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Social and Physiological Cognates of Looming Vulnerability to Anxiety

A thesis submitted in partial fulfillment of the requirement for the degree of Bachelors of Arts in Psychology from The College of William and Mary

by

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Social and Physiological Cognates of Looming Vulnerability to Anxiety

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Abstract

The looming vulnerability model posits that the experience of anxiety is based on the anticipation that feared stimuli are rapidly approaching and intensifying rather than remaining stable. The present study examined several possible social and physiological cognates of looming vulnerability including attachment anxiety and avoidance in adult relationships, parental care and overprotection, intrusions, and physiological reactivity to chosen film clips. Results showed that adult relationship anxiety, but not avoidance, was associated with higher levels of looming vulnerability. Results did not show a significant relationship between parental bonding, physiological reactivity, or intrusions and looming vulnerability. Implications of the experimental mediums chosen are discussed in relation to the looming construct along with directions for future research.
Social and Physiological Cognates of Looming Vulnerability to Anxiety

What do a child terrified of snakes, a soldier with flashbacks after combat, and a chronic worrier all have in common? They all suffer from anxiety. Anxiety is defined by the DSM-IV-TR as an "apprehensive anticipation of future danger or misfortune accompanied by a feeling of dysphoria or somatic symptoms of tension" (American Psychiatric Association, 2000). Anxiety disorders are the most commonly diagnosed type of mental disorder, affecting approximately 15.7 million people in the United States each year, and 30 million people in the United States at some point in their lives (Lépine, 2002). The categories of anxiety disorders specified in the DSM-IV-TR include social phobia, specific phobia, posttraumatic stress disorder, obsessive compulsive disorder, panic disorder with and without agoraphobia, and generalized anxiety disorder (APA, 2000). Anxiety disorders also have a high level of comorbidity with many other mental disorders (Kessler, Chiu, Demler, & Walters, 2005). The prolonged and acute stress caused by anxiety disorders can have severe effects on sufferers’ psychological, physical, social, and economic well-being.

In recent years, cognitive models have come to the forefront in the conceptualization and treatment of anxiety disorders. Beck’s cognitive theory of anxiety proposes that anxiety involves a biased interpretation of information related to future threat or danger (Beck, 1985). According to Beck and Clark’s (1997) refined cognitive model, not only is anxiety related to overestimation of threat due to biased processing, but it is also influenced by an underestimation of coping ability and environmental safety. What differentiates anxiety disorders from nonpathological forms of anxiety and worry is that the overestimation of danger is persistent, is experienced as out of the individual’s control, is not supported by actual cues in the environment, and impairs functioning (Beck & Clark, 1997). For example, it would be understandable to feel anxious if
you were thrown into a pit of snakes like Indiana Jones, but it would be an overestimation of
danger if you refused to ever go outside for fear of snakes.

Beck and Clark’s (1997) refined cognitive model focuses on a processing sequence of
three stages involved in the formation of anxiety. The first stage involves the automatic
registration of the stimulus. This automatic processing is biased to threatening information as an
evolutionary advantage, but it can become extreme in the biased processing of anxiety disorders.
The second stage involves immediate preparation to deal with the threat. This includes the
primary appraisal of the threat and the activation of the “threat mode”. This triggers a variety of
physiological and psychological changes that prepare the body for escape or defense against the
threat. Finally, we arrive at the third stage of secondary elaboration. This stage involves the
activation of elaborate semantic processing and reflective consideration of protective factors
such as coping abilities and safety signals in the environment. A majority of cognitive therapy
focuses on regaining control of the threat bias in the third stage of processing, as the others are
mostly automatic. (Beck & Clark, 1997)

Beck’s cognitive model is reflected in each of the specific anxiety disorders. In panic
disorder, a misinterpretation of the bodily sensations involved in anxiety, such as heart
palpitations or shortness of breath, increase the anxiety of impending disaster (Clark, 1988). In
social phobia, individuals are too busily engaged in threat perceptions and presentations of safety
behaviors to attend to positive cues in the environment. Therefore, the cues about the reception
of behaviors come primarily from the sufferers and their negative processing bias, rather than
from the environment (Clark & Wells, 1995). The cognitive theory of posttraumatic stress
disorder focuses on the role of rigid schemas that lead the anxious individual to perceive the
world as extremely dangerous and the self as incapable of coping successfully, as well as a
variety of maladaptive coping styles (Feeny & Foa, 2006). In obsessive compulsive disorder, for example, individuals suffer from an exaggerated sense of responsibility and misinterpret the importance of intrusive thoughts (Rachman, Shafran, & Riskind, 2006). In generalized anxiety disorder, biased processing leads individuals to overestimate the severity of the threat and overuse protective strategies to increase their coping resources (Riskind & Williams, 2005).

Ultimately, the cognitive theory of anxiety presents a framework within which the wide spectrum of anxiety disorders can be understood.

In addition to the framework of Beck’s cognitive model of anxiety, what are some of the specific risk factors that can increase the experience of anxiety disorders? One important cognitive factor is the tendency to overestimate the likelihood of threatening events and interpret ambiguous situations as threatening (Butler & Mathews, 1983, 1987). Anxiety has also been linked to an increased frequency of actual negative life events (Beasley, Thompson, & Davidson, 2003; Herrington, Matheny, Curlette, McCarthy, & Penick, 2005), especially ones that are threatening as opposed to those related to a past loss, such as a death (Sandin, Chorot, Santed, & Valiente, 2004). Another important risk factor for anxiety is anxiety sensitivity. Anxiety sensitivity is the concept that people will become anxious in the presence of a feared stimulus, not only because of the stimulus, but also because they become highly sensitized to and fear their own physiological reactions to the anxiety (Berman, Wheaton, McGrath, & Abramowitz, 2010).

Physiological reactivity is an important facet of anxiety disorders. Anxiety sensitivity has been linked to greater tonic heart rate and greater diastolic blood pressure (Schmidt, Santiago, & Wernicke, 2001). One study found that anxious adolescents were more aware of small increases in physiological arousal in a stressful situation, and more concerned about the implications of that arousal (Anderson & Hope, 2009). Physiological reactivity has also been
shown to be a crucial element in the experience of several different types of anxiety disorders, such as posttraumatic stress disorder (McTeague et al., 2010), social and specific phobias (Cuthbert et al., 2003), and panic disorder (Rassovsky, Abrams, & Kushner, 2004). Studies also show that individuals with specific anxiety disorders, such as social phobia, show greater physiological reactivity to imagery related to their specific fear but the same physiological reactivity as nonanxious individuals to universal survival threats (McTeague et al., 2009). Cichon (2004) also found a partial link between greater physiological reactivity to an anxiety task and rumination.

One of the challenges facing cognitive theorists today is how to separate cognitive processes associated with anxiety from depression, since these issues are often comorbid. Beck’s cognitive theory posits that anxiety is related to the overestimation of future threat, whereas depression focuses on hopelessness and past loss (Beck & Clark, 1997). Depressive cognitive styles focus on the explanations of past events, such as loss and failure, and individuals who exhibit this style are at risk to develop depression following negative life events (Abramson, Metalsky, & Alloy, 1989; Beck, 1987). However, many elements that are posited to be specific to anxiety, such as threat cognitions, are difficult to distinguish from elements of depression (Beck & Perkins, 2001; Brown, Campbell, Lehman, Grisham, & Mancill, 2001). The model of “looming vulnerability” is one answer to this problem.

The model of looming vulnerability attempts to integrate the cognitive theory of fear biases while eliminating the overlap frequently found with depression. Looming vulnerability refers to “a sense that dangers are rapidly rising in risk as they approach through time or through space, or move toward dreaded ends” (Riskind, Williams, & Joiner, 2006). This model assumes that the experience of anxiety is based on the anticipation that feared stimuli are rapidly
approaching and intensifying rather than remaining stable (Riskind, 1997). The threat present in looming vulnerability can occur due to the forward velocity of the threat and the perception of its acceleration (Riskind, 1997). In one study conducted by Riskind & Wahl (1992), participants viewed videos of rabbits and spiders moving forward, moving backward, or standing still. The video of the tarantula moving forward created a significantly greater amount of anxiety than any other condition. Ultimately, the cognitive bias of individuals towards threatening information leads them to experience a sense of looming vulnerability (Riskind, 1997).

The concept of looming vulnerability is derived from an evolutionary and cognitive base. From an evolutionary perspective, a cognitive bias toward a threat in motion was adaptive for the preservation of the species. It was of the utmost importance to notice an approaching predator to maintain survival (Riskind, 1997). There is an extensive body of evidence that suggests that this bias is not only a human phenomenon. Many species including crabs, hens, rats, fish, and primates automatically react to moving stimuli (Riskind, 1997). Cognitive processing also plays an important role in creating looming vulnerability. Looming vulnerability is evidenced through the looming cognitive style, which is an overarching tendency to interpret information as conveying rapidly rising risk (Riskind et al., 2006). The looming cognitive style (LCS) functions as a danger schema which biases information processing to signs of movement and threat (Riskind, 1997). This schema interacts with specific fears to create the different manifestations of anxiety disorders (Riskind & Williams, 1999).

This bias for interpreting information as threatening is different from the concept of catastrophizing. Looming vulnerability is a higher-order cognitive bias that applies to all anxiety producing situations, whereas catastrophizing is an example of looming vulnerability interacting with the fear of a catastrophe in a specific situation to create anxiety (Riskind & Williams, 1999).
Several studies illustrate the overarching bias for threat in the LCS. One study showed that individuals high in LCS showed a significant bias toward interpreting ambiguous homophones, such as “dye” and “die”, in a threatening manner (Riskind, Williams, Gessner, Chrosniak, & Cortina, 2000). Another study showed that participants with high LCS were more likely to recall moving rather than static images on a recall task, thus illustrating the bias, not only for objectively negative information, but also for movement associated with the threat (Riskind et al., 2000). Riskind (1997) also hypothesized that individuals with high LCS had more elaborate and fixed fear-scripts. Fear-scripts are patterns of action stored in memory that have sequenced rules to help a person anticipate the forward motion of a threat (Riskind, 1997). Those with high LCS are more likely to frequently activate elaborate and highly rehearsed fear-scripts that will increase the attention to looming in threatening stimuli (Riskind, 1997).

The looming vulnerability model is also reinforced by a series of feedback loops and protective behaviors. Once the LCS is established, a biased danger schema is created that will bias attention toward potential threats (Riskind et al., 2000). It also creates biased estimates for the rate the danger is intensifying. According to Gibson (1979), individuals decide where to use their attentional resources based on changes in stimuli, such as motion, rather than the content of the stimuli themselves. Therefore, individuals experiencing a sense of looming will spend more energy focusing on anxiety. The biased attention for threat quickly leads to a sense that the danger is urgent and fear producing (Riskind et al., 2006). In order to cope with the frequent levels of high threat and anxiety, individuals tend to develop avoidant and rigid coping mechanisms (Riskind et al., 2000). One type of avoidant coping strategy is worry (Borkovec, 1994). Worry helps alleviate anxiety by putting it into a less threatening linguistic form (Riskind et al., 2006). The use of avoidant coping strategies initiates a feedback loop by maintaining the
distorted perception of the threat and the lack of ability to cope with it (Riskind et al., 2006). Basically, a spiral is created because a threat bias is initiated and then avoidant behaviors are engaged in so that the fears are never proven wrong. It is also posited that this can lead people to generate their own stressful life events without any help from the environment (Riskind et al., 2006).

Looming has become an important construct in the prediction and development of anxiety disorders. Looming has been shown to predict specific levels of anxiety even when controlling for the level of fear (Riskind et al., 2006). Looming has also been shown to be an independent construct from those frequently associated with anxiety, such as neuroticism, negative affect, or negative life events (Riskind et al., 2000). One of the most important benefits of the looming vulnerability model is its ability to differentiate between anxiety and depression (Riskind, 1997; Riskind & Wahl, 1992). It has also been shown to be the strongest predictor of thought intrusion and distress (Riskind et al., 2006). Ultimately, LCS can be understood as an overarching dimension of anxiety that underlies the common features of all anxiety disorders (Riskind et al., 2006).

The effectiveness of the looming vulnerability model to explain the anxiety process in different anxiety disorders has been well documented. Research has shown that individuals with obsessive compulsive disorder have a higher sense of looming vulnerability related to the spread of contamination (Riskind, Abreu, Strauss, & Holt, 1997) and that high levels of looming anxiety predict symptom severity in OCD beyond the effect of beliefs and interpretations (Riskind & Rector, 2007). Another study by Riskind, Wheeler, and Picerno (1997) also showed that directing OCD patients to mentally “freeze” the threat of contamination in place in their minds lowered the anxiety reported by those patients. Individuals suffering from posttraumatic stress
disorder are also affected by looming vulnerability. Flashbacks that occur in PTSD often contain scenes of motion and looming danger (Hellawell & Brewin, 2004; Ehlers & Steil 1995), and the looming cognitive style leads patients to generate mental scenarios of rapidly rising risk that similar frightening events will occur (Riskind et al., 2006).

People who suffer from specific phobias can also exhibit looming vulnerabilities for only that specific fear. For example, in one study people with an intense fear of spiders imagined that a spider in the room would move toward them rather than other people in the room, and that it would move toward them very quickly (Riskind, Moore, & Bowley, 1995). Individuals with social phobia or performance related phobias often exhibit an interaction between a looming cognitive style and early experiences that link performance to acceptance. These individuals have images of rapidly rising danger of being scrutinized, negatively evaluated, and rejected when faced with a social or performance situation (Brown & Stopa, 2008; Riskind et al., 2006). The looming model was also used in a clinical intervention with an individual suffering from severe performance anxiety with great success (Riskind, Long, Duckworth, & Gessner, 2004). Another study showed that people who suffer from panic disorders experienced heightened sensitivity for physical sensations, such as increased heart rate, and generate scenarios of rapidly intensifying physical danger (Riskind et al., 2006).

Generalized anxiety disorder has also been extensively studied in relation to the looming vulnerability model. Those with GAD suffer from overactivation of danger related schemas according to cognitive theory (Beck & Clark, 1997; Riskind & Williams, 2005). The study by Riskind and Williams (2005) presents three ways in which looming cognitive style contributes to GAD. First, it leads the individual to generate threatening mental scenarios even about everyday objects or situations. Second, looming absorbs the mental resources of the individual which
makes them unable to cope with the threatening thoughts. Third, it encourages the individual to use cognitive avoidance techniques, like protracted worry, to neutralize the anxiety-related thoughts. Looming cognitive style is also associated with an increase in mental imagery which can increase the perception of the increasing threat of the feared stimulus (Riskind et al., 2006). This can even include the concept of meta-worry, in other words, worrying about worrying or worrying about being overcome by an emotion like anxiety or depression (Riskind et al., 2006).

One possible developmental cognate for looming cognitive style is parental bonding. Bowlby (1969) related disruption of attachment bonds to a variety of psychological disorders including depression and suicide. Parental bonding requires elements of parental care and protection in order to produce love and affection and a sense of safety (Bowlby, 1969). Several studies have illustrated links between psychological disorders such as depression and anxiety and parental overprotection (Bennet & Stirling, 1998; Silove, Parker, Hadzi-Pavlovic, & Manicavasagar, 1991). One study conducted by Riskind et al. (2004b) attempted to integrate the impact of parental bonding and psychopathology and the cognitive looming vulnerability. The study found that retrospective perceptions of low maternal overprotection and high paternal overprotection were associated with higher levels of looming cognitive style. The study also found that retrospective reports of an insecure maternal attachment style were also associated with higher levels of cognitive vulnerability to anxiety. It was postulated that overprotective fathers send a message of greater danger due to the deviation from expected gender roles, whereas a mother who is not overprotective could lead the child to develop feelings of vulnerability (Riskind et al., 2004b). If parental bonding is disturbed in a variety of ways it can increase the feeling of vulnerability to threat or lead to a lack of ability or confidence in coping mechanisms.
Attachment theory can also expand to include a model of adult romantic attachment. A study by Baldwin, Keelan, Fehr, Enns, and Koh-Rangarajoo (1996) explains that attachment patterns developed in early childhood help to form schemas governing relationships with others. These schemas can influence attention and behavior as people move from childhood attachment into adult romantic relationships. A model by Brennan, Clark, and Shaver (1998) presents a dimensional model of attachment. The two dimensions of attachment anxiety and attachment avoidance intersect to form four different attachment styles: secure, fearful, dismissing, and preoccupied. Secure adults hold positive relational schemas toward the self and others (Bartholomew & Horowitz, 1991; Collins & Read 1990). Fearful adults hold a negative relational schema toward the self and others and anticipate rejection from others (Mikulincer, 1998). Dismissing adults hold a positive view of the self, but a negative view towards others and use defensive mechanisms to de-emphasize attachment needs (Fraley & Shaver, 1997). Preoccupied adults hold a negative view of the self but a positive view of others and thus doubt their acceptability to others (Mikulincer, 1998).

Attachment literature suggests that disruption in childhood attachment could be a developmental factor in the creation of negative cognitive styles (Alloy et al., 2001). Williams and Riskind (2004) conducted a study to evaluate the connection between adult romantic attachment styles and looming cognitive vulnerability. The study found that high levels of attachment insecurity were linked to higher levels of anxiety and depression, higher levels of relationship impairments and higher looming cognitive vulnerabilities. People who fell into categories that contained a negative view of the self (fearful and preoccupied groups) showed higher levels of cognitive vulnerability. Attachment avoidance and anxiety are postulated to be
strong developmental factors for looming vulnerability because of their ability to predict anxiety but not depression.

The clinical implications of the looming vulnerability model have only just begun to be explored. The term “looming management” was coined by Riskind & Williams (1999) to refer to the various therapeutic uses of the looming vulnerability model. This could include interventions to change the cognitive vulnerabilities to LCS (Riskind et al., 2006). It could also possibly be used to treat anxiety by decreasing the sense of movement and looming present in the mental representations of anxiety. One study by Riskind, Wheeler, and Picerno (1997) found that individuals with OCD who were taught to “freeze” their mental images of looming contamination in their minds experienced a decrease in anxiety. By decreasing the sense that the contamination was spreading rapidly towards them, they could effectively decrease their anxiety.

Another technique involves slowing down the imagined progression of an event that actually involves motion. In the Riskind et al. (2004a) clinical case study the research team used this technique to treat an individual suffering from severe performance anxiety prior to a dance recital. The patient initially imagined the dance happening too quickly for her to remember her steps and keep up with the other dancers. The research team then instructed her to imagine herself dancing at only a small fraction of the speed she was imagining. They gradually increased the speed she imagined herself dancing successfully without anxiety until it was well above her initial level. She then felt confident that she could perform the steps at the original speed. Also, increasing progress toward the understanding of the developmental antecedents of the looming cognitive style will open new avenues to explore in clinical treatment and prevention. Attacking the source of the looming cognitive style could have a profound impact on its development and manifestation.
The primary objective of the present study was to examine several of the hypothesized developmental cognates of looming vulnerability. One portion of the study involved a partial replication of Williams and Riskind’s (2004) study on adult attachment. It was hypothesized that adult attachment anxiety and avoidance would be associated with higher levels of looming cognitive vulnerability. This study also attempted to replicate the Riskind et al. (2004b) study on parental bonding. It was predicted that high levels of parental overprotection or low levels of parental care would be associated with higher levels of looming cognitive vulnerability. However, it was anticipated that the effect found by Riskind et al. (2004b) for gender differences in parental involvement would not be found when evaluated in a sample with greater gender equality. It is believed that differences in maternal and paternal influence found in the Riskind et al. (2004b) study were the result of a skewed gender sample (78 females and 12 males).

The current study also explored the link between physiological reactivity and looming vulnerability. Based on studies emphasizing the importance of motion in looming vulnerability, this study looked at physiological reactivity to film clips that portrayed episodes in which interpersonal conflict and negative affect were expressed. It was hypothesized that the participants with greater physiological reactivity during the emotional film clips would also have higher looming vulnerability scores. Finally, this study also investigated the concept of thought intrusion and biased memory in looming vulnerability. It was hypothesized that participants with higher looming vulnerability scores would report more instances of conscious thought intrusion and dream content relating to the film clips as measured by a self-report questionnaire administered one week following the film viewing.

Method
Participants

Participants were 52 undergraduate students (17 men, 35 women) who ranged in age from 18 to 22 ($M = 19.15$, $SD = .998$). Participants were enrolled in introductory psychology courses and participated in this study in exchange for course credit. Most participants were underclassmen: 43% of the sample were freshmen; 27% were sophomores; 27% were juniors; and 3% were seniors. The majority of the sample described their racial identification as Caucasian (72%).

Materials

The *Sona Systems Database* is an online experiment management system (Sona Systems Ltd., 2008). Participants gained access through the College of William and Mary psychology research participation system. Participants used this system to register for available study time slots. They also completed a mass testing packet online that included demographic information and several depression and anxiety measures.

The *Beck Anxiety Inventory* (BAI; Beck, Epstein, Brown, & Steer, 1988) is a 21-item self-report measure designed to assess anxiety symptoms in clinical and community populations. Participants rate how much they have been bothered by each of the 21 anxiety symptoms over the past week on a 4-point Likert scale.

The *Looming Maladaptive Style Questionnaire* (LMSQ; Riskind et al., 2000) is a 18-item measure of the tendency for individuals to generate mental images of potentially threatening situations as rapidly risking in risk or danger. Participants read six brief vignettes describing potentially stressful situations and complete three questions for each using a 5-point Likert scale.
The Parental Bonding Instrument (PBI; Parker, Tupling, & Brown, 1979) is a 25-item questionnaire that measures two dimensions of parental bonding: care and overprotection. Participants rate separately the level of care and protection provided by their mother and father in the first sixteen years of life on a 0-3 scale.

The Experiences in Close Relationship Scale (ECR; Brennan et al., 1998) is a 36-item questionnaire designed to measure attachment anxiety and attachment avoidance in adult romantic relationships. Participants rate the extent to which each item describes their feelings in close relationships on a 7-point Likert scale. Eighteen items are focused on attachment anxiety, while the other eighteen are focused on attachment avoidance.

The Post Film Questionnaire (Rottenburg & Gross, 2007) contains a modified PANAS scale on which participants indicate the greatest amount of each emotion felt during the preceding film clip, using both discrete emotion (specific) and dimensional (pleasant vs. unpleasant) terms. Each emotion is rated on a 9-point Likert scale. In addition, participants were asked to rate the intensity of each clip on a 7-point Likert scale and rate how strongly they agreed with the statements that the clip would pop into their head or affect their sleep or dream content during the following week on a 7-point Likert scale. One week later, participants received a follow-up survey which asked if they had dreamt about any of the clips during that week and if any of the clips had popped into their head during that week. These questions were used to assess intrusion of the film clips.

Film Clips. Each participant viewed a total of eight film clips. These film clips included four negatively arousing clips and four neutral clips. Each film clip was edited to be approximately three minutes in length, although small variations in the length of the film clips
were accepted to make sure the thematic content was understandable. These film clips were chosen from a large number of clips using a procedure for piloting film clips recommended by Gross and Levenson (1995). The negatively arousing film clips were chosen on the basis of involving themes of immediate bodily harm or confrontation. The clips were chosen after conducting within-subjects t-tests to show the extent to which each film elicited high emotion and arousal ratings. All emotional film clips chosen had a mean target emotion of 5 or higher on an 8-point Likert scale. The scenes chosen came from the films *Carnal Knowledge* (Nichols, 1971), *Falling Down* (Shumacher, 1993), *Kingdom of Spiders* (Cardos, 1977), and *Black Hawk Down* (Scott, 2001). The neutral film clips were chosen for their lack of positive or negative stimuli while still including human figures. The neutral clips elicited an average rating of 2 or lower on the 8-point Likert scale used during the pilot tests. These clips depicted slightly varied scenes of a busy street intersection.

*Biopac Systems, Inc.* (Biopac Systems, Inc., Goleta, CA). Physiological data was collected with a Biopac encoder unit (MP150) and AcqKnowledge 3.9 software with a sampling rate of 1,000 samples per second.

*SuperLab Pro* (SuperLab, Phoenix, AZ) was the experimental laboratory software used to write the program for stimulus presentation and data recording.

**Procedure**

Participants registered for the study using the SONA Systems Database. There were no pre-selection criteria used and all students enrolled in the introductory psychology classes had the opportunity to register for available spots in the study. After reading and signing the consent form, participants completed a packet of several surveys including a brief demographic
questionnaire, the Experiences in Close Relationships Scale, the Parental Bonding Instrument, the Looming Maladaptive Style Questionnaire, and the Beck Anxiety Inventory. The titles of the surveys were removed to foster unbiased responses.

After the surveys were completed, participants were tested for possible allergic reactions by rubbing a small amount of electrode gel on the forearm to test for sensitivity. Participants then had disposable Ag/AgCl electrodes for electrocardiogram (ECG) monitoring attached to the back of the left and right calves and the left forearm. Skin conductance electrodes were also attached to the first and middle fingers of the participants’ nondominant hand. The electrode sensors were small, pre-gelled, self-adhesive devices purchased from the BioPac corporation that are widely used in clinical and research studies.

After an explanation of the instructions, which was also presented on the computer screen, baseline heart rate (HR) and skin conductance (EDA) were recorded. Participants then began viewing a series of eight three-minute film clips containing either neutral or negative emotional scenes. Heart rate and skin conductance measures were recorded continuously during each clip with markers entered by the experimenter to indicate the start and stop of each film clip. The clips were presented in the following order: Carnal Knowledge (Nichols, 1971), neutral clip, Black Hawk Down (Scott, 2001), Falling Down (Shumacher, 1993), neutral clip, neutral clip, Kingdom of Spiders (Cardos, 1977), neutral clip. All neutral clips were slight variations of a busy street intersection. After viewing each clip, participants completed several backward digit span tasks to assess the potential effects of the clips on working memory and cognitive processing efficiency. After each clip, they also filled out the post film questionnaire and additional post film questions about the emotional impact of the clip. Once the participant
had viewed all of the film clips and completed the surveys for each one, they had the BioPac electrodes removed. The participant was then informed that a follow-up survey would be sent to their email in one week, and that it was necessary for them to complete the brief survey to receive credit for their participation. After a week, the follow-up survey was sent by email to the participants containing two questions about intrusive images related to the clips. Participants responded to questions of which clips, if any, they had dreamt about during the week or had pop into their head while awake.

Upon receipt of the email survey responses, the participants were granted credit for the completion of the study through the SONA system. All data was coded with sequential numbers so that personal identifying information was not associated with any data source. Email responses were transferred to a separate coded document and the original responses permanently deleted to assure anonymity for all participants. For heart rate, data was stored as beats per minute (BPM), and for skin conductance, data was stored in its raw form, as µS. Then, the raw skin conductance data was log transformed, as recommended by Venables and Christie (1980). For both measures, the data was visually inspected for detection and removal of artifacts before analysis. Arousal levels during each film clip were analyzed using the middle one-minute section of each clip.

Results

Manipulation Check

The film clips chosen for this study had not been previously evaluated for their relation to the looming construct or anxiety in general. Therefore, correlations between looming and the reported anxiety for each film clip were conducted to evaluate the efficacy of these film clips to
produce the desired levels of anxiety. The correlations between looming anxiety scores and each of the eight film clips are presented in Table 1. All four emotional clips were significantly correlated with looming anxiety scores: film one, *Carnal Knowledge*, $r(52) = .441, p < .01$; film three, *Black Hawk Down*, $r(52) = .498, p < .01$; film four, *Falling Down*, $r(52) = .465, p < .01$; film seven, *Kingdom of Spiders*, $r(52) = .433, p < .01$. All four neutral clips of the busy intersection, films two, five, six, and eight, did not show any significant correlation with looming anxiety scores.

**Descriptive Statistics**

In addition to scores calculated from the aforementioned surveys, several other variables were created. The mean anxiety rating for the emotional film clips was calculated by taking the self-reported rankings of anxiety during each film clip for the four emotional film clips and computing the mean for each participant. The mean EDA difference score and mean heart rate score were computed by taking the mean of the recorded EDA and heart rate data respectively for the emotional and neutral film clips and then computing a difference score between the two different types of clips to develop a measure of overall change in reactivity between emotional and neutral clips. Correlations between looming anxiety scores, anxiety self-report, mother care, mother overprotection, father care, father overprotection, Beck anxiety scores, presence of intrusions, relationship avoidance, relationship anxiety, mean skin conductance difference, mean heart rate difference, and mean anxiety ratings of emotional films were then conducted. These correlations are shown in Table 2. Total looming score was significantly correlated with anxiety self-report $r = .380, p < .01$; Beck anxiety $r = .409, p < .01$; mean anxiety ratings of emotional films $r = .595, p < .01$; and relationship anxiety $r = .461, p < .01$. Relationship anxiety was also significantly correlated with a variety of other factors including anxiety self report $r = .457, p <$
mother care $r = -.399, p < .01$; mother overprotection $r = .312, p < .05$; Beck anxiety $r = .479, p < .01$; and mean anxiety ratings of emotional films $r = .346, p < .05$. There was no significant correlation between looming scores and mother care, mother overprotection, father care, father overprotection, presence of intrusions, relationship avoidance, mean EDA difference, or mean heart rate difference.

**Regression Analysis**

Linear regression analysis was used to develop a model for predicting looming vulnerability scores from social and physiological cognates. The following elements were included in the model as predictor variables: mother care, mother overprotection, father care, father overprotection, relationship avoidance, relationship anxiety, presence of intrusions, mean heart rate difference, mean EDA difference, average anxiety rating for emotional clips, Beck anxiety scores, and self-reported anxiety scores with looming scores as the dependent measure. This predictor model produced an adjusted $R^2$ of $0.483 (F(12, 36) = 3.801, p < .01)$ for the prediction of looming anxiety. Relationship anxiety was a significant predictor above and beyond the other factors ($\beta = .420, p < .05$), as were average anxiety ratings for emotional clips ($\beta = .306, p < .05$) and Beck anxiety scores ($\beta = .375, p < .05$). The other measures did not independently predict significant variance in looming scores: mother care ($\beta = .150, p = .289$); mother overprotection ($\beta = -.131, p = .349$); father care ($\beta = -.010, p = .951$); father overprotection ($\beta = -.232, p = .131$); presence of intrusions ($\beta = -.104, p = .497$); relationship avoidance ($\beta = -.188, p = .205$); mean heart rate difference ($\beta = -.114, p = .527$); mean EDA difference ($\beta = -.091, p = .477$); and anxiety self-report ($\beta = .256, p = .114$).
Another linear regression model was developed to test the ability of Beck anxiety and relationship anxiety to predict mean EDA for emotional film clips. This predictor model produced an adjusted $R^2$ of .086 ($F(2, 51) = 3.401, p < .05$) for the prediction of mean EDA for emotional film clips. Beck anxiety was shown to be a significant predictor above and beyond the other factors ($\beta = .309, p < .05$), but relationship anxiety was not a significant predictor in this model. A similar regression model designed to predict the mean heart rate for emotional film clips from Beck anxiety and relationship anxiety did not yield significant results.

**Discussion**

*Film Clips*

The present study was designed to assess different potential cognates of looming vulnerability to anxiety. Film clips were used to invoke anxiety responses in the participants. The clips that were chosen had not been utilized to evaluate this construct in any previous study. Therefore, it was first important to evaluate the effectiveness of these clips in producing the desired levels of anxiety. Highly significant correlations were found between looming anxiety scores and the anxiety ratings for all four of the emotional film clips. There were no significant correlations found between looming anxiety scores and any of the four neutral film clips. These results support the effectiveness of these clips in eliciting anxiety that can be evaluated within the looming construct. The threatening stimuli presented in the clips, as well as the fact that all clips end without a resolution to the threatening action, make it likely for those with high looming anxiety to imagine the action continuing towards dreaded ends as hypothesized in the looming anxiety model (Riskind, 1997). Thus, one can conclude that looming anxiety increases the emotional impact of stressful stimuli, as hypothesized.
Parental Bonding

One factor that has been identified as a possible developmental factor of looming cognitive vulnerability is parental bonding. The Riskind et al. (2004b) study found that retrospective perceptions of low maternal overprotection and high paternal overprotection were associated with higher levels of looming cognitive style. The current study did not find support for the hypothesis that high parental overprotection or low parental care would increase looming anxiety scores. These results were unexpected in light of the previous Riskind et al. (2004b) study. However, adult relationship anxiety was positively correlated with maternal overprotection and negatively correlated with maternal care. This suggests that maternal care and overprotection do affect adult anxiety. It is possible that the lack of effect of parental bonding on looming is due to the fact that looming incorporates both physical and social elements of anxiety. The effect of parental bonding may be limited to the experience of anxiety in relationships and social interactions rather than the experience of looming anxiety in general. The correlation between adult relationship anxiety and maternal care and overprotection does indicate the trend that these factors influence anxiety in the hypothesized directions. Higher levels of maternal overprotection were correlated with higher levels of relationship anxiety, supporting the hypothesis that children with overprotective mothers internalize the belief that the world and other relationships are threatening, thus making it likely for such individuals to develop high relationship anxiety as adults. Lower levels of maternal care were also highly correlated with higher levels of relationship anxiety. This supports the hypothesis that without maternal support children have difficulty establishing a base of love and safety from which to explore relationships with the rest of the world (Bowlby, 1969).
The fact that only maternal care and overprotection were associated with relationship anxiety, and father care and overprotection were not, could have several possible explanations. One explanation is that the involvement of mothers in the raising of children far outweighs the involvement of fathers, even in the present age. Therefore, it would follow that the impact of the care and overprotection of the primary caregiver (the mother) would have more of an impact on the child than that of a more remote caregiver (the father). It is also possible that the ratio of males to females in the study (17 males to 35 females) biased the information toward maternal impact due to the fact that mothers were more frequently the same-sex parent.

**Adult Attachment**

This study hypothesized that high levels of adult attachment avoidance and anxiety would predict high levels of looming vulnerability in participants. Partial support was found for this hypothesis. Adult relationship avoidance was not significantly correlated with looming scores and was not a significant predictor in the regression analysis. However, adult relationship anxiety was highly correlated with looming scores and was the strongest significant predictor in the regression analysis. Adult attachment anxiety was also correlated with the variety of other measures outlined in the results. While it was hypothesized that adult attachment anxiety would be related to looming anxiety, its overwhelming effect on the study was unexpected and fascinating. Further research is necessary to explore the reasons behind this strong relationship of adult attachment anxiety and looming vulnerability to anxiety.

**Physiological Reactivity**

The hypothesis that physiological reactivity would be related to high levels of looming anxiety was not supported by the study. Since it was demonstrated that the film clips did elicit
the expected levels of anxiety, it follows that the inability to achieve significant results is related
to the actual physiological response and the recording of the physiological response rather than
inability of the film clips to elicit anxiety. It is possible that although the participants reported
feeling high levels of anxiety while viewing the emotional clips, the threat level was not high
enough to create a physiological reaction, especially since the threat was only a film on a
computer screen and they were aware they were participating in an experiment. It is also
possible that lack of sensitivity of the measures themselves or of the recording equipment
influenced the results. Using the back of the legs for electrode placement, while standard
procedure, produced challenges. Particularly, thick leg hair on many males made it difficult to
get high clarity in the heart rate readings. The results of the regression models exploring the
predictive effect of relationship anxiety and Beck anxiety scores on heart rate and EDA for
emotional film clips supports the hypothesis that recording difficulties were a possible factor in
reducing electrode sensitivity. The regression model for the EDA (which was measured with
electrodes only on the fingers) yielded significant results, while the regression model for heart
rate (which was measured with electrodes on the back of the legs) did not yield significant
results. The Beck anxiety scores were the only significant predictor of EDA for emotional film
clips. This makes sense because the Beck anxiety measure focuses almost exclusively on reports
of physiological experiences of anxiety, such as lightheadedness and trembling. It is possible
that future studies may find more significant results using different placements for the electrodes,
or shaving the leg hair before applying the electrodes.

Intrusions

The hypothesis that intrusions would be related to higher looming scores was not
supported by the results of this study. It is believed that the method used for assessing the
presence of intrusions, which consisted of asking participants if they dreamt about any of the clips in the week following the experiment or if any of the clips popped into their head in the week following the experiment, did not successfully approximate the desired construct of intrusions. Most participants did not report forceful intrusions of the film clips into their consciousness, but instead reported that environmental cues led them to casually recall the clip information. Several examples of participant reports of intrusions of this nature are given in Appendix A. Also, the fact that participants were waiting during this week with the knowledge that they would be receiving a follow-up survey, and that they had not yet received credit for their participation possibly kept elements of the study in the forefront of their minds and led to a greater amount of casual recall about the clips. Future research should attempt to explore different methods to assess the presence of intrusions following the film clips. For example, only asking for reports of spontaneous intrusions rather than those triggered by environmental cues.

*Limitations and Future Directions*

There were several limitations to the present study. First, the correlational nature of portions of the research design prevents directionality from being established. It is not possible to determine from this research if factors correlated with looming anxiety, such as adult relationship anxiety, cause looming anxiety, are the result of looming anxiety, or are both influenced by other developmental factors. Second, this study relied on self-report measures for all variables except the physiological measures. While the surveys used were highly researched and validated, they are still vulnerable to response bias. This is also true for the reports of anxiety during the film clips and reports of intrusions. The limitations of the physiological recording equipment and electrode sensitivity have also been previously discussed. Finally, the
use of college psychology students as participants, as well as the gender inequality, limits the ability of the results of this study to be generalized to other populations.

This was a broad study designed to investigate several possible cognates of looming vulnerability to anxiety. Thus, the results present a myriad of directions for future research. The strong relationship between looming and relationship anxiety should be explored by future research. Future research could also explore the relationship between parental bonding and looming more deeply by examining differences in mother and father involvement and identification. A different method for exploring the presence of intrusions should also be developed that focuses on more forceful or persistent experiences of intrusions rather than the casual recall presented in this study. Finally, the range of physiological recording measures leaves much room for alteration and expansion in the methods of assessing physiological reactivity in participants. For example, it may be possible to obtain significant results by sampling from only critical moments in the clip rather than the overall film interval average. It is also possible that there may not have been enough time allotted to return to a baseline rate between stimulus presentations, so that activity level remained elevated across all trial. Allotting more time between film clip presentations could reduce this problem.
References


emotional disorders (pp. 285-301). Mahwah, NJ: Lawrence Erlbaum Associates


distortion of movement and menace. *Behaviour Research and Therapy, 33*(2), 171-178.


Appendix A

Examples of Intrusion Responses

1. After fighting with my boyfriend, the first clip of the man and woman arguing [*Carnal Knowledge*] popped into my head, but it did not stay long.

2. I thought about the war scene when the soldier was in the house quieting the locals [*Black Hawk Down*], because there was a news article about the war in Afghanistan. Reading the newspaper brought the clip to mind.

3. The spiders in the basement clip [*Kingdom of Spiders*] did pop into my head a few days ago when I saw a spider in my boat at crew practice.

4. I thought about the traffic light clip [neutral clip] because I walked by a place that looked similar.
Appendix B

Beck Anxiety Inventory

Instructions: Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Not At All</th>
<th>Mildly but it didn’t bother me much.</th>
<th>Moderately - it wasn’t pleasant at times</th>
<th>Severely – it bothered me a lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbness or tingling</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling hot</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Wobbliness in legs</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Unable to relax</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fear of worst happening</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Dizzy or lightheaded</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Heart pounding/racing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Unsteady</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Terrified or afraid</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nervous</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling of choking</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hands trembling</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Shaky / unsteady</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fear of losing control</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty in breathing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fear of dying</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Scared</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Indigestion</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Faint / lightheaded</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Face flushed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hot/cold sweats</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Column Sum**
Appendix C

Looming Maladaptive Style Questionnaire

Instructions: In these questions, we are interested in your immediate thoughts and reactions to a number of different scenes. Put down whatever comes to mind in response to each of these scenes immediately, rather than thinking about your answer for a long time. After you read each scene, try to vividly imagine it. What comes to mind as you bring that scene to mind and think about it? Concentrate on it and imagine it in as much vivid detail as possible. After you have finished concentrating on the scene, answer the questions about what you were imagining was happening. Please do not leave out any questions if possible.

To summarize:
1) Vividly imagine yourself in each scene.
2) Answer all the questions about your own immediate thoughts and feelings.

1. Suppose that you were to hear a strange engine noise from your car as you were driving on the expressway in heavy rush hour traffic. There are rushing cars and trucks on both sides of you and your car sounds as if it the engine could be cracking or the engine is developing a serious problem.

1. How worried or anxious does your imagining this scene make you feel?
   Not at all 1 2 3 4 5 Very Much

2. In this scene, are the chances of your having a difficulty with the car’s engine decreasing, or increasing and expanding with each moment?
   Chances are decreasing with time 1 2 3 4 5 Chances are expanding

3. Is the level of threat to you from the car’s engine staying fairly constant, or is it growing rapidly larger with each passing moment?
   Threat is staying fairly constant 1 2 3 4 5 Threat is growing rapidly larger

4. How much do you visualize your car’s engine as in the act of progressively worsening?
   Not at all 1 2 3 4 5 Very Much

2. Suppose that a person you have been romantically involved with is behaving oddly. They were late to meet you and there are long moments of silence when they don’t speak and don’t give you eye contact. It seems your relationship could be breaking up.

1. How worried or anxious does your imagining this scene make you feel?
2. In this scene, are the chances of your having a difficulty with the relationship decreasing, or increasing and expanding with each moment?
   Chances are decreasing with time  1  2  3  4  5  Chances are expanding

3. Is the level of threat of losing your relationship staying fairly constant, or is it growing rapidly larger with each passing moment?
   Threat is staying fairly constant  1  2  3  4  5  Threat is growing rapidly larger

4. How much do you visualize your relationship as in the act of progressively breaking up?
   Not at all  1  2  3  4  5  Very Much

3. Suppose that you get odd heart palpitations while talking to someone about a financial problem. You have never had palpitations where your heart skipped around like this and you could be developing a heart murmur.

1. How worried or anxious does your imagining this scene make you feel?
   Not at all  1  2  3  4  5  Very Much

2. In this scene, are the chances of your having a difficulty with your heart seem to be decreasing, or increasing and expanding with each moment?
   Chances are decreasing with time  1  2  3  4  5  Chances are expanding

3. Is the level of threat of a heart condition staying fairly constant, or is it growing rapidly larger with each passing moment?
   Threat is staying fairly constant  1  2  3  4  5  Threat is growing rapidly larger

4. How much do you visualize your heart problem as in the act of becoming progressively worse?
   Not at all  1  2  3  4  5  Very Much

4. Suppose you walk up to an extremely popular, self-centered person in a group of people. The person looks a little bored when first glancing at you and many of the people in the group are looking in your direction. You want to extend an invitation to a party to the person but the person could reject your invitation.

1. How worried or anxious does your imagining this scene make you feel?
   Not at all  1  2  3  4  5  Very Much
2. In this scene, are the chances of your having a difficulty decreasing, or increasing and expanding with each moment?
   Threat is decreasing with time  1  2  3  4  5  Threat is expanding

3. Is the level of threat of your being rejected staying fairly constant, or is it growing rapidly larger with each passing moment?
   Threat is staying fairly constant  1  2  3  4  5  Threat is growing rapidly larger

4. How much do you visualize the risk of being rejected as in the act of becoming progressively worse?
   Not at all  1  2  3  4  5  Very Much

5. Suppose that you are in front of a large audience of strangers. You are speaking about a topic on which you do not know a lot. Some of the people look bored or disinterested, while others look upset. It seems that you could get a very negative audience reaction.

   1. How worried or anxious does your imagining this scene make you feel?
      Not at all  1  2  3  4  5  Very Much

   2. In this scene, are the chances of your having a difficulty with the audience decreasing, or increasing and expanding with each moment?
      Threat is decreasing with time  1  2  3  4  5  Threat is expanding

   3. Is the level of threat from the audience staying fairly constant, or is it growing rapidly larger with each passing moment?
      Threat is staying fairly constant  1  2  3  4  5  Threat is growing rapidly larger

   4. How much do you visualize the audience reaction as in the act of becoming progressively worse?
      Not at all  1  2  3  4  5  Very Much

6. Suppose that it is 6:00 in the evening-- the height of the rush hour and you are heading home on the expressway in your car. A red truck is speeding aggressively in and out of traffic behind you without seeming to notice your position. It seems that there is a definite risk of getting into an accident.

   1. How worried or anxious does your imagining this scene make you feel?
      Not at all  1  2  3  4  5  Very Much

   2. In this scene, are the chances of your having difficulty with the red truck decreasing, or increasing and expanding with each moment?
      Threat is getting smaller or decreasing with time  1  2  3  4  5  Threat is expanding
3. Is the level of threat of an accident staying fairly constant, or is it growing rapidly larger with each passing moment?
   Threat is staying fairly constant  1  2  3  4  5  Threat is growing rapidly larger

4. How much do you visualize the risk of an accident as in the act of becoming progressively worse?
   Not at all  1  2  3  4  5  Very Much
### Appendix D

Parental Bonding Instrument Mother Form

**MOTHER FORM**

*This questionnaire lists various attitudes and behaviours of parents. As you remember your MOTHER in your first 16 years would you place a tick in the most appropriate box next to each question.*

<table>
<thead>
<tr>
<th></th>
<th>Very like</th>
<th>Moderately like</th>
<th>Moderately unlike</th>
<th>Very unlike</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spoke to me in a warm and friendly voice</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Did not help me as much as I needed</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Let me do those things I liked doing</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. Seemed emotionally cold to me</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. Appeared to understand my problems and worries</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6. Was affectionate to me</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>7. Liked me to make my own decisions</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>8. Did not want me to grow up</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>9. Tried to control everything I did</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>10. Invaded my privacy</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>11. Enjoyed talking things over with me</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>12. Frequently smiled at me</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>13. Tended to baby me</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>14. Did not seem to understand what I needed or wanted</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>15. Let me decide things for myself</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>16. Made me feel I wasn't wanted</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>17. Could make me feel better when I was upset</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>18. Did not talk with me very much</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>19. Tried to make me feel dependent on her/him</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>20. Felt I could not look after myself unless she/he was around</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>21. Gave me as much freedom as I wanted</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>22. Let me go out as often as I wanted</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>23. Was overprotective of me</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>24. Did not praise me</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>25. Let me dress in any way I pleased</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Appendix E

Parental Bonding Instrument Father Form

<table>
<thead>
<tr>
<th>Item</th>
<th>Very like</th>
<th>Moderately like</th>
<th>Moderately unlike</th>
<th>Very unlike</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spoke to me in a warm and friendly voice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Did not help me as much as I needed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Let me do those things I liked doing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Seemed emotionally cold to me</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>5. Appeared to understand my problems and worries</td>
<td></td>
<td></td>
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<tr>
<td>6. Was affectionate to me</td>
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<td></td>
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<tr>
<td>7. Liked me to make my own decisions</td>
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<tr>
<td>8. Did not want me to grow up</td>
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<tr>
<td>11. Enjoyed talking things over with me</td>
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<tr>
<td>12. Frequently smiled at me</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>13. Tended to baby me</td>
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<tr>
<td>14. Did not seem to understand what I needed or wanted</td>
<td></td>
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<td></td>
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<tr>
<td>15. Let me decide things for myself</td>
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<tr>
<td>16. Made me feel I wasn’t wanted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Could make me feel better when I was upset</td>
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<td></td>
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<tr>
<td>18. Did not talk with me very much</td>
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<tr>
<td>19. Tried to make me feel dependent of her/him</td>
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<tr>
<td>20. Felt I could not look after myself unless she/he was around</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>21. Gave me as much freedom as I wanted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Let me go out as often as I wanted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Was overprotective of me</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Did not praise me</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Let me dress in any way I pleased</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Appendix F

Experiences in Close Relationships Scale

Instructions: The following statements concern how you feel in romantic relationships. We are interested in how you generally experience relationships, not just in what is happening in a current relationship. Respond to each statement by indicating how much you agree or disagree with it. Write the number in the space provided, using the following rating scale:

Disagree strongly  Neutral/Mixed  Agree Strongly
1  2  3  4  5  6  7

_____ 1. I prefer not to show a partner how I feel deep down.
_____ 2. I worry about being abandoned.
_____ 3. I am very comfortable being close to romantic partners.
_____ 4. I worry a lot about my relationships.
_____ 5. Just when my partner starts to get close to me I find myself pulling away.
_____ 6. I worry that romantic partners won’t care about me as much as I care about them.
_____ 7. I get uncomfortable when a romantic partner wants to be very close.
_____ 8. I worry a fair amount about losing my partner.
_____ 9. I don’t feel comfortable opening up to romantic partners.
_____ 10. I often wish that my partner’s feelings for me were as strong as my feelings for him/her.
_____ 11. I want to get close to my partner, but I keep pulling back.
_____ 12. I often want to merge completely with romantic partners, and this sometimes scares them away.
_____ 13. I am nervous when partners get too close to me.
15. I feel comfortable sharing my private thoughts and feelings with my partner.
16. My desire to be very close sometimes scares people away.
17. I try to avoid getting too close to my partner.
18. I need a lot of reassurance that I am loved by my partner.
19. I find it relatively easy to get close to my partner.
20. Sometimes I feel that I force my partners to show more feeling, more commitment.
21. I find it difficult to allow myself to depend on romantic partners.
22. I do not often worry about being abandoned.
23. I prefer not to be too close to romantic partners.
24. If I can’t get my partner to show interest in me, I get upset or angry.
25. I tell my partner just about everything.
26. I find that my partner(s) don’t want to get as close as I would like.
27. I usually discuss my problems and concerns with my partner.
28. When I’m not involved in a relationship, I feel somewhat anxious and insecure.
29. I feel comfortable depending on romantic partners.
30. I get frustrated when my partner is not around as much as I would like.
31. I don’t mind asking romantic partners for comfort, advice, or help.
32. I get frustrated if romantic partners are not available when I need them.
33. It helps to turn to my romantic partner in times of need.
34. When romantic partners disapprove of me, I feel really bad about myself.
35. I turn to my partner for many things, including comfort and reassurance.
36. I resent it when my partner spends time away from me.
Appendix G

Post Film Questionnaire for Each Clip

**POST FILM QUESTIONNAIRE**

The following questions refer to how you felt while watching the film.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all/none</td>
<td>somewhat/some</td>
<td>extremely/a great deal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Using the scale above, please indicate the greatest amount of EACH emotion you experienced while watching the film.

- □ amusement
- □ embarrassment
- □ love
- □ anger
- □ fear
- □ pride
- □ anxiety
- □ guilt
- □ sadness
- □ confusion
- □ happiness
- □ shame
- □ contempt
- □ interest
- □ surprise
- □ disgust
- □ joy
- □ unhappiness

Did you feel any other emotion during the film? □ No □ Yes

If so, what was the emotion? _____________________________

How much of this emotion did you feel? ______

Please use the following pleasantness scale to rate the feelings you had during the film. Circle your answer:

0 1 2 3 4 5 6 7 8

unpleasant

pleasant

Had you seen this film before? □ No □ Yes

Did you close your eyes or look away during any scenes? □ No □ Yes
Appendix H

Additional Film Questions and Follow-up Survey

Additional Questions for Each Film Clip:

1. This clip will affect my sleep and/or dream content this week.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Neutral/Mixed</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Aspects of this clip will pop into my head during the next week.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Neutral/Mixed</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. How would you rate the intensity of this clip?

<table>
<thead>
<tr>
<th>Not at all intense</th>
<th>Average intensity</th>
<th>Extremely intense</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Follow-up Survey Questions:

1. Did any clip you viewed affect your sleep and/or dream content this week? If so please list the clip or clips (ex: yelling husband, war, man with baseball bat, spiders, traffic light).

2. Did aspects of any clip pop into your head during the week? If so please list the clip or clips (ex: yelling husband, war, man with baseball bat, spiders, traffic light).
Author Note

I would first like to thank my advisor Dr. Glenn Shean for his support throughout this project and mentorship over the last two years. I would also like to thank Dr. Chris Ball and Nicole Karcher for teaching me the operation and analysis of the Biopac system. Finally, I express my deepest appreciation to Nicole Karcher for her extensive work selecting and piloting the film clips, programming the experiment, and answering my endless array of questions. This project would not have been possible without your support.
Table 1  
*Correlations Between Looming and the Eight Film Clips*

<table>
<thead>
<tr>
<th>Variable</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Looming Total Score</td>
<td>–</td>
</tr>
<tr>
<td>2. <em>Carnal Knowledge</em></td>
<td>.441***</td>
</tr>
<tr>
<td>3. Neutral clip</td>
<td>.137</td>
</tr>
<tr>
<td>4. <em>Black Hawk Down</em></td>
<td>.498***</td>
</tr>
<tr>
<td>5. <em>Falling Down</em></td>
<td>.465***</td>
</tr>
<tr>
<td>6. Neutral clip</td>
<td>.212</td>
</tr>
<tr>
<td>7. <em>Kingdom of Spiders</em></td>
<td>.433***</td>
</tr>
<tr>
<td>8. Neutral Clip</td>
<td>.995</td>
</tr>
</tbody>
</table>

*Note.* *p* < .05; **p** < .01; ***p*** < .001.
Table 2

Correlations Between Looming Total Score, Anxiety Self-Report, Mother Care, Mother Overprotection, Father Care, Father Overprotection, Beck Anxiety Score, Intrusions, Relationship Avoidance, Relationship Anxiety, Mean EDA Difference Score, Mean Heart Rate Difference Score, Mean Anxiety for Emotional Film Clips

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<th>10</th>
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<th>13</th>
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</thead>
<tbody>
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<td>1. Looming Total Score</td>
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<tr>
<td>2. Anxiety Self-Report</td>
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<td></td>
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</tr>
<tr>
<td>3. Mother Care</td>
<td>-.08</td>
<td>-.29*</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>4. Mother Overprotection</td>
<td>.03</td>
<td>.05</td>
<td>-.34*</td>
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<td>5. Father Care</td>
<td>-.05</td>
<td>-.22</td>
<td>.22</td>
<td>-.12</td>
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<td></td>
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<tr>
<td>6. Father Overprotection</td>
<td>.02</td>
<td>.14</td>
<td>-.26</td>
<td>.28*</td>
<td>-.44***</td>
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<tr>
<td>7. Beck Anxiety Score</td>
<td>.41**</td>
<td>.39**</td>
<td>-.27</td>
<td>.19</td>
<td>-.15</td>
<td>.17</td>
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<tr>
<td>8. Any Intrusion</td>
<td>.04</td>
<td>.43**</td>
<td>-.20</td>
<td>.01</td>
<td>-.15</td>
<td>.13</td>
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<td>9. Relationship Avoidance</td>
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<td>10. Relationship Anxiety</td>
<td>.46***</td>
<td>.46***</td>
<td>-.40**</td>
<td>.31*</td>
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<td>.25</td>
<td>.48***</td>
<td>.23</td>
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<tr>
<td>11. Mean EDA Diff</td>
<td>.24</td>
<td>.19</td>
<td>-.00</td>
<td>.12</td>
<td>-.01</td>
<td>-.08</td>
<td>.22</td>
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<td>-.07</td>
<td>.16</td>
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<tr>
<td>12. Mean HR Diff</td>
<td>-.01</td>
<td>.30*</td>
<td>-.36**</td>
<td>.23</td>
<td>.03</td>
<td>-.05</td>
<td>.16</td>
<td>-.22</td>
<td>.08</td>
<td>.19</td>
<td>.01</td>
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<td>13. Mean Emotional Film Anxiety</td>
<td>.56***</td>
<td>.13</td>
<td>-.08</td>
<td>-.01</td>
<td>.02</td>
<td>.03</td>
<td>.17</td>
<td>-.11</td>
<td>-.22</td>
<td>.35*</td>
<td>.18</td>
<td>-.06</td>
<td></td>
</tr>
</tbody>
</table>

Note. * p < .05; ** p < .01; *** p < .001.