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EXPLORING REACTION TIME DIFFERENCES TO AGGRESSION WORDS AS A
FUNCTION OF ATTACHMENT RELATED AVOIDANCE AND ANXIETY

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ABSTRACT

A previous study using an Emotional Stroop task (EST) and a Visual Lexical Decision task (VLDT) determined that threat-related subliminal primes (for participants high in attachment anxiety) 1) heightened accessibility of representations of attachment figures, and 2) inhibited attachment representations (high attachment avoidance) when the threat prime was the word *separation*. The current study also used both tasks (EST and VLDT) to explore differences in reaction time (RT) without a subliminal prime for neutral, physical, and relational aggressive words as a function of attachment avoidance and attachment anxiety. Results showed that for the EST, higher avoidance reflected slower RTs to physical aggression words, whereas higher anxiety reflected faster RTs to all three word types. Also, for the VLDT, higher avoidance showed a faster RT to physical aggression words and a slower RT to relational aggression words compared to low avoidance. Furthermore, high anxiety reflected faster RTs to all three word types compared to low anxiety. Theoretical and practical implications of my results are discussed further in the General Discussion.

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CHAPTER I

INTRODUCTION

Aggression

Aggression has been examined thoroughly in several previous studies. Only recently, within the past decade or so, have researchers started to define subtypes of aggression. While there are many ways of categorizing aggression, the most common and relevant to the current study are *physical aggression* and *relational aggression*. Physical aggression is a type of aggression in which harm occurs through physical damage to another person and includes behaviors such as physical attacks and threats of physical attacks (Crick, Casas, & Mosher, 1997). In contrast, relational aggression involves inflicting harm to a peer through purposeful manipulation, or damage to relationships such as deriding, purposeful exclusion or deliberately spreading false information in order to damage the reputation of someone (Crick, 1996; Galen & Underwood, 1997). These types of aggression are observable socially and throughout life. Theoretical explanations of

aggression, and what type of aggression a person is most sensitive to, are described in a variety of areas, including attachment theory. In order to accurately explain how attachment and aggression are related, we first discuss the fundamentals of attachment theory.

Attachment Theory

The concept of attachment is not new to psychology. Attachment describes interpersonal relationship styles as developed from the quality of the relationship with the caregiver from birth (Bowlby, 1969; 1973; 1980). This notion of attachment is further extended by examining the type and quality of the relationship with the caregiver as the basis for an individual's working model. Working models are internal representations of the attachment relationship a person experiences throughout the lifespan (Mikulincer, 1998). An individual's working model is characterized by their internal representations of self and others. More specifically, the internal representation of self is focused around whether or not the self is judged to be the sort of person towards whom anyone, the attachment figure in particular, is likely to respond in a helpful way, and whether or not the attachment figure is judged to be the sort of person who in general responds to calls for support and protection (Bowlby, 1973). Individuals develop their working model through their attachment style. This idea was first demonstrated in the "Strange Situation" study where Ainesworth and colleagues concluded that there are three main attachment types for children: *secure*, *insecure avoidant* or *insecure anxious-ambivalent* (Ainesworth, Blehar, Walters, & Wall, 1978).

From this initial assessment of three main attachment styles, current research has steered away from the categorization of individuals and instead looks at attachment based on a continuum. Mikulincer and Shaver (2007) proposed a dynamic model of the attachment behavioral system that further explains attachment by means of “primary attachment strategy,” which explains the notion of seeking support from a trusted caregiver when one is upset or threatened, with the expectation that he or she will provide protection and assistance. Therefore, individuals with low avoidance and low anxiety (prototypically secure) are defined by the confidence of the availability of attachment figures in times of need and by comfort with closeness and interdependence. Such individuals view their relationships as close, stable, and more satisfactory than insecurely attached individuals. Whereas individuals with low avoidance and low anxiety exhibit higher levels of social support and trust (Shaver & Hazen, 1993) and have a more positive coherent view of the self (Mikulincer, 1995). When in distress, securely attached individuals engage in more constructive coping strategies than the insecurely attached (Mikulincer, 1998).

Also included in the dynamic model of the attachment behavior system are the two secondary attachment strategies that arise from past insecure attachment bonds. These strategies are defined in terms of *hyperactivation* and *deactivation*. The hyperactivation of the attachment system is more commonly referred to as attachment related anxiety. Individuals high on this dimension are characterized by insecurity to others’ responses, with a further emphasis on a strong desire for intimacy, paired with a high fear of rejection (Mikulincer, 1998). This strategy is thought to be learned early in life as a way of making certain that an inconsistent, distracted or unreliable caregiver pays attention

and provides adequate protection and support (Ainesworth, Blehar, Waters & Wall, 1978)

The second attachment strategy, deactivation, is more commonly referred to as *avoidance*. This avoidance strategy is characterized by the insecurity concerning others' intentions (Mikulincer, 1998). Individuals high on this dimension have a preference for emotional distance. The goal of this strategy is to maintain an extreme degree of independence, invulnerability and autonomy (Bowlby, 1982). This strategy is learned in the context of a caregiver who provides better care when one does not complain, make requests, or seem overly needy or whiny, and does not insist on close bodily contact (Ainesworth et al., 1978). Both avoidance and anxiety attachment types report lower levels of satisfaction in their relationships. In addition, both of these attachment types tend to view themselves more negatively with respect to the esteem of securely attached individuals. They handle distress in a negative way, although the way they cope with negative situations differs. Individuals high on avoidance tend to adopt a distancing strategy from a negative situation, and therefore they have a more repressive coping style (Kobak & Sceery, 1988; Mikulincer, 1995). Individuals high on anxiety tend to engage in ruminative worry when dealing with stressful situations. These hyperactivation and deactivation responses to life stressors also manifest themselves in several other areas, including how they handle their emotions.

Aggression and attachment

The ways of interpreting, experiencing and showing anger also differ as a function of attachment type. Bowlby (1973) defined anger differently for secure and insecure (avoidant and anxious) individuals. For the purpose of this study, anger will be referred to

as the experience of aggression in regards to attachment theory. Secure individuals, those relatively low in avoidance and anxiety, experience aggression in a functional way, whereas insecure individuals, those high on either or both dimensions, manifest more characteristics of dysfunctional aggression (Mikulincer, 1998). Individuals low on avoidance and anxiety see aggression as the functional protest reaction of others' negative attachment behavior. This idea is known as anger of hope because it is a healthy way to demonstrate aggression, with the goal being to maintain strong attachment bonds. Conversely, insecure aggression is displayed in aggression that is referred to as anger of despair. This idea results from constant perceived threats of rejection and abandonment. Dysfunctional aggression manifests itself in tantrums or internal or external bouts of destructive behavior (Mikulincer, 1998). Examples of external bouts of destructive behavior include physical acts of aggression, whereas internal destructive behavior includes rumination and degradation. Therefore, it would follow that individuals high on avoidance, anxiety, or both would be more likely to engage (or be more sensitive to) physical and relational aggression than individuals low on both attachment dimensions. Also, which type of aggression an individual is most prone to is dependent on their levels of anger proneness, anger expression, hostile attribution and response to anger.

A previous study (Mikulincer, 1998) found that avoidant individuals have low anger proneness, low anger expression and virtually no negative hostile attribution to negative situations. Anxious individuals showed high anger proneness, high anger expression and high hostile attribution. The different responses to aggression (either experienced or displayed) are a direct implication of the individual's working model. In other words, one's ability to handle a situation in a functional way is dependent upon

one's typical way of handling circumstances, such as aggression.

Social Cognition

The ability to handle a negative situation is also influenced by whether or not the individual has experienced any type of priming. Priming refers to the implicit memory effect in which exposure to a stimulus influences responses to a later stimulus. It can occur following perceptual, semantic or conceptual stimulus repetition (Kolb & Whishaw, 2003). In addition, the effect of priming is dependent on an individual's threshold of activation. Words that are primed have their threshold of activation lowered relative to their resting state, and thus are more readily available than words that are not primed. Therefore, it is easier to associate a word with another word when it is part of the individual's cognitive schema, or mental framework, that is organized around a particular representation. When a word is part of the mental schema, it has a lower resting activation compared to words outside of the schema.

Attachment has also been shown to affect attentional bias in individuals with respect to avoidance and anxiety. Studies focusing on these strategies in adulthood and their effects on attention and cognition have found that people high on anxiety tend to focus their attention on, and have difficulty disengaging their attention from, attachment-related stimuli (Mikulincer, Birnbaum, Woddis, & Nachmias, 2000; Mikulincer, Gillath & Shaver, 2002). Thus, this idea can be tested using several measures, two of which are a visual lexical decision task (VLDT) and an emotional Stroop task (EST).

Cognitive measures to explore social cognition

Visual Lexical Decision Task (VLDT)

In this task, an individual is presented with a string of letters and must determine as quickly as possible whether those letters are a word or nonword (Meyer & Schvaneveldt, 1971). Most often, performance in this task is measured by reaction time (RT) to identify the word. Words with shorter RTs are inferred to be easier to process. Several studies support the use of VLDT for examining responses to neutral and emotional words. More specifically, this task has been used to compare responses to positive and negative emotional words with responses to neutral words. Results demonstrate that callous unemotional traits (e.g., *lack of guilt, absence of empathy*) were related to slower RTs in negative emotion words (e.g., *sadness, anger*), and poor impulse control (e.g., *becomes angry when corrected*) was related to faster RTs in negative emotion words. There was no significant difference in reaction time for neutral words in individuals with callous traits (Loney, Frick, Clements, Ellis & Kerlin, 2003).

The VLDT has also been used to examine anger and its effects on RTs for secure and insecure individuals. A previous study (Mikulincer, 1998) looked at anger in two contexts (anger relevant and anger irrelevant) and found that in the anger relevant context, RTs to positive words (e.g., *understand, accept*) were quicker for secure individuals compared to both insecure types. RTs to negative response words were quicker among avoidant and anxious individuals compared to individuals with a secure attachment type. Neutral words (e.g., *read, write*) yielded no significant differences between the three attachment groups (Mikulincer, 1998). More recently, two studies were

conducted looking at the activation of representations of attachment figures based on the effects of subliminal priming. They concluded that threat words presented subliminally had an effect on RTs to attachment figure names for individuals high on attachment anxiety. Based on these studies, it is clear that the VLDT is an appropriate way to examine differential processing in physical and relational aggression words as a function of attachment related avoidance and anxiety.

Emotional Stroop Task (EST)

The EST is a variation of the Stroop task (Stroop, 1932) where the word presented is an emotional word. Individuals are presented with words that are printed in one of some number of varying colors (typically, red, blue green and yellow), and participants are instructed to ignore the meaning of the word and name the color that the word is presented in instead. For example, if participants are presented with the word *house* in red font, their task would be to say the color *red* aloud (as opposed to reading the word, *house*). The RTs to correctly identify the color of the word are recorded. When an individual is presented with emotion words (e.g., *anger*), several studies (see, e.g. Ray, 1979; Matthews & MacLeod, 1985) suggest that RTs are slower. The greater the meaning of the word to the individual, the greater the interference that will be manifested in the color-naming task, and thus the longer the RT (Smith & Waterman, 2005). In one study, participants with clinical anxiety disorders took longer to identify the words with threatening themes than the neutral words compared to controls (Williams et. al., 1996; 1997). In a non-clinical sample, indirect aggression words (e.g., *bitch*) and direct aggression words (e.g., *punch*) were presented, along with positive and negative

emotional words, and both types of aggressive words were found to be more disruptive to the performance of the task (i.e., longer RTs, more errors, or both) than any other word. However, no significant differences were found between the two aggression types (Smith & Waterman, 2005). A third study (Mikulincer, 2002) used the EST to evaluate RT differences to attachment figures when presented with subliminal threat words. The results showed that individuals with higher anxiety showed longer RTs and individuals higher on avoidance showed shorter RTs following the threat (e.g.: *separation*) subliminal prime. Based on these studies, the EST is an effective way to examine differential processing in physical and relational aggression words as a function of attachment style. Furthermore, to the best of current knowledge, no study to date has looked at different types of aggression words using a non-contextual VLDT without a subliminal prime, nor examined both tasks within the same individual. Also, the Mikulincer (2002) study used names of people that the individual knew to measure availability of attachment figures, whereas the current study used physical and relational aggression words to activate these attachment-related strategies.

Research Aims

In this study, I examined whether individuals with differing levels of avoidance and anxiety took either longer or shorter (depending on the task) to respond. I was interested in determining if results from Mikulincer (2002) study could be replicated without the presentation of a subliminal prime. I predicted faster RTs in the VLDT as a result of attachment-related avoidance and anxiety, and slower RTs in the EST for the same reason. Thus, individuals higher in avoidance and anxiety would perform better or worse,

depending on the task.

A screening study was conducted to ensure that all aggression-related stimulus words used in the current study were rated as the intended type of aggression word (i.e., relational rated as relational and not physical, and vice versa). Participants in the screening study (n = 9) also were asked to rate the intensity of aggressiveness of the word, where 0 was “*not aggressive at all*” and 3 was “*extremely aggressive.*” This second rating was done in order to analyze whether the predicted results would correlate with the intensity ratings, such that the effects are larger in the stimuli rated as most intense (e.g., *whore* rated more aggressive than the word *spite*).²

Specific Hypotheses

For individuals in the EST, participants’ low on avoidance were expected to respond the same to all three types of stimulus words (neutral, physical aggression, relational aggression). On the other hand, participants high on the avoidance were expected to respond 1) more slowly to physical aggression words compared to neutral words, 2) more slowly to relational aggression words compared to neutral words, and 3) more slowly to physical aggression words compared to relational aggression words. Moreover, participants’ low on anxiety were expected to respond the same to all three types of stimulus words (neutral, physical aggression, relational aggression). However, participants high on anxiety were expected to respond 1) more slowly to relational aggression words compared to neutral words, 2) more slowly to physical aggression words compared to neutral words, and 3) more slowly to relational aggression words compared to physical aggression words.

For individuals in the VLDT, participants' low avoidance were expected to respond the same to all three types of stimulus words. Participants high on avoidance were expected to respond 1) more quickly to physical aggression words than compared to the neutral words, 2) more quickly to relational aggression words compared to neutral words, and 3) more quickly to physical aggression words than compared to relational aggression words. Finally, participants low on anxiety were predicted to respond 1) more quickly to physical aggression words than compared to the neutral words, 2) more quickly to relational aggression words compared to neutral words, and 3) more quickly to relational aggression words than compared to physical aggression words.

CHAPTER II

EXPERIMENT

Method

Participants

Participants were recruited first by completing a preliminary online survey where they were given a measure of attachment called The Experiences in Close Relationships Survey Revised (ECR-R). Their scores on the two attachment dimensions (avoidance and anxiety) were calculated and used as their final avoidance and anxiety scores in the current experiment. Participants completed this online survey using SONA systems in order to gain research credit.

Fifty-nine undergraduate students participated. Participants were native speakers of American English and physically able to participate in both the VLDT and the EST.

However, three of the participants did not list American English as their first

language, one participant could not physically complete the lexical decision task, three participant's lexical decision data were accidentally erased due to technical difficulties with the Smart Voice (SV-1) voice key, two participants' EST data were unusable and one participant's Experiences in Close Relationships (ECR-R) attachment scores were not saved. The total number of participants' usable data then became forty-nine.

There were 38 females and 11 males in the usable data. Five participants were left-handed, one was ambidextrous, and the remaining sample was right-handed. The sample was a majority of white participants, 57%, with 31% black, 8% American Indian and 4% considered themselves of more than one race. The mean age was 23.3 years (SD = 8.42). The mean avoidance score was 3.25 (range 1.17-5.39, SD = 1.09). The mean anxiety score was 3.68 (range 1.11-5.94, SD = 1.33).

Materials

Measures

The Experiences in Close Relationships Revised (Fraley, Waller, & Brennan, 2000) is a self-report measure used to determine an individual's score on both anxious and avoidant attachment dimensions. This measure is currently the one that is used when looking at individual scores on attachment avoidance or anxiety dimensions. In previous studies that used the ECR-R, each participant was asked to think about how they generally view their close relationships. Participants then read 36 different sentences that either measured attachment avoidance or attachment anxiety. Using a 7-point Likert scale, participants marked 1 "disagree strongly" to 7 "agree strongly" for each of the sentences. An example of an avoidance item is as follows: "I find it difficult to allow

myself to depend on romantic partners.” An example of an anxiety item is as follows: “I often worry that my partner doesn’t really love me.” See Appendix A for the complete questionnaire. For this sample, Croenbach’s alpha demonstrated high internal reliability for avoidance $\alpha = .93$ and anxiety $\alpha = .98$.

Stimuli

The stimuli used for this study consisted of nine neutral words, nine physical aggression words and nine relational aggression words. The mean number of letters was 5.1, 5.8, and 6.2 for neutral, physical aggression, and relational aggression words, respectively. The mean number of syllables was 1.5, 1.8, and 2.0 for neutral, physical aggression, and relational aggression words, respectively. The mean familiarity was 6.9, 7.0, and 6.8 for neutral, physical aggression, and relational aggression words, respectively (Nusbaum, Pisoni, & Davis, 1984). The mean log frequency was 2.1, 2.1, and 1.7 for neutral, physical aggression and relational aggression words, respectively. Independent samples *t*-tests of each word type showed no significant differences in number of letters, number of syllables, word familiarity, or log frequency (Kucera & Francis, 1967). As mentioned previously, a screening study was conducted to ensure that both types of aggression words were rated as more aggressive overall than the neutral words. Using a 0-3 scale, where 0 is “not at all aggressive” and 3 is “extremely aggressive,” the mean rating for the neutral words was 0.04. In contrast, the mean ratings for the physical and relational aggression words were 2.43 and 1.64, respectively. The second purpose of the screening study was to ensure that relationally and physically aggressive words were correctly identified. Percent accuracy for correctly naming a

relationally aggressive word was 83.33%, and percent accuracy for correctly naming a physically aggressive word was 83.34%. See Appendix B for the complete list of stimuli.

Procedure

Participants first read and completed the consent forms when they arrived in the Language Research Laboratory (see Appendix C). Participants were asked to indicate whether or not they were speakers of American English and each individual completed a demographics questionnaire (see Appendix D) at the completion of the experiment along with a post experiment questionnaire (see Appendix E). Participants were asked to complete the VLDT or the EST first in order to counterbalance the experiment. Instructions for the VLDT and the EST are in Appendices F and G, respectively. After completion of the first task (either the VLDT or the EST), participants were given a brief, timed 5-minute break before they were asked to complete the remaining task (either the VLDT or the EST, depending on which one they completed first).

A typical VLDT trial was as follows: A string of letters appeared on the computer screen in white font and a black background. Participants were asked to determine if what they saw was a word or a nonword by pressing the appropriate button on the button box with their dominant hand. For right-handed participants, they made the word response with their right thumb on the last button on the right and nonword responses with the left thumb on the left-most button. This was switched for left-handed participants, such that they made the word response with their left thumb and nonword response with their right thumb. Participants initiated the start of each new trial by pressing either button. For the VLDT, there was one version of the experiment created on Superlab 4.0 and the order of

words and nonwords presented was randomized automatically for each participant. The words were selected from a psycholinguistic database (Rastle et al., 2002). The nonwords had a low orthotactic probability of letters and combination of letters, but the nonwords were not orthotactically illegal (e.g., XLV would be orthotactically illegal because no word in the English language begins with these letters).

A typical EST trial was as follows: Participants were presented with a stimulus word in one of three colors (red, green, or blue) on the computer screen. The stimulus words used were the same nine neutral words, nine physical aggression words, and nine relational aggression words used in the VLDT. Three versions of the experiment were made on Superlab 4.0, such that the colors of the words were counterbalanced and no word appeared in the same color twice. In other words, there were nine words of each color and three words of each type in three separate counterbalanced experimental versions. Participants were first asked to complete a practice phase with different words to familiarize themselves with the experiment. They were asked to ignore the word and instead say the color in which the word was presented on the computer screen in a black background as quickly and accurately as possible. The RTs of participants' verbal responses were recorded using an SV-1 voice key, and their actual responses were recorded by an experimenter who was present in the room (in order to score for accuracy). Each trial was initiated by the vocal response of the participant and RTs were recorded from the onset of the presentation of the word to the onset of the participant's vocal response. Only RTs for the correct responses (in milliseconds, or ms) were used in the analyses.

The post experiment questionnaire was given to participants after they completed

both the VLDT and the EST. Participants were handed the paper questionnaire, and asked to answer the questions by writing down their responses in the space provided. For a complete copy of the questionnaire, including the list of questions, see Appendix H. Finally, participants were debriefed and given a copy of their consent form and told that the study they had just participated in was confidential, and were asked not share the purpose or description of the experiment with anyone else they knew that might be participating in the experiment. Participants were also thanked for participating and given research credit.

Results

Two separate 2 (Attachment: Avoidance and Anxiety) X 3 (Word Type: Neutral, Physical aggression, and Relational aggression) repeated measures General Linear models (GLMs) were performed on participants' raw mean RTs to correct responses, one for the EST and one for the VLDT.²

Inverse and log transformations were performed on the raw data, however patterns of results did not change, and therefore raw RTs were used for all analyses.

Accuracy was high for each word type, with the mean accuracy for all three word types in the EST being 98% (range: 85.2% - 100%). Specifically, the neutral words mean accuracy was 96.8% (range: 66.7% - 100%), physical words mean accuracy was 96.8% (range: 66.7% - 100%), and relational words mean accuracy was 99.1% (range: 77.8% - 100%). Also for the VLDT, mean accuracy for all three word types was 98% (range: 85.19% - 100%), physical words mean accuracy was 98% (range: 66.7% - 100%) and relational words mean accuracy was 98% (range: 77.8% - 100%).

For the avoidance and anxiety scores, a median split was performed on participants' scores, splitting the groups above and below the median. RTs that were greater than 2SD above of the mean were excluded from the final analyses. For the EST, this resulted in 4 RTs (i.e., 8.2% of the RTs) being excluded, and for the VLDT, this resulted in 5 RTs (i.e., 10.2% of the RTs) being excluded.

EST Results

There was no main effect of Word Type, $F(2, 84) = 1.41, p = .25, \eta_p^2 = .08$. There was also no main effect of Avoidance, $F(1, 35) = .43, p = .52, \eta_p^2 = .01$, or Anxiety, $F(1, 35) = .46, p = .50, \eta_p^2 = .01$. Even though I am not statistically justified in looking at further subsequent analyses without a significant main effect, given my specific a priori predictions, additional analyses were performed and will be reported. Bonferroni adjustments for planned comparisons showed no statistical differences between word types. However, there was a pattern of participants responding faster to the neutral words ($M = 683.03$) than to either the physical aggression ($M = 691.54$) or the relational aggression ($M = 696.05$) words.

I also examined the predicted two-way interactions of Avoidance X Word Type and Anxiety X Word Type. The Avoidance X Word Type interaction yielded the following result, $F(2, 84) = 3.58, p = .03, \eta_p^2 = .08$, indicating there was a relationship between the RT to word type and the participant's avoidance score. Following the result of the significant Avoidance X Word Type interaction, the sample was split in half, such that half were low on avoidance and half were high on avoidance.

For the low avoidance group, there was no main effect of Word Type $F(2, 42) =$

.375, $p = .69$, $\eta_p^2 = .01$. Bonferroni comparisons also revealed no significant differences between word types. Nevertheless, the pattern of results for the group low on avoidance showed that participants responded faster to the neutral words ($M = 675.13$) than to either the physical aggression words ($M = 677.96$) or the relational aggression words ($M = 694.68$).

Within the high avoidance group, there was no main effect of Word Type, $F(2, 36) = .43$, $p = .66$, $\eta_p^2 = .06$. Bonferroni adjustments showed no significant differences between the three word types. Nevertheless, the pattern of results for the group high on avoidance showed the fastest RTs to the neutral words ($M = 690.92$) compared to the physical aggression words ($M = 705.39$) and relational aggression words ($M = 697.42$), consistent with my initial predictions (albeit only a non-significant trend in the right direction). Table 1 shows mean RTs to word type as a function of low and high avoidance.

Table 1. *Mean RTs (in MS) for Avoidance scores in EST*

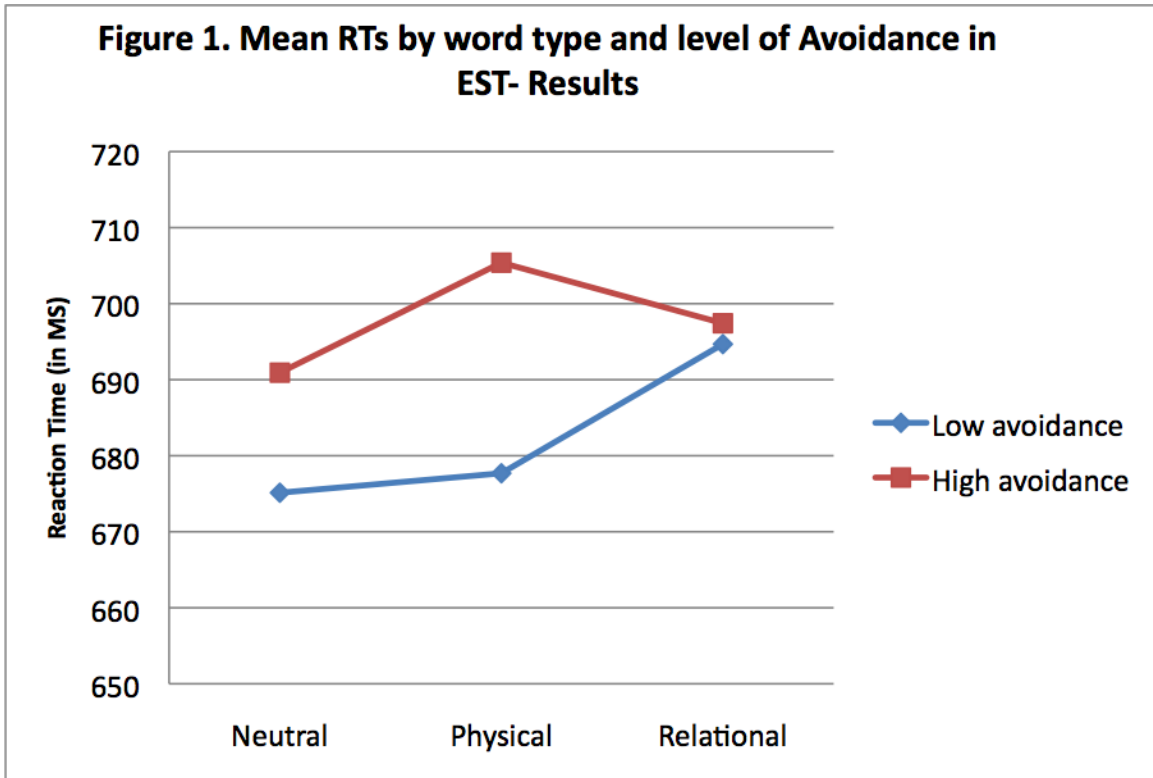
Word type	Low Avoidance (n = 24)	High Avoidance (n = 21)	Total (n = 45)
Neutral	675.13	690.92	683.03
Physical	677.69	705.39	691.54
Relational	694.68	697.42	696.05

Furthermore, the Anxiety X Word Type interaction was not significant, $F(2, 84) = 1.66$, $p = .12$, $\eta_p^2 = .04$. Bonferroni adjustments showed no significant differences between the three word types. Again, I split the group based on our specific hypotheses and found no main effect of word type for either the low anxiety, $F(2, 36) = .181$, $p =$

.83, $\eta_p^2 = .01$, or high anxiety, $F(2, 42) = .10$, $p = .09$, $\eta_p^2 = .01$ groups. However, the pattern of mean RTs showed that participants in the low anxiety group responded slower to relational aggression words ($M = 721.39$) compared to the neutral ($M = 697.49$) and physical aggression words, ($M = 704.12$), inconsistent with my initial predictions. Finally, there was a pattern for participants in the high anxiety group to respond slower to the physical aggression words ($M = 678.80$) compared to the relational aggression words ($M = 673.71$) or the neutral words ($M = 669.38$), also inconsistent with my initial predictions. Table 2 shows mean RTs to word type as a function of low and high anxiety.

Table 2. Mean RTs (in MS) for Anxiety scores in EST

Word type	Low Anxiety (n = 24)	High Anxiety (n = 21)	Total (n = 45)
Neutral	697.49	669.38	683.44
Physical	704.12	678.80	691.46
Relational	721.39	673.71	697.50



Discussion

Following the significant interaction, the mean RTs for each word type by Avoidance are illustrated above in Figure 1. The results suggest that, consistent with our predictions at the outset of this study, people high on avoidance showed interference in responding to physical and relational words. Finally, the results showed that level of avoidance (high or low) did not have any effect on how long it took participants to respond to relational aggression word, with both groups responding at about the same time, including higher avoidance responding faster to the relational aggression words than the physical aggression words. In addition, one interesting finding was that individuals' low on avoidance responded slower to relational aggression words than compared to the physical or neutral words. Potential reasons for this are discussed further

in the General Discussion.

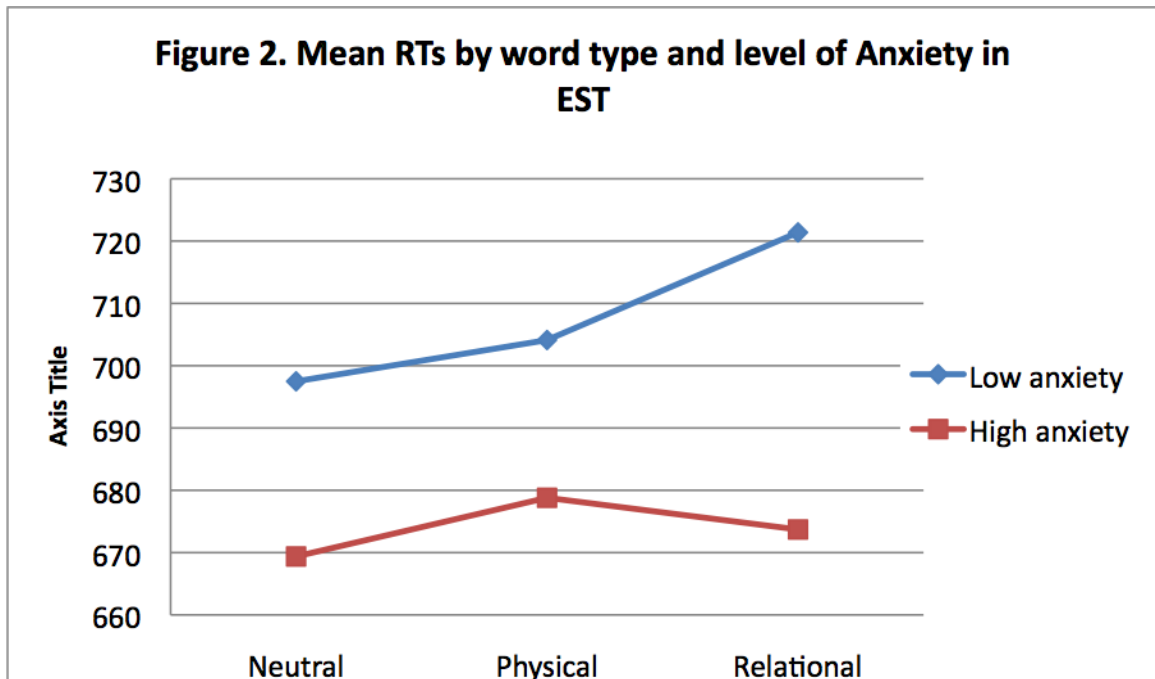


Figure 2 above illustrates the finding for high and low Anxiety by Word Type. Participants' high on anxiety responded faster overall to each of the three word types than participants' lower on anxiety. Furthermore, there seems to be an unaccounted for variable responsible for these results. Participants with lower anxiety scores experienced more interference (slower RTs) than participants with higher anxiety scores. Interestingly, high and low anxiety reflected different RTs to neutral words. This finding was against our predictions. Interpretations and possible explanations will be discussed further in the General Discussion.

VLDT Results

There was marginal significance for the main effect of Word Type $F(2, 82) = 2.76$,

$p = .07$, $\eta_p^2 = .06$. There was also no main effect of Avoidance, $F(1, 36) = .08$, $p = .79$, $\eta_p^2 < .01$, or Anxiety, $F(1, 36) = .05$, $p = .88$, $\eta_p^2 < .01$. Bonferroni adjustments showed significant differences between neutral and relational words, $p > .01$, and between relational and physical words, $p < .01$.

In addition, I also examined the predicted interaction of Avoidance X Word Type. This interaction was not significant $F(2, 82) = .157$, $p = .86$, $\eta_p^2 < .01$. Nevertheless, to test the predictions between high and low avoidance scores, I again divided the sample such that half were above the mean, and half were below the mean. For the low avoidance group, there was no main effect of word type $F(2, 38) = .50$, $p = .61$, $\eta_p^2 = .03$. Again, normally I would stop my analyses here, but because of my specific a priori predictions I again looked at differences between the word types. Bonferroni adjustments for the low avoidance group showed statistically significant differences between neutral ($M = 741.68$) $p = .002$ and relational words ($M = 877.69$) $p = .001$ and relational ($M = 877.69$) and physical words ($M = 749.75$) $p = .002$. For the high avoidance group, there was no main effect of word type, $F(2, 38) = .90$, $p = .42$, $\eta_p^2 = .05$. Bonferroni adjustments showed statistically significant differences between neutral words ($M = 755.63$) and relational aggression words ($M = 851.45$) $p = .008$.

There was also a nonsignificant Anxiety X Word Type interaction, $F(2, 82) = .24$, $p = .78$, $\eta_p^2 < .01$. Again, for anxiety scores, we split the sample into two groups. For the low anxiety group there was no main effect of word type, $F(2, 38) = .75$, $p = .48$, $\eta_p^2 = .04$. Bonferroni adjustments showed statistically significant differences between the neutral ($M = 763.77$) and relational words ($M = 885.43$), $p = .008$ and relational ($M = 885.43$) and physical words ($M = 769.69$) $p = .009$. There was also no main effect of

word type for the high anxiety group, $F(2, 38) = 1.23$, $p = .30$, $\eta_p^2 = .06$. Again, Bonferroni adjustments showed statistically significant differences between neutral ($M = 733.54$) and relational words ($M = 843.71$) $p = .003$ and relational ($M = 843.71$) and physical words ($M = 760.97$) $p = .047$. The mean RTs for groups low and high on avoidance and anxiety are presented in Tables 3 and 4, respectively.

Table 3. Mean RTs (in ms) for Avoidance scores in VLDT.

Word type	Low Avoidance (n = 22)	High Avoidance (n = 22)	Total (n = 44)
Neutral	741.68	755.63	748.66
Physical	749.75	780.91	765.33
Relational	877.69	851.45	864.57

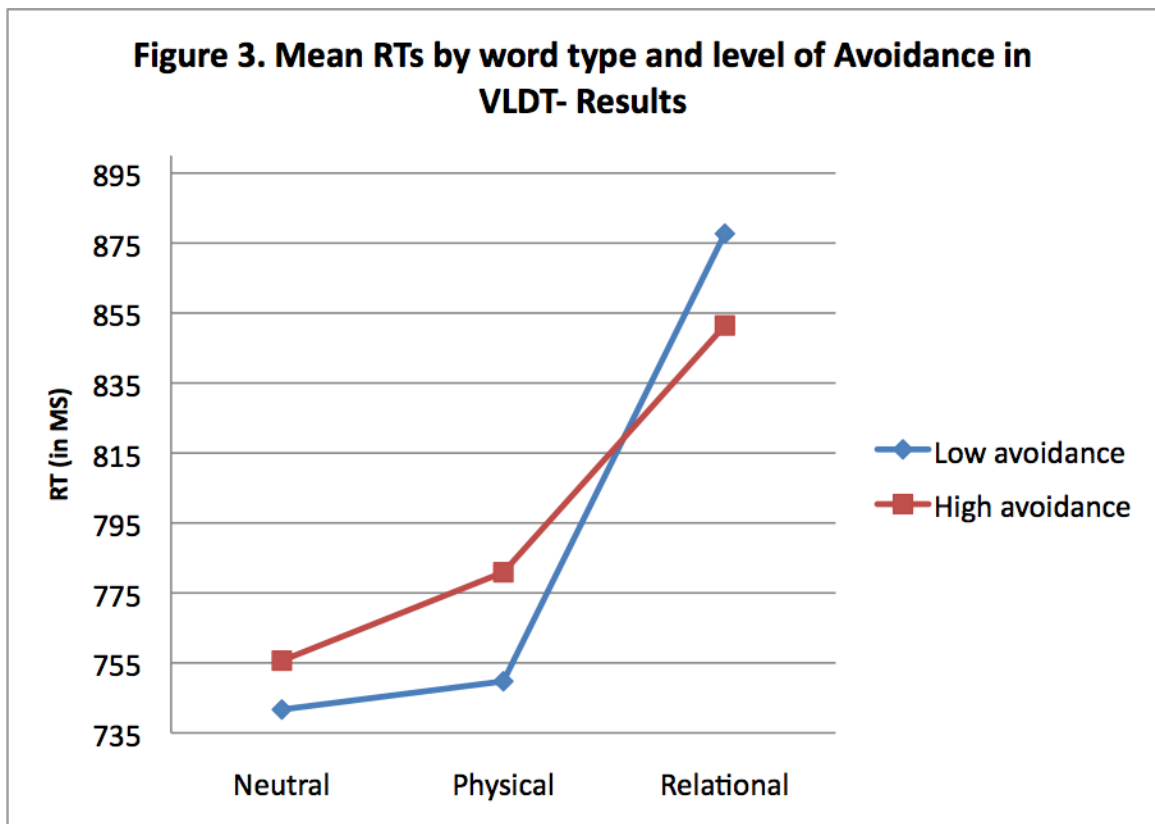
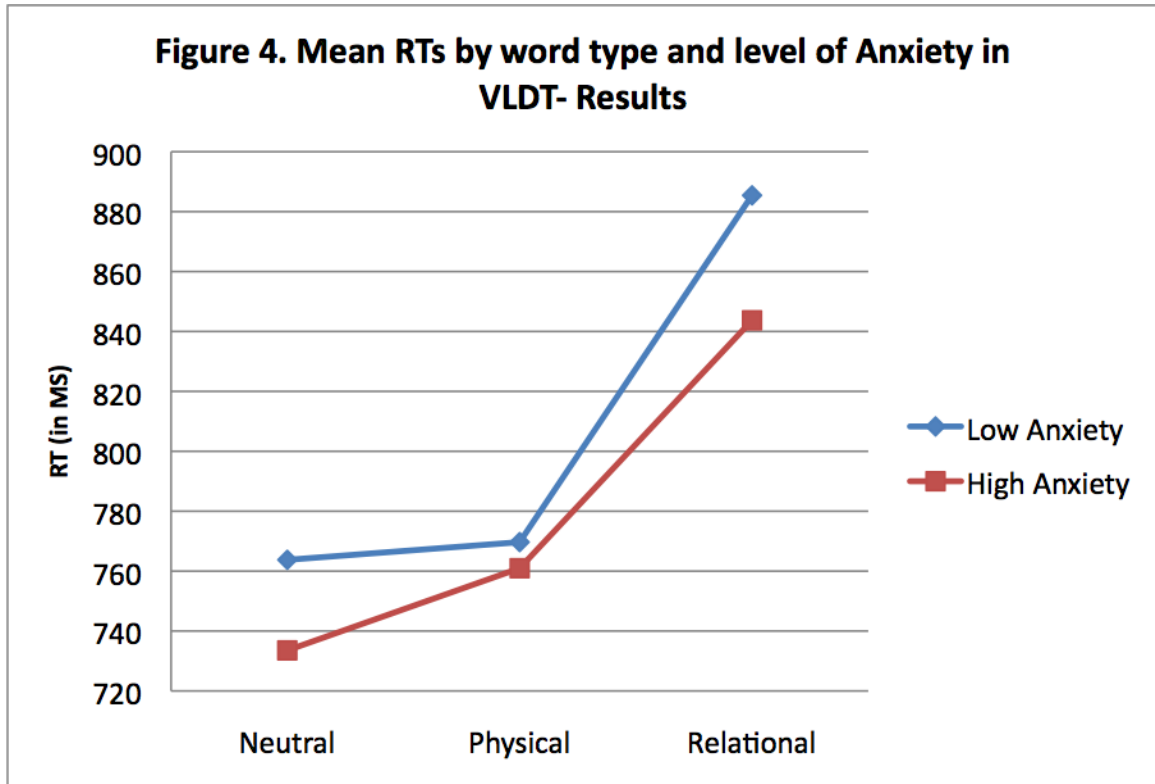


Table 4. Mean RTs (in ms) for Anxiety scores in VLDT.

Word type	Low Avoidance (n=22)	High Avoidance (n=22)	Total (n=44)
Neutral	741.68	755.63	748.66
Physical	749.75	780.91	765.33
Relational	877.69	851.45	864.57



Discussion

The most interesting finding from the VLDT data is that participants respond more slowly to the relational aggression words, regardless of their score on either attachment dimension, as illustrated in Figures 3 and 4. Therefore participants' level of attachment-related avoidance or anxiety did not hinder or facilitate (as predicted) their performance on the VLDT. Secondly, there were RT differences observed for both high and low anxiety and avoidance scores. We predicted no difference between word type for low avoidance and low anxiety groups. Figure 3 shows that higher avoidance scores

responded slower to the physical aggression words than the low avoidance scores; however, this pattern was reversed for relational aggression words, where individuals with lower avoidance scores responded slower than individuals with higher avoidance scores. Also, Figure 4 shows that individuals responded the slowest to relational aggression words regardless of their anxiety scores. Some possible accounts for these findings are discussed further in the General Discussion.

General Discussion

In this study, I investigated the relationship between information processing and attachment related avoidance and anxiety. In particular, I conducted a study that looked at reaction time differences to the EST and VLDT as a function of the individual's score on attachment related avoidance and anxiety. The following patterns of results were consistent with my predictions: High avoidance scores showed a slower RT than low avoidance scores in the EST. Specifically, high avoidant scores had a slower RT to physical words than to relational words. Also, in the VLDT both high and low avoidance groups responded about the same to the neutral words. In addition, low anxiety scores reflected a faster RT to neutral words and physical words compared to relational words in the VLDT.

The following patterns of results were inconsistent with my predictions: For the EST, high anxiety scores actually showed faster RTs to all three word types. Also, in the VLDT, high avoidance scores showed a slower RT to all three word types. While some of the findings were inconsistent with my initial predictions, the results are nonetheless informative. The current study attempted to obtain evidence of the

hyperactivation/deactivation strategies of individuals without an attachment-related prime while using aggression words. Previous studies support the use of attachment-related primes in order to activate this cognitive-control attachment related strategy. Individuals with high anxiety scores, tended to focus their attention on, and had difficulty disengaging from, attachment-related stimuli and information (Mikulincer et al., 2002). On the other hand, individuals high on avoidance use a cognitive control strategy to shift their attention away from attachment related stimuli and take longer to identify attachment-related information under certain conditions (Mikulincer et al. 2002).

For example, in the EST, individuals with lower avoidant scores responded more quickly to the physical aggression words than to the neutral words, suggesting that an individual's level of avoidance may play a role in word processing. Specifically, people low in attachment avoidance do not carry any ascribed meaning to the physical aggression words and therefore can perform the task more quickly than individuals who carry some ascribed meaning to the physical aggression words. Concluding from the results of attachment related anxiety, it may be possible that while a sincere effort was made to control for any possible stimulus differences between the word types (e.g., frequency), the possibility exists that there is some unintended systematic difference between the word types that can account for our current set of results. One way to adjust this is to use stimuli words that do not vary so much in length (i.e., all one or two syllable words). Another way the three groups of words could be additionally controlled is using the same type of words across all three word type conditions. For example, while the current study used nouns, adjectives, and verbs, an additional control for the word types could be to use only nouns, adjectives or verbs across each word type.

For the VLDT, it may be that attachment dimensions affect inhibitions rather than perceptions; it may also be that the level of interference needs to be readily prompted by some sort of attachment related stimulus. This finding provides support to the claim that individuals do not walk around in a constant state of hyperactivation or deactivation, and instead may only show these differences when they are primed. This study attempted to replicate Mikulincer (2002) without the use of a subliminal prime, and the results of this study support the idea that a prime is necessary to activate attachment representations. In addition, the stimulus words used in this study were not the exact words used by Mikulincer (2002), so the aggression words used may not have been sufficient in activating attachment representations. It may also be possible that sensitivity to aggression may be more appropriately measured through spatial means, such as a dot-probe task. In a variation of the dot-probe task, the emotional pictures dot-probe task is a spatially oriented motivated attention task that is administered via computer to capture attentional bias toward emotional cues. Participants focus on a fixation cross in the center of the computer screen while two pictures (one threat-related and the other neutral) appear simultaneously on screen for 500ms. Then one of the pictures disappear and the task is to press a button on the keyboard or use a button box to determine what side of the screen the dot was on. In this task, faster RT to the dot where to threat-related picture was indicated a hyper vigilance to threat. Perhaps using these experimental methods future studies can better assess attachment and the attentional biases of emotional stimuli.

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FOOTNOTES

¹There was no difference in RT between higher and lower rated aggression words.

Therefore these analyses are not included in the results.

²The full design included Order (VLDT first, EST first), which was counterbalanced across participants. As predicted, Order was not significant $F(2, 40) = 2.79, p = .07, \eta^2 = .12$, and did not interact with word type for either the EST, $F(2, 84) = 1.67, p = .20, \eta^2 = .04$ or the VLD $F(1, 42) = .03, p = .88, \eta^2 = .27$. Therefore we collapsed over levels of order in our analyses.

APPENDICES

Appendix A The ECR-R Items

[The ECR-R uses instructions similar to those for the ECR, but replaces some of the ECR items with new ones based on analyses described by Fraley, Waller, and Brennan (2000).]

The following statements concern how you generally feel in close relationships (e.g., with romantic partners, close friends, or family members). Respond to each statement by indicating how much you agree or disagree with it. Type the number in the space provided, using the following rating scale:

1	2	3	4	5	6	7
<i>Disagree Strongly</i>	<i>Disagree</i>	<i>Disagree Slightly</i>	<i>Neutral/ Mixed</i>	<i>Agree Slightly</i>	<i>Agree</i>	<i>Agree Strongly</i>

AVOIDANCE ITEMS

1. I prefer not to show a partner how I feel deep down.
2. I feel comfortable sharing my private thoughts and feelings with my partner.*
3. I find it difficult to allow myself to depend on romantic partners.
4. I am very comfortable being close to romantic partners.*
5. I don't feel comfortable opening up to romantic partners.
6. I prefer not to be too close to romantic partners.
7. I get uncomfortable when a romantic partner wants to be very close.
8. I find it relatively easy to get close to my partner.*
9. It's not difficult for me to get close to my partner.*
10. I usually discuss my problems and concerns with my partner.*
11. It helps to turn to my romantic partner in times of need.*
12. I tell my partner just about everything.*
13. I talk things over with my partner.*
14. I am nervous when partners get too close to me.
15. I feel comfortable depending on romantic partners.*
16. I find it easy to depend on romantic partners.*
17. It's easy for me to be affectionate with my partner.*
18. My partner really understands me and my needs.

ANXIETY ITEMS

1. I'm afraid that I will lose my partner's love.
2. I often worry that my partner will not want to stay with me.
3. I often worry that my partner doesn't really love me.
4. I worry that romantic partners won't care about me as much as I care about them.
5. I often wish that my partner's feelings for me were as strong as my feelings for him or her.
6. I worry a lot about my relationships.
7. When my partner is out of sight, I worry that he or she might become interested in someone else

8. When I show my feelings for romantic partners, I'm afraid they will not feel the same about me.
9. I rarely worry about my partner leaving me.*
10. My romantic partner makes me doubt myself.
11. I do not often worry about being abandoned.*
12. I find that my partner(s) don't want to get as close as I would like.
13. Sometimes romantic partners change their feelings about me for no apparent reason.
14. My desire to be very close sometimes scares people away.
15. I'm afraid that once a romantic partner gets to know me, he or she won't like who I really am.
16. It makes me mad that I don't get the affection and support I need from my partner.
17. I worry that I won't measure up to other people.
18. My partner only seems to notice me when I'm angry.

Note: * Denotes items that are reverse-keyed.

APPENDIX B

Stimulus Words

Neutral Words	PA Words	RA Words
<i>Asparagus</i>	<i>Angry</i>	<i>Aggravate</i>
<i>Call</i>	<i>Brutal</i>	<i>Argue</i>
<i>Dish</i>	<i>Choke</i>	<i>Bigot</i>
<i>Equipment</i>	<i>Fight</i>	<i>Defile</i>
<i>Kite</i>	<i>Gun</i>	<i>Manipulate</i>
<i>Leaf</i>	<i>Kill</i>	<i>Queer</i>
<i>Lime</i>	<i>Mutilate</i>	<i>Spite</i>
<i>Minute</i>	<i>Punch</i>	<i>Threat</i>
<i>Pebble</i>	<i>Suffocation</i>	<i>Whore</i>

Nonwords

<i>Bewde</i>	<i>Noasts</i>	<i>Doart</i>
<i>Pell</i>	<i>Towls</i>	<i>Dunts</i>
<i>Turs</i>	<i>Rops</i>	<i>Freighndged</i>
<i>Shreindge</i>	<i>Vabbs</i>	<i>Karth</i>
<i>Smoops</i>	<i>Wegs</i>	<i>Kneek</i>
<i>Sworched</i>	<i>Cates</i>	<i>Lates</i>
<i>Tane</i>	<i>Turs</i>	<i>Lormed</i>
<i>Thruiched</i>	<i>Craughmbth</i>	<i>Mab</i>
<i>Cags</i>	<i>Crunthed</i>	<i>Mealed</i>

APPENDIX C

PARTICIPANT CONSENT FORM
Exploring Information Processing to Words Moderated by Attachment Style Stephanie L. Johnson, Graduate Student: sjohns2909@gmail.com
Dr. McLennan, Faculty Advisor: c.mclennan@csuohio.edu (216) 687-3750
Language Research Laboratory - Chester Building 249
LANGUAGERESEARCH@MAC.COM (216) 687-3834
<http://web.mac.com/languageresearch>
Cleveland State University: Department of Psychology

This research project is being conducted as part of Stephanie Johnson's Master's Thesis under the supervision of Dr. McLennan. If you have any questions about this project, please feel free to contact Ms. Johnson and/or Dr. McLennan at any time (contact information above).

There are two copies of this letter. After signing them, please keep one copy for your records and return the other one. Thank you in advance for your cooperation and support.

"I agree to participate in a perceptual experiment in which I will see different types of words on a computer screen. I agree to respond to these words by pressing a response button or speaking out loud into a microphone that will record my voice. I also understand that I may be asked to complete a few questionnaires. I further understand that confidentiality of my identity will be maintained at all times (i.e., a participant ID code will be assigned to all of my data).

I understand that the procedures to be followed in this experiment have been fully explained to me and that I may ask questions regarding the experiment at the end of the experimental session. I understand the approximate time commitment involved is approximately 30 minutes and that I will receive 1.0 research credit for my participation.

I understand that participation in this experiment involves minimal risk beyond those associated with daily living. I further understand that thinking about my answers to some of the questions may make me upset. However, I am also aware that I may choose not to respond to any question that makes me uncomfortable, that I may withdraw at any time without penalty, and that the location and telephone number for Cleveland State University's Counseling Center will be provided to me before I leave the lab today.

I understand that the purpose of this research is to add knowledge to the field of information processing. I understand that although there may be several indirect benefits of this study, its direct benefit is adding to the current body of knowledge on human perception.

I, the undersigned, am 18 years or older and have read and understood this consent form and hereby agree to give my consent to voluntarily participate in this experiment

I understand that if I have any questions about my rights as a research participant I can contact the Cleveland State University Institutional Review Board at (216) 687-3630.

Signature of Participant

Date

Name of Participant (PLEASE PRINT)

Date

APPENDIX D

PARTICIPANT INFORMATION FORM
EXPLORING INFORMATION PROCESSING TO DIFFERENT TYPES OF AGGRESSION WORDS MODERATED
BY ATTACHMENT STYLE
STEPHANIE JOHNSON, MASTERS THESIS DR. CONOR T. McLENNAN, ASSISTANT PROFESSOR AND
DIRECTOR
LANGUAGE RESEARCH LABORATORY
CLEVELAND STATE UNIVERSITY: DEPARTMENT OF PSYCHOLOGY
CHESTER BUILDING 249
(216) 687-3834

FOR LRL USE:
Room # _____
Participant # _____
_____ (credits) OR \$ _____
Experiment _____
Date _____
Experimenter _____

Please fill in the following information:

Name: _____

*Address: _____

E-mail address(es): _____

Telephone Number: _____ Cell Phone Number: _____

Date of Birth: _____ Place of birth (City): _____

Gender: _____ Major: _____

Place of Longest Residence (City): _____

(Please circle one) Left-handed Right-handed Ambidextrous

Are you a native English speaker? Yes No

Would you like to be added to (or remain on) our "Paid Participants Database" so that we can notify you in the future of paid experiments for which you are eligible to participate? _____

APPENDIX E

POST-EXPERIMENT QUESTIONNAIRE
EXPLORING INFORMATION PROCESSING TO DIFFERENT TYPES OF AGGRESSION WORDS
MODERATED BY ATTACHMENT STYLE
STEPHANIE JOHNSON MASTERS THESIS DR. CONOR T. M^CLENNAN, ASSISTANT PROFESSOR
AND DIRECTOR
LANGUAGE RESEARCH LABORATORY
CLEVELAND STATE UNIVERSITY: DEPARTMENT OF PSYCHOLOGY
CHESTER BUILDING 249
(216) 687-3834

You can further help us by providing answers to the following questions. There are no right or wrong answers. We are simply interested in your experience in the experiment that you have just participated in. If you have any questions, please ask the experimenter.

1. What do you think was the purpose of this experiment?

2. Did you have any problems hearing (and/or seeing) or understanding the words and/or nonwords you were presented?

3. Do you have any general comments or observations about the experiment?

4. Your gender is (circle one): Male Female

5. Your ethnic background is (circle one):

Hispanic or Latino Not Hispanic or Latino

6. Your racial background is (circle one):

American Indian/Alaska Native Asian
Native Hawaiian or Other Pacific Islander Black or African American
White More than One Race

APPENDIX F

Instructions for VLDT

Language Research Laboratory
Chester Building Room 249

Welcome to the Language Research Laboratory. We appreciate your helping us today.

In the experiment that you will be participating in today, you will see a series of words on the computer screen. Some of the words will be real English words; some will be nonsense words. We want you to decide as quickly but as accurately as possible if each word is a real word in English OR a nonword by pressing one of the two appropriately labeled buttons on the response box in front of you.

A typical trial will proceed as follows: A word will appear on the computer screen. As quickly as you can, press the GREEN button on the right if you think the word is a real word or the RED button on the left if you think the word is not a real word in English. Try to be as fast but as accurate as possible. As soon as you have responded, a new trial will begin.

Please rest your hands on the response box with your right thumb above the GREEN (word) button and your left thumb above the RED (nonword) button.

Let the experimenter know when you are ready to begin the experiment. Thank you.

APPENDIX G

Instructions for EST

Language Research Laboratory
Chester Building Room 249

Welcome to the Language Research Laboratory. We appreciate your helping us today.

In the experiment that you will be participating in today, you will see words written in different color fonts on the computer screen. Your task is to ignore the meaning of the words and to simply name the color in which they are printed as quickly and accurately as possible.

A typical trial will proceed as follows: a word will appear on the screen. As quickly and accurately as possible, name the color in which the word is printed. As soon as you have made a verbal response, a new trial will begin.

We will begin with a brief practice phase to familiarize you with the experiment.

If you have any questions, please ask the experimenter now.

Let the experimenter know when you are ready to begin the experiment.

Thank you.

APPENDIX H

POST-EXPERIMENT INFORMATION FORM
EXPLORING INFORMATION PROCESSING TO DIFFERENT TYPES OF AGGRESSION
WORDS MODERATED BY ATTACHMENT STYLE
STEPHANIE JOHNSON MASTERS THESIS
DR. CONOR T. McLENNAN, ASSISTANT PROFESSOR AND DIRECTOR
LANGUAGE RESEARCH LABORATORY
CLEVELAND STATE UNIVERSITY: DEPARTMENT OF PSYCHOLOGY
CHESTER BUILDING 249
(216) 687-3834
E-MAIL: language@mac.com
WEBSITE: <http://web.mac.com/language@mac.com>

Thank you for your participation in this experiment today. In the Language Research Laboratory, we are interested in discovering how people perceive language. In the experiment you participated in today, we are specifically , interested in how people respond to different types of words as a function of attachment style The experiment you participated in today will lead us to a better understanding of the relationship between attachment style and language perception.

If you have friends participating in experiments in this laboratory, please keep the purpose of this experiment confidential in case we ask them to help us out.

If you have any further questions about this experiment, please feel free to ask. You may also contact the Language Research Laboratory at (216) 687-3834 if you have questions later that you wish to have answered.

If you have any questions about your rights as a research participant, you are encouraged to contact the Cleveland State University Institutional Review Board at (216) 687-3630.

Should have experienced any reaction to today's experiment in which you would like to seek counseling, the Counseling center is located on the twelfth floor of Rhodes Tower, room 1235. Or their phone number is (216) 687-2277.

Thanks again for your participation in this experiment.

