

Exploring a Psycholinguistic Method of Assessing Attachment Orientation in Couple Therapy

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## ABSTRACT

Research conducted with the Adult Attachment Interview (AAI) has provided a wealth of information regarding how adults behave in and respond to relationships. Unfortunately, despite the AAI's usefulness in assessing attachment orientation, administering the AAI requires intensive training, cost, and time. Because of this, a limited number of researchers are able to use the AAI despite the measure's demonstrated psychometric properties and utility for research related to attachment theory. The present study aimed to utilize the Linguistic Inquiry and Word Count software to assess attachment orientation in the context of an attachment-based couple therapy, with the broad goal of potentially expanding our ability to measure attachment orientation in research. The results indicate that attachment orientation is a meaningful metric for analyzing individuals' speech regarding their relationships in an attachment-based couple therapy.

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## CHAPTER 1: INTRODUCTION

### Statement of the Problem

Attachment has become a key construct for investigation in the social and psychological sciences (Ravitz, Maunder, Hunter, Sthankiya, & Lancee, 2010). In particular, attachment is a significant factor in the study of adult romantic relationships. Adult attachment characteristics are correlated with many traits important to relationships, including individuals' functioning within a romantic relationship (Holland & Roisman, 2010), relationship conflict management (Creasey, 2002) and emotion regulation (Fuendeling, 1998). Presently, there are several different measures to assess attachment in adults (Ravitz, et. al, 2010). However, there is significant debate regarding precisely what each of these assessments measure, and whether they are assessing the same constructs (Crowell, Fraley, & Shaver, 2008). Because of this, it is recommended that researchers strongly consider the theoretical underpinnings of an attachment measure before selecting it for their study (Crowell, Fraley, & Shaver, 2008). The majority of attachment measures can roughly be divided into two categories—self-report questionnaires and narrative assessments that are typically conducted in an interview or observation format (Crowell & Treboux, 1995). Within the narrative assessment category, measures are theoretically guided by the concept that while individuals are often aware of some aspects of their own attachment, there are elements that may lie beyond their own conscious awareness (Crowell & Treboux, 1995). The narrative attachment assessments are less concerned with the content reported by the individual, and more focused on the story the individual constructs to describe their experiences; it is thought that the coherence of the narrative provides insight into the individual's *internal* representations of attachment (Crowell, Fraley & Shaver, 2008; Crowell & Treboux, 1995). Self-report measures, on the other hand, provide valuable

information regarding an individual's *conscious* emotional experiences and behaviors (Crowell, Fraley, & Shaver, 2008; Crowell, Treboux, & Waters, 1999). Self-report measures are guided by the concept that attachment histories affect how individuals experience and reflect on their own behaviors within relationships.

**Narrative assessments and the adult attachment interview.** Researchers who are interested in assessing an individual's underlying emotional and cognitive processes, as opposed to examining individuals' conscious experience of relationships, typically use narrative assessments (Crowell, Fraley, & Shaver, 2008). There are several narrative assessments available; however, the most widely used and empirically validated is the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1984; Borelli et. al, 2013; Ravitz et. al, 2010). Through a series of interview questions, the AAI explores how individuals make meaning of their attachment histories and how they express this meaning through language. By examining the narrative coherence of the story the individual tells regarding their attachment history, the AAI assesses an individual's attachment orientation. These orientations are divided into two main categories—secure and insecure—and three subcategories of the insecure category—dismissing, preoccupied, and unresolved/disorganized. Persons who are securely attached provide relatively straightforward, cohesive responses to AAI questions and provide examples to support their statements about their attachment histories (Crowell, Fraley, & Shaver, 2008). Also, securely attached individuals typically emphasize the impact of attachment relationships on their own personal development. By contrast, individuals classified by the AAI as dismissing typically undervalue their attachment history, and may provide idealized accounts of attachment relationships with little support for these descriptions. These individuals sometimes refuse to answer AAI questions or state that they cannot remember details about attachment relationships

(Crowell, Fraley, & Shaver, 2008). In contrast, individuals classified as preoccupied discuss their attachment history in a manner that indicates that they are fixated on past attachment experiences. They typically provide lengthy, non-cohesive narratives around particular events or feelings that are triggered by, but not necessarily a direct response to, AAI questions (Hesse, 2008). They may also describe feeling that they needed to attend to their parent's needs as opposed to the parent meeting their needs (Crowell, Fraley, & Shaver, 2008). Finally, when talking about abuse or loss, unresolved/disorganized individuals discuss their attachment relationships in a confused manner, sometimes speaking as past events as if they were happening in the present, or suddenly using florid language (Hesse, 2008). Unlike the three other attachment categories, the unresolved/disorganized category is assigned to persons based solely on their comments surrounding loss or abuse (Lyons-Ruth, Yellin, Melnick, & Atwood, 2005). For this reason, persons who are classified as unresolved/disorganized are also given a secondary classification of secure, preoccupied or dismissing (Hesse, 2008). The secondary classification represents the individual's overall attachment strategy during the interview (i.e., when not discussing loss or abuse) (Hesse, 2008). Research conducted with the AAI has provided the field with a wealth of information regarding how adults within each attachment orientation behave in and respond to relationships, including relationship conflict behaviors (Creasey & Ladd, 2005); marital quality during the transition to parenthood (Curran, Hazen, Jacobvitz, & Feldman, 2005); and expression of affect during marital interactions (Paley, Cox, Burchinal, & Payne, 1999). The AAI has had its psychometric properties thoroughly examined (van IJzendoorn, 1995), and demonstrates strong stability, reliability, and discriminant and predictive validity (Ravitz et. al, 2010). The AAI utilizes double blind coding, and has high test-retest reliability, with at least one study placing interrater agreement at 95% (Sagi et. al, 1994).

Unfortunately, despite the AAI's usefulness in assessing attachment orientation, administering the AAI requires intensive training, cost, and time (Hesse, 1999; Borelli, Sbarra, Mehl, & David, 2011). Because of this, a limited number of researchers are able to use the AAI despite the measure's demonstrated psychometric properties and utility for the attachment field. Attachment research would benefit from an assessment that requires fewer resources to implement and yet is able to accurately classify an individual's attachment orientation.

### **Significance**

Because the AAI emphasizes the importance of language in the expression of attachment, it seems fitting that a measure that analyzes language could potentially serve as a proxy for the AAI. The Linguistic Inquiry and Word Count (LIWC; Pennebaker, Francis, & Booth, 2001) software program has shown promising potential in this field. The LIWC compares text samples against an internal dictionary that consists of over 4500 words, arranged into more than 80 categories (Tausczik & Pennebaker, 2010). These categories widely vary, but include parts of speech (e.g., pronouns, verbs, prepositions), psychological components (e.g., thought-related terms, feeling words), and specific content words (e.g., work, school, spirituality, sexuality). When the LIWC software is provided with a text, it first counts the total number of words. The LIWC then looks at each word in the text and determines if the word matches any word that is included in the LIWC categories. The software then generates the percentage of occurrences that each category appears in the text. For example, if we direct the LIWC to analyze the lyrics to the Star Spangled Banner, the software provides us with the total number of words in the text (i.e., *total word count*)—81—and then the percentage that each of the other 79 LIWC categories appears in the text—so, 0% of words in the text would be classified as the 'I' category (there are no I words in the text), 6.7% of the words would be

classified as the ‘inclusive’ category (e.g., we, us, both), 7.4% would be classified as the ‘verb’ category (i.e., grammatical verbs), along with the percentages for the other 76 LIWC categories. The LIWC software program is an unsophisticated form of analysis, but has shown encouraging results. Studies have indicated that, when the LIWC software has been applied to participant responses to the AAI, the LIWC assignment of attachment orientation was found to be in agreement with the AAI coders 82% (Stone, 2003), 71% (Cassidy, Sherman, & Jones, 2012), and 100% (O’Hara, 2007) of the time. In other words, by analyzing the AAI transcripts, the LIWC software was able to come to the same attachment categorization as the extensively trained AAI coders in 71-100% of the cases. The LIWC could be immensely useful in assessing attachment orientation, because, unlike the AAI, the LIWC is inexpensive and requires little training to use. Specifically, researchers have found that LIWC categories systematically vary in the language used by each attachment orientation. For example, when Cassidy and colleagues (2012) applied the LIWC to AAI transcripts, they found that preoccupied adults use words from the *inhibition* (e.g., keep, ban, stop) and *hear* (e.g., listen, say, yell) categories more often than secure and dismissing adults, and that dismissing adults use words from the *feel* (e.g., feel, feeling, touch), *inclusive* (e.g., both, close, with, we) and *conjunction* (e.g., and, but, though) categories less than secure adults. The authors note that because adults classified as dismissing by the AAI typically devalue the importance of close relationships, it is unsurprising and, indeed, expected, that they would use fewer *feel* and *inclusive* words when responding to AAI questions (Cassidy, Sherman, & Jones, 2012). Dismissing persons attempt to avoid discussing feelings and view themselves as not needing relationships (i.e., not needing to be a “we”), so these linguistic patterns are in line with attachment theory.

The present study will build upon this research by utilizing the LIWC software to assess attachment orientation in the context of attachment-based couple therapy. To the author's knowledge this is the first study to attempt to linguistically measure attachment orientation outside of the AAI transcripts.

## **Rationale**

The AAI is an incredibly useful tool for measuring attachment orientation, however it is costly and requires substantial training to use. Preliminary studies of the LIWC software indicate that the LIWC reliably assesses linguistic correlates of attachment orientation, is inexpensive, and requires little training to use. Furthermore, as Borelli points out, the “construct validity of attachment classification would be enhanced if these classifications conform to expectable patterns of linguistic discourse derived from text analyses” (Borelli et. al., 2011, p. 342). In other words, if the LIWC software is able to determine linguistic patterns correlated with attachment orientation outside the text of the AAI, it would provide further evidence that attachment orientation is a meaningful concept for assessing relationship interactions. We could ask such questions as; ‘do persons express their underlying attachment orientation in attachment-based couple therapy,’ and ‘are couples’ linguistic interactions shaped by attachment orientation?’ To begin looking at these questions, this study will use the LIWC software program to determine if the speech of persons in couple therapy reflects their attachment orientation. This study will examine attachment-based couple therapy sessions in which both partners are present, and also individual sessions occurring in the context of the couple treatment. Because we do not yet know if or how the expression of attachment orientation might be impacted by an individual's partner being present, it is important for us to

examine how each partner speaks individually *and* how they speak when with their significant other.

### **Theoretical Framework**

The present study will be guided by attachment theory. Attachment theory posits that the relationship between child and caregiver is defined along dimensions of security, warmth, and trust (Bowlby, 1973). The relationship between a child and his or her primary caregiver (typically a parent) significantly impacts the child's views of how relationships function, affecting how the individual perceives and behaves in intimate relationships in childhood, adolescence, and adulthood (Bowlby, 1969; 1973; 1980). Attachment theory provides a guide for how an individual's understanding of his or her relationships with early caregivers impact several psychosocial factors, including support seeking, stress management, and behavioral flexibility (Treboux, Crowell, & Waters, 2004). The present study will explore potential linguistic correlates of attachment in natural speech.

**Linguistics and attachment.** Prior findings suggest that individuals' natural language use reflects a wide range of psychological, emotional, personal, and social traits (Pennebaker, 2003). For example, researchers have found that language use predicts depression and suicidal ideation (Bucci & Freedman, 1981; Stirman & Pennebaker, 2001), relationship functioning (Simmons, Chambless, & Gordon, 2008) and relationship satisfaction (Williams-Baucom, et. al, 2010). Unfortunately, studies that directly examine the relationship between attachment and linguistics are sparse, although there are a few studies from which to draw on. The bulk of this research examines the linguistic characteristics of AAI transcripts. For example, using a measure of linguistic referential activity, Appelman (2000) examined the section of the AAI transcript that asks participants to provide five adjectives that reflect their relationship to each

parent. This study found that mothers who were securely attached used more referential activity in their speech than mothers who were insecurely attached (Appelman, 2000). Speech high in referential activity typically evokes a sensory experience that draws the listener into the story, whereas speech low in referential activity typically uses abstract, unclear terms that the listener may have difficulty connecting to (Appelman, 2000). This study has significant implications, as a mother who is able to articulate her own attachment experiences in clear, concrete language would likely be better able to advance this ability in her child, increasing the child's likelihood of developing a secure attachment (Appelman, 2000).

Using the LIWC software, researchers have noted several interesting patterns in the AAI transcripts. For example, looking at word count alone, researchers have found that individuals classified as preoccupied typically have the longest transcripts, followed by secure individuals, and dismissing individuals typically have the shortest transcripts (Kane, 2002; Stone 2003; O'Hara, 2007). This is in line with attachment theory, as preoccupied individuals are often fully absorbed in their own narrative (they are indeed, *preoccupied* with it), and tend to speak at more length. By contrast, dismissing individuals are uncomfortable speaking about their attachment history, and therefore provide the shortest narratives. Secure individuals typically fall in the middle of these two extremes. Furthermore, research with the LIWC software has indicated that preoccupied persons typically use the greatest amount of present tense verbs, followed by dismissing persons, and then secure persons use the fewest amount of present tense verbs (O'Hara, 2007; Stone, 2003). Again, this finding seems somewhat expected given what we know about AAI transcripts, in that preoccupied individuals are typically engaged in their narrative in a way that suggests that the past is very much alive for them; their present continually seeps into their discussion of past events (Main et al., 2002). It is unclear why

dismissing individuals would use the second largest amount of present tense verbs, and secure individuals the least. This research is some of the first to look at the linguistic correlates of attachment, and is very promising. It has paved the way for the present study, which will explore the linguistics of attachment orientation outside AAI transcripts.

### **Purpose of the Study**

There is ample research indicating that attachment orientation is a powerful factor in determining how individuals behave in relationships. Throughout the lifespan, attachment shapes how persons connect to others. Given its importance, it is essential that we continue to find effective and efficient methods of assessing attachment orientation. Also, while there has been significant research regarding the behaviors associated with attachment, there is a need for further examination regarding its linguistic correlates. The present study will address both of these concerns, utilizing an attachment framework and the LIWC software to explore if the speech patterns of adults in couple therapy reflect their attachment orientations. It is important to note that the modality utilized for therapy sessions in this study is an empirically validated, attachment-based couple therapy model called Emotionally Focused Couple Therapy (EFT). Data for this study come from a clinical trial of EFT that treated martially distressed couples in which at least one partner was identified by the Beck II (BDI-II; Beck, Steer, & Brown, 1996) as having depression. Depression and EFT will be discussed in further detail below.

**Depression.** This study used a clinical sample in which participants were actively enrolled in couple therapy to treat depression of one or both partners and marital problems. According to the Diagnostic and Statistical Manual of Mental Disorders-IV-TR (DSM-IV-TR; American Psychiatric Association, 2000), depression is characterized by depressed or irritable mood, decreased interest in activities, fatigue, and often sleeplessness or hyposomnia.

Individuals who are depressed typically have a pessimistic, self-focused worldview (Hamilton & Abramson, 1983; Ingram, Lumry, Cruet & Sieber, 1987). Depressed persons focus on their own internal experience, and research has found that their language use reflects this stance. For example, using the LIWC software, research has demonstrated that depressed individuals typically use more first person singular words (e.g., I, my, me) in their speech than non-depressed persons (Rude, Gortner & Pennebaker, 2004). Specifically, researchers asked students to write essays regarding their “deepest thoughts and feelings about being in college,” and found that those who suffered from depression were more self-focused, using words such as “I, my, and, me” more frequently than those who were not experiencing depressive symptoms (Rude, Gortner & Pennebaker, 2004, p. 1128). Another study determined that participant responses to affective and somatic questions on the BDI-II correlated with participants’ use of affective and somatic words in natural speech (Vanheule, Desmet, & Meganck, 2009). Essentially, the more strongly the individual identified with somatic and affective depressive symptoms on the BDI-II (i.e., the higher the scores on these items), the more frequently the individual discussed these respective symptoms during a clinical interview regarding their experiences with depression. Based on these studies, it is possible that the speech of depressed individuals in the present study may be impacted by their depression. However, given that the studies above utilized texts from entirely different topics of discussion than the present study, it is difficult to predict how and if depressive symptoms will appear in participants’ lexical choices. The text from the present study focuses on relationships, whereas the texts from the studies outlined above were focused on the self. With little research available regarding the impact of depression on language use when discussing intimate relationships, we do not have a clear guide for how the presence of depression will affect participants’ language in the current study.

**Emotionally Focused Couple Therapy.** The therapy sessions that will be transcribed for analysis in this study are taken from a course of Emotionally Focused Couple Therapy (EFT; Johnson, 2004), an attachment-based couple therapy model. Transcripts from EFT sessions were selected since it is a context in which participants would likely discuss their attachment histories and behaviors, thus, forging the next logical step in examining the predictive capability of the LIWC software from the AAI to attachment-laden conversations in psychotherapy. EFT was developed by Susan Johnson and Leslie Greenberg in the 1980's to create a more humanistic framework in which to work with couples, as opposed to the behavioral models that dominated the field at the time (Johnson, 2004). EFT posits that marital discord derives from partners becoming stuck in fixed interactional patterns that maintain their underlying negative affect towards each other (Johnson, Hunsley, Greenberg, & Schindler, 1999). EFT directly targets the negative cycles and accompanying emotions for change, helping partners to have more positive emotional experiences of one another. As each partner's emotional experience of the relationship changes, the individual is able to shift his or her behavior, interrupting the negative interactional cycle (Johnson, 2004). According to EFT, attachment is at the heart of intimate adult relationships. Attachment needs are viewed as healthy drives that motivate adults to seek safety and comfort from close others (Johnson, 2004). EFT encourages partners to access and express their attachment needs and related emotions to their partners in order to receive a new, often more supportive response, so that, ultimately, each partner's attachment needs begin to be met (Johnson, 2004).

Since EFT emphasizes the expression of attachment needs, we expect that attachment language would be reflected in the therapy session transcripts using this modality. The present study will analyze this language, looking for linguistic correlates of attachment orientation.

Research suggests that it is possible for attachment orientations to change over the course of therapy. Although findings have not yet supported this for EFT, Fonagy and his colleagues (1995) found that in a group of patients diagnosed with borderline personality disorder—one of the most difficult diagnoses to treat—40% had moved from insecure to secure attachment classifications after inpatient psychiatric treatment. To increase internal validity, the present study will use texts from sessions early in treatment, near the time of their initial AAI assessment, since those sessions would best capture the speech patterns of partners before they have made potentially significant changes in their primary attachment relationship and possibly attachment orientations.

Furthermore, because the first session of EFT typically involves gathering background information and having the therapist join with the couple—which may limit the amount of attachment language used by each partner—the present study will use the second conjoint couple therapy sessions for analysis. Finally, as the course of EFT often includes at least one individual therapy session with each partner, typically occurring immediately after the first conjoint couple session, the present study will utilize these individual sessions for analysis as well (Johnson, 2004).

**Research Questions:**

(A) Using text from the second attachment-based couple therapy session, is the LIWC able to distinguish between baseline insecure and secure attachment as assessed by the AAI?

(B) Using text from second attachment-based couple therapy session, is the LIWC able to distinguish among baseline attachment orientations (i.e., secure, preoccupied, dismissing,) as assessed by the AAI?

(C) Using text from an individual therapy session held during the course of attachment-based couple therapy, is the LIWC able to distinguish between insecure and secure attachment as assessed by the AAI?

(D) Using text from an individual therapy session held during the course of attachment-based couple therapy, is the LIWC able to distinguish among attachment orientations (i.e., secure, preoccupied, dismissing) as assessed by the AAI?

## CHAPTER 2: LITERATURE REVIEW

In order to place this study in the appropriate context, it is necessary to examine many of the related topics, including attachment and attachment measurement, textual analysis and the LIWC software, and Emotionally Focused Couple Therapy (EFT). Specifically, there will be a review of the significance of the attachment construct and the concerns regarding its measurement. Also, the history of textual analysis and the development of the LIWC software will be discussed. Next, a detailed exploration of previous studies' use of the LIWC software to analyze AAI transcripts will be provided. Finally, there will be an examination of EFT and its emphasis on attachment.

### **Attachment**

Attachment theory was born from John Bowlby's work with maladjusted boys and their mothers (Cassidy, 2008). Because of his experiences with these youth, Bowlby came to believe that the relationship between caregiver and child has lasting implications for the child throughout his or her lifespan; Bowlby developed attachment theory as a systematic method to explain these primary relationships (Cassidy, 2008). Bowlby posited that children enact attachment behaviors as a way to achieve closeness with their caregivers. For example, when a child cries because the caregiver leaves the room, it is a healthy response; it draws the caregiver back to the child to offer safety and support (Marvin & Britner, 1999). Through repeated interactions with caregivers, children begin to develop what Bowlby termed "Internal Working Models," or cognitive schemas regarding the functioning of close relationships (Bowlby, 1969/1982, 1988). These schemas affect children's expectations of parental behavior. Children who are 'securely attached' perceive that their caregiver will be available if they require protection or comfort (Weinfield et. al., 2008). Secure children can initiate attachment behaviors

(e.g., crying, smiling, vocalizing) and feel confident that their primary caregiver will be responsive to them (Cassidy, 2008; Weinfield et. al., 2008). In contrast, ‘insecurely attached’ children are those whose parents are inconsistently responsive or neglectful of their child’s attachment behaviors (Weinfield et. al., 2008), and therefore these children do not feel confident that their needs for comfort and protection would be met.

Through her research, Mary Ainsworth affirmed Bowlby’s hypothesized concept of internal working models (Feeney, 2008). In Ainsworth’s Strange Situation experiment, a young child is briefly separated from his or her parent and then reunited with the parent, with researchers observing their separation and reunion (Weinfield, Sroufe, Egeland, & Carlson, 2008). Ainsworth posited that the toddlers’ responses to the Strange Situation experiment exemplified the children’s expectations of how the caregiver would respond to their bids for attention (Vaughn, Bost, & van Ijzendoorn, 2008). The securely attached children expected that their mother would comfort them through the difficult experience of separation, and were therefore able to ask for and receive comfort from their mothers. Insecure children, on the other hand, were uncertain as to whether their mothers would provide effective comfort, and so these children resisted or outright avoided their mother’s attention.

### **Attachment Orientation**

In addition to the secure and insecure attachment categorizations, Ainsworth and her team further developed two subcategories under the insecure heading—anxious and avoidant. Later, a fourth category—disorganized—was developed for infants who exhibited unusual reactions to the experiment. The researchers found that securely attached toddlers looked for and readily accepted comfort from their mothers, and demonstrated a clear preference for their mother over the stranger. By contrast, avoidantly attached toddlers showed less distress overall,

and were more likely to approach the stranger no differently from how they approached their mother. Avoidant toddlers were also more likely to actively turn away from their mother's comfort. Anxious toddlers, on the other hand, were more likely to be anxious throughout the episode, so that they looked towards their mother even before the separation began, instead of exploring their environment like the toddlers in the other two categories. When the mother did leave, the anxious toddlers became highly distressed, but unlike the secure toddler, the anxious toddler resisted being comforted by their mother upon reunion. Finally, disorganized toddlers exhibited unusual reactions during the experiment, including freezing in place, staring straight ahead as if in a trance, and approaching their mother with fear. Later research demonstrated that the disorganized attachment orientation is correlated with child maltreatment (Carlson, Cicchetti, Barnett, & Braunwald, 1989). These distinct patterns of reactions by toddlers to the Strange Situation experiment—secure, anxious, avoidant, disorganized—form the foundation of attachment orientation.

### **Attachment in Adulthood**

Bowlby posited that attachment continues to play an important role in adulthood (Bowlby, 1969) and the research literature shows support for this. For example, because insecurely attached individuals have internalized the belief that others will not be able to effectively respond to their attachment needs, they are more vulnerable to negative views of their partners (Treboux, Crowell, & Waters, 2004). Specifically, this study indicated that adults who were securely attached (as assessed by the AAI) and had positive views of their intimate relationships, were less vulnerable to stressful events negatively impacting their view of their relationships (Treboux, Crowell, & Waters, 2004). By contrast, individuals who were *insecurely* attached, and who had positive views of their relationships were more likely to view

their partners negatively following the occurrence of stressful events (Treboux, Crowell & Waters, 2004). We see, then, that because securely attached adults feel more confident that their partners will be able to meet their attachment needs, they are better able to maintain a positive perception of their partners when stressors enter the relationship.

Attachment orientation appears to impact not only an individual's *view* of relationships, but also their actual *behaviors* within the relationship as well. Using data derived from both home and laboratory observations, research indicates that securely attached husbands are typically less conflictual in their intimate relationship interactions, and the couple typically engages more positively with each other than couples in which the husband is insecurely attached (Cohn, et. al, 1992). Furthermore, results from a study conducted by Crowell and colleagues indicate that securely attached males and females are better able to ask for and accept support from their partners than individuals classified as preoccupied or dismissing (Crowell et al., 2002)

Finally, recent research also provides neurobiological support that attachment continues to serve an important function in adulthood, in that it helps individuals regulate their emotional responses (Beckes & Coan, 2012). In one study, married women were subjected to the threat of electric shock while in an MRI machine (Coan, Schaefer & Davidson, 2006). The women were asked to endure the threat while holding the hand of a stranger, holding the hand of their partner, and while not holding anyone's hand. The researchers found that women displayed less neural response to threat when they were holding the hand of their partners or the hand of a stranger rather than while alone. Also, the more highly the woman rated her satisfaction with her relationship to her partner, the lower the level of her neural response to threat (Coan, Schaefer & Davidson, 2006). This study indicates that adults rely on others to help cope with

their own emotional experiences, and that the most satisfying relationships enable higher levels of emotional regulation.

### **Adult Attachment and Measurement**

As mentioned in the previous chapter, two overarching groups of measurements dominate the adult attachment field: narrative assessments and self-report measures (Roisman, Holland, Fortuna, Fraley, Clausell, & Clarke, 2007; Crowley, Fraley, & Shaver, 2008). Narrative assessments stem from the concept that individuals reflect their mental and behavioral processes in “coherent, organized language” (Crowley, Fraley, & Shaver, 2008, p. 1911). Narrative measures assume that an individual is not fully aware of the emotional and cognitive processes that drive their own orientation towards and behaviors within relationships, but that these processes are ultimately expressed in the individual’s relationship narratives (Crowley, Fraley, & Shaver, 2008). While there are several narrative assessments available, the AAI is the most widely used (Borelli et. al, 2013) and has high reliability and validity (Ravitz et. al, 2010).

In contrast to narrative measures, self-reports assess the individual’s *conscious experience* of relationships with others, as opposed to examining underlying cognitive and emotional schemas (Crowley, Fraley & Shaver, 2008). Self-report measures are based on the idea that attachment history potentially affects the way in which an individual encounters relationships (Rubenstein & Shaver, 1982). While there are a number of self-reports that assess adult attachment, the most widely used is the Experiences in Close Relationships Scale (Brennan, Clark, & Shaver, 1998), which was specifically created to examine the function of attachment in adult intimate partnerships (Crowley, Fraley, & Shaver, 2008); like the AAI, many of the self-report measures have strong reliability and validity (see Ravitz et. al 2010 for a full review)

When selecting an attachment measure to utilize, a researcher must consider how the measure relates to the characteristics of interest for the study. The present study is interested in whether or not an individual's overall attachment orientation is reflected in his or her language usage, which indicates that utilizing a narrative assessment is most appropriate. As described above, narrative assessments examine narrative cohesion and assess an individual's underlying attachment orientation towards relationships.

### **The Adult Attachment Interview**

Main, Kaplan, and Cassidy (1985) developed the AAI in order to assess an individual's attachment orientation. During the administration of the AAI protocol, the researcher asks the participant a series of twenty questions, primarily focusing on the individual's relationship with his or her primary caregivers. The AAI protocol asks individuals to reflect on their experiences with their early parental figures, and to discuss the impact of these relationships on their overall development and present relationship orientation and behaviors (Hesse, 2008). The interview typically lasts forty-five minutes to an hour. The interview is then transcribed verbatim and systematically coded by a trained researcher. Based on the researcher's coding, the individual's transcript is assigned to one of five categories; secure-autonomous, insecure-preoccupied, insecure-dismissing, unresolved/disorganized, and cannot classify (Main, Kaplan, & Cassidy, 1985; Hesse, 2008).

Because of the pacing of the interview and the intimate and complex nature of the questions asked, the interviewee is pushed to respond as their thoughts occur to them, with little time to carefully weigh or self-edit their answers (Hesse, 2008). AAI coders examine transcripts based on several scales, including the parental experience scales (i.e., the coder's assessment of respondents' likely experiences with parental figures) and overall state-of-mind

scales (e.g., respondents' ability to provide coherent, credible accounts of their histories and the meaning they ascribe to them) (Hesse, 2008). The experience scales rate the narrative on concepts such as loving and unloving parental behavior, including parental role reversion, rejection/acceptance of the child's attachment needs, and neglect (Hesse, 2008). The state-of-mind scales examine coherence of the narrative based on several components, including the presence of anger, idealization, and passive speech (Crowell, Fraley, & Shaver, 2008). In particular, the state-of-mind 'coherence' scales prompt AAI coders to measure participant responses against Grice's Maxims, which are: speak honestly and provide evidence for your statements; supply responses that fully answer the question, yet are concise; do not significantly stray from the topic under discussion; and speak in a manner that is straightforward and easy for the listener to follow, using little jargon or obtuse grammar (Grice, 1975). Participant responses that substantially and repeatedly violate these maxims will be viewed as incoherent by the AAI coders, and are likely to be assigned to the insecure or disorganized attachment categories (Hesse, 2008).

The AAI has shown high reliability, with interrater agreement between coders demonstrated to be as high as 95% (Sagi et. al, 1994). Research has also found strong predictive validity with the AAI (van IJzendoorn, 1995). Because of the AAI's consideration of the linguistic properties of the participant's transcript, a number of studies have been performed to assess the measure's discriminant validity, to ensure that the results were not skewed by factors unrelated to attachment. For instance, AAI classification has no relationship to participant intelligence (van IJzendoorn, 1995) and memory (Sagi et al, 1994; Bakermans-Kranenburg & van IJzendoorn, 1993); this indicates that the responses provided in the AAI are based on actual attachment status as opposed to intellectual ability.

## **Textual Analysis and the Linguistic Inquiry and Word Count Software**

Textual analysis has a significant history in the psychological sciences (Tausczik & Pennebaker, 2010). For example, in the 1950's, Gottschalk created a method of analysis that examined texts for Freudian themes (Gottschalk, Gleser, Daniels, & Block, 1958). In the Gottschalk method, judges reviewed texts to determine if they included themes such as anxiety and aggression; this analysis was used as a diagnostic tool for mental health concerns such as schizophrenia (Gottschalk, Gleser, Goldine, Magliocco, & D'Zumura, 1961) and suicidality (Gottschalk & Gleser, 1960). In the 1980's, Weintraub (1989) pioneered studies reviewing the most common words in speech, such as pronouns and articles. By examining political speech and medical interviews, Weintraub found that the use of first person singular pronouns was correlated to depression in the speaker (Weintraub, 1989). Weintraub did not have computer software available to him, and therefore counted the words under study by hand (Weintraub, 1989).

Developed by Pennebaker and Francis, the LIWC compares the words in a given text document to more than 4500 words in the program's dictionaries (Pennebaker, Mehl, & Niederhoffer, 2003; Tausczik & Pennebaker, 2010). Independent judges have organized the dictionary into more than 80 categories, including grammar (e.g., prepositions, pronouns, first person), psychological dimensions (e.g., words reflective of social, affective, and cognitive processes such as talk, happy, think), time and space (e.g., verb tense, movement), and content (e.g., sex, death) (Pennebaker, Mehl, & Niederhoffer, 2003). Once the LIWC has compared a given text to its dictionaries, the program then calculates the percentage that each category appears in the text per the total word count (Pennebaker, Mehl, & Niederhoffer, 2003). Research conducted with the LIWC has examined the relationship between a large number of

psychological and social variables, including marital aggression in men (Schweinle, Ickes, Rollings, & Jacquot, 2010), lying (Newman, Pennebaker, Berry, & Richards, 2003), and suicide (Stirman & Pennebaker, 2001).

Particularly relevant to the present study, the LIWC found a correlation between an individual's language use and their emotional expression. For example, Holtgraves (2011) found that participant language in text messages varied by the function of that relationship—in particular, the study demonstrated that participants were more likely to use emoticons with significant others than other message recipients, including friends. Also, using the LIWC, Dewitt Goudelock (2008) found that couples who successfully completed couple therapy used more “we” language, less “I” language, and less depressive language by the final therapy session. We see, then, that the LIWC has been found to be a useful tool for analyzing language related to emotion and relationships.

### **Linguistic Inquiry and Word Count Software and Attachment Orientation**

Surprisingly, there has been little research conducted directly examining the impact of attachment orientation on linguistics. However, promising research has been conducted with the LIWC software and the AAI. Studies have found the LIWC to be in agreement with the AAI coders 82% (Stone, 2003), 71% (Cassidy, Sherman, & Jones, 2012), and 100% (O'Hara, 2007) of the time. All three of these studies used samples of parents with young or recently adopted children. The Stone and O'Hara studies primarily used attachment theory to guide their selection of LIWC variables that were likely to yield systematic differences among attachment categories; Cassidy and colleagues used an empirically determined method. To begin, Stone utilized the LIWC software to analyze the AAI transcripts of 117 married women who were in the third trimester of their first pregnancy (2003). For this study, Stone selected LIWC

categories based on their potential relevance to attachment theory; however, little detail is provided as to why these particular categories would likely be more closely related to attachment theory than others. The author notes that the developer of LIWC specifically created the *inclusive* (e.g., together, also, among) and *exclusive* (e.g., without, except, but) categories to highlight attachment-related concerns, but no further information is provided (2003).

Beginning with 25 theoretically selected variables, Stone employed a multinomial logistic regression that categorized attachment orientation correctly 82.3% of the time; specifically, secure attachment was correctly identified 82.4% of the time, preoccupied 62.5%, and dismissing 87.6%. The 21 variables found to be predictive of attachment orientation included: *6letter* (i.e., words that are longer than six letters), *1<sup>st</sup> person singular* (e.g., I, me, mine), *first person plural* (e.g., we, us, ours), *other* (e.g., he, her, she), *article* (i.e., grammatical articles), *prepositions* (i.e., grammatical prepositions), *optimism* (e.g., strong, terrific, best), *anxious* (e.g., worried, fearful, nervous), *anger* (e.g., hate, kill, annoyed), *sad* (e.g., crying, grief, sad), *negations* (e.g., no, not, never), *social* (e.g., mate, talk, child), *other references* (e.g., anybody, someone, their), *past* (i.e., past tense verbs), *present* (i.e., present tense verbs), *inclusive* (e.g., and, with, include), *exclusive* (e.g., but, without, exclude), *self* (e.g., I, myself, ourselves), *you* (e.g., you, ya'll, your), *positive emotions* (e.g., love, nice), and *negative emotions* (e.g., hurt, ugly).

O'Hara (2007) built upon this research, using many of the variables identified by Stone as predictive to analyze the AAI transcripts of 73 parents who had recently adopted difficult to place, maltreated children. Of the studies that have applied the LIWC software to AAI transcripts, O'Hara's study has the highest rate of attachment orientation prediction at 100% for the included attachment orientation groups. However, the sample only included transcripts of

persons who were classified by the AAI as either secure or dismissing; preoccupied and disorganized individuals were not included due to their small sample size. O'Hara utilized all of the LIWC variables identified by Stone as predictive of attachment orientation (listed above), except: *6letter*, *social*, and *self*; the study does not state why these particular variables are not included. O'Hara also added LIWC variables that Kane (2002)<sup>1</sup> noted were distinct to each attachment orientation, including *unique* (i.e., words that are infrequently used in speech), *hear* (e.g., listen, yell, say), *feel* (e.g., feeling, contact, touch), and *affect* (e.g., happy, cried, abandoned). In addition, the *see* (e.g., view, saw, seen) and *word count* (i.e., total number of words in the text) variables were utilized, but the author does not comment on why these variables were added to the analysis. Beginning with 25 variables, O'Hara used backward stepwise logistic regression analysis, and found that each attachment orientation significantly differed on their use of 23 variables; *word count*, *first person singular*, *first person plural*, *total first person* (i.e., first person plural and first person singular), *total second person* (i.e., second person plural and second person singular), *total third person* (i.e., third person plural and third person singular), *negations*, *articles*, *prepositions*, *affect*, *positive emotion*, *optimism*, *negative emotions*, *anxiety*, *anger*, *sad*, *hear*, *feel*, *see* (e.g., view, saw, seen), *past*, *present*, *inclusive*, and *exclusive*.

Finally, Cassidy, Sherman and Jones utilized the LIWC software to analyze the AAI transcripts of 220 financially distressed, first time mothers of ill-tempered infants included in a study whose aim was to increase the likelihood of secure infant attachment (2012). Unlike the two studies above, Cassidy and colleagues did not select potential predictive LIWC variables primarily on the basis of their presumed relation to the attachment construct; instead, the

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<sup>1</sup> Kane (2002) is an unpublished undergraduate thesis. Full text was unavailable for review.

research team utilized empirically driven methods. Furthermore, this study used the 2007 version of the LIWC software, as opposed to the 2001 version utilized in the two previous studies. The two versions of software slightly differed in the linguistic categories available for analysis; specifically, the *optimism* category was not included in the 2007 LIWC dictionary, and this variable was used in both of the previous studies. Of the 80 categories available, the research team removed 36 of the variables prior to analysis, including: variables that are overarching categories containing smaller categories (e.g., the *perception* category contains all words from *feel*, *hear*, and *see* categories); variables that describe text files (e.g., percentage of words in the text that are in the LIWC dictionary); content variables unrelated to social or psychological constructs (e.g., *work*, *leisure*); variables unrelated to spoken language (e.g., punctuation categories such as *periods*, *commas*); and variables that do not contain actual words (e.g., *nonfluencies*, *fillers*, which include words such as “umm,” “blah”). After removing these variables, 44 remained available for analysis, which include, broadly—linguistic components (e.g., *prepositions*, *past tense verbs*), psychological processes (e.g., *affect*), physical processes (e.g., *see*, *hear*), and cognitive processes (e.g., *insight*, *certainty*). Utilizing these 44 variables, the authors conducted a multiple groups profile analysis or multivariate analysis of variance (MANOVA) along with Least Significant Differences (LSD) pairwise comparisons, and found that each attachment orientation group significantly differed on their use of the following 14 LIWC categories: *inclusive*, *feel*, *conjunctions* (e.g., but, though, and), *negations*, *assent* (e.g., okay, yes, agree), *numbers* (e.g., hundred, first, zero), *certainty* (e.g., always, never, absolute), *swear words* (e.g., damn, suck, crap), *time* (e.g., hour, today, early), *anger*, *space* (e.g., among, under, near), *hear* (e.g., listen, yell, say), *inhibition*, (e.g., keep, stop, ban), and *causation* (e.g., reason, why, justify).

Looking at the studies above, we see that the *negations, anger, and inclusive* LIWC variables were found to be predictive of attachment orientation across all three studies. The *feel* and *hear* variables were also predictive of attachment orientation in the two studies in which they were used. As we see, then, all three studies have found significant differences in the language used by participants in each of the attachment orientation classification categories. However, the specific variables on which participants differ have not been consistent across studies. In part, this may be due to the methods used to select LIWC variables for analysis. Stone and O'Hara used theoretical methods to select variables, and did not analyze several of the variables that Cassidy found to be predictive of attachment orientation, including; *conjunctions, assent, numbers, certainly, swear words, time, space, and causation*. As the two previous studies did not utilize these variables for their analysis, we do not know if these samples would have significantly differed in their usage of these variables based on attachment orientation.

It is also unclear why the Cassidy study did not replicate the results found in the two previous studies, in which the following variables were found to be predictive of attachment orientation: *first person singular, first person plural, other, articles, prepositions, sad, past, present, positive emotions, and negative emotions*. One possible reason lies with the demographics of the three samples. Specifically, both the O'Hara and Stone studies contained more racially homogenous studies, in which the overwhelming majority of participants were Caucasian, while in the Cassidy study, the majority of the sample included racial minorities (primarily African-American and Hispanic), and only 28% of the sample was Caucasian. Unfortunately, no studies have directly used the LIWC software to examine race and language use, so there is little insight into how race could potentially be impacting these results.

Furthermore, the O’Hara and Stone studies also included samples in which the mean age of participants was approximately 35, while the mean age of participants in the Cassidy sample was 24. Previous research with the LIWC software has demonstrated that as persons age, their usage of past tense, present tense, negative affect, and positive affect words shift, all of which are captured by the variables found to be predictive of attachment orientation in the O’Hara and Stone studies (with older participants) and not found in the Cassidy study (with younger participants) (Pennebaker & Stone, 2003). As with race, without further research available, it is difficult to tease out the precise relationship among linguistics, attachment orientation, and age.

Finally, two of the studies—Cassidy and Stone—included female participants only. Research suggests that usage of LIWC variables can significantly differ by gender within the AAI (Stone, 2003). Specifically, one study found that males and females significantly differed in their usage of nine variables within the AAI transcripts, including: *6 letter words*, *prepositions*, *anger*, *sad*, *past*, *inclusive*, and *negative emotions* (Stone, 2003). Therefore, gender could potentially be a significant factor.

As is evident from this review, we still have limited information regarding systematic differences in linguistic patterns based on attachment theory. The attachment research field would benefit from examining all potentially relevant variables for differences among attachment orientations.

### **Emotionally Focused Couple Therapy**

Emotionally Focused Couple Therapy (EFT) is an empirically validated approach for treating couple distress (Johnson & Greenberg, 1985; Baucom, Shoham, Mueser, Daiuto, & Stickle, 1998). EFT is an attachment-based model with a central goal of fostering and strengthening the emotional connection between partners (Johnson & Wittenborn, 2012). The

process of EFT includes three stages: de-escalation of negative interactional cycles, restructuring interactions, and consolidating couples' new patterns and behaviors (Johnson, 2004). In stage one, the therapist joins with the couple, and helps them place their conflict within the context of a destructive interactional cycle; they are encouraged to consider this cycle as the opponent instead of their partner. Framing the cycle as the problem helps the couple to de-escalate their conflict, and to approach their relationship difficulties as a unit instead of as adversaries. The therapist further works with the couple to help each partner access and express the emotions underneath their behaviors. For example, a partner who withdraws from arguments may appear uninterested; however, often beneath the withdrawal the individual fears that engaging in the conflict will only make the issue worse, and potentially endanger the relationship. The clinician begins to work with the couple to help them acknowledge these feelings.

In stage two of EFT, the clinician continues to encourage each partner to share the vulnerable emotions underlying their behaviors and helps the receiving partner to accept these feelings. Often, partners have not heard these emotions and are surprised or even doubtful that they exist. The clinician helps each partner to hear the other's deeper feelings of fear, sadness, hurt, and to respond with acceptance and support. As partners are able to share with and respond to each other in new ways, they are able to exit their negative interactional pattern and to deepen their emotional attachment to one another.

In stage three, the couple is encouraged to utilize their strengthened emotional connection to address conflicts that they could not effectively discuss in the past. Because partners are now de-escalated and feel more emotionally in-tune with each other, they are able to develop solutions to problems instead of becoming caught in a negative interactional cycle.

A meta-analysis of randomized clinical trials in which EFT was utilized indicated that approximately 70% of couples were considered recovered at the three-month follow-up (Johnson et. al, 1999). EFT has also been effective in treating couples coping with other mental health concerns, such as depression (Denton, Wittenborn & Golden, 2012; Dessaulles, Johnson & Denton, 2003) and trauma (Macintosh & Johnson, 2008); in these instances, not only were couple relationships improved, but the other mental health issues improved as well.

Finally, the present study is particularly concerned with EFT as an attachment based therapy model. EFT encourages individuals to process attachment-related feelings and thoughts in session. For the present study, it is expected that the transcripts from these sessions will be rich with attachment language, and that the LIWC software will potentially be able to identify attachment-oriented linguistic patterns and themes. The creator of EFT—Susan Johnson—has stated that EFT is concerned with how a “couple connects or does not connect and their basic attachment needs and fears” (Young, 2008, p. 288). For example, when one partner continually argues with the other, the individual may express anger; however, underneath the anger often lies feelings of hurt and sadness regarding the rupture of connection within the couple. Through anger, this partner is thought to be stating they *need* the other; they long for the security and emotional regulation that an attachment relationship provides. EFT encourages partners to express these attachment needs in the therapy room in order to strengthen the couple’s emotional connection. Furthermore, one of the uses of EFT is to heal *attachment injuries*, which are thought to be events in which one partner feels that the other has abandoned or betrayed them in a time of need (Johnson, Makinen, & Millikin, 2001). These are essentially violations of an individual’s most basic attachment needs for comfort and support. EFT helps couples to

share these wounds with their partner and then repair these breaks in attachment (Makinen & Johnson, 2006).

### **Conclusion**

In conclusion, we see that EFT's emphasis on attachment provides an excellent opportunity to investigate whether attachment orientation can be assessed within the context of attachment-based couple therapy. Currently, there is limited research available directly examining linguistics and attachment orientation, which is somewhat surprising given the emphasis of narrative assessments on importance of language. As demonstrated by the review above, the current body of literature has mostly researched the link between attachment orientation and speech by using linguistic software to directly examine AAI transcripts. The present study will build upon this research by using the same software to explore linguistic correlates of attachment in the setting of couple therapy.

## **CHAPTER 3: METHODS**

### **Design of the Study**

The present study used secondary data gathered from a randomized clinical trial conducted by Dr. Andrea Wittenborn. The central goal of Wittenborn's study was to examine the efficacy of EFT compared to treatment as usual (TAU) for couples in which at least one partner was depressed and both partners reported marital problems. Participants from Wittenborn's study included 28 couples that were randomly assigned to attend fifteen weekly sessions of either EFT or TAU, defined as a couple therapy other than EFT. In addition to the fifteen couple therapy sessions, each participant also attended one individual session with the couple therapist. Only the individual and couple therapy sessions for participants assigned to the EFT condition were videotaped. For the present study, the investigator used the session recordings to transcribe the text from each individual session and each couple's second therapy session. The investigator analyzed the subsequent text from these sessions using the LIWC program and Classification and Regression Tree (CART) methods of analysis (Breiman, Friedman, Olshen, & Stone, 1984). Performing this analysis allowed the investigator to examine whether the participant scores on the LIWC software systematically vary by attachment orientation, as assessed by the AAI. This study did not examine the transcripts of participants who were considered "cannot classify" by the AAI, as this designation does not place the transcripts into a discrete category for analysis.

### **Study Participants**

Participants in Wittenborn's study were heterosexual couples in committed partnerships seeking couple therapy, with at least one partner struggling with mild to moderate depression, as indicated by the individual scoring between 20 and 30 on the BDI-II. The research team

recruited participants in the Washington, DC metropolitan area through advertisements on websites, posted fliers in public spaces, mailings, and referrals from mental health professionals. Couples received therapy at a reduced cost as compensation for their participation in the study. In order to be included, both partners had to be over the age of 18, and consider their relationship distressed, as demonstrated by their scores on the Dyadic Adjustment Scale (DAS; Spanier, 1976). Furthermore, couples had to be cohabiting for at least one year and have no immediate plans for divorce or separation. Persons who met the following criteria were *excluded*: couples in which ongoing domestic violence was present, and individuals who had a history of psychotic symptoms, bipolar disorder, were actively suicidal, had an active substance abuse problem, were receiving other psychotherapy services, or had begun taking medication for depression less than two months prior to screening.

Only participants who were assigned to the EFT treatment condition and completed at least three therapy sessions were included in the present study. This included a total of 24 participants from 13 couples; two male partners were excluded from analyses due to being coded as ‘unable to classify’ on the AAI. The 24 participants ranged in age from 21 to 62; the average age was 39. Twenty individuals (83%) identified as Caucasian, one (4%) identified as Hispanic, one identified as African-American (4%), and two (8%) identified as Asian. The sample was well-educated; 95% of the participants identified as having a high school diploma or higher and 75% identified as having a college degree or higher. Ten participants were coded by the AAI as dismissing, five participants as preoccupied, and nine participants as secure. Three of the insecure participants were also coded as ‘unresolved.’ A decision was made to include these individuals in the analyses, as unresolved status is determined solely on the basis of an individual’s comments surrounding loss or trauma, often comprised of only a few lines of

text (Hesse, 2008). Typically the individual is able to demonstrate a consistent attachment strategy within the overall AAI transcript (Hesse, 2008). Due to the small sample size in this study, it was deemed more valuable to include these persons, using their secondary attachment strategy—secure, preoccupied or dismissing—for analyses. Finally, five of the participants in this study spoke a first language other than English. Research indicates that individuals across cultures understand attachment security in similar ways (Posada et al., 1995), and also that the three main attachment classifications (secure, preoccupied, and dismissing) appear in all the cultural samples in which the AAI has been conducted (Cassibba, Sette, Bakermans-Kranenburg, & van IJzendoorn, 2013). This suggests that the non-native speakers included in this sample would understand and demonstrate attachment in the same manner as the native speakers. Unfortunately, little research has been conducted directly examining whether there are measurement differences when individuals complete the AAI in their native or non-native language. The presence of persons with differing first languages seems unlikely to significantly affect the results of the current study, however. As previously discussed, the LIWC software, while incredibly valuable, is not a particularly sophisticated form of linguistic analysis. The LIWC does not consider language context or subtlety; complex language usage, such as sarcasm, goes largely undetected by the software. Because of the LIWC's simplicity, it seems unlikely that an individual who speaks a second language fluently enough to complete the AAI would have considerably different LIWC scores than someone completing the AAI in their first language.

## **Procedures**

Approval to complete secondary analyses on the data was granted from the Institutional Review Board (IRB) at Virginia Polytechnic Institute and State University. In the original

study, potential participants were screened over the telephone. Potential participants called to express interest in the study, and staff administered a brief screening measure over the phone to determine if the couples met the qualifications. Couples that met the qualifications for the study were asked to meet with the project staff in order to complete the consent forms and initial assessments. In order to keep participant's information confidential, participants were assigned an individual identification number and a couple identification number, and were instructed to use these numbers on their assessments over the course of the study.

Using random assignment, couples were assigned to either the EFT condition or the TAU condition. The study employed licensed therapists in the Washington, DC metropolitan area to provide therapeutic treatment to the participants. Couples completed one conjoint session, one individual session each, and then thirteen additional conjoint sessions. Couples completed assessments at pre-treatment (before treatment began), mid-treatment (after 7 sessions), post-treatment (after 15 sessions) and follow-up (4 months and 1 year after treatment). Only the baseline AAI was used in the current study. In order to ensure that therapists adhered to the treatment protocol, the weekly sessions for couples assigned to the EFT condition were videotaped and reviewed by the primary investigator and the clinical supervisor. The clinical supervisor, a certified EFT trainer and supervisor, provided regular supervision to EFT therapists to ensure treatment fidelity. Both the assessment data and the session recordings were used for the present study.

For the current study, the researcher employed professional transcription services in order to transcribe the videotaped couple and individual therapy sessions. The researcher used the second joint couple therapy session and each participant's individual session for analysis. After the transcripts from these sessions were generated, the researcher analyzed the text using

the LIWC software program. The researcher then analyzed the LIWC results using the Classification and Regression Tree (CART; Breiman, Friedman, Olshen, & Stone, 1984) package in the R Software program (RStudio, 2012).

## **Instruments**

**Linguistic Inquiry and Word Count Software.** The LIWC (Pennebaker, Francis, & Booth, 2001) is a software program that compares samples of text against a dictionary that consists of over 4500 words, and is arranged into more than 80 categories (Tausczik & Pennebaker, 2010). These categories widely vary, but include parts of speech (e.g., pronouns, verbs, prepositions) psychological components (e.g., thought-related terms, feeling words), and specific content words (e.g., work, school, spirituality, sexuality). The LIWC first counts the number of words in the text. It then looks at each word and determines if the word matches any word that is included in one of the categories, and then generates the percentage of occurrences that the particular category appears in the text. For example, if we were to upload the Pledge of Allegiance into the LIWC, the software program would systematically search the text, looking for words that match its 80 categories, and then generate the percentage that each category appears in the text. Specifically, the LIWC would find that the *total word count* was 31—and then the percentages that each of the other 79 LIWC categories appears in the text. For example, 9.68% of the words would be classified as the *inclusive* category (e.g., we, us, both), 25.81% of the words would be classified as the *prepositions* category (i.e., grammatical prepositions), and so on. The LIWC software has shown good reliability and validity, with LIWC categories demonstrating internal (alpha) reliability as high as .98 (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). Validity has been established by calculating the correlation between independent judge ratings and the LIWC scales for each category; the average for the

categories for which validity has been assessed is 0.45. (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). The LIWC software has been demonstrated to capture more than 86% of words persons use in speech and writing (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007).

**The Adult Attachment Interview.** The AAI assesses an individual's attachment orientation (George, Kaplan, & Main, 1984, 1985, 1996). Psychometric research with the AAI indicates that the measure has strong stability, reliability, and discriminant and predictive validity (see Ravitz et al., 2010 for full review). AAI reliability has been measured by assessing the inter-rater agreement between coders; it has been found to be as high as 95% (Sagi et al., 1994). In a meta-analysis of 18 studies using the AAI, the correlation between parental and child security—i.e., the predictive validity for the AAI—was found to be 75% (van IJzendoorn, 1995). During the interview, individuals are asked to discuss their childhood emotional experiences with their caregivers, the impact of these experiences on the adult's present personality, and the quality of their current relationships with their parents and their children (George, Kaplan, & Main, 1984). The AAI contains twenty questions along with additional follow-up probes that direct the participant to discuss the feelings, thoughts, and emotions surrounding their experiences with caregivers, and how they presently understand them. The interview is audio recorded, and typically lasts between 45 to 60 minutes. The interviews are then transcribed verbatim for coding, based on the classification system developed by Main and Goldwyn (1998). Transcript coding is performed using two sets of scales: parental behaviors and state-of-mind (Crowell, Fraley, & Shaver, 2008). The parental behavior scales include loving, involving, pressuring, and neglecting; the researcher is tasked with assessing the individual's description of each parent's actions without taking the participant's assessment into

account. The state-of-mind scales guide the researcher in examining the coherence of the narrative based on several components, including the presence of anger, idealization, and passive speech (Crowell, Fraley, & Shaver, 2008). The transcript is also examined for overall coherence, as determined by Grice's maxims, which are indicated by the narrative's quality (i.e., plausible, reasonable), relevance to the question at hand, appropriate quantity, and tone (i.e., transparent, original language). Individuals rated by coders as secure provide coherent, balanced narratives and recognize the impact of attachment related experiences on their development. Individuals rated as insecure typically provide less coherent narratives in which the description of their experiences with their caregivers does not match their assessment of the caregiver (e.g., the individual states the parent is loving but can provide no examples of loving behavior). Specifically, individuals rated as insecure-dismissing often provide idealizing narratives, and frequently state they cannot remember experiences with caregivers. Individuals rated as insecure-preoccupied typically express current anger regarding past events or marked passivity (Crowell, Fraley, & Shaver, 2008).

### **Analyses**

Utilizing video from each participant's individual therapy session and second couple therapy session, the participants' texts were transcribed. All therapist comments were removed. The transcript of the couple session was separated so that each participant had one transcript in which only that participant's speech was included. The couple therapy transcript for each participant was uploaded into the LIWC software. The LIWC software was then directed to generate scores for the 44 categories utilized by Cassidy and colleagues (2012) for analysis. These categories include: *first person singular, first person plural, second person, third person singular, third person plural, impersonal pronouns, articles, auxiliary verbs, past tense, present*

*tense, future tense, adverbs, prepositions, conjunctions, negations, quantifiers, numbers, swear words, family, friends, humans, positive emotions, anxiety, anger, sadness, insight, causation, discrepancy, tentative, certainty, inhibition, inclusive, exclusive, see, hear, feel, body, health, sexual, ingestion, motion, space, time, assent.* The R Suite statistical software program (RStudio, 2012) was utilized to complete a Classification and Regression Tree (CART; Breiman, Friedman, Olshen, & Stone, 1984). CART methods were more desirable for this study than other methods due to the study's small sample size. As a nonparametric test, the CART methods can be performed without violating statistical assumptions common to factor analysis, MANCOVA and other related approaches, and there is less risk of Type I error (Lemon, Roy, Clark, Friedmann, & Rakowski, 2003). CART Methods function by employing a probability-based algorithm that examines all independent variables to determine which variable best splits the data into two groups that most differ on the dependent variable (Kuroki & Tilley, 2012). The binary splitting process continues until the resulting group is homogenous in regards to the dependent variable or there are too few observations in the remaining group (McKenzie et. al, 2011). The algorithm utilized is termed a 'greedy algorithm', in that it decides on the optimal split at each juncture, without considering potential future splits (Dasgupta, Papadimitriou, & Vazirani, 2008).

For the present study, the couple session transcript scores on the 44 LIWC categories were loaded into the classification tree package in the R Suite software. The LIWC categories were coded as the independent variables, and the dependent variable was coded as having two potential outcomes—secure and insecure. The resulting classification tree illustrated the LIWC categories that best predicted secure and insecure attachment orientation.

The analysis was then repeated, coding the same LIWC categories as above for the independent variables, and coding the dependent variables for *three* outcomes—secure, insecure-dismissing, and insecure-preoccupied. Examining the classification tree allowed the investigator to determine which LIWC categories were able to predict secure, insecure-dismissing, and insecure-preoccupied attachment. In sum, the analyses described above indicated whether the LIWC software was able to predict attachment orientation based on participants' speech patterns in the couple therapy sessions.

The entire process outlined above was then repeated using transcripts from each participant's *individual* therapy sessions. This indicated which LIWC categories were able to predict attachment orientation (secure or insecure; secure, preoccupied, or dismissing) based on the participant's speech pattern in the individual therapy session.

## CHAPTER 4: RESULTS

### Exploring a Psycholinguistic Method of Assessing Attachment Orientation in Couple Therapy

Attachment has become a key construct for investigation in the social and psychological sciences (Ravitz, Maunder, Hunter, Sthankiya, & Lancee, 2010). In particular, attachment is a significant factor in the study of adult romantic relationships. Adult attachment characteristics are correlated with many important relationship traits, including individuals' functioning within a romantic relationship (Holland & Roisman, 2010), relationship conflict management (Creasey, 2002) and emotion regulation (Fuendeling, 1998).

Researchers who are interested in assessing an individual's attachment-related emotional and cognitive processes, as opposed to examining individuals' conscious experience of relationships, typically use narrative assessments (Crowell, Fraley, & Shaver, 2008). There are several narrative assessments available; however, the most widely used and empirically validated is the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1984; Borelli et al, 2013; Ravitz et. al, 2010). Through a series of interview questions, the AAI explores how individuals make meaning of their attachment histories and how they express this meaning through language. By examining the narrative coherence of the story the individual tells regarding their attachment history, the AAI assesses an individual's attachment orientation. These orientations are divided into two main categories—secure and insecure—and three subcategories of the insecure category—dismissing, preoccupied, and unresolved/disorganized. Persons who are securely attached provide relatively straightforward, cohesive responses to AAI questions and provide examples to support their statements about their attachment histories (Crowell, Fraley, & Shaver, 2008). Also, securely attached individuals typically emphasize the impact of attachment relationships on their own personal development. By contrast, individuals

classified by the AAI as dismissing typically undervalue their attachment history, and may provide idealized accounts of attachment relationships with little support for these descriptions. These individuals sometimes refuse to answer AAI questions or state that they cannot remember details about attachment relationships (Crowell, Fraley, & Shaver, 2008). In contrast, individuals classified as preoccupied discuss their attachment history in a manner that indicates that they are fixated on past attachment experiences. They typically provide lengthy, non-cohesive narratives around particular events or feelings that are triggered by, but not necessarily a direct response to, AAI questions (Hesse, 2008). They may also describe feeling that they needed to attend to their parent's needs as opposed to the parent meeting their needs (Crowell, Fraley, & Shaver, 2008). Finally, when talking about abuse or loss, unresolved/disorganized individuals discuss their attachment relationships in a confused manner, sometimes speaking as past events as if they were happening in the present, or suddenly using florid language (Hesse, 2008). Unlike the three other attachment categories, the unresolved/disorganized category is assigned to persons based solely on their comments surrounding loss or abuse (Lyons-Ruth, Yellin, Melnick, & Atwood, 2005). For this reason, persons who are classified as unresolved/disorganized are also given a secondary classification of secure, preoccupied or dismissing (Hesse, 2008). The secondary classification represents the individual's overall attachment strategy during the interview (i.e., when not discussing loss or abuse) (Hesse, 2008).

Research conducted with the AAI has provided the field with a wealth of information regarding how adults within each attachment orientation behave in and respond to relationships, including relationship conflict behaviors (Creasey & Ladd, 2005), marital quality during the transition to parenthood (Curran, Hazen, Jacobvitz, & Feldman, 2005), and expression of affect during marital interactions (Paley, Cox, Burchinal, & Payne, 1999). Unfortunately, despite the

AAI's usefulness in assessing attachment orientation, administering the AAI requires intensive training, cost, and time (Hesse, 1999; Borelli, Sbarra, Mehl, & David, 2011). Because of this, a limited number of researchers are able to use the AAI despite the measure's demonstrated psychometric properties and utility for the attachment field.

### **Linguistics and Attachment**

Prior findings suggest that individuals' natural language use reflects a wide range of psychological, emotional, personal, and social traits (Pennebaker, 2003). For example, researchers have found that language use predicts depression and suicidal ideation (Bucci & Freedman, 1981; Stirman & Pennebaker, 2001), relationship functioning (Simmons, Chambless, & Gordon, 2008) and relationship satisfaction (Williams-Baucom, et. al, 2010). Unfortunately, studies that directly examine the relationship between attachment orientation and linguistics are somewhat sparse. The available research mostly examines the linguistic characteristics of AAI transcripts. In particular, the Linguistic Inquiry and Word Count (LIWC; Pennebaker, Francis, & Booth, 2001) software program has been demonstrated to be incredibly useful in this regard. The LIWC compares text samples against an internal dictionary that consists of more than 4500 words, arranged into more than 80 categories, including psychological components (e.g., words related to cognition and emotion), parts of speech (e.g., verbs, pronouns, articles), and content words (e.g., school, death, leisure). Studies have indicated that, when the LIWC software has been applied to participant responses to the AAI, the LIWC assignment of attachment orientation was in agreement with the AAI coders 82% (Stone, 2003), 71% (Cassidy, Sherman, & Jones, 2012), and 100% (O'Hara, 2007) of the time. In other words, by analyzing the AAI transcripts, the LIWC software was able to come to the same attachment categorization as the extensively trained AAI coders in 71-100% of the cases. The LIWC could be useful in

assessing attachment orientation, because, unlike the AAI, the LIWC is inexpensive and requires little training to use.

Furthermore, researchers have noted several interesting linguistic patterns in the AAI transcripts. Looking at word count alone, researchers have found that individuals classified as preoccupied typically have the longest transcripts, followed by secure individuals, and dismissing individuals typically have the shortest transcripts (Kane, 2002; Stone 2003; O’Hara, 2007). This fits with our knowledge of attachment theory, as preoccupied individuals are often fully absorbed in their own narrative (they are indeed, *preoccupied* with it), and tend to speak at more length (Hesse, 2008). By contrast, dismissing individuals are uncomfortable speaking about their attachment history, and therefore provide the shortest narratives. Secure individuals typically fall in the middle of these two extremes (Hesse, 2008). Additional research with the LIWC focusing on attachment orientation would benefit both attachment measurement and further develop our understanding of the relationship between attachment and linguistics.

### **Depression**

The present study used a clinical sample in which participants were actively enrolled in couple therapy to treat marital problems and depression of one or both partners. According to the Diagnostic and Statistical Manual of Mental Disorders-IV-TR (DSM-IV-TR; American Psychiatric Association, 2000), depression is characterized by depressed or irritable mood, decreased interest in activities, fatigue, and often sleeplessness or hyposomnia. Individuals who are depressed typically have a pessimistic, self-focused worldview (Hamilton & Abramson, 1983; Ingram, Lumry, Cruet & Sieber, 1987). Depressed persons focus on their own internal experience, and research has found that their language use reflects this stance. For example, using the LIWC software, research has demonstrated that depressed individuals typically use

more first person singular words (e.g., I, my, me) in their speech than non-depressed persons (Rude, Gortner & Pennebaker, 2004). Specifically, researchers asked students to write essays regarding their “deepest thoughts and feelings about being in college,” and found that those who suffered from depression were more self-focused, using words such as “I, my, and, me” more frequently than those who were not experiencing depressive symptoms (Rude, Gortner & Pennebaker, 2004, p. 1128). Based on this research, it is possible that the speech of depressed individuals in the present study may be impacted by their depression. However, given that the previous study utilized texts from entirely different topics of discussion than the present study, it is difficult to predict how and if depressive symptoms will appear in participants’ lexical choices. With little research available regarding the impact of depression on language use when discussing intimate relationships, we do not have a clear guide for how the presence of depression will affect participants’ language in the current study.

### **Emotionally Focused Couple Therapy**

The therapy sessions utilized for analysis in this study are taken from a course of Emotionally Focused Couple Therapy (EFT; Johnson, 2004), an attachment-based couple therapy model. Transcripts from EFT sessions were selected since it is a context in which participants would likely discuss their attachment histories and behaviors, thus, forging the next logical step in examining the predictive capability of the LIWC software from the AAI to attachment-laden conversations in psychotherapy. EFT was developed by Susan Johnson and Leslie Greenberg in the 1980’s to create a more humanistic framework in which to work with couples, as opposed to the behavioral models that dominated the field at the time (Johnson, 2004). EFT posits that marital discord derives from partners becoming stuck in fixed interactional patterns that maintain their underlying negative affect towards each other

(Johnson, Hunsley, Greenberg, & Schindler, 1999). EFT directly targets the negative cycles and accompanying emotions for change, helping partners to have more positive emotional experiences of one another.

According to EFT, attachment is at the heart of intimate adult relationships. Attachment needs are viewed as healthy drives that motivate adults to seek safety and comfort from close others (Johnson, 2004). EFT encourages partners to express their attachment needs and related emotions to their partners in order to receive a new, often more supportive response, so that, ultimately, each partner's attachment needs begin to be met (Johnson, 2004).

Since EFT emphasizes the expression of attachment needs, we expect that attachment language would be reflected in the therapy session transcripts using this modality. The present study will analyze this language, looking for linguistic correlates of attachment orientation.

Also, because the first session of EFT typically involves gathering background information and having the therapist join with the couple—which may limit the amount of attachment language used by each partner—the present study will use the *second* conjoint couple therapy sessions for analysis. Finally, as the course of EFT often includes at least one individual therapy session with each partner, typically occurring immediately after the first conjoint couple session, the present study will utilize these individual sessions for analysis as well (Johnson, 2004).

### **The Present Study**

The aim of the present study was to utilize the LIWC software to assess attachment orientation in the context of an attachment-based couple therapy, in hopes of eventually expanding our ability to measure attachment orientation. Because we do not know if or how the expression of attachment orientation might be impacted by an individual's partner being

present, it is important to examine how each partner speaks individually *and* how they speak when with their significant other. Therefore, transcripts from both the couple second session and the individual session were used for analysis. The researcher first employed professional transcription services to transcribe the videotaped couple and individual sessions. After the transcripts from these sessions were generated, each transcript was uploaded into the LIWC software and results on the LIWC variables were produced. Finally, in order to determine how the linguistic patterns were related to each attachment orientation, the LIWC scores for each group of transcripts (couple and individual) were analyzed using Classification and Regression Tree (CART) methods (Breiman, Friedman, Olshen, & Stone, 1984) in the R software program (RStudio, 2012). CART methods employ a probability-based algorithm that examines all available independent variables in order to determine which variable best splits the data into two groups that most differ on the dependent variable (Kuroki & Tilley, 2012). The binary splitting process continues until the resulting group is homogenous in regards to the dependent variable or there are too few observations in the remaining group (McKenzie et. al, 2011). A classification tree was utilized because, as a nonparametric test, it can be used for small samples to analyze data that may not meet specific statistical assumptions, such as having a normal distribution; it is also able to handle categorical predictors and a large number of independent variables, which were key components of the present study (Phelps & Merkle, 2008).

## **Procedures**

The study procedures were approved by the Virginia Tech Institutional Review Board prior to employment of professional services to transcribe the couple therapy sessions. As stated above, data for the present study come from previous research in which martially

distressed couples with at least one partner identified by the Beck II (BDI-II; Beck, Steer, & Brown, 1996) as having depression were treated with EFT or other couple therapy treatment.

The research team recruited participants in the Washington, DC metropolitan area through advertisements on websites, posted fliers in public spaces, mailings, and referrals from mental health professionals. Couples received therapy at a reduced cost as compensation for their participation in the study. In order to be included, both partners had to be over the age of 18, and consider their relationship distressed, as demonstrated by their scores on the Dyadic Adjustment Scale (DAS; Spanier, 1976). Furthermore, couples had to be cohabiting for at least one year and have no immediate plans for divorce or separation. Persons who met the following criteria were *excluded*: couples in which ongoing domestic violence was present, same-sex couples, and individuals who had a history of psychotic symptoms, bipolar disorder, were actively suicidal, had an active substance abuse problem, were receiving other psychotherapy services, or had recently began taking medication for depression.

Using random assignment, couples were assigned to either the EFT condition or the Treatment as Usual (TAU) condition. The study employed licensed therapists in the Washington, DC metropolitan area to provide therapeutic treatment to the participants. Couples completed 14 conjoint sessions and one individual session each. In order to ensure that therapists adhered to the treatment protocol, the weekly sessions for couples assigned to the EFT condition were videotaped and reviewed by the primary investigator and the clinical supervisor. The clinical supervisor, a certified EFT trainer and supervisor, provided regular supervision to EFT therapists to ensure treatment fidelity. Both the baseline AAI assessments and the session recordings were used for the present study.

## **Study Participant Demographics**

Only participants who were assigned to the EFT treatment condition and completed at least three therapy sessions were included in the present study. This included a total of 24 participants from 13 couples; two male partners were excluded from analyses due to being coded as ‘cannot classify’ on the AAI. The 24 participants ranged in age from 21 to 62; the average age was 39. Twenty individuals (83%) identified as Caucasian, one (4%) identified as Hispanic, one (4%) identified as African-American, and two (8%) identified as Asian. The sample was well-educated; 95% of the participants identified as having a high school diploma or higher and 75% identified as having a college degree or higher. Ten participants were coded by the AAI as dismissing, five as preoccupied, and nine as secure. Three of the insecure participants were also coded as ‘unresolved.’ A decision was made to include these individuals in the analyses, as unresolved status is determined solely on the basis of an individual’s comments surrounding loss or trauma, often comprised of only a few lines of text (Hesse, 2008). Typically the individual is able to demonstrate a consistent attachment strategy within the overall AAI transcript (Hesse, 2008). Due to the small sample size in this study, it was deemed more valuable to include these persons, using their secondary attachment strategy—secure, preoccupied or dismissing—for analyses.

Finally, five of the participants in this study spoke a first language other than English. Research indicates that individuals across cultures understand attachment security in similar ways (Posada et al., 1995), and also that the three main attachment classifications (secure, preoccupied, and dismissing) appear in all the cultural samples in which the AAI has been conducted (Cassibba, Sette, Bakermans-Kranenburg, & van IJzendoorn, 2013). This research suggests that non-native speakers would understand and demonstrate attachment in a similar

manner as native speakers. Furthermore, the LIWC software, while incredibly valuable, is not a particularly sophisticated form of linguistic analysis. The LIWC does not consider language context or subtlety; complex language usage, such as sarcasm, goes largely undetected by the software. Because of the LIWC's simplicity, it seems unlikely that an individual who speaks a second language fluently enough to complete the AAI would have considerably different LIWC scores than someone completing the AAI in their first language.

## Measures

**Linguistic Inquiry and Word Count Software.** All participant transcripts were analyzed using the LIWC software program (Pennebaker, Francis, & Booth, 2001). The LIWC compares samples of text against an internal dictionary that consists of over 4500 words, and is arranged into more than 80 categories (Tausczik & Pennebaker, 2010). These categories widely vary, but include parts of speech (e.g., pronouns, verbs, prepositions) psychological components (e.g., thought-related terms, feeling words), and specific content words (e.g., work, school, spirituality, sexuality). The LIWC first counts the number of words in the text. It then looks at each word and determines if the word matches any word that is included in one of the categories, and then generates the percentage of occurrences that the particular category appears in the text. For example, if we were to upload the Pledge of Allegiance into the LIWC, the software program would systematically search the text, looking for words that match its 80 categories, and then generate the percentage that each category appears in the text. Specifically, the LIWC would find that the *total word count* was 31—and also the percentages that each of the other 79 LIWC categories appears in the text. For example, 9.68% of the words would be classified as the *inclusive* category (terms such as ‘we,’ ‘us,’ ‘both’), 25.81% of the words would be classified as the *prepositions* category (i.e., grammatical prepositions), and so on. The

LIWC software has shown good reliability and validity, with LIWC categories demonstrating internal (alpha) reliability as high as .98 (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). Validity has been established by calculating the correlation between independent judge ratings and the LIWC scales for each category; the average for the categories for which validity has been assessed is .45. (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). Studies with the LIWC software indicate that it is able to capture more than 86% of words persons use in speech and writing (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007).

**The Adult Attachment Interview.** The attachment orientation of each participant was measured using the AAI (George, Kaplan, & Main, 1984, 1985, 1996). Psychometric research with the AAI indicates that the measure has strong stability, reliability, and discriminant and predictive validity (see Ravitz et al., 2010 for full review). AAI reliability has been measured by assessing the inter-rater agreement between coders; it has been found to be as high as 95% (Sagi et al., 1994). In a meta-analysis of 18 studies using the AAI, the correlation between parental and child security—i.e., the predictive validity for the AAI—was found to be 75% (van IJzendoorn, 1995). During the interview, individuals are asked to discuss their childhood emotional experiences with their caregivers, the impact of these experiences on the adult's present personality, and the quality of their current relationships with their parents and their children (George, Kaplan, & Main, 1984). The AAI contains twenty questions along with additional follow-up probes that direct the participant to discuss the feelings, thoughts, and emotions surrounding their experiences with caregivers, and how they presently understand them. The interview is audio recorded, and typically lasts between 45 to 60 minutes. The interviews are then transcribed verbatim for coding, based on the classification system developed by Main and Goldwyn (1998). Transcript coding is performed using two sets of

scales: parental behaviors and state of mind (Crowell, Fraley, & Shaver, 2008). The parental behavior scales include loving, involving, pressuring, and neglecting; the researcher is tasked with assessing the individual's description of each parent's actions without taking the participant's assessment into account. The state of mind scales guide the researcher in examining the coherence of the narrative based on several components, including the presence of anger, idealization, and passive speech (Crowell, Fraley, & Shaver, 2008). The transcript is also examined for overall coherence, as determined by Grice's maxims, which are indicated by the narrative's quality (i.e., plausible, reasonable), relevance to the question at hand, appropriate quantity, and tone (i.e., transparent, original language) (1975). Individuals rated by coders as secure provide coherent, balanced narratives and recognize the impact of attachment related experiences on their development. Individuals rated as insecure typically provide less coherent narratives in which the description of their experiences with their caregivers does not match their assessment of the caregiver (e.g., the individual states the parent is loving but can provide no examples of loving behavior). Specifically, individuals rated as insecure-dismissing often provide idealizing narratives, and frequently state they cannot remember experiences with caregivers. Individuals rated as insecure-preoccupied typically express current anger regarding past events or marked passivity (Crowell, Fraley, & Shaver, 2008).

### **Analyses**

Video from each participant's individual therapy session and second couple therapy session were transcribed. All therapist comments were removed. The transcript of the couple session was separated so that each participant had one transcript in which only that participant's speech was included. The couple therapy transcript for each participant was uploaded into the LIWC software. The LIWC software was then directed to generate scores for the 44 categories

utilized by Cassidy and colleagues (2012) for analysis. Broadly, they include; linguistic components (e.g., *prepositions, past tense verbs*), psychological processes (e.g., *affect*), physical processes (e.g., *see, hear*), and cognitive processes (e.g., *insight, certainty*). The full list of categories is available from the author. The R Suite statistical software program (RStudio, 2012) was used to complete a Classification and Regression Tree (CART; Breiman, Friedman, Olshen, & Stone, 1984). CART methods were more desirable for this study than other approaches due to the study's small sample size. As a nonparametric test, CART methods can be performed without violating statistical assumptions common to factor analysis, MANCOVA and other related methods, and there is less risk of Type I error (Lemon, Roy, Clark, Friedmann, & Rakowski, 2003). CART methods employ a probability-based algorithm that examines all available independent variables in order to determine which variable best splits the data into two groups that most differ on the dependent variable (Kuroki & Tilley, 2012). The statistical output is a visual display that looks much like the branches of a tree. The top of the tree illustrates the independent variables that are the most predictive of the dependent variable. The binary splitting process continues until the resulting group is homogenous in regards to the dependent variable or there are too few observations in the remaining group (McKenzie et. al, 2011). The algorithm utilized is termed a 'greedy algorithm' in that it decides on the optimal split at each juncture, without considering potential future splits (Dasgupta, Papadimitriou, Vazirani, 2008).

For the present study, the couple session transcript scores on the 44 LIWC categories were loaded into the classification tree package in the R Suite software. The LIWC categories were coded as the independent variables, and the dependent variable was coded as having two potential outcomes—secure and insecure. The resulting classification tree illustrated the LIWC categories that best predicted secure and insecure attachment orientation.

The analysis was then repeated, coding the same LIWC categories as above for the independent variables, and coding the dependent variables for *three* outcomes—secure, insecure-dismissing, and insecure-preoccupied. Examining the classification tree allowed the investigator to determine which LIWC categories were able to predict secure, insecure-dismissing, and insecure-preoccupied attachment. In sum, the analyses described above indicated whether the LIWC software is able to predict attachment orientation based on participants' speech patterns in the couple therapy sessions.

The entire process outlined above was then repeated using transcripts from each participant's *individual* therapy sessions. This indicated which LIWC categories were able to predict attachment orientation (i.e., secure or insecure; secure, preoccupied, or dismissing) based on the participant's speech pattern in the individual therapy session.

## **Results**

In order to determine which LIWC variables were correlated with each attachment orientation in the couple and individual session transcripts, the researcher employed CART methods of analysis. For the couple and individual session transcripts, two classification trees were created—in one tree, attachment was coded as secure or insecure, and in the second tree attachment was coded as secure, dismissing, or preoccupied. To account for the potential impact of depression, gender, and differences in first-language spoken by participants, these variables were included in all the couple and individual session classification trees. Also, it is important to note that each LIWC variable score represents the percentage that the category appears in the participant's overall text. For example, a score of 3.82% on the *past* variable indicates that 3.82% of the individual's overall text contains words that comprise the *exclusive* category in the LIWC's internal dictionary. Finally, in regards to the tree construction, for all of the

classification trees presented below, the misclassification error rate was 0, meaning that the trees generated were able to categorize all independent variables by attachment orientation. Due to the small sample size, the researcher chose to minimize misclassification error, creating a tree that accounted for all individuals in the sample, instead of creating a more general tree that would have a significantly higher rate of error. The four trees generated by the couple and individual transcripts, analyzed along two (insecure or secure) and three (secure, preoccupied, or dismissing) dimensions of attachment are reviewed next. Mean and range scores for the predictive LIWC variables are included in Tables 1 and 2.

Table 1. Mean and range scores of predictive LIWC variables in individual session transcripts

LIWC Variable	Examples	Mean	Range
<i>Body</i>	<i>i.e., body parts and processes</i>	0.26	0.03 to 0.51
<i>Family</i>	<i>mom, wife, cousin</i>	1.17	0.2 to 3.16
<i>First Person Plural</i>	<i>we, ours, us</i>	1.37	0.64 to 2.38
<i>First Person Singular</i>	<i>I'm, myself, me</i>	8.8	6.19 to 10.84
<i>Sad</i>	<i>Cry, alone, hopeless</i>	0.27	0.06 to 0.47

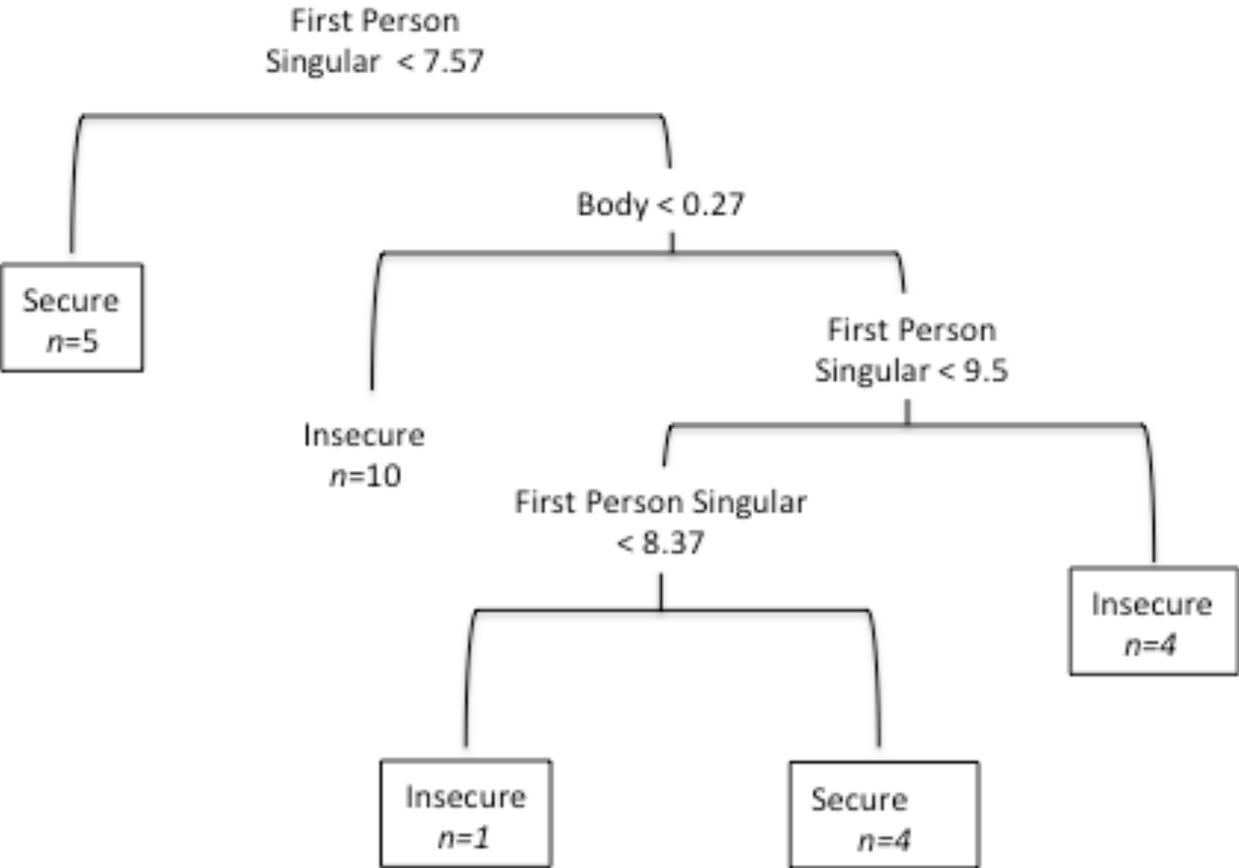
**Individual session transcripts two-way attachment tree.** Figure 1 displays the classification trees generated by the individual transcripts, analyzed along two attachment dimensions—secure and insecure. For this particular tree, the *first person singular* and *body* (i.e., body parts and processes) variables were predictive of attachment orientation.

In the individual two-way attachment tree, two linguistic pathways led to individuals being classified as secure. For the first, individuals who scored less than 7.57% on the *first person singular* variable were classified as secure ( $n=5$ ). In the second pathway, individuals who scored more than 7.57% on the *first person singular* variable, more than 0.27% on the *body*

variable, and between 8.37% and 9.5% on the *first person singular* variable were classified as secure ( $n=4$ ).

The insecure category also had two main linguistic pathways to classification, with one outlier. For the first pathway, individuals classified as insecure scored more than 7.57% on the *first person singular* variable, and less than 0.27% on the *body* variable ( $n=10$ ). In the second pathway, individuals who scored more than 0.27% on the *body* variable, and more than 9.5% on the *first person singular* variable were classified as insecure ( $n=4$ ). The outlier in the insecure category scored between 7.57% and 8.37% on the *first person singular* variable and more than 0.27% on the *body* variable ( $n=1$ ).

Figure 1. Individual session transcripts two-way attachment tree



**Individual session transcripts two-way attachment tree.** In regards to the tree generated from the individual session data analyzed along three attachment dimensions (i.e., secure, preoccupied, or dismissing), the *sad* (e.g., cry, alone, hopeless), *first person singular*, *family* (e.g., mom, wife, cousin), and *first person plural* variables were found to be predictive attachment orientation, along with the non-native speaker variable (Figure 2). To begin, there was one dominant linguistic pathway toward the preoccupied category—these individuals scored greater than 0.36% on the *sad* variable and were native speakers ( $n=4$ ). There was one preoccupied outlier, an individual who scored less than 0.36% on the *sad* variable, more than 10.52 on the *first person singular* variable, and less than 1.59% on the *family* variable ( $n=1$ ).

For the secure category, there were two linguistic pathways that led to this classification with one outlier. In the first pathway, individuals classified as secure scored less than 0.36% on the *sad* variable and less than 7.57% on the *first person singular* variable ( $n=5$ ). For the second pathway, individuals who scored less than 0.36% on the *sad* variable, more than 7.57% on the *first person singular* variable, more than 1.59% on the *family* variable, and less than 1.49% on the *first person plural* variable were classified as secure ( $n=3$ ). Finally, one individual classified as secure scored more than 0.36% on the *sad* variable, and was placed into the non-native speaker category ( $n=1$ ).

The dismissing category had one distinct linguistic pathway, along with one outlier. Nearly all of the individuals classified as dismissing scored less than 0.36% on the *sad* variable, between 7.57% and 10.52% on the *first person singular* variable, and less than 1.59% on the *family* variable ( $n=9$ ). One individual classified as dismissing differed from this pathway, scoring less than 0.36 on the *sad* variable, more than 7.57% on the *first person singular* variable, more than 1.59% on the *family* variable, and more than 1.49% on the *we* variable.

Figure 2. Individual session transcripts three-way attachment tree

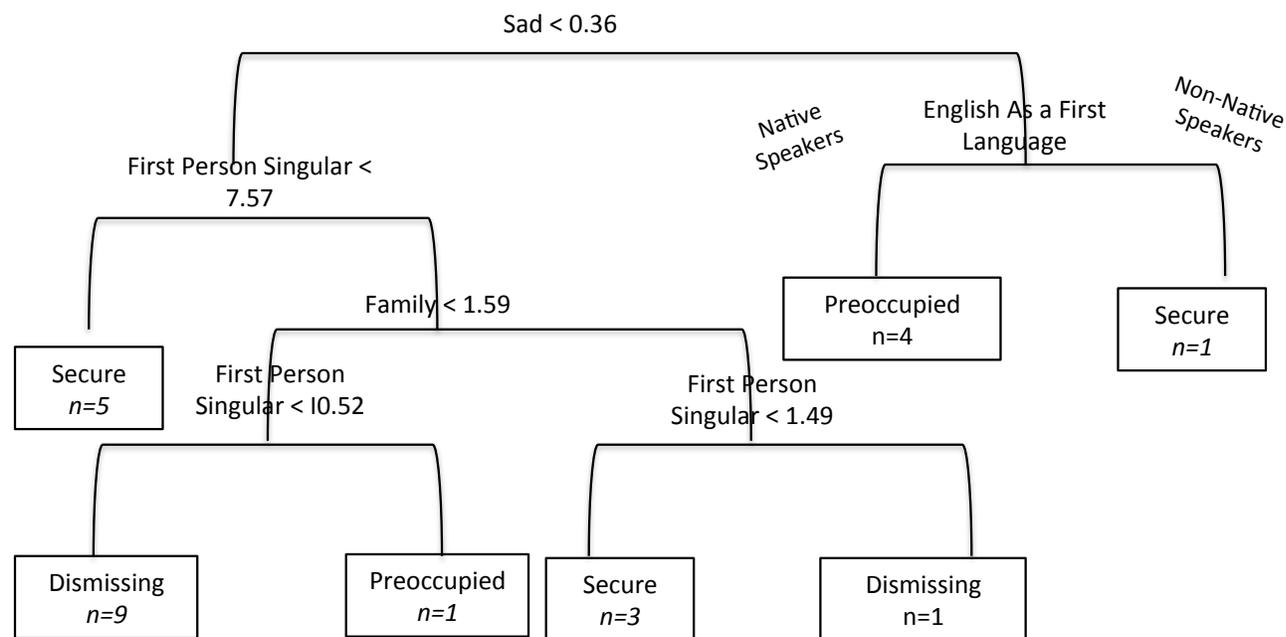


Table 2. Mean and range scores of predictive LIWC variables in couple session transcripts

LIWC Variable	Examples	Mean	Range
<i>Article</i>	<i>i.e., grammatical articles</i>	4.14	2.84 to 6.23
<i>Certainty</i>	<i>always, never, absolute</i>	1.53	0.74 to 2.47
<i>Exclusive</i>	<i>without, except, but</i>	5.35	2.78 to 7.63
<i>First Person Plural</i>	<i>we, ours, us</i>	1.62	0.67 to 2.71
<i>First Person Singular</i>	<i>I'm, myself, me</i>	9.12	6.5 to 11.61
<i>Motion</i>	<i>drive, climb, deliver</i>	1.96	0.82 to 3.31
<i>Past</i>	<i>Past tense verbs</i>	4.45	1.11 to 6.03
<i>Present</i>	<i>Present tense verbs</i>	14.87	11.4 to 18.48
<i>Sexual</i>	<i>kiss, breast, love</i>	0.19	0.0 to 1.38

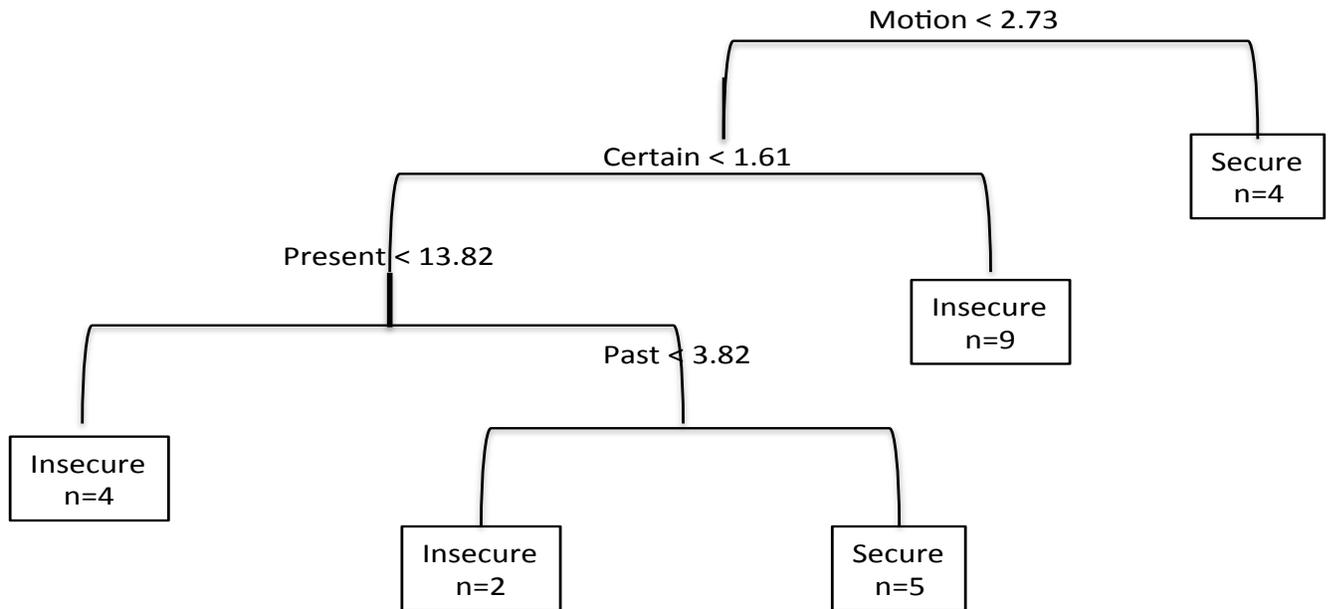
**Couple session transcripts two-way attachment tree.** For the couple session texts analyzed along two dimensions of attachment—secure/insecure—none of the potentially confounding variables (i.e., depression, gender, and non-native speaker) were predictive of LIWC variables scores associated with attachment (See Figure 3). For this classification tree,

the *motion* (e.g., drive, fall, grow), *certainty* (e.g., absolutely, must, never), *present* (i.e., present tense verbs) and *past* (i.e., past tense verbs) variables were predictive of attachment orientation.

There were two linguistic pathways towards the secure attachment classification. In the first, individuals who scored more than 2.73% on the *motion* variable were classified as secure ( $n=4$ ). For the second pathway, secure individuals scored less than 1.61% on the *certainty* variable more than 13.82% on the *present* variable, and more than 3.82% on the *past* variable ( $n=5$ ).

Three linguistic pathways led to the insecure attachment orientation. In the first pathway, insecure individuals scored less than 2.73% on the *motion* variable and more than 1.61% on the *certainty* variable ( $n=9$ ). For the second pathway, insecure individuals scored less than 2.73% on the *motion* variable, less than 1.61% on the *certainty* variable, and less than 13.82% on the *present* variable ( $n=4$ ). Finally, in the third pathway, insecure individuals scored less than 2.73% on the *motion* variable, less than 1.61% on the *certainty* variable, more than 13.82% on the *present* variable, and less than 3.82% on the *past* variable ( $n=2$ ).

Figure 3. *Couple session transcripts two-way attachment tree*



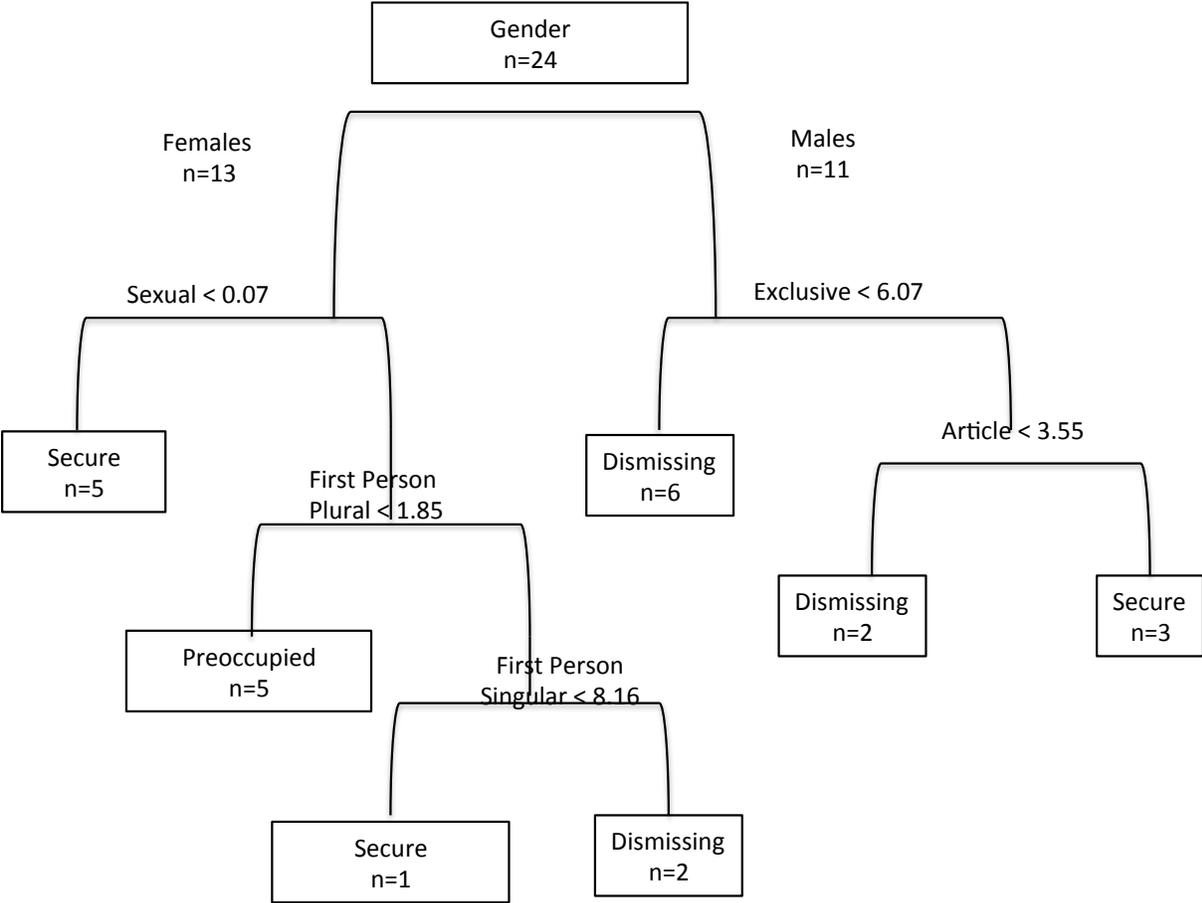
**Couple session transcripts three-way attachment tree.** The visual display for the Couple Transcript 3-Way Attachment Tree is included in Figure 4. Gender was the first variable to split the data, indicating that it was the most predictive of the participants' LIWC scores in the couple session transcripts when attachment was coded three ways—secure, dismissing, preoccupied. Essentially, within the couple session, males and females demonstrated separate yet distinct patterns of speech associated with their specific attachment orientation. LIWC variables that were predictive of attachment in this tree included *exclusive* (e.g., without, except, but), *article* (i.e., grammatical articles), *sexual* (e.g., kiss, breast, love), *first person plural* (e.g., we, ours, us), and *first person singular* (e.g., I'm, myself, me). The remaining LIWC variables were not predictive of attachment orientation.

In particular, for males ( $n=11$ ), the *exclusive* and *article* variables were predictive of dismissing and secure attachment (there were no preoccupied males in the sample). Males who scored less than 6.07% on the *exclusive* variable were classified as dismissing ( $n=6$ ). Males

who scored more than 6.07% on the *exclusive* variable were then classified as either dismissing or secure—those who scored less than 3.55% on the *article* variable were classified as dismissing ( $n=2$ ), while males who scored greater than 3.55% on the *article* variable were classified as secure ( $n=3$ ). In other words, all securely attached males in the couple session transcripts scored greater than 6.07% on the *exclusive* variable and also scored greater than 3.55% on the *article* variable. Dismissing males, on the other hand, either scored less than 6.07% on the *exclusive* variable, or, scored greater than 6.07% on the *exclusive* variable and less than 3.55% on the *article* variable.

For females ( $n=13$ ), the *sexual*, *first person plural* and *first person singular* variables were predictive of attachment orientation. Females who scored less than 0.07% on the *sexual* variable were classified as secure ( $n=5$ ). Only one secure female was classified outside this group—this female scored greater than 0.07% on the *sexual* variable, and greater than 1.85% on the *first person plural* variable ( $n=1$ ). Furthermore, all females who scored greater than 0.07% on the *sexual* variable and scored less than 1.85% on the *first person plural* variable were classified as preoccupied ( $n=5$ ). Finally, the females classified as dismissing scored higher than .07% on the *sexual* variable, greater than 1.85% on the *first person plural* variable, and greater than 8.16 on the *first person singular* variable ( $n=2$ ).

Figure 4. Couple session transcripts three-way attachment tree



**Discussion**

The intersection of attachment and language has been a focal point in attachment measurement since the introduction of the AAI. Furthermore, it is important to continue to develop methods to assess attachment orientation for research purposes. The goal of the present study was to examine the relationship between attachment orientation and speech in an attachment-based couple therapy. The results indicate that attachment orientation is a meaningful metric for analyzing individuals’ speech with and about their relationships. First, similar to prior studies in which the LIWC was used to analyze the AAI, the *first person singular, first person plural, articles, sad, exclusive, past, present, certainty* variables were all found to be predictive of attachment orientation (Cassidy, Sherman, & Jones, 2012; O’Hara,

2007; Stone, 2003). Furthermore, additional LIWC variables that were predictive of attachment orientation, including *body*, *family*, *sexual*, and *motion*, emerged in this research. Finally, this study also found that two confounding variables impacted the results—gender and the presence of non-native speakers. These variables were only predictive in the transcripts analyzed along the three-way dimension of attachment and were not found to be predictive when attachment was analyzed along the two-way dimension. A detailed examination of the results are provided below, along with limitations of the study and directions for future research.

### **Discussion of Findings from Two-way Analysis**

**Insecure and secure.** In the couple session transcripts analyzed along two attachment dimensions, 60% of individuals classified as insecure used the *motion* variable at an approximately average rate and used the *certainty* variable at a greater than average rate. Cassidy and colleagues (2012) also found that *certainty* was indicative of insecure attachment, although their findings were particularly related to preoccupied attachment. In this study, *certainty* was predictive of the overarching umbrella of insecurity. In the AAI transcripts, both dismissing and preoccupied persons typically discuss relationships in black and white terms; preoccupied persons often speak about their own emotional experiences in an intense and exaggerated manner, while dismissing individuals often present idealistic pictures of their attachment figures, ultimately providing little evidence to support their claims (Hesse, 2008). Because of this, it seems fitting that insecure persons were more likely than secure individuals to use terms such as *definitely*, *forever*, and *must* when discussing their attachment relationships.

An interesting finding was that individuals classified as insecure often used lower rates of *present* and *past* variables than securely attached individuals. Again, this finding seems somewhat expected given what we know about AAI transcripts, in that preoccupied individuals

are typically engaged in their narrative in a way that suggests that the past is very much alive for them; their present continually seeps into their discussion of past events (Main et al., 2002). It is difficult, however, to interpret exactly why dismissive persons would also use lower levels of *past* and *present* variables; perhaps because these individuals limit their discussion of attachment relationships in general, they ultimately make fewer *past* references by default (Hesse, 2008). Stone found similar results; both dismissing and preoccupied persons demonstrated low levels of *past* and *present* variables, with preoccupied persons demonstrating the least usages of all (2003).

Finally, 44% of individuals classified as secure demonstrated significantly higher usage of the motion variable ( $n=4$ ). For this variable, the average score for all participants was 1.96%, however, the scores for these secure individuals were much higher than average—2.73% and greater. In regards to the words that comprise the *motion* category, most of the terms are verbs that are specifically related to movement, e.g., drive, climb, deliver. This emphasis on discrete verbs seems somewhat expected of the secure attachment group—their language surrounding attachment-related issues is typically clear and precise. Because secure individuals are comfortable talking about attachment-related issues, it seems that they are better able to provide rich detail while discussing their experiences in couple therapy (Crowell, et al., 2002).

Looking at the individual session transcripts, 55% of individuals who were classified as securely attached ( $n=5$ ) had much lower than average scores on the *first person singular* variable. The lower than average scores for securely attached individuals on the *first person singular* variable appear to reflect their comfort in discussing their relationships to other (Hesse, 2008); they demonstrate lower than average *first person singular* scores, and higher scores on

variables related to relationships. The findings for the individual transcripts analyzed along three dimensions of attachment were similar, and are discussed below.

Findings indicated a strong association between secure attachment and a lack of usage of bodily terms. The finding for the *body* variable is difficult to interpret. In regards to attachment, there is no theoretical expectation regarding the discussion of body parts and processes, particularly within the context of an individual session in the course of couple therapy. Subsequent research is needed to ascertain the potential significance of this finding.

### **Discussion of Findings from Three-way Analysis**

**Secure.** Secure males in the couple session transcripts were identified by higher than average use of the *exclusive* variable (eg, but, either, except), and average to high use of the *article* (e.g., a, a lot, an, the) variable. From looking at the couple transcripts, a potential reason for the high use of the *exclusive* variable, is that it appears secure males often attempted to explain their thoughts and feelings and used the *exclusive* words in order to clarify their position. For example, one male stated (*exclusive* words are italicized); “I'm *either* kind of levelheaded *or*, if I'm *really* showing emotion...” Because securely attached persons are more likely to recognize emotional complexity than insecure persons, the secure males in this group may be using the *exclusive* words to provide further detail regarding their interactions with their partner (Hesse, 2008).

In regards to secure males' high usage of the *article* variable, previous research with the LIWC has indicated that low usage of *articles* typically corresponds with neuroticism (Pennebaker & King, 1999). Furthermore, prior findings indicate that neuroticism is positively correlated with preoccupied and dismissing attachment, but not secure attachment (Nofle &

Shaver, 2006). Secure males' high usage of grammatical articles, then, fits with previous attachment and linguistic research.

In the couple transcripts, secure females were marked by lower than average scores on the *sexual* variable. However, the *sexual* variable was one of the least used LIWC categories in the transcripts, averaging only 0.19% of an individual's transcript. Still, it is interesting, that secure females used particularly low levels of *sexual* words. While the terms that identify the *sexual* category are mostly words directly related to sexual behaviors (e.g., sex, erection, vagina); it also includes words such as 'passion' and 'love,' which would we theoretically expect secure females to feel comfortable discussing.

In the individual session transcripts, secure orientation was associated with score patterns on the *first person singular*, *family*, and *first person plural* variables. In particular, secure persons typically used the *first person singular* variable at lower rates than persons in the preoccupied and dismissing categories. When secure persons did use *first person singular* at slightly higher rates (although still lower than the variable average), they also used the *family* variable at higher rates, and also the *first person plural* variable at approximately average rates for the sample. In other words, in discussing attachment concerns, secure individuals used a wider range of personal pronouns and family relationship designations than persons in the preoccupied and dismissing categories. Because of their high level of comfort in discussing attachment-related concerns, secure persons in the individual therapy sessions were able to speak more broadly about their experiences, without an obsessive focus on either themselves or others. This finding fits with our theoretical knowledge regarding secure attachment, and also replicates Stone's (2003) findings that secure persons use a fuller range of pronouns on the AAI.

**Preoccupied.** The preoccupied group was the smallest attachment orientation category in this study ( $n=4$ ), and as previously stated, was comprised entirely of female participants. Also, none of the non-native speakers were categorized as preoccupied. In the couple session transcripts, preoccupied females were demonstrated by higher *sexual* variable scores and lower *first person plural* variable scores. Again, this finding partially mirrors results from previous LIWC research conducted with the AAI, in which preoccupied individuals used the lowest rates of the *first person plural* variable (Stone, 2003).

In the individual session transcripts, native speakers who used the *sad* variable at higher than average rates were classified as preoccupied ( $n=4$ ). This fits with our theoretical expectation regarding preoccupied attachment; research indicates that preoccupied individuals demonstrate intense focus on their own emotional landscape, including feelings of sadness (Mikulincer & Orbach, 1995). However, this finding does contradict that of Stone (2003) who found that preoccupied individuals used the *sad* variable at lower rates than dismissing and secure persons on the AAI.

**Dismissing.** In the couple session transcripts, males who were classified as dismissing typically used the *exclusive* variable at lower rates than secure individuals. As indicated in the section above regarding securely attached males in the couple session, dismissing males could potentially use the *exclusive* words at lower rates because their discomfort with discussing attachment-related concerns makes them less likely to clarify or explain their emotional experiences with their partner (Hesse, 2008).

There were only two dismissing females in the sample. These two females demonstrated greater use of the *sexual* variable, greater use of the *first person plural* variable, and greater use of the *first person singular* variable than secure and preoccupied females.

Research indicates that dismissing individuals are more likely than other attachment groups to avoid emotional commitment to their partners by fantasizing about sex with other persons and engaging in extramarital affairs (Brennan & Shaver, 1995). Perhaps dismissing females in couple therapy used more *sexual* terms instead of discussing other types of intimacy, which they may feel less comfortable with. The finding regarding the *first person plural* variable is unexpected, and does not fit with our knowledge of dismissing individuals.

In the individual session transcripts, 90% of individuals classified as dismissing had lower scores on the *sad* and *family* variables than insecure and preoccupied persons, along with a score range of 7.57% to 10.52% on the *first person singular* variable ( $n=9$ ). In regards to the lower scores on the *sad* and *family* variables, this corresponds with our knowledge of dismissing individuals. Persons classified as dismissing are typically uncomfortable focusing on emotions, so it is expected that they would particularly shy away from discussing the vulnerable emotion of sadness. Also, in regards to the *family* variable, dismissing persons are often reluctant to discuss relationships, which would naturally lead to fewer references of family members in their transcripts. Finally, the scores for individuals classified as dismissing on the *first person singular* variable are a bit complex. It appears that, generally, dismissing individuals use I-words (e.g., I'm, me, my) at higher rates than persons who are securely attached, but at lower rates than persons who are preoccupied. In AAI transcripts, dismissing individuals typically demonstrate less self-focus than preoccupied individuals, who are hypervigilant regarding their own emotional experiences (Hesse, 2008). However, as they are also less comfortable talking about their relationships with others, they ultimately focus more on themselves than securely attached persons, who are more comfortable discussing both their experiences regarding themselves *and* their relationship to others (Hesse, 2008).

## CHAPTER 5: CONCLUSIONS

### Implications and Suggestions for Future Research

These research findings indicate that there are linguistic patterns associated with attachment orientation in the context of attachment-based couple therapy. Much of our understanding of how different attachment orientations respond to the AAI questions corresponded to how these groups discussed their relationships. For example, dismissing individuals appeared to be less willing to discuss vulnerable emotions such as sadness, or their relationships with family members in therapy sessions. Preoccupied individuals demonstrated significant self-focus, while secure persons were able to speak about themselves and their relationships to others. As previous studies have suggested that attachment orientation is associated with how individuals *view* relationships, and also how they *behave* in relationships, this study indicates that attachment orientation is reflected in how they *speak* with and about their partners. A next step in this line of inquiry would be to determine if attachment orientation correlates with individuals' speech in other settings in which attachment concerns are discussed. For example, do the linguistic patterns associated with attachment orientation in the present study extend into partners' discussion of their relationship outside of therapy?

Also, it was interesting that gender was predictive of linguistic attachment patterns in the trees analyzed along three dimensions (i.e., secure, preoccupied, dismissing), but not in the trees analyzed along two dimensions (i.e., secure, insecure). Given that studies indicate that attachment is not correlated with gender, this could be a reflection simply of the present sample, in which there were no preoccupied males (Bakermans-Kranenburg & van IJzendoorn, 2009). However, it could also be that when individuals discuss attachment related issues in therapy, as opposed to a clinical interview like the AAI, the social construct of gender becomes a more

salient factor. Further research regarding understanding the intersection of gender and attachment in non-clinical settings is indicated.

In addition, as noted above, the presence of non-native speakers was found to be predictive of speech associated with attachment orientation. While numerous studies have used the AAI in languages other than English, studies that directly examine the completion of the AAI in a *second* language are sparse in the literature. The present study indicates that more research in this area is needed.

Finally, although forty-four LIWC variables were utilized for analyses, only twelve of these variables were suggested to be predictive of attachment orientation. This leaves thirty-two LIWC variables that were not indicated to be predictive. A potential reason for the lack of predictive ability for some of these variables may lie within the demographics of the sample itself. In previous studies with the LIWC and the AAI, the studies with the most similar demographics had more predictive LIWC variables in common. In particular, the samples utilized by the O'Hara (2007) and Stone (2003) studies were demographically similar, and the sets of LIWC variables suggested to be predictive of attachment orientation in each study were nearly the same, while the sample in the Cassidy, Sherman, and Jones (2012) study was the least demographically similar to the O'Hara (2007) and Stone (2003) studies, and the resulting predictive LIWC variables were different from the other studies. The present study is more demographically similar to the Stone (2003) and O'Hara (2007) studies than the Cassidy (2012) study, and the resulting LIWC variables better match those indicated by Stone (2003) and O'Hara (2007). More research is needed to determine whether this hypothesis is accurate.

## Limitations

A significant limitation of this study was the small sample size, which may restrict the ability to generalize these results outside the present group. The sample also did not reflect a typical distribution of attachment orientation—there were no preoccupied males in the sample and only two dismissing females. Furthermore, the present sample lacked diversity in race, educational level and age—the majority of participants were well educated Caucasians in their late thirties and early forties. As previous studies indicate that speech patterns are associated with race, age, and education—future research is needed to ascertain if these results would emerge outside of this group (Eberhardt, 2009; Pennebaker & Stone, 2003; Sillars, Shellen, McIntosh, & Pomegranate, 1997). In addition, because of the small sample size, participants with primary classifications of unresolved/disorganized were retained. It is possible that the presence of this data could have influenced the results. Finally, while this study indicated that there were differences in the usage of LIWC variables by attachment orientation, the practical differences in the LIWC percentages were minimal. For example, for the *certainty* variable, participant scores ranged from 0.74% to 2.47%—these percentages are only a small fraction of the overall couple session transcript. To determine if these small differences are meaningful, future studies are needed to examine whether the findings replicate among other samples. The small differences in the LIWC percentages among AAI classifications would be undetectable without the use of a computer software program; therefore, such textual analysis may only be useful for research purposes and not for assessing spoken language in real-time clinical sessions.

## **Conclusion**

The purpose of this study was to examine the relationship between attachment orientation and participant speech in attachment-based couple therapy. This study built upon prior research that indicated there were linguistic patterns associated with attachment orientation in the AAI. This study took the next logical step in this line of research and analyzed attachment-based couple therapy transcripts in place of AAI transcripts. The results of the current study indicate that attachment orientation is reflected in the language of participants engaged in attachment-based couple therapy.

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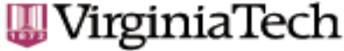
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APPENDIX

IRB APPROVAL LETTER



Office of Research Compliance  
Institutional Review Board  
North End Center, Suite 4120, Virginia Tech  
300 Turner Street NW  
Blacksburg, Virginia 24061  
540/231-4606 Fax 540/231-0959  
email irb@vt.edu  
website <http://www.irb.vt.edu>

**MEMORANDUM**

**DATE:** June 19, 2013  
**TO:** Andrea K Wittenborn, Erica R Turner  
**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires April 25, 2018)  
**PROTOCOL TITLE:** Exploring a Psycholinguistic Method of Assessing Attachment Orientation (Masters Thesis)  
**IRB NUMBER:** 13-571

Effective June 19, 2013, the Virginia Tech Institutional Review Board (IRB) Chair, David M Moore, approved the New Application request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<http://www.irb.vt.edu/pages/responsibilities.htm>

(Please review responsibilities before the commencement of your research.)

**PROTOCOL INFORMATION:**

Approved As: **Expedited, under 45 CFR 46.110 category(ies) 5**  
Protocol Approval Date: **June 19, 2013**  
Protocol Expiration Date: **June 18, 2014**  
Continuing Review Due Date\*: **June 4, 2014**

\*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

**FEDERALLY FUNDED RESEARCH REQUIREMENTS:**

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

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