidance and satisfaction with life when controlling for the effects of prior satisfaction with life and other facets of intelligence.

Hypothesis 6a: I predicted that greater cognitive control, working memory, and short-term memory span would be associated with higher satisfaction with life at Time 2 among those with high attachment avoidance.

METHOD

Participants

Participants were undergraduate students above 18 years of age recruited from entry-level psychology courses at Indiana University-Purdue University Indianapolis (IUPUI). Participants were awarded course credit for their participation in the Time 1 procedures. Participants who completed Time 2 were entered in a drawing to win a $50 gift certificate. The winner was notified and sent the gift certificate via email.

Procedure

Participants were recruited using Sona, a widely used, secure, web-based experiment scheduling system. They registered in Sona and could view the study description and select their Time 1 session. Participants completed the measures and tasks in a laboratory setting at Time 1. Upon entering the lab, participants were asked to read an informed consent document. Next, they completed two cognitive tasks on a computer, the Flanker and Stroop tasks. The sequence of presentation of these two tasks was counterbalanced across participants. The participants then completed five of the Wechsler Adult Intelligence Scale—Fourth Edition (WAIS-IV; Wechsler, 2008) subtests in the following order: Letter-Number Sequencing subtest, Digit Span Forward subtest, Symbol Search subtest, Matrix Reasoning subtest, and Information subtest. After completion of the cognitive measures, participants completed self-report measures on a password-protected website, SurveyMonkey. Self-report measures included attachment avoidance, attachment anxiety, depressive symptoms, anxiety symptoms, anger, negative affect, positive affect, and satisfaction with life. Following completion of the self-report measures, participants provided demographic information and their IUPUI email addresses in order to be awarded course credit. The email addresses were used to send participants the Time 2 survey link and match data from both time points.

Three months from their Time 1 sessions, participants were sent emails requesting that they complete the Time 2 self-report measures. The Time 2 survey, presented on SurveyMonkey, included the measures of depressive symptoms, negative affect, anxiety symptoms, anger, positive affect, and satisfaction with life in order to assess change in these variables. Participants again provided their IUPUI email addresses in order to match Time 1 and Time 2 data and to be entered into the drawing for the gift certificate.

Measures

Attachment Avoidance and Attachment Anxiety

Attachment avoidance and attachment anxiety were measured using the Experiences in Close Relationships Scale (ECRS; Brennan et al., 1998). This scale is a 36-item self-report measure of adult attachment style derived from a large-scale factor analysis of over 300 items, which were taken from extant self-report measures of attachment. An example of an item assessing attachment avoidance is "I find it difficult to allow myself to depend on romantic partners." An example of an item assessing attachment anxiety is "I worry about being abandoned." Participants were asked to indicate their agreement with each statement on a 7-point Likert-type scale with anchors ranging from "strongly disagree" to "strongly agree." Eighteen items were summed to determine attachment avoidance, and the remaining 18 items were summed to derive attachment anxiety. Higher scores indicate greater attachment avoidance and greater attachment anxiety. In the validation study, the two scales were designed to be orthogonal. In this study, however, the correlation between the two subscales was $r = .34$, $p < .001$. Test-retest reliability has been found to be adequate in a sample of first-year college students; after a six-month interval, the correlations between the two time points were .68 for attachment anxiety and .71 for attachment avoidance (Lopez & Gormley, 2002). The avoidance subscale of the ECRS has been found to have high internal consistency, with coefficient alphas in the .90-.93 range (Brennan et al., 1998). The internal consistency of the scale in this study consistent with previous findings ($\alpha = .92$). Additionally, evidence of the scale's validity has been found via behavioral observations

of individuals interacting with their partners. That is, people who are higher on ECRS avoidance are less likely to share emotional information with their partners and are less likely to touch their partners. The anxiety subscale has been found to have excellent internal consistency in previous research, and the Cronbach's alpha found in this study was similarly acceptable ($\alpha = .92$).

Depressive Symptoms

Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a 20-item self-report measure of depressive symptoms experienced during the past week. The scale was developed for use with the general population by examining existing measures of depressive symptoms. Based on this examination, the scale was designed to assess the following depressive symptoms: depressed mood, guilt, worthlessness, helplessness, hopelessness, psychomotor retardation, change in appetite, and sleep disturbance. Items include "I had crying spells" and "I felt sad." Respondents were asked to describe on a 4-point Likert-type scale (0-3) how frequently in the past week they experienced each symptom with anchors ranging from "rarely or none of the time" to "most or all of the time." The scale has been found to be internally reliable with Cronbach's alphas in the .85 to .90 range, and internal reliability in this study was consistent with past findings (Time 1 $\alpha = .88$; Time 2 $\alpha = .91$). Additionally, the CES-D has been found to have good validity and has been used to discriminate between non-clinical and clinical samples identified by clinician-rated scales (e.g., Hamilton Scale for Depression).

Anxiety Symptoms

Anxiety symptoms were measured using the Anxiety Subscale (AS) of the Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995b). The AS is a 14-item self-report measure of anxiety symptoms, including autonomic arousal, skeletal muscle effects, situational anxiety, and subjective anxious affect over the past week. Items included "I felt scared without any good reason" and "I experienced trembling (e.g., in the hands)." Participants were asked to respond regarding their experiences over

the past week on a 4-point Likert-type scale (0-3) with anchors ranging from "did not apply to me at all" to "applied to me very much, or most of the time." The AS has been found to have acceptable internal consistency, with a Cronbach's alpha of .89 reported in the validation sample (Lovibond & Lovibond, 1995a). Acceptable Cronbach's alphas were found in this study (Time 1 $\alpha = .75$; Time 2 $\alpha = .89$). Furthermore, the AS shows acceptable discriminative validity from measures of depressive symptoms. The AS's test-retest reliability in college students over a 3-year interval was .47, demonstrating an underlying stability in anxiety symptoms and still providing some sensitivity to change (Lovibond, 1998).

Anger

Anger was assessed using the State Anger Scale (SAS) of the State-Trait Anger Expression Inventory (STAXI; Spielberger, Jacobs, Russell, & Crane, 1983; Spielberger, 1988). The SAS is a 10-item self-report measure assessing state anger. Participants were asked to report on their experiences of anger over the past week on a 4-point Likert-type scale (1-4) with anchors ranging from "not at all" to "very much so." Items included "I felt angry" and "I felt like yelling at somebody." The scale has high internal consistency reported in the literature ($\alpha = .93$; Spielberger, 1988). In this study, acceptably high Cronbach's alphas were found (Time 1 $\alpha = .89$; Time 2 $\alpha = .93$).

Positive and Negative Affect

Positive and negative affect were measured using the brief version of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The positive affect subscale is composed of 10 items assessing the presence of positive affectivity, such as interest, excitement, strength, pride, enthusiasm, alertness, inspiration, determination, activity, and attentiveness. The negative affect subscale is a self-report measure composed of 10 items assessing general psychological distress, guilt, fear, hostility, irritability, shame, and anxiety. The PANAS has been presented with directions asking people to report on their current affect, affect during that day, the past few days, the past week, the past year, and in general. In order to mirror the directions of the CES-

D, which was of primary interest, participants were asked to report on their negative affect over the past week on a 5-point Likert-type response scale with anchors ranging from "very slightly" to "extremely." Cronbach's alphas between .85 and .87 have been reported for the various forms of the negative affect subscale, and indices of internal reliability found in this study were similar (Time 1 $\alpha = .83$; Time 2 $\alpha = .88$). Eight week test-retest reliability for the scale, using the "past week" directions was .47 in the validation study, indicating that the measure is sensitive to change. Coefficient alphas between .86 and .90 have been reported for the various forms of the positive affect subscale. Acceptable indices of internal consistency were found in the present study (Time 1 $\alpha = .86$; Time 2 $\alpha = .88$). Eight week test-retest reliability for the scale using the "past week" directions was .47 in the validation study, indicating that the measure is sensitive to change.

Satisfaction with Life

Satisfaction with life was measured using the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, Griffin, 1985). Participants were asked to indicate the extent to which they agree with the scale's five items, which include "The conditions of my life are excellent" and "I am satisfied with my life." The SWLS uses a 7-point Likert-type response scale with anchors ranging from "Strongly disagree" to "Strongly agree." The SWLS is acceptably internally consistent with a coefficient alpha of .87 reported in the validation study. Acceptable indices of internal consistency were found in the present study (Time 1 $\alpha = .85$; Time 2 $\alpha = .86$). The SWLS has been found to have a two-month test-retest reliability of .82 among college students. Despite this high level of temporal stability, the sensitivity of the scale to change is adequate as evidenced by lower test-retest reliability estimates found in people undergoing significant life stressors (Pavot & Diener, 1993).

Cognitive Control

I operationalized cognitive control as the extent to which task-irrelevant information could be disregarded in favor of attention toward task-relevant information. Cognitive control was assessed using the Stroop task and a flanker task.

Stroop Task

The Stroop task (Stroop, 1935) is a widely-used measure of cognitive control (referred to by neuropsychologists as executive functioning). In this study, the Stroop stimuli were presented on a computer screen using Cedrus SuperLab software. The Stroop task included three conditions: word naming, color naming, and incongruent. First, participants were given instructions for the word naming condition. In the first block of 60 words, the word naming condition, participants were presented with names of colors in black ink and asked to press the button on the response pad corresponding to color name as quickly as possible. Participants were then presented with instructions for the color naming condition. In the second block of 60 stimuli, the color naming condition, participants were presented with five Xs (e.g., XXXXX) in one of four colors and asked to press the button on the response pad corresponding to the color of the Xs as quickly as possible. Participants were then presented with the instructions for the incongruent condition. In the third block of 60 words, the incongruent condition, participants were presented with names of colors presented in an ink color incongruent with the word being presented. Participants were asked to press the button on the response pad corresponding with the color of the ink as quickly as possible. In order to minimize the influence of outliers on response times, I winsorized individual response times greater than three standard deviations from individuals' mean response time scores to three standard deviations from the individual's mean response time (Hastings, Mosteller, Tukey, & Winsor, 1947). I then calculated the mean for each of the three conditions using only accurate response times. To calculate the Stroop interference effect, I subtracted the average of the word naming and color naming conditions from the incongruent condition (Valentijn et al., 2005). Higher Stroop interference scores indicate lower cognitive control.

Six participants reported having color-blindness and their Stroop interference effects were imputed at the mean level for the sample. Four participants were found to have interference scores greater than three standard deviations from the sample mean. These scores were winsorized to be three standard deviations from the mean. The distribution did not meet Kline's (1998) recommendations for indices indicating

normality (skew = 3.26; kurtosis = 15.67), thus a square-root transformation was applied. The transformed Stroop interference scores met Kline's recommendations for indications of normality (skew = 1.90; kurtosis = 5.81) and were used in all analyses.

Flanker Task

I employed a flanker task (Eriksen & Eriksen, 1974) that is commonly-used in cognitive psychology studies and has been used to explore the superiority of cognitive control among avoidant individuals (Gillath et al., 2009). In this task, five symbols were presented on a computer screen (e.g., > > < > >, > > > > >, < < > < <, < < < < <, − − < − − , or − − > − −) using Cedrus SuperLab software. The participant was instructed to press a button on a response pad corresponding to the direction of the center arrow as quickly as possible. In the cases in which the center arrow is pointing in the same direction as the flanking arrows, response time is slightly attenuated (Fan, McCandliss, Sommer, Raz, & Posner, 2002). That is, congruency between the flankers and the target stimulus facilitates response time. In the cases in which the center arrow is pointing in the opposite direction of the flanking arrows, response time is increased. That is, incongruence between the flankers and the target stimulus impairs response time. The cases in which the flankers are non-directional dashes are considered neutral.

The procedure for this task was modeled after Gillath and colleagues' (2009) methodology for the flanker task. Participants were given instructions for the task. A fixation point was presented between each trial for 750 milliseconds (ms) and participants were asked to look at the fixation point. The target stimulus and flankers were presented for 250 ms. Participants were asked to complete 10 training trials to orient them to the task. After the training trials, participants completed 480 trials. These comprised 160 trials presented for each of the three conditions (i.e., congruent, incongruent, and neutral flankers). Response times less than 100 ms and greater than 750 ms indicate problematic responding (e.g., being distracted) and were not used in computing the flanker scores (Gillath et al., 2009). Accurate response times within the specified range were averaged to create a mean time for incongruent trials and neutral trials. The flanker interference score was calculated as the difference between mean reaction time on the incongruent

trials and the mean reaction time on the neutral trials. Higher flanker interference scores indicate lower cognitive control.

Working Memory

Working memory was assessed using the Letter-Number Sequencing subtest of the WAIS-IV (Wechsler, 2008). In this task, participants were given a series of digits and letters. Participants were asked to recall the letters first in alphabetic order followed by the numbers in ascending order. Raw scores were summed and converted to standardized scaled scores by age. The reliability coefficient reported for the subtest is .88. This subtest has been found to load onto the general intelligence factor at .64.

Short-term Memory Span

Short-term memory span was assessed using the Digit Span Forward subtest of the WAIS-IV (Wechsler, 2008). In this task, participants were given a series of digits and asked to repeat them in the order in which they were presented. Raw scores were summed and converted to standardized scaled scores by age. The task has a reported reliability coefficient of .88. The mean number of digits able to be recalled by the average adult is 6.4 though this decreases with age (Wechsler, 2008). This subtest has been found to load onto the general intelligence factor at .50.

Other Facets of Intelligence

Cognitive control and working memory have been related to general intelligence (Engle, Tuholski, Laughlin, & Conway, 1999). Indeed, working memory is a subfactor of general intelligence tests (Kaufman & Lichtenberger, 2006). In order to determine the extent to which attachment avoidance and depressive symptoms are uniquely moderated by specific cognitive abilities, rather than other aspects of intelligence, I also assessed three other facets of intelligence to use as covariates. I chose representative subtests of the Perceptual Reasoning Index, Verbal Comprehension Index, and Processing Speed Index from WAIS-IV (Wechsler, 2008). I used the Matrix Reasoning, a subtest of the

Perceptual Reasoning Index, the Information, a subtest of the Verbal Comprehension Index, and Symbol Search, a subtest of the Processing Speed Index.

Perceptual Reasoning

Perceptual intelligence was measured using the Matrix Reasoning subtest of the WAIS-IV (Wechsler, 2008). In the Matrix Reasoning subtest, participants were shown visual stimuli and required to inductively derive rules and relationships among the stimuli. In addition to being a measure of Perceptual Reasoning, the Matrix Reasoning subtest has been described as a measure of general fluid intelligence (Kaufman & Lichetenberger, 2006). Fluid intelligence does not require verbal abilities and is thought to be less influenced by culture than crystallized intelligence, which is related to educational background (Horn & Cattell, 1967). Moreover, fluid intelligence has been related to both working memory and effective thought suppression (Brewin & Beaton, 2002). Participants' number of correct responses were summed and converted into scaled scores based on normative age groups. The Matrix Reasoning subtest has been found to have a reliability coefficient of .90 (Wechsler, 2008). The Matrix Reasoning subtest loads onto the general factor of intelligence, which includes measures of crystallized intelligence, at .75.

Verbal Comprehension

Verbal comprehension was measured using the Information subtest of the WAIS-IV (Wechsler, 2008). This subtest has also been described as a measure of crystallized intelligence (Kaufman & Lichtenberger, 2006). Crystallized intelligence is related to the information garnered throughout life experiences, usually in educational settings. The Information subtest required participants to answer broad general knowledge questions. For example, knowledge of historical facts is required for some answers. Raw scores were summed and converted to standardized scaled scores by age. The Information subtest has been found to have a reliability coefficient of .93 (Wechsler, 2008). The Information subtest loads onto the general factor of intelligence at .75.

Processing Speed

Processing speed was measured using the Symbol Search subtest of the WAIS-IV (Wechsler, 2008). The test is a measure of the respondent's speed of mental processing. The Symbol Search subtest required participants to determine if target symbols were represented in arrays of groups of symbols as quickly, but accurately, as possible during a two-minute time span (Wechsler, 2008). Some array groups contained the target symbols, whereas others did not. Participants marked "yes" if they saw the target symbol in the array and "no" if they did not see the target symbol in the array. The number of correct answers was summed and converted into scaled scores based on normative age groups. The Symbol Search subtest has been found to have a reliability coefficient of .81 (Wechsler, 2008). The Symbol Search subtest loads onto the general factor of intelligence at .70.

RESULTS

Preliminary Analyses

Sample

Time 1 participants were 169 college undergraduates recruited from psychology courses during the 2011-2012 school year. Demographic features of the sample are presented in Table 1. Most participants were female (73.40%) and Caucasian (76.30%) with smaller numbers of African-American (10.10%), Asian (6.50%), Hispanic and/or Latino (3.00%), and multiracial participants (1.80%). The mean age of the sample was 21.00 years with a standard deviation of 5.67 years. The plurality of participants reported being married or in a long-term committed relationship (45.00%) with fewer participants reporting no current romantic relationship (39.10%) or an involvement in a casual romantic relationship (15.40%).

Data Screening

I examined the data for assumptions of normality, assessed the quantity of missing data, and examined the data for meaningful patterns of attrition. I examined skewness and kurtosis to assess continuous variables of interest for normality. Using Kline's (1998) suggested cut-offs of 3 for the measure of skew and 10 for the measure of kurtosis, only the Stroop interference effect showed excessive skew or kurtosis. I applied a square-root transformation to the Stroop interference scores after which the skew and kurtosis were acceptable, and the transformed Stroop interference scores were used in all analyses. Measures of skew among variables ranged from -.80 to 2.10; indices of kurtosis ranged from -.61 to 5.81 (see Table 2).

The majority of participants completed all Time 1 tasks and responded to all Time 1 self-report items. There was less than 4% of missing data for any self-report item at

Time 1. Given the low level of missing data, I used a mean-level imputation at the item level for all missing data points at Time 1. Of the 169 Time 1 participants, 117 completed the Time 2 self-report measures (69.23%). There was less than 2% missing data at the item level among those who completed Time 2. For participants who completed Time 2 and had missing items, I imputed the sample mean for each item.

Attrition Analyses

I tested for patterns of attrition in demographic variables and the variables of focus (see Table 3). I compared completers versus non-completers on the demographic variables of age, gender, race/ethnicity, and relationship status. Due to small numbers of participants in some groups, I combined racial/ethnic minority categories and compared them to white participants. Racial/ethnic minority participants were less likely to complete Time 2 than white participants (χ^2 [1, *N = 169*] = 6.04, *p* = .01). Completers were not significantly different from non-completers on any other demographic variable. I also tested for significant differences between completers and non-completers on the cognitive tasks. There were no significant differences between completers and non-completers on any of the cognitive tasks.

Additionally, I tested for significant differences between completers and non-completers of Time 2 on the following Time 1 self-report variables: attachment avoidance, attachment anxiety, depressive symptoms, negative affect, anxiety symptoms, anger, positive affect, and satisfaction with life. Levene's tests for equality of variances revealed the assumption was not met for age, depressive symptoms, anger, or negative affect; therefore, tests and degrees of freedom for these comparisons were adjusted to account for the violation of this assumption. There were no significant differences between completers and non-completers on attachment avoidance, attachment anxiety, negative affect, or anxiety symptoms. However, non-completers had significantly more Time 1 depressive symptoms (*t*[74.20] = 2.35, *p* = .02), and anger (*t*[79.28] = 2.29, *p* = .03) than completers. Conversely, completers had significantly greater Time 1 positive affect (*t*[167] = -2.10, *p* = .04) and satisfaction with life (*t*[167] = -3.70, *p* <.001) than non-completers.

Correlations among Time 1 Variables

Correlations among Time 1 measures are presented in Table 4. Of note, greater attachment avoidance was associated with greater flanker interference effect (r = .16, p = .04). Greater attachment avoidance was associated with lower scores on the Letter-Number Sequencing subtest (r = -.20, p = .01) and the Matrix Reasoning subtest (r = -.21, p = .01). Attachment avoidance was not significantly associated with any of the other cognitive variables. Greater attachment avoidance was associated with more depressive symptoms (r = .37, p <.001), anxiety symptoms (r = .25, p = .001), anger (r = .28, p < .001), and negative affect at Time 1 (r = .27, p < .001). Greater attachment avoidance was also related to less positive affect (r = -.24, p = .002) and lower satisfaction with life at Time 1 (r = -.34, p < .001).

There were significant correlations between Time 1 depressive symptoms and two of the cognitive variables. More depressive symptoms at Time 1 were associated with lower scores on the Letter-Number Sequencing (r = -.26, p = .001) and Digit Span Forward subtests (r = -.19, p = .01). More anxiety symptoms at Time 1 were associated with lower scores on Letter-Number Sequencing (r = -.22, p = .004), Symbol Search (r = -.17, p = .03), and Information subtests (r = -.16, p = .04). Greater anger at Time 1 was associated with lower scores on Letter-Number Sequencing (r = -.21, p = .01). Greater Time 1 negative affect was also associated with lower scores on the Letter-Number Sequencing subtest (r = -.29, p < .001). Positive affect at Time 1 was not related to any of the cognitive measures. Greater Time 1 satisfaction with life, however, was associated with better performance on the Letter-Number Sequencing (r = .20, p = .01) and Matrix Reasoning subtests (r = .16, p = .04).

Examination of Repeated Measures

I examined the correlations among the Time 1 and Time 2 outcome variables (see Table 5). All Time 1 outcome variables were associated with their repeated measures at Time 2. Correlations revealed medium to large effect sizes between all Time 1 and Time 2 variables, including depressive symptoms (r = .47, p < .001), anxiety symptoms (r =

.46, p <.001), anger (r = .28, p = .002), negative affect (r = .58, p < .001), positive affect (r = .54, p < .001), and satisfaction with life (r = .62, p < .001).

I also examined the arithmetic differences in means and standard deviations between time points (Time 1 – Time 2). The mean level of depressive symptoms was higher at Time 1 than Time 2 (.87), and the standard deviation was lower at Time 1 than Time 2 (-.61). The mean level of anxiety symptoms was lower at Time 1 than Time 2 (-.06), and the standard deviation was lower at Time 1 than Time 2 (-1.45). The mean level of anger was lower at Time 1 than Time 2 (-.09), and the standard deviation was lower at Time 1 than Time 2 (-.54). The mean level of negative affect was higher at Time 1 than Time 2 (.71), and the standard deviation was lower at Time 1 than Time 2 (-.57). The mean level of positive affect was higher at Time 1 than Time 2 (.97), and the standard deviation was lower at Time 1 than Time 2 (-.15). The mean level of satisfaction with life was lower at Time 1 than Time 2 (-.90), and the standard deviation was higher at Time 1 than Time 2 (.45).

Correlations with Time 2 Measures

I examined correlations among Time 1 predictors and moderators and Time 2 variables (see Table 6). Greater attachment avoidance at Time 1 was significantly related to more depressive symptoms (r = .28, p = .002) and less satisfaction with life at Time 2 (r = -.37, p < .001). Greater Time 1 attachment anxiety was associated with more Time 2 depressive symptoms (r = .37, p < .001), anxiety symptoms (r = .26, p = .01), greater anger (r = .19, p = .04), and greater negative affect (r = .28, p = .002). Greater Time 1 attachment anxiety was also associated with less positive affect (r = -.31, p = .001) and lower satisfaction with life at Time 2 (r = -.35, p < .001). Greater flanker interference at Time 1 was associated with less satisfaction with life at Time 2 (r = .18, p = .048). None of the other cognitive ability measures was associated with the Time 2 variables.

I also examined correlations among Time 1 and Time 2 outcome measures (see Table 5). Time 1 depressive symptoms were positively associated with Time 2 anxiety symptoms (r = .31, p <.001) and negative affect (r = .38, p < .001) and negatively associated with Time 2 positive affect (r = -.35, p < .001) and satisfaction with life (r = -

.39, $p < .001$). There was not a significant correlation between Time 1 depressive symptoms and Time 2 anger at the .05 level ($r = .17$, $p = .07$). Time 1 anxiety symptoms were positively associated with Time 2 depressive symptoms ($r = .48$, $p < .001$), anger ($r = .22$, $p = .02$), and negative affect ($r = .39$, $p < .001$) and negatively associated with Time 2 positive affect ($r = -.23$, $p = .01$) and satisfaction with life ($r = -.32$, $p < .001$). Time 1 anger was positively associated with Time 2 depressive symptoms ($r = .33$, $p < .001$), anxiety symptoms ($r = .21$, $p = .03$), and negative affect ($r = .30$, $p = .001$) and negatively associated with Time 2 satisfaction with life ($r = -.20$, $p = .03$). Time 1 anger was not significantly correlated with Time 2 positive affect at the $p < .05$ level ($r = -.16$, $p = .09$). Time 1 negative affect was positively associated with Time 2 depressive symptoms ($r = .48$, $p < .001$), anxiety symptoms ($r = .39$, $p < .001$), and anger ($r = .33$, $p < .001$) and negatively associated with Time 2 positive affect ($r = -.20$, $p = .04$) and satisfaction with life ($r = -.29$, $p = .002$). Time 1 positive affect was positively associated with Time 2 satisfaction with life ($r = .19$, $p = .046$) but not significantly associated with Time 2 depressive symptoms ($r = -.18$, $p = .05$), anxiety symptoms ($r = -.12$, $p = .19$), anger ($r = -.02$, $p = .81$), or negative affect ($r = .02$, $p = .81$). Time 1 satisfaction with life was negatively associated with Time 2 depressive symptoms ($r = -.48$, $p < .001$), anxiety symptoms ($r = -.32$, $p < .001$), anger ($r = -.31$, $p = .001$), and negative affect ($r = -.36$, $p < .001$) and positively associated with Time 2 positive affect ($r = .35$, $p < .001$).

Description of Depression Groups

The following cut-off scores on the CES-D have been widely used to discriminate between absent to minimal depression (0 – 9), mild depression (10 – 16), moderate depression (17 – 24), and moderate to severe depression (> 24; Radloff, 1977). I examined the number and percentage of participants at each time point falling within these widely-used ranges. The frequency of participants reporting each level of depression at both time points is presented in Table 7.

Description of WAIS-IV Results

In order to place the cognitive abilities of the present sample in a larger context, I compared the means and standard deviations on the WAIS-IV cognitive ability measures to those of the standardization sample. For all WAIS-IV subtests, the standardization sample had a scaled score of 10 with a standard deviation of three (Wechsler, 2008). In four of the five measures (Letter-Number Sequencing, Digit Span Forward, Matrix Reasoning, and Information), the present sample had means below 10 suggesting that the present sample has slightly lower cognitive abilities than the standardization sample. The present sample's mean score on Symbol Search, however, was higher than the standardization sample. Standard deviations for all five WAIS-IV measures were less than three, indicating less variance in scores in the present sample compared to the standardization sample.

Moderation Analyses

In order to conduct the primary test of moderation, I used hierarchical linear regression to predict Time 2 depressive symptoms while controlling for Time 1 depressive symptoms. Depressive symptoms at Time 1 were entered into Step 1 of the regression in order to provide a more stringent test of the hypotheses by predicting change in depressive symptoms. In Step 2, I included Matrix Reasoning, Information, and Symbol Search scaled scores as covariates for a more conservative test of the cognitive variables of interest. I also included attachment anxiety as a covariate because previous research has found that attachment anxiety is reliably associated with greater depressive symptoms (e.g., Burnette et al., 2009). Additionally, I included gender as a covariate given the wealth of research showing the association between gender and depressive symptoms (e.g., Nolen-Hoeksema, 2001). In Step 3, I entered the mean-centered predictors of interest, attachment avoidance, flanker interference, transformed Stroop interference, Letter-Number Sequencing, and Digit Span Forward. I used the mean-centered variables in Step 3 to create product terms using attachment avoidance and each of the cognitive variables. The products of attachment avoidance and each of the cognitive ability variables were entered into Step 4. Given that the regression was testing

multiple moderators, I used a Bonferroni correction to reduce the risk of Type I error. I adjusted my required alpha level for the four interactions to $p < .0125$.

Test of Hypothesis 1

The results of the regression predicting Time 2 depressive symptoms are displayed in Table 8. In Step 1, the effect of Time 1 depressive symptoms on Time 2 depressive symptoms was significant ($F[1, 115] = 33.03$, $p < .001$) and predicted 22% of the variance. The addition of the covariates in Step 2 explained an additional 4.8% of variance in Time 2 depressive symptoms ($\Delta R^2 = 0.05$, $p = .22$). The main effects of attachment avoidance and the cognitive variables in Step 3 did not significantly improve prediction of change in depressive symptoms ($\Delta R^2 = 0.03$, $p = .53$). The addition of Step 4, which included the interaction terms, also did not account for significant increases in variance explained ($\Delta R^2 = 0.02$, $p = .68$). All variance inflation factors (VIFs) for the predictors in the model were below 1.26, indicating low multicollinearity. The final model accounted for over 31% of the variance in Time 2 depressive symptoms. None of the interaction terms in Step 4 was significant at the $p < .01$ level. Thus, there was no evidence that attachment avoidance interacts with cognitive abilities to influence depressive symptoms.

Tests of Secondary Hypotheses

My secondary tests of moderation mirrored that of the hierarchical linear regression on Time 2 depressive symptoms. I conducted separate regressions on each of the following Time 2 outcome variables: anxiety symptoms, anger, negative affect, positive affect, and satisfaction with life.

Test of Hypothesis 2

The results of the regression predicting Time 2 anxiety symptoms are displayed in Table 9. In Step 1, the effect of Time 1 anxiety symptoms on Time 2 anxiety symptoms was significant ($F[1, 115] = 31.08$, $p < .001$) and accounted for 21% of the variance. The addition of the covariates in Step 2 did not account for a significant increase in ability to

explain variance in Time 2 anxiety ($\Delta R^2 = 0.02$, $p = .65$). The main effects of attachment avoidance and the cognitive variables in Step 3 did not account for significantly more variance in Time 2 anxiety symptoms ($\Delta R^2 = 0.01$, $p = .85$). The addition of Step 4, which included the interaction terms, also did not account for significantly greater variance in Time 2 anxiety symptoms ($\Delta R^2 = 0.05$, $p = .14$). All VIFs for the predictors in the model were below 1.24, indicating low multicollinearity. The final model accounted for almost 30% of the variance in Time 2 anxiety symptoms. None of the interaction terms in Step 4 was significant at the $p < .01$ level. Thus, there was no evidence that attachment avoidance interacts with cognitive abilities to influence anxiety symptoms.

Test of Hypothesis 3

The results of the regression predicting Time 2 anger are displayed in Table 10. In Step 1, the effect of Time 1 state anger on Time 2 anger was significant ($F[1, 115] = 10.04$, $p = .002$) and accounted for 8% of the variance. The addition of the covariates in Step 2 did not account for a significant increase in variance explained in Time 2 anger ($\Delta R^2 = 0.03$, $p = .61$). The main effects of attachment avoidance and the cognitive variables in Step 3 did not significantly improve variance explained in Time 2 anger ($\Delta R^2 = 0.05$, $p = .29$). The addition of Step 4, which included the interaction terms, also did not account for significantly greater variance explained in Time 2 anger ($\Delta R^2 = 0.03$, p = .55). All VIFs for the predictors in the model were below 1.30, indicating low multicollinearity. The final model accounted for approximately 18% of the variance in Time 2 anger. None of the interaction terms in Step 4 was significant at $p < .01$. Thus, there is no evidence that cognitive variables interact with attachment avoidance to predict anger.

Test of Hypothesis 4

The results of the regression predicting Time 2 negative affect are displayed in Table 11. In Step 1, the effect of Time 1 negative affect on Time 2 negative affect was significant ($F[1, 115] = 57.88$, $p < .001$) and accounted for almost 34% of the variance. The addition of the covariates in Step 2 did not account for a significant increase in

ability to explain variance in Time 2 negative affect (ΔR^2 = 0.02, p = .59). The main effects of attachment avoidance and the cognitive variables in Step 3 did not significantly increase variance explained in Time 2 negative affect (ΔR^2 = 0.02, p = .69). The addition of Step 4, which included the interaction terms, also did not account for significantly greater variance explained in Time 2 negative affect (ΔR^2 = 0.01, p = .73). All VIFs for the predictors in the model were below 1.24, indicating low multicollinearity. The final model accounted for almost 39% of the variance in Time 2 negative affect. None of the interaction terms in Step 4 was significant at $p < .01$ level. Therefore, there is no evidence that differences in cognitive ability influence the relationship between attachment avoidance and negative affect.

Test of Hypothesis 5

The results of the regression predicting Time 2 positive affect are displayed in Table 12. In Step 1, the effect of Time 1 positive affect on Time 2 positive affect was significant (F[1, 115] = 48.20, $p < .001$) and predicted more than 29% of the variance. The addition of the covariates in Step 2 did not account for a significant increase in variance of Time 2 positive affect explained (ΔR^2 = 0.05, p = .14). The main effects of attachment avoidance and the cognitive variables in Step 3 did not significantly improve accounted for variance in positive affect (ΔR^2 = 0.02, p = .56). The addition of Step 4, which included the interaction terms, also did not account for significantly greater variance in Time 2 positive affect (ΔR^2 = 0.03, p = .33). All VIFs for the predictors in the model were below 1.23, indicating low multicollinearity. The final model accounted for almost 40% of the variance in Time 2 positive affect. None of the interaction terms in Step 4 was significant at $p <.01$ level. Thus, there was no evidence that attachment avoidance interacts with cognitive abilities to influence positive affect.

Test of Hypothesis 6

The results of the regression predicting Time 2 satisfaction with life are displayed in Table 13. In Step 1, the effect of Time 1 satisfaction with life on Time 2 satisfaction with life was significant (F[1, 115] = 70.76, $p < .001$) and accounted for 38% of the

variance. The addition of attachment anxiety in Step 2 did not account for significant additional variance in Time 2 satisfaction with life ($\Delta R^2 = 0.03$, $p = .41$). The main effects of attachment avoidance and the cognitive variables in Step 3 did not significantly improve variance accounted for in satisfaction with life ($\Delta R^2 = 0.03$, $p = .30$). The addition of Step 4, which included the interaction terms, also did not account for significantly greater variance accounted for in Time 2 satisfaction with life ($\Delta R^2 = 0.01$, $p = .77$). All VIFs for the predictors in the model were below 1.23, indicating low multicollinearity. The final model accounted for 45% of the variance in Time 2 satisfaction with life. Furthermore, none of the interaction terms in Step 4 was significant, which reveals no evidence that cognitive variables interact with attachment avoidance to predict satisfaction with life.

Exploratory Follow-up of Interactions

As stated above, none of the interactions between attachment avoidance and the cognitive variables significantly moderated the effects on the outcomes examined at $p < .0125$. Two interactions, however, reached significance at the $p \leq .05$ level: the effect of the interaction between attachment avoidance and Digit Span Forward on Time 2 anxiety symptoms ($\beta = .20$, $p = .05$) and attachment avoidance and Letter-Number Sequencing on Time 2 positive affect ($\beta = .21$, $p = .04$). These results are likely spurious findings. Nevertheless, in order to inform future hypothesis generation and research, I conducted follow-up examinations of these interactions using Aiken and West's recommendations (1991). I plotted these interaction effects graphically. I probed the interactions across three values of the cognitive variables: one standard deviation below the mean, the mean, and one standard deviation above the mean. I examined each of these three slopes to test if they were statistically significantly different from 0.

Exploratory Test of Hypothesis 2a

The graph exploring the interaction between attachment avoidance and Digit Span Forward on anxiety symptoms is shown in Figure 1. Simple slopes analyses revealed that at one standard deviation above the mean, the slope was significantly different from zero

(t[113] = 2.53, p = .01). This suggests that in those with greater short-term memory spans, higher attachment avoidance may be related to more anxiety symptoms. This contradicts the hypothesis that greater short-term memory span would be associated with attenuated anxiety symptoms among those high in attachment avoidance. There was not a significant difference from zero in the slopes at the mean (t[113] = 1.45, p = .15) or one standard deviation below the mean (t [113] = -.62, p = .54).

Exploratory Test of Hypothesis 5a

The graph exploring the interaction between attachment avoidance and Letter-Number Sequencing on positive affect is shown in Figure 2. Simple slopes analyses revealed that at one standard deviation above the mean, the slope was significantly different from zero (t[113] = 2.49, p = .01). This suggests that in those with better working memories, higher attachment avoidance may be related to greater positive affect. There was not a significant difference from zero in the slopes at the mean (t[113] = 1.45, p = .15) or one standard deviation below the mean (t [113] = -.63, p = .53). This finding supports the hypothesis that better working memory is associated with greater positive affect in those high in attachment avoidance. However, this finding is not consistent with the aforementioned finding for anxiety symptoms. Given that these two interactions are contradictory, and that none of the other outcomes' relationships with attachment avoidance were moderated by any other cognitive variables, these results are likely to be spurious.

DISCUSSION

Given the high social and economic costs of depression, it is important to develop better understanding of predictors and moderators associated with depressive symptoms. The purpose of this research was to examine if cognitive abilities, such as cognitive control, working memory, and short-term memory span, moderate the relationship between attachment avoidance and change in depressive symptoms. In addition, I examined whether cognitive abilities moderate the relationships between attachment avoidance and anxiety, anger, negative affect, positive affect, and satisfaction with life. Using criteria for correcting alpha levels for Type I error given the large number of hypotheses, the results of this research do not provide evidence that cognitive abilities influence the relationship between attachment avoidance and psychological distress and subjective well-being.

In the interest of avoiding Type II error, I conducted exploratory analyses of two interactions that trended toward significance. I probed the interaction between attachment avoidance and short-term memory span on anxiety. I found that high attachment avoidance in the context of a longer short-term memory span was associated with greater anxiety. I also probed the interaction between attachment avoidance and working memory on positive affect. I found that high attachment avoidance in the context of better working memory was associated with greater positive affect. That is, the first probe suggested that a cognitive ability was associated with greater psychological distress in those high in attachment avoidance; whereas, the other probe suggested that a cognitive ability was associated with greater subjective well-being in those high in attachment avoidance. Given that the results of the probes of these two interactions are contradictory, it is likely that these findings are spurious in nature.

Consideration of Null Findings

The results of this study fail to support the proposed hypotheses. Kazdin (2003) has proposed two broad explanations for no-difference findings, including that the findings reflect "the true state of affairs" (p. 481) and methodological issues influenced the ability to detect effects. I will first provide reasoning for why cognitive abilities may not moderate the relationship between attachment avoidance and depressive symptoms or other indices of psychological distress and subjective well-being. I will then discuss the methodological limitations of the present study that may have prevented detection of the influence of cognitive abilities on the relationship between attachment avoidance and psychological distress and subjective well-being.

Theoretical Considerations for Null Findings

There are several reasons why cognitive abilities may not moderate the relationship between attachment avoidance and depressive symptoms, psychological distress, or subjective well-being. These reasons include the influence of cognitive abilities on emotion regulation strategies over longer periods of time, the nature of the situation on the ability to employ cognitive abilities to effectively regulate emotions, and the influence of other possible moderators, such as important coping skills, that may diminish the importance of cognitive abilities.

Cognitive abilities, like cognitive control and working memory, have been found to aid in effective suppression as an emotion regulation strategy in laboratory tasks (e.g., Brewin & Beaton, 2002), but they may not have a strong long-term influence on psychological distress and subjective well-being. In the present study, psychological distress and subjective well-being measures asked participants to self-report on symptoms and subjective well-being over a period of one week rather than the shorter periods of time in which laboratory tasks are conducted. Indeed, tests of the resource model of self-control have shown that the suppression of thoughts impairs future suppression of emotional expression (e.g., Muraven, Tice, & Baumeister, 1998). Suppression of emotional *expression*, but not the suppression of emotional *experience*, has been found to be an effective emotion regulation strategy (Webb, Miles, & Sheeran, 2012). Therefore,

even if people who are high in attachment avoidance have superior cognitive abilities allowing them to suppress thoughts more effectively at single time points, their ability to effectively suppress emotional experience may diminish over time.

In the present study, the cognitive tasks were general and not specifically related to stimuli that would activate the attachment behavioral system. For example, one task in the present study assessed the ability to manipulate letters and numbers within working memory. Other research, however, examining the relationship between attachment avoidance and cognitive control have used methodology that would require participants to exclude attachment-related information, such as negative relationship memories or stimuli related to separation and loss (Mikulincer et al., 2004; Silva, Soares, & Esteves, 2012). For example, Mikulincer and colleagues (2004) found that when asked to suppress painful relationship-related memories, avoidant individuals were able to more effectively do so while under low versus high cognitive load. However, there may be individual differences in cognitive control and suppression of interpersonal stimuli among those high in attachment avoidance. Cognitive control of information that activates the attachment behavior system (i.e., relational or threat-related information) may be an important moderator of the relationship between attachment avoidance and psychological distress and subjective well-being. That is, general cognitive abilities may be less important in protecting against psychological distress and promoting subjective well-being than the ability to effectively use cognitive abilities when in interpersonal contexts or during times of threat and stress.

Although avoidant individuals may not use others for social support and tend to rely on problematic emotion regulation strategies, such as suppression, a subset may employ other more positive strategies that explain why they evade psychological distress. The present research focused on cognitive abilities that are used in emotion regulation strategies related to attentional deployment and response modification, namely cognitive control and suppression (Gross, 1998; 2001). It is likely that some avoidant individuals also rely on other emotion regulation strategies that are not as dependent upon the cognitive abilities measured here. Avoidant individuals may effectively use situation selection, situation modification, and cognitive change strategies to avoid psychological

distress. For instance, highly avoidant people, by definition, are likely to avoid close interpersonal relationships that may lead to conflict and are likely to leave situations in which interpersonal conflict is present. Additionally, they may be more likely to utilize independent problem-focused coping that could prevent or reduce stressor-related psychological distress. A recent meta-analysis has found problem-solving to be related to lower symptoms of psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Furthermore, in a cross-sectional design, Wei and colleagues (2003) found that perceived problem-solving abilities partially mediated the relationship between attachment avoidance and indices of psychological distress. Also in support of the importance of problem solving for avoidant individuals, one study found that depressed individuals high in attachment avoidance show greater reductions in depression after Cognitive Behavioral Therapy (CBT) compared to Interpersonal Therapy for depression (McBride, Atkinson, Quilty, & Bagby, 2006). This difference is thought to result from the greater focus in CBT on cognitions and problem-solving rather than interpersonal interactions. Perhaps people high in attachment avoidance but low in depressive symptoms are able to use coping strategies similar to those taught in CBT (i.e., modifying distorted thoughts, problem solving) to avoid psychological distress.

Methodological Considerations for Null Findings

The aforementioned reasons may explain the present study's null findings; however, methodological factors could account for the negative findings. Possible methodological features described by Kazdin (2003) that may be applicable to this study include power issues, limitations of the outcome measures, and measurement of the moderator variables.

This study was underpowered to detect small effects in the interaction terms (Cohen, 1977). In order to reach a power level of .80 with the Bonferroni correction of the p-value requirement to .0125, at least 261 participants at Time 2 are required to detect a .10 effect size. Furthermore, the majority of regression coefficients of the interaction terms in this study were less than .10. Given that this study had 117 participants at Time

2, lack of power may explain why no interaction was found for attachment avoidance and the cognitive variables on psychological distress and subjective well-being.

There are several methodological issues related to the outcome variables that may have contributed to the present study's null findings. First, participants with higher levels of depressive symptoms and anger and lower levels of subjective well-being were significantly less likely to complete the Time 2 outcome measures of this study. Thus, tests of the hypotheses, which controlled for Time 1 symptoms, excluded individuals with higher levels of depressive symptoms and anger and lower levels of subjective well-being. The findings of this research may not be applicable for people with higher levels of depressive symptoms and anger and lower levels of subjective well-being. Furthermore, the greater attrition of those with more depressive symptoms, greater anger, and less subjective well-being lead to a greater restriction of range in the longitudinal sample. Second, the present study recruited from a nonclinical college population with rates of depressive symptoms and other forms of psychological distress that were relatively low, possibly leading to a positively-skewed distribution. Future research should attempt to recruit people with greater levels of psychological distress, perhaps by the screening and recruitment of those with depressive scores above a certain cut-off. Third, the relative stability of the outcome measures over the two time points left less variance to be explained by the interaction terms of interest. In the future, longitudinal research with similar hypotheses should seek to increase the temporal distance between time points to allow for greater change in psychological distress and subjective well-being.

The measurement of the outcomes of interest may have contributed to the null findings of this study. Although all measures used have reported strong validity, these outcomes may be difficult to accurately assess among those in high in attachment avoidance. People high in attachment avoidance, by definition, prefer not to disclose their emotional experiences to other people (Ainsworth et al., 1978). The detection of psychological distress and subjective well-being in this study relied on participants' willingness and ability to disclose their emotional experience and related phenomena, which may be compromised in avoidant individuals. Indeed, some research has revealed

discrepancies in avoidant individuals' physiological correlates of emotional experiences and their self-report (e.g., Mikulincer, 1998). It is possible that those high in attachment avoidance underreported their emotional experiences and related symptoms in this study. Future research should include measures of psychological distress and subjective well-being that do not solely rely on participants' ability to report their emotional experiences (e.g., physiological measures of stress).

There are several reasons why the cognitive ability variables may have contributed to the inability to detect interaction effects. First, this study recruited from a college student population with a range of cognitive abilities that is truncated in comparison to the general population. Restriction in the range of cognitive abilities decreases the likelihood of achieving statistically significant results. Inclusion of individuals with lower levels of cognitive abilities, increasing the range of cognitive abilities in the sample, may have increased the likelihood of detecting effects. Furthermore, all participants completed all cognitive tasks. Although the Stroop and Flanker tasks were counterbalanced to correct for order effects on fatigue and depletion of self-control, all other cognitive tasks were presented in a fixed order. It is possible that the tasks presented later in the study session differentially underestimated participants' cognitive abilities due to fatigue effects and/or depletion of self-control. Recent research has found that people high in attachment avoidance are less able to suppress painful childhood memories *after* completing a task that depletes self-control (Kohn, Rholes, & Schmeichel, 2012). Thus, not only is there evidence that avoidant individuals suppress less effectively during times of high cognitive load (e.g., Mikulincer et al., 2004), avoidant individuals are less able to suppress negative memories after a depletion task (i.e., when no current cognitive load is applied). Thus, the individual difference in ability to suppress successfully after depleting tasks, such as boring cognitive ability tasks, may be an important moderator in the relationship between attachment avoidance and psychological distress and subjective well-being. The present study is not able to account for differences in depletion of self-control across the measurement of cognitive ability tasks, which may account for null findings.

Attachment Avoidance and Cognitive Abilities

Though not the focus of this study, my findings did not replicate previous findings that attachment avoidance is related to enhanced general cognitive control (Gillath et al., 2009). In fact, in the present study, attachment avoidance was inversely related to cognitive control as measured by the Flanker interference effect. Gillath and colleagues (2009), however, covaried neuroticism in their examination of the relationship between attachment avoidance and cognitive control, which was not done in the present study due to the focus on outcome variables of interest related to neuroticism (i.e., depressive symptoms, negative affect, etc.). Thus, it is possible that once mood-related effects are controlled, there may not be a relationship between attachment avoidance and cognitive control. Indeed, previous research has found that performance on some cognitive tasks is impaired by those with anxiety and depressive symptoms (Gorlyn, Keilp, Oquendo, Burke, Sackeim, & Mann, 2006; Lichtenberger & Kaufman, 2009). In order to test this possibility, I conducted an exploratory hierarchical regression on flanker interference controlling for Time 1 negative affect, gender, and attachment anxiety in Step 1. I entered the variable of interest, attachment avoidance, at Step 2. Attachment avoidance did not account for additional variance explained in flanker interference ($\Delta R^2 = 0.02$, $p = .59$) but was no longer significantly negatively related to flanker interference ($\beta = .10$, $p = .23$). Thus, the zero-order finding regarding the relationship between cognitive control and attachment avoidance may be explained by mood-related effects. The influence of mood may also explain the finding that attachment avoidance was negatively related to working memory, as measured by the Letter-Number Sequencing subtest, and general fluid intelligence, as measured by the Matrix Reasoning subtest. Nevertheless, there is no evidence from the present study that attachment avoidance is related to superior cognitive control.

Future Directions

The results of this study suggest several directions for future research to clarify possible moderators of the relationship between attachment avoidance and psychological distress and subjective well-being. Recommendations gleaned from this study include

both conceptual and methodological concerns. Additionally, I provide recommendations for researchers examining the relationship between attachment avoidance and cognitive abilities.

Conceptual recommendations to clarify moderators of the relationship between attachment avoidance and psychological distress and subjective well-being include examining the influence of cognitive abilities over longer periods of time, specific cognitive abilities, and the use of certain emotion regulation and coping strategies in specific contexts. As discussed above, cognitive abilities at a single time point may not be as important in protecting avoidant individuals from psychological distress and promoting subjective well-being as avoidant individuals' capacities to effectively employ these cognitive abilities repeatedly. Previous research examining self-control suggests that individuals' abilities will decline with repeated use (e.g., Muraven et al., 1998). It is possible that the differences in the relative rate of decrease in effectiveness may moderate the relationship between attachment avoidance and psychological distress and subjective well-being. Future research should examine individual differences in the effectiveness of cognitive abilities over prolonged periods of time and repeated use.

This study examined cognitive abilities in a neutral context rather than the use of cognitive abilities in situations in which the attachment behavioral system is activated. The differential ability to employ cognitive abilities when in relational or high threat contexts may be influential on the relationship between attachment avoidance and psychological distress and subjective well-being. For example, researchers might apply a manipulation in which participants are given distressing information related to separation or loss and measure cognitive abilities in this context. Superior performance on cognitive tasks while under a threat-related manipulation may protect avoidant individuals from psychological distress and promote subjective well-being.

There is a growing body of research that has investigated the relationship between attachment avoidance and suppression (Mikulincer & Shaver, 2007). Future research should continue to examine other emotion regulation and coping strategies' effects on the relationships between attachment avoidance and psychological distress and subjective well-being, especially in periods of high stress. As discussed above, there is cross-

sectional evidence suggesting that perceived coping abilities partially mediate the relationship between attachment avoidance and psychological distress (Wei et al., 2003). Additionally, intervention research has found that depressed avoidant individuals benefit more from problem-focused therapy (i.e., CBT) than relationship-focused therapy (i.e., interpersonal therapy; McBride, Atkinson et al., 2006). Avoidant individuals who are not psychologically distressed may have strong problem-solving skills that they are able to use during periods of stress. Future research should examine, not only perceived coping skills, but measure actual practical problem solving skills to assess if problem solving abilities moderate the relationship between attachment avoidance and psychological distress and subjective well-being. The manipulation of participant stress during the measurement of problem solving ability could be especially useful in understanding why certain avoidant individuals are able to avoid longer term psychological distress and maintain well-being.

Methodological recommendations gleaned from the present research include sample size considerations, sample composition, the length of time between time points, and study design related to the measurement of multiple cognitive abilities. I offer several recommendations with regard to sampling as a result of the information gleaned in this study. This study provides important information for future research (i.e., effect size estimates) that researchers should use in order to plan necessary sample sizes to detect effects. Researchers continuing this line of inquiry should seek to recruit larger sample sizes than obtained in the present study. Furthermore, future research should seek to recruit a sample with a greater range of psychological distress than is generally found in the general college student population. For example, researchers might seek to recruit people with identified clinical disorders, such as Major Depressive Disorder. This is especially important given the higher levels of attrition for participants with greater psychological distress and lower subjective well-being. Another limitation of the college student population is the restriction in range of cognitive abilities compared to the general population; future research should recruit from populations that include lower levels of cognitive abilities.

A strength of the present study was its longitudinal design. Nevertheless, given the relatively short period of time between time points, Time 1 and Time 2 outcome measures were moderately related leaving less variance to be explained by the predictors and interactions than optimal. Future research should seek to extend the length of the study to allow for greater change in psychological distress and subjective well-being. The study of avoidant individuals prior to beginning particularly stressful tasks should also be considered.

Future research should consider the effects of fatigue and depletion of resources on the measurement of multiple cognitive abilities. The present study counterbalanced the first two cognitive ability measures but presented the remaining cognitive tasks in a fixed order, which may have contributed to the null findings. New investigations of the influence of cognitive abilities should account for fatigue and depletion in the study methodology. Designs that counterbalance all tasks should control for the possible effects related to fatigue and depletion. Alternatively, studies could measure cognitive abilities at multiple time points in order to decrease the influence that multiple taxing measures might have on cognitive ability performance.

Examination of the zero-order correlation between attachment avoidance and cognitive control, as measured by the flanker task, suggested that attachment avoidance was associated with less cognitive control. However, supplementary analyses revealed that this relationship may be the result of mood-related effects. That is, those with greater negative affect have greater difficulty with cognitive control. Future researchers interested in understanding the relationship between attachment avoidance and cognitive abilities should ensure the inclusion of a measure of negative affectivity, such as state negative affect or trait-like neuroticism, in their analyses as a control.

Conclusions

The present study sought to determine if cognitive abilities moderate the relationship between attachment avoidance and depressive symptoms, other forms of psychological distress, and subjective well-being. The results of this study do not provide evidence that greater cognitive abilities are associated with lower psychological distress

and higher levels of subjective well-being among those high in attachment avoidance. However, there were important methodological limitations in this study. The discussion of these factors provides important information for future researchers to consider when furthering this line of study. Furthermore, several theoretical alternatives were offered for future inquiry into the moderators of the relationship between attachment avoidance and psychological distress and subjective well-being.

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TABLES

Table 1. Study Participant Characteristics

	N = 169	Percentage
Gender		
Female	124	73.40
Race/ethnicity		
African-American	17	10.10
Asian	11	6.50
Caucasian	129	76.30
Hispanic or Latino	5	3.00
Multiracial	3	1.80
Relationship status		
Married/Long-term committed relationship	76	45.00
No current romantic relationship	66	39.10
Casual romantic relationship	26	15.40
	Mean	SD
Age	21.00	5.67

Table 2. Measures of Skew and Kurtosis

	Skew	Kurtosis
Time 1		
Attachment Avoidance	.80	.73
Attachment Anxiety	.18	-.47
Flanker Interference	.57	.69
Non-transformed Stroop Interference	3.26	15.67
Transformed Stroop Interference	1.90	5.81
Letter-Number Sequencing	1.46	4.83
Digit Span Forward	.13	-.07
Matrix Reasoning	-.13	-.61
Information	.18	-.51
Symbol Search	.24	.03
Depressive Symptoms	1.14	1.11
Anxiety Symptoms	1.75	4.36
Anger	1.41	1.55
Negative Affect	.82	-.16
Positive Affect	-.42	.15
Satisfaction with Life	-.47	-.48
Time 2		
Depressive Symptoms	1.25	1.30
Anxiety Symptoms	2.10	4.55
Anger	2.05	4.86
Negative Affect	1.19	1.04
Positive Affect	-.37	.05
Satisfaction with Life	-.80	.54

Table 3. Attrition Analyses

	Test statistic	*df*	*p-value*
Age	-1.23[a]	148.39	.22
Gender	2.26[b]	1	.13
Race/ethnicity	6.04[b]	1	.01
Relationship Status	1.67[b]	2	.43
Flanker Interference	.55[a]	167	.58
Stroop Interference	-.04[a]	167	.97
Letter-Number Sequencing	.22[a]	167	.83
Digit Span Forward	.12[a]	167	.90
Matrix Reasoning	-1.44[a]	167	.15
Information	-1.89[a]	167	.06
Symbol Search	.06[a]	167	.96
Attachment Avoidance	1.57[a]	167	.12
Attachment Anxiety	.82[a]	167	.41
Depressive Symptoms	2.35[a]	74.20	.02
Anxiety Symptoms	1.78[a]	167	.08
Anger	2.29[a]	79.28	.03
Negative Affect	1.99[a]	83.80	.05
Positive Affect	-2.10[a]	167	.01
Satisfaction with Life	-3.71[a]	167	<.001

Note. a = t-test; b = chi-square test. Stroop Interference = Transformed Stroop Interference. Tests and degrees of freedom adjusted for age, depressive symptoms, anger, and negative affect comparisons due to Levene's tests revealing equal variances assumption not met.

Table 4. Correlations Among Time 1 Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Att Avo		**.34**	**.37**	**.25**	**.28**	**.27**	**-.24**	**-.34**	.01	**.16**	**-.20**	.01	**-.21**	-.04	-.14
2. Att Anx			**.52**	**.35**	**.30**	**.46**	**-.26**	**-.39**	.06	**.20**	**-.17**	-.13	-.03	-.09	-.11
3. Dep Sx				**.57**	**.56**	**.65**	**-.49**	**-.53**	.07	.10	**-.26**	**-.19**	-.07	-.07	-.09
4. Anx Sx					**.46**	**.58**	**-.21**	**-.38**	.08	.09	**-.22**	-.07	-.11	**-.16**	**-.17**
5. Anger						**.63**	**-.30**	**-.42**	-.01	.08	**-.21**	-.08	-.14	-.02	-.03
6. NA							**-.21**	**-.40**	.03	.14	**-.29**	-.09	-.10	-.05	-.13
7. PA								**.49**	-.03	.01	.04	.04	-.05	.03	-.07
8. SWL									-.04	-.07	**.20**	.11	**.16**	.05	.09
9. Str Int										.13	-.14	-.13	-.14	-.09	-.10
10. Fla Int											-.11	-.02	**-.25**	-.09	-.14
11. LNS												**.44**	**.17**	.13	**.25**
12. DSF													-.09	.02	.12
13. MR														**.20**	**.18**
14. Info															.08
15. SS															
Mean	45.30	62.03	13.18	4.21	15.08	18.52	35.31	25.50	2.58	55.66	9.51	9.32	8.62	9.91	11.66
SD	18.00	21.54	9.03	4.08	5.43	6.38	7.48	6.23	.93	34.11	2.08	2.75	2.91	2.61	2.59
α	.92	.92	.88	.75	.89	.83	.86	.85							

Table 4 Note. Bolded values indicate $p < .05$. Att. Avo. = Attachment avoidance; Att. Anx. = Attachment Anxiety; Dep. Sx = Depressive symptoms; Anx. Sx = Anxiety symptoms; NA = Negative affect; PA = Positive affect; SWL = Satisfaction with Life; Str. Int. = Transformed Stroop Interference; Fla. Int. = Flanker Interference; LNS = Letter-Number Sequencing; DSF = Digit Span Forward; MR = Matrix Reasoning; Info = Information; SS = Symbol Search.

Table 5 Correlations among Time 1 and Time 2 Outcome Variables

	T1 Dep	T1 Anx	T1 Ang	T1 NA	T1 PA	T1 SWL
T2 Dep	**.47**	**.48**	**.33**	**.48**	-.18	**-.48**
T2 Anx	**.31**	**.46**	**.21**	**.39**	-.12	**-.32**
T2 Ang	.17	**.22**	**.28**	**.33**	-.02	**-.31**
T2 NA	**.38**	**.39**	**.30**	**.58**	.02	**-.36**
T2 PA	**-.35**	**-.23**	-.16	**-.20**	**.54**	**.35**
T2 SWL	**-.39**	**-.32**	**-.20**	**-.29**	**.19**	**.62**

Note. N = 117. Bolded values significant at $p < .05$. T1 = Time 1; T2 = Time 2; Dep = Depressive Symptoms; Anx = Anxiety Symptoms; Ang = Anger; NA = Negative Affect; PA = Positive Affect; SWL = Satisfaction with Life.

Table 6. Time 1 Predictor and Moderator Correlations with Time 2 Measures

	T2 Dep	T2 Anx	T2 Ang	T2 NA	T2 PA	T2 SWL
T1 Att. Avo.	**.28**	.15	.03	.18	-.12	**-.37**
T1 Att. Anx.	**.37**	**.26**	**.19**	**.28**	**-.31**	**-.35**
T1 Str. Int.	.02	.09	.02	.06	.04	.01
T1 Fla. Int.	.11	.12	.08	.15	-.01	**-.21**
T1 LNS	-.05	-.03	-.12	-.12	.04	.04
T1 DSF	.04	-.08	.12	-.05	.05	-.01
T1 MR	-.02	-.07	-.09	-.06	.04	.09
T1 INFO	-.05	.07	-.05	.04	.09	.07
T1 SS	-.08	-.11	-.02	-.15	.07	.03
Mean	12.31	4.27	15.17	17.81	34.34	26.40
SD	9.64	5.53	5.97	6.95	7.63	5.78
α	.91	.89	.93	.88	.88	.86

Note. Att Avo. = Attachment Avoidance; Att. Anx. = Attachment Anxiety; Str. Int. = Transformed Stroop Interference; Fla. Int. = Flanker Interference; LNS = Letter-Number Sequencing; DSF = Digit Span Forward; MR = Matrix Reasoning; INFO = Information; SS = Symbol Search; Dep = Depressive Symptoms; Anx = Anxiety Symptoms; Ang = Anger; NA = Negative Affect; PA = Positive Affect; SWL = Satisfaction with Life

Table 7. Frequency of Severity of Depression at Each Time Point

	Time 1	Time 2
None to Minimal (0 - 9)	69 (40.80%)	57 (48.70%)
Mild (10 - 16)	53 (31.40%)	29 (24.80%)
Moderate (17 - 24)	27 (16.00%)	17 (14.50%)
Moderate to Severe (> 24)	20 (11.80%)	14 (12.00%)
	N = 169	N = 117

Table 8. Hierarchical Regression on Time 2 Depressive Symptoms

	β	*B*	*SE*	R^2	ΔR^2	ΔR^2 *p*	*df*	*F*	*p*
Step 1				.22	.22	<.01	1	33.03	<.01
T1 Depressive Sx	.40	.45	.12						<.01
Step 2				.27	.05	.22	5	6.80	<.01
Gender	-.11	-2.53	2.25						.27
Attachment Anxiety	.19	.09	.05						.06
Matrix Reasoning	.06	.21	.32						.52
Information	.04	.15	.37						.68
Symbol Search	-.09	-.32	.34						.34
Step 3				.30	.03	.53	5	4.07	<.01
Attachment Avoidance	.08	.04	.05						.41
Flanker Interference	.04	.01	.03						.67
Stroop Interference	.02	.00	.00						.83
DSF	.17	.57	.33						.09
LNS	-.05	-.25	.54						.65
Step 4				.31	.02	.68	4	3.09	<.01
FlankerXavoidance	.04	.00	.00						.70
StroopXavoidance	.02	.00	.00						.84
DSFXavoidance	.15	.03	.02						.15
LNSXavoidance	-.08	-.02	.03						.48

Note. T1 Depressive Sx = Time 1 Depressive Symptoms; Stroop Interference = Transformed Stroop interference; FlankerXavoidance = Interaction term between Flanker interference and attachment avoidance; StroopXavoidance = Interaction term between transformed Stroop interference and attachment avoidance; DSFXavoidance = Interaction term between Digit Span Forward and attachment avoidance; LNSXavoidance = Interaction term between Letter-Number Sequencing and attachment avoidance.

Table 9. Hierarchical Regression on Time 2 Anxiety Symptoms

	β	*B*	*SE*	R^2	ΔR^2	ΔR^2 *p*	*df*	*F*	*p*
Step 1				.21	.21	<.01	1	31.08	<.01
T1 Anxiety Symptoms	.39	.57	.14						<.01
Step 2				.24	.02	.65	5	5.66	<.01
Gender	-.02	-.31	1.30						.81
Attachment Anxiety	.12	.03	.03						.22
Matrix Reasoning	-.08	-.17	.19						.38
Information	.12	.26	.21						.22
Symbol Search	.02	.04	.20						.85
Step 3				.25	.01	.85	5	3.18	<.01
Attachment Avoidance	.08	.03	.03						.43
Flanker Interference	.06	.01	.02						.53
Stroop Interference	.09	.00	.00						.35
DSF	-.07	-.14	.19						.48
LNS	.06	.16	.31						.62
Step 4				.30	.05	.14	4	2.87	<.01
FlankerXavoidance	-.12	-.00	.00						.20
StroopXavoidance	.14	.00	.00						.13
DSFXavoidance	.20	.02	.01						.05
LNSXavoidance	-.09	-.01	.02						.42

Note. Stroop Interference = Transformed Stroop interference; FlankerXavoidance = Interaction term between Flanker interference and attachment avoidance; StroopXavoidance = Interaction term between Stroop interference and attachment avoidance; DSFXavoidance = Interaction term between Digit Span Forward and attachment avoidance; LNSXavoidance = Interaction term between Letter-Number Sequencing and attachment avoidance.

Table 10. Hierarchical Regression on Time 2 Anger

	β	*B*	*SE*	R^2	ΔR^2	ΔR^2 *p*	*df*	*F*	*P*
Step 1				.08	.08	<.01	1	10.04	<.01
T1 Anger	.24	.29	.12						.02
Step 2				.11	.03	.61	5	2.25	.04
Gender	-.09	-1.21	1.52						.43
Attachment Anxiety	.21	.06	.03						.05
Matrix Reasoning	-.01	-.03	.22						.90
Information	.03	.07	.25						.79
Symbol Search	.00	.01	.23						.98
Step 3				.16	.05	.29	5	1.81	.06
Attachment Avoidance	-.10	-.03	.04						.35
Flanker Interference	.05	.01	.02						.61
Stroop Interference	.00	.00	.00						.98
DSF	.24	.50	.23						.03
LNS	-.19	-.59	.37						.11
Step 4				.18	.03	.55	4	1.52	.11
FlankerXavoidance	-.03	.00	.00						.74
StroopXavoidance	.07	.00	.00						.53
DSFXavoidance	.18	.02	.01						.11
LNSXavoidance	-.06	-.01	.02						.63

Note. Stroop Interference = Transformed Stroop interference; FlankerXavoidance = Interaction term between Flanker interference and attachment avoidance; StroopXavoidance = Interaction term between Stroop interference and attachment avoidance; DSFXavoidance = Interaction term between Digit Span Forward and attachment avoidance; LNSXavoidance = Interaction term between Letter-Number Sequencing and attachment avoidance.

Table 11. Hierarchical Regression on Time 2 Negative Affect

	β	*B*	*SE*	R^2	ΔR^2	ΔR^2 *p*	*df*	*F*	*p*
Step 1				.34	.34	<.01	1	57.88	<.01
T1 Negative Affect	.54	.64	.11						<.01
Step 2				.36	.02	.59	5	10.17	<.01
Gender	-.08	-1.31	1.53						.40
Attachment Anxiety	.04	.01	.03						.71
Matrix Reasoning	.02	.04	.22						.85
Information	.11	.28	.25						.26
Symbol Search	-.10	-.27	.23						.25
Step 3				.38	.02	.70	5	5.73	<.01
Attachment Avoidance	.10	.04	.04						.27
Flanker Interference	.06	.01	.02						.52
Stroop Interference	.08	.00	.00						.32
DSF	-.03	-.06	.23						.79
LNS	.07	.24	.38						.54
Step 4				.30	.01	.73	4	4.25	<.01
FlankerXavoidance	-.04	.00	.00						.67
StroopXavoidance	.05	.00	.00						.55
DSFXavoidance	.12	.02	.01						.22
LNSXavoidance	-.08	-.02	.02						.43

Note. Stroop Interference = Transformed Stroop interference; FlankerXavoidance = Interaction term between Flanker interference and attachment avoidance; StroopXavoidance = Interaction term between Stroop interference and attachment avoidance; DSFXavoidance = Interaction term between Digit Span Forward and attachment avoidance; LNSXavoidance = Interaction term between Letter-Number Sequencing and attachment avoidance.

Table 12. Hierarchical Regression on Time 2 Positive Affect

	β	*B*	*SE*	R^2	ΔR^2	ΔR^2 *p*	*df*	*F*	*p*
Step 1				.30	.30	<.01	1	48.20	<.01
T1 Positive Affect	.53	.56	.09						<.01
Step 2				.35	.05	.14	5	9.71	<.01
Gender	.10	1.85	1.66						.27
Attachment Anxiety	-.21	-.08	.03						.02
Matrix Reasoning	.07	.21	.24						.39
Information	.04	.10	.27						.70
Symbol Search	.05	.15	.25						.55
Step 3				.37	.02	.56	5	5.60	<.01
Att. Avoidance	.13	.06	.04						.15
Flanker Interference	-.01	-.00	.02						.87
Stroop Interference	.13	.00	.00						.14
DSF	.02	.06	.25						.81
LNS	.09	.34	.40						.40
Step 4				.40	.03	.33	4	4.44	<.01
FlankerXavoidance	-.03	.00	.00						.69
StroopXavoidance	-.02	.00	.00						.85
DSFXavoidance	-.13	-.02	.02						.20
LNSXavoidance	.21	.05	.02						.04

Note. Att. Avoidance = Attachment Avoidance; Stroop Interference = Transformed Stroop interference; FlankerXavoidance = Interaction term between Flanker interference and attachment avoidance; StroopXavoidance = Interaction term between Stroop interference and attachment avoidance; DSFXavoidance = Interaction term between Digit Span Forward and attachment avoidance; LNSXavoidance = Interaction term between Letter-Number Sequencing and attachment avoidance.

Table 13. Hierarchical Regression on Time 2 Satisfaction with Life

	β	*B*	*SE*	R^2	ΔR^2	ΔR^2 *p*	*df*	*F*	*p*
Step 1				.38	.38	<.01	1	70.76	<.01
T1 Satis. with Life	.56	.57	.09						<.01
Step 2				.41	.03	.41	5	12.65	<.01
Gender	-.07	-.90	1.20						.46
Attachment Anxiety	-.08	-.02	.02						.34
Matrix Reasoning	-.02	-.04	.17						.83
Information	.13	.28	.20						.16
Symbol Search	-.08	-.19	.18						.31
Step 3				.44	.03	.30	5	7.53	<.01
Att. Avoidance	-.14	-.05	.03						.10
Flanker Interference	-.12	-.02	.02						.14
Stroop Interference	.04	.00	.00						.60
DSF	-.02	-.04	.18						.82
LNS	-.06	-.17	.29						.56
Step 4				.37	.01	.77	4	5.53	<.01
FlankerXavoidance	.01	.00	.00						.93
StroopXavoidance	.06	.00	.00						.47
DSFXavoidance	-.08	-.01	.01						.36
LNSXavoidance	.01	.00	.02						.95

Note. T1 Satis. with Life = T1 Satisfaction with Life; Att. Avoidance = Attachment Avoidance; Stroop Interference = Transformed Stroop interference; FlankerXavoidance = Interaction term between Flanker interference and attachment avoidance; StroopXavoidance = Interaction term between Stroop interference and attachment avoidance; DSFXavoidance = Interaction term between Digit Span Forward and attachment avoidance; LNSXavoidance = Interaction term between Letter-Number Sequencing and attachment avoidance.

FIGURES

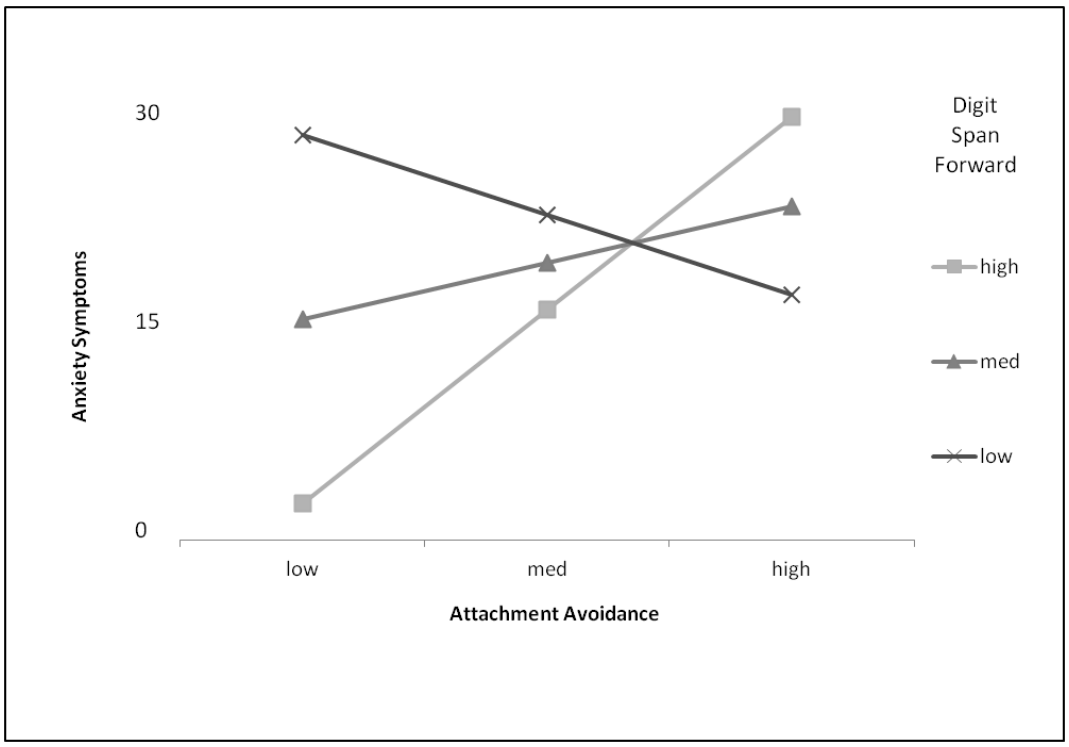

Figure 1. Graph of Interaction between Attachment Avoidance and Digit Span Forward on Anxiety Symptoms.

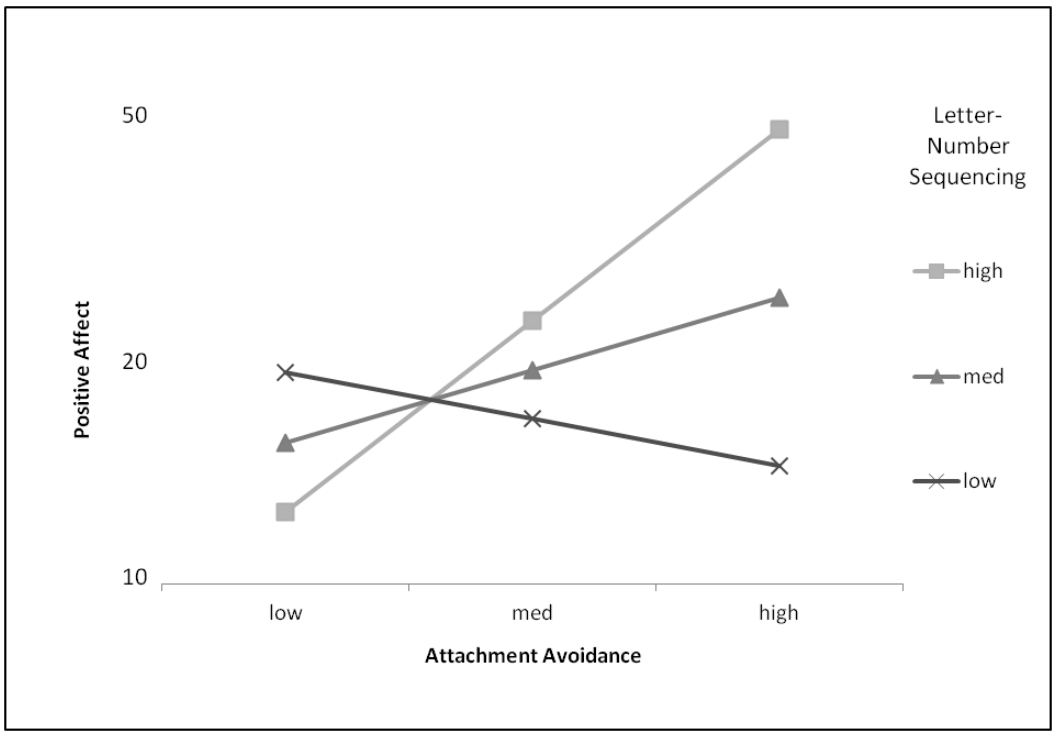

Figure 2. Graph of Interaction between Attachment Avoidance and Letter-Number Sequencing on Positive Affect.

VITA

VITA

Amanda M. Shea

EDUCATION

December 2013	Doctor of Philosophy in Clinical Psychology Indiana University – Purdue University Indianapolis (APA-Accredited) Indianapolis, IN Dissertation Title: Attachment Avoidance and Depressive Symptoms: A Test of Moderation by Cognitive Abilities;
July 2012 – June 2013	Predoctoral Internship in Psychology Veteran Affairs of Maryland Healthcare System/University of Maryland Baltimore Consortium (APA-Accredited) Baltimore, Maryland
May 2011	Preliminary Examination Indiana University – Purdue University Indianapolis Indianapolis, IN Preliminary Examination Title: Attachment Avoidance and Depressive Symptoms in Adults: A Meta-Analysis of the Relationship and its Moderators
May 2010	Master of Science in Clinical Psychology Indiana University – Purdue University Indianapolis Indianapolis, IN Thesis Title: Suicidal Ideation in College Students: A Test of a Theoretical Model
May 2007	Bachelor of Arts Ohio State University Columbus, OH Psychology major

CLINICAL EXPERIENCE

07/2012 – 06/2013	Predoctoral Intern, Adult Outpatient Psychiatry at University of Maryland Medical Center (Major Rotation) Supervisors: Laura Anderson, Ph.D. & Melanie Bennett, Ph.D.
07/2012 – 06/2013	Predoctoral Intern, Trauma Recovery Program at the Baltimore Veteran Affairs Medical Center Supervisor: Melissa Decker, Psy.D.
07/2012 – 06/2013	Predoctoral Intern, Psychosocial Rehabilitation and Recovery Center at the Baltimore Veteran Affairs Medical Center Supervisor: Melanie Bennett, Ph.D.
05/2011 – 09/2011	Practicum Student, Youth Services at Larue D. Carter Memorial Hospital (State Psychiatric Hospital) Supervisor: John Spanke, Ph.D.
03/2010 – 09/2011	Research Interviewer, Indiana University Simon Cancer Center; Goal-related Thoughts and End of Life Decisions in Advanced Cancer Patients Supervisor: Kevin L. Rand, Ph.D.
08/2010 – 01/2011	Practicum Student, Neuropsychology Clinic at Indiana University School of Medicine Supervisor: Dan Rexroth, Psy.D.
08/2009 – 01/2010	Practicum Student, Psychiatry Clinic at Indiana University School of Medicine Supervisor: Jeff Lightfoot, Ph.D.
01/2009 – 08/2009	Practicum Student, Richard L. Roudebush Veteran's Affairs Medical Center, Psychiatric Intensive Outpatient and Day Treatment Program Supervisor: Paul Lysaker, Ph.D.

PUBLICATIONS

Rand, K. L. & Shea, A. M. (2013). Optimism within the context of disability. In M. L. Wehmeyer (Ed.), *The Oxford handbook of positive psychology and disability* (pp. 48-59). New York: Oxford University Press.

Rand, K. L., Martin, A. D., & Shea, A. M. (2011). Hope, but not optimism, predicts academic performance of law students beyond previous academic achievement. *Journal of Research in Personality 45,* 683-686.

Lysaker, P. H., Shea, A. M., Buck, K. D., Dimaggio, G., Nicolo, G., Procacci, M., Salvatore, M., & Rand, K. L. (2010). Metacognition as a mediator of the effects of impairments in neurocognition on social function in schizophrenia spectrum disorders. *Acta Psychiatrica Scandinavica 122,* 405-413.

PRESENTATIONS

Shea, A.M., & Himelhoch, S. (2013, May). *Psychosocial Correlates of Prostitution in a Methadone Maintenance Treatment Sample*. Paper presented at the Veteran Affais Maryland Healthcare System's Research Day, Baltimore, MD.

Rand, K.L., Banno, D.A., Shea, A.M., & Cripe, L.D. (2013, March). *Life and Treatment Goals of Patients with Advanced Cancer.* Poster presented at the annual meeting of the Society of Behavioral Medicine, San Francisco, CA.

Shea, A. M., & Rand, K. L. (2012, January). *Attachment Avoidance and Depressive Symptoms in Adults: A Meta-analysis of the Relationship and its Moderators.* Poster presented at the annual meeting of the Society of Personality and Social Psychology, San Diego, CA.

Shea, A. M. (2011, September) *Cognitive-behavioral Therapy with a Child in an Inpatient Setting*. Case presented to the faculty and students of the Clinical Psychology Doctoral Program at Indiana University-Purdue University Indianapolis.

Shea, A. M., & Rand, K. L. (2011, January). *Pathways to Suicidal Thinking: Hope as a Predictor of Increased Suicidal Ideation in College Students.* Poster presented at the annual meeting of the Society of Personality and Social Psychology, San Antonio, TX.

Shea, A. M., Rand, K. L., & Martin, A. D. (2010, November). *Hope and Optimism in Law Students: Longitudinal Associations with Academic Performance and Life Satisfaction.* Poster presented at the annual meeting of the Indiana Psychological Association, Indianapolis, IN.

Shea, A. M., Rand, K. L., & Martin, A. D. (2010, January). *Hope and Optimism in Law Students: Longitudinal Associations with Academic Performance and Life Satisfaction.* Poster presented at the annual meeting of the Society of Personality and Social Psychology, Las Vegas, NV.

RESEARCH EXPERIENCE

2011 – 2013	Dissertation: Attachment Avoidance and Depressive Symptoms: A Test of Moderation by Cognitive Abilities Committee: Kevin Rand, Ph.D. (chair), Jesse Stewart, Ph.D., Melissa Cyders, Ph.D, Leslie Ashburn-Nardo, Ph.D.
2010 – 2011	Preliminary Examination: Attachment Avoidance and Depressive Symptoms in Adults: A Meta-Analysis of the Relationship and its Moderators Committee: Kevin Rand, Ph.D. (chair), Jesse Stewart, Ph.D., Melissa Cyders, Ph.D.
2008 – 2012	Goal-related Thoughts and End of Life Decisions in Advanced Cancer Patients; funded by the American Cancer Society Role: Research Assistant Principal Investigator: Kevin Rand, Ph.D. Co-Investigators: Larry Cripe, M.D.; Susan Perkins, Ph.D.
2009 – 2012	Personal Attitudes, Academic Performance, and Well-being in Law Students: A Multi-site Study Role: Research Assistant Principal Investigator: Kevin Rand, Ph.D. Co-Investigator: Allison Martin, J.D.
2009 – 2010	Metacognition in Men with Schizophrenia and Schizoaffective Disorder Role: Research Assistant Principal Investigator: Paul Lysaker, Ph.D.
2007 – 2009	Master's Thesis: Suicidal Ideation in College Students: a Theoretical Model Committee: Kevin Rand, Ph.D. (chair), Soren Svanum, Ph.D., Jesse Stewart, Ph.D.
2007 – 2010	Hope and Optimism in Law Students: Longitudinal Associations with Academic Performance and Life Satisfaction Role: Research Assistant Principal Investigator: Kevin Rand, Ph.D. Co-Investigator: Allison Martin, J.D.
2009	Decreasing Suicidal Ideation in Young Adults by Simulated Life Role: Research Assistant Principal Investigator: Joseph Defazio, Ph.D. Co-Investigator: Kevin Rand, Ph.D.

2007 – 2008	Test of Goal Attitudes: Development of a Measure Role: Research Assistant Principal Investigator: Kevin Rand, Ph.D.
2007 – 2008	Cardiovascular Reactivity and Recovery: Psychological Correlates Role: Research Assistant Principal Investigator: Jesse Stewart, Ph.D. Co-Investigator: Kevin Rand, Ph.D.
2006 – 2007	Attentional Training for the Treatment of Depression Role: Research Assistant Principal Investigator: Daniel Strunk, Ph.D.
2003 – 2006	Ziprasidone Observational Study of Cardiac Outcomes (ZODIAC) Role: Research Assistant Co-Investigators: Michael Chan, M.D.; Kevin Ware, M.D.; Fred Romeo, M.D.; Arthur Thalassinos, M.D.
2003	Broad Effectiveness Trial of Aripiprazole (BETA) Phase III Role: Research Assistant Co-Investigators: Kevin Ware, M.D.; Fred Romeo, M.D.

RELEVANT WORK EXPERIENCE

08/98 – 08/07	Mount Carmel Psychiatric Services, Mount Carmel Health Columbus, Ohio Roles: Office Manager, Department Secretary, Unit Secretary

WORKSHOPS & SPECIAL TRAINING

2012 – 2013	Predoctoral Internship Seminar Veteran's Affairs Maryland Healthcare System and University of Maryland Baltimore Internship Consortium, Baltimore, MD
2012 – 2013	Trauma Clinical Seminar University of Maryland Baltimore, School of Medicine, Department of Psychiatry, Adult Outpatient Clinic, Baltimore, MD
09/ 2013	Clinical Supervision Workshop Carol Falender, Ph.D., Veteran's Affairs Maryland Healthcare System, Baltimore, MD

2009 – 2012	ProSeminar in Clinical Psychology Department of Psychology, IUPUI, Indianapolis, IN
03/2011	Schema Therapy Workshop Joan Farrell, Indiana University School of Medicine, Department of Psychiatry and Training Director of the Center for Borderline Personality Disorder Treatment & Research. Indianapolis, IN
01/2011	Society for Personality and Social Psychology Annual Conference Preconference: Close Relationships San Antonio, TX
03/2010	Evidence-Based Practice Workshop Barbara Walker, Indiana University-Purdue University Indianapolis, Indianapolis, IN
Summer 2009	Seminar in Teaching Psychology Kathy Johnson, Ph.D., Indiana University-Purdue University Indianapolis, Instructor. Indianapolis, IN. Grade: A
04/2009	Acceptance and Commitment Therapy Workshop Rhonda M. Merwin, Duke University Assistant Professor. Indianapolis, IN
04/2008	Motivational Interviewing Workshop Indianapolis, IN

AWARDS

2012	Clinical Excellence—Indiana University-Purdue University Indianapolis.
2010	Student Poster Competition—Tied for Third Place; Indiana Psychological Association.

SERVICE

2010 – 2011	Graduate Student Representative to the General Psychology Faculty for Indiana University-Purdue University Indianapolis' Psychology Graduate Student Organization

TEACHING EXPERIENCE

Fall 2009	PSY-B 424 Theories of Personality Role: Instructor
Fall 2009	PSY-B 104 Psychology as a Social Science Role: Instructor
Spring 2009	PSY-B 461 Capstone Seminar in Psychology Role: Teaching Assistant Instructor: Silvia Bigatti, Ph.D.
Spring 2009	PSY-B 365 Psychology of Stress and Health Role: Teaching Assistant Instructor: Silvia Bigatti, Ph.D.
Fall 2008	PSY-I 664 Psychological Assessment I; graduate-level course Role: Teaching Assistant Instructor: Alex Khislavsky, Ph.D.
Spring 2007	PSY-B 310 Lifespan Development Role: Teaching Assistant Instructor: Shenan Kroupa, Ph.D.
Spring 2007	PSY-B 424 Theories of Personality Role: Teaching Assistant Instructor: Kevin Rand, Ph.D.
Fall 2007	PSY-B 310 Lifespan Development Role: Teaching Assistant Instructor: Shenan Kroupa, Ph.D.
Fall 2007	PSY-B 424 Theories of Personality Role: Teaching Assistant Instructor: Kevin Rand, Ph.D.

PROFESSIONAL ORGANIZATIONS

2013 – Present	International Society for Traumatic Stress Studies
2012 – Present	Ohio Psychological Association

2010 – 2012	Indiana Psychological Association
2009 – 2012	Society for Personality and Social Psychology