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USING LANGUAGE TO DETECT AND CHANGE ATTACHMENT STYLE

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Using Language to Detect and Change Attachment Style

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Dedication

My work in general, and this dissertation specifically, is dedicated to my beloved children, Katherine Kennedy Galloway, Marnie Elizabeth Galloway, and William Estes Galloway. Without their unwavering love, support and encouragement through the inevitable trials and difficult periods over the last nine years, without their sacrifices, without their smiles and laughter, and without their joyful sharing of achievements along the way, I would not have succeeded in this dream of an endeavor. I would not be the woman I am today without their presence in my life, and I have no doubt I would have been much the poorer without them.

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Using Language to Detect and Change Attachment Style

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Decades of research on attachment style has resulted in a plethora of assessment techniques and an imprecise taxonomy of styles. Beginning with an assumption that interpersonal connections are revealed in the words used to discuss those relationships, the current studies were designed to investigate the efficacy of a language-based approach to discriminating attachment styles. Because recent research has shown that small words such as pronouns are psychologically important (e.g., Pennebaker & Stone, in press), Study 1 explored the patterns of word use that best predicted attachment styles in a sample of Adult Attachment Interviews (AAI; George, Kaplan & Main, 1985/1996) of married couples (N=214). A multinomial logistic regression using theoretically-selected word categories resulted in correct categorizations of 82.3% of cases (secure 82.4%, dismissing 87.6%, and preoccupied 62.5%). Applying the resulting equations to the AAI resulted in correct classification of 50% of cases. Predicting

to a different criterion, the Adult Attachment Scale (AAS; Collins & Read, 1990), provided a slightly more effective set of categorizations (58%). There were theoretically relevant differences among attachment styles in the use of pronouns and emotional words. Study 2 (N=201) was designed to apply the model derived in Study 1 to a sample of college students using the AAS as a criterion. In addition, Study 2 employed a writing intervention designed to change the attachment styles of insecurely attached students. Participants in the experimental condition wrote five essays about their family experiences across a semester in response to a prompt assembled from AAI questions. The Study 1 model remained a significant predictor of attachment style in Study 2, correctly classifying 51% at Time 1 and 61% at Time 5. Participants in the writing intervention condition did not change attachment styles as a function of condition, but there were some beneficial effects of condition on selected adjustment variables including coping and social integration. The inability of the writing intervention to influence attachment style change is discussed in the context of the social nature of attachment style.

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INTRODUCTION

We choose our words to communicate many things. We express anger, love, urgency, grocery lists, and thoughts that we wish to share with others. As important as these communications are for our day-to-day lives, they do not paint a complete picture of the emotional and psychological importance of language. The smaller, apparently insignificant words that hold our thoughts together (such as pronouns and articles) also convey very important details. Under certain circumstances, we will undertake effortful processing to choose just the right pronoun to communicate a particular emphasis (for example, telling a misbehaving child "We don't really want to do that, do we?"). For the most part, however, pronouns and other small words trip off our tongues without much thought.

One domain in which these small words are interesting from a theoretical perspective is the area of attachment styles. At the heart of attachment theory is the idea that people have tendencies to relate to close others in systematically different ways as a function of their earliest relationships with caregivers. For example, a child with a responsive and caring mother (or other primary caregiver) who is available and attentive to her needs is likely to develop the idea that relationships are secure and nurturing. Barring disruptive events, this child will

grow into an adult who is comfortable being close to other people and who expects that others are generally trustworthy. On the other hand, a child with an unresponsive caregiver who is inattentive and neglects her care and comfort is likely to believe that relationships are unpredictable and that other people are not to be trusted. If this child does not get a meaningful opportunity to learn otherwise, she will likely grow into an adult who is uncomfortable being close to others – or perhaps one who desperately clings to others and worries that they do not feel as close to her as she does to them. Individuals with these dysfunctional styles of attachment are plagued by a host of personal and interpersonal difficulties, including low levels of self-worth and confidence, unsatisfying relationships, affective suppression, and negative views of other people (e.g., Mikulincer & Horesh, 1999).

Because pronouns are necessary when we talk to or about other people, they have the potential to reveal a great deal about our orientation to others. Individuals who are uncomfortable being close to others, for instance, are theoretically less likely to speak in terms of *we* and more likely to indicate their separateness by maintaining their position as *I.* Persons who are comfortably invested in a relationship might run the pronoun gamut, moving effortlessly among all the pronominal possibilities. We are also uncovering evidence that distinctive patterns of pronoun usage are associated with personality change (Pennebaker & Lay, 2002), aging (Pennebaker & Stone, in press), improvements

in physical health (Campbell & Pennebaker, 2003), and may serve as markers of psychological health (Rude, Gortner, & Pennebaker, *in press*; Stone & Pennebaker, 2002). Pronouns appear to be much more powerful than their stature suggests.

In a departure from the many approaches to investigating attachment styles undertaken thus far, the current projects were designed to examine the specific words people use when they talk about their important relationships as a window into and expression of these mental models. A fundamental assumption of this work is that one's connection to others is revealed in the words used to discuss the relationships. Additionally, a language-based intervention was designed to help insecurely attached people integrate their negative relationship experiences in such a way as to produce linguistic and psychological change. The expressive writing paradigm developed by Pennebaker (for reviews, see Pennebaker, 1997; Smyth, 1998) has been found to be a powerful technique to effect physical, psychological, and behavioral change, and it was hypothesized to be well suited to facilitate the integration of painful issues surrounding insecure attachment.

Development and assessment of attachment styles

The father of attachment theory, John Bowlby, clearly considered early attachment relationships to be critically important. Comparing a range of studies from different countries, Bowlby discovered similar patterns: those children who

had been deprived of necessary care developed predictable patterns of superficial relationships, low levels of emotion, and often hostile or antisocial tendencies (Bowlby, 1951). Furthermore, these maladaptive patterns were self-reinforcing and hard to overcome. Burlingham and Freud (1944) reported that efforts to develop relationships with these children were frequently thwarted and the children were quite difficult to reach. When the World Health Organization asked Bowlby to present a report on the fate of homeless children in Europe after World War II, he realized that a theory was necessary to explain and integrate the profound effects of separation and deprivation experiences on young children.

Working from an evolutionary perspective, Bowlby proposed a theory of dynamic processes between mother and child that produce either healthy or pathological kinds of attachment. The child produces attachment behavior, which serves to increase proximity to the primary caregiver (usually the mother) and the caregiver produce behaviors (the care giving system) that promote proximity and provide comfort when the child is perceived to be in real or potential danger. Caregiver and child work together to maintain a comfortable degree of proximity, producing a dynamic equilibrium between the care giving system and the attachment system (Cassidy, 1999). This system creates an environment in which the child can pursue safe exploration (Ainsworth, Bell, & Stayton, 1971). The consequences of disruption of this system are variable, depending on the age of the child, but have been found to produce predictable patterns of behavior.

Because of the richness of Bowlby's original theory, researchers working within his tradition have developed a dizzying array of assessment approaches, from observational techniques to lengthy interviews, to simple paper and pencil measures. While each of these different approaches offers unique perspectives on the experience and consequences of attachment style, they are not without their limitations, both individually and as a whole.

ASSESSMENT ISSUES

Measurement concerns revolve around two related topics: the format of assessment (language-based narratives or simple questionnaires) and number and designation of attachment styles.

Format

Ainsworth and colleagues relied on observation of objective behaviors in the Strange Situation to assess infants' attachment styles, including frequencies of exploration behavior in the presence and absence of the mother, approaches toward a stranger, crying, playing, and initiation of interaction with the mother upon her return. Beyond this observational approach, two additional formats have been developed for determining attachment style: narrative interview measures, and self-report questionnaires.

NARRATIVE INTERVIEWS. These approaches rely on a basic assumption that behavioral and representational processes are reflected in language and story. Two types of interviews have been developed to explore attachment style in this

approach. The first, the Adult Attachment Interview (AAI) was developed by Mary Main and her colleagues (George, Kaplan & Main, 1985/1996). Trained interviewers ask participants a series of questions about their childhood relationships with parents, focusing on both the relationships and separation and rejection episodes. The full interview has critical follow-up probes, and takes roughly one hour to administer. This format represents a dramatic shift from measuring observable behaviors of infants to eliciting adults' current mental representations of their childhood experiences.

In the tradition of most language-based research, determining attachment style from the transcripts of these lengthy interviews is a time-consuming and labor-intensive procedure carried out by researchers who are trained to use two sets of scales to code the transcripts: parental behavior, and state of mind scales. Specific memories and descriptions of parental behavior are important for the first scale, and discourse style and coherence are important for the second scale. Coherence is assessed using Grice's maxims (1975) concerning discourse, wherein high coherence reflects quality of response, quantity, relevance to the questions, and the manner in which the responses are given. Because the AAI was developed to assess the mental representations of parents whose children had been judged to differ in the Ainsworth Strange Situation, the resulting categorization of attachment style maps relatively well to that determined by the Strange Situation. The standard classification system determined by the AAI is Secure, Dismissing,

Preoccupied, Unresolved, and Cannot Classify (Main & Goldwyn, 1998). These correspond, respectively, to the Secure, Avoidant, Ambivalent, and Disorganized infant classifications determined by the SS.

A recent meta-analysis examined the ability of the AAI (utilizing a simple division of secure and insecure attachment) to predict two factors: the quality of the infant/parent attachment relationship, and parents' responsiveness to their infants' attachment behaviors. Significant effect sizes were noted for both factors (1.06 and 0.72, respectively), with results in the expected directions (van IJzendoorn, 1995). In other words, secure attachment style as assessed by the AAI predicted high quality attachment relationships and responsiveness to infant attachment behaviors. The AAI has also demonstrated remarkable reliability. For example, Sagi and colleagues (1994) found test-retest reliabilities of 90%, (κ = .79) over a three-month period, and Crowell and colleagues (1996) report reliabilities of 86% (κ = .73) over a period of 1.5 years. Despite these strengths, it is burdened by the lengthy training and laborious coding that is required to determine attachment styles.

Another narrative approach is the Current Relationship Interview (CRI; Crowell & Owens, 1996). Unlike the AAI which addresses parental relationships, the CRI explores adult attachment within adult partnerships. This interview (and its associated scoring system) is remarkably similar to the AAI. Scoring is based on state of mind issues as well as recall and explication of specific attachment

behaviors. Resulting classifications also mirror those of the AAI: secure, dismissing, preoccupied, and unresolved (Crowell & Owens, 1996). However, because of its focus on current relationships, classifications produced under this system show lower levels of reliability.

Bowlby (1973, 1980) and Main et al (1985) emphasized the importance of mental models for understanding why people hold certain expectations and beliefs about the behavior of others. Narrative assessment techniques offer a rich resource for investigators interested in getting a full picture of the mental models people have of relationship issues. Although people are reporting on themselves, in essence, this approach avoids some of the known problems of self-report – particularly when investigators focus on aspects that are not necessarily accessible to participants' immediate awareness, such as nonverbal cues, discourse style, and small word usage (e.g., pronouns and articles). The speaker's language can be qualitatively coded, nonverbal signals can be recorded and interpreted, and the words themselves can be analyzed. The drawback, of course, is that this approach is inherently time- and labor-intensive. Other approaches attempt to tap the mental models with a straightforward and quick-to-administer questionnaire approach.

SELF-REPORT MEASURES. Paper-and-pencil measures of attachment style have proliferated in recent years. Some are directed towards self-reports of attachment history (e.g., Attachment History Questionnaire [AHQ; Pottharst, 1990]; the Inventory of Parent and Peer Attachment [IPPA; Armsden &

Greenberg, 1987]; and the Parental Attachment Questionnaire [PAQ; Kenny, 1987]). These measures are typically derived from the theoretical stances of Bowlby and Ainsworth, but the resulting classifications do not necessarily map cleanly onto the attachment classifications of Ainsworth. For example, the AHQ produces four factors: secure attachment base, parental discipline, threats of separation, and peer affectional support (Pottharst, 1990) and the IPPA assesses three constructs: degree of mutual trust (between self and parents), quality of communications, and degree of anger and alienation (Armsden & Greenberg, 1987).

After Hazan and Shaver (1987) published their influential paper in which they framed romantic relationships in terms of an attachment process, self-report questionnaires assessing attachment style in this domain multiplied rapidly. Some use a simple categorical approach in which participants select one of a number of paragraphs that best describes their attitudes towards romantic attachments (e.g., the Adult Attachment Questionnaire [AAQ; Hazan & Shaver, 1987/1990]; the Relationship Questionnaire [RQ; Bartholomew & Horowitz, 1991]). Others take a factor-analytic approach to multi-item scales. For example, the Attachment Style Measure (ASM; Simpson, 1990) is a 13-item scale that yields three categorizations: secure, avoidant, and anxious/ambivalent. Collins and Read (1990) developed the Adult Attachment Scale, which is a 21-item scale yielding the same three categorizations as the ASM. The Experiences in Close

Relationships Scale (ECL; Brennan, Clark & Shaver, 1998) is a 36-item self-report measure based around the two primary constructs of avoidance and anxiety.

The multitude of scales created in the last fifteen years has left attachment researchers with an embarrassment of riches in terms of measurement tools, but difficulty in working across domains and methods. With sufficiently high levels of reliability and statistical power, the varieties of self-report measures of attachment tend to converge (Bartholomew & Shaver, 1998). However, the relationships are small between attachment in different domains (e.g., parents and romantic relationships) ($r = .23$) or when assessed with different methods ($r = .27$) (Crowell, Fraley & Shaver, 1999). These differences make generalizability difficult and leave attachment researchers with less than desirable tools for expanding our understanding of the dynamic nature of attachment. While there is a very clear theory tying all the pieces together, there is not a systematically unified measurement approach. The discovery of distinctive language patterns underlying forms of attachment could provide some unification from the fragmentation produced by the variety of self-report instruments.

Number of styles

While Ainsworth originally conceptualized three styles based on her observations (secure, avoidant, and anxious/ambivalent), subsequent researchers have labeled four to six different attachment styles. All agree on the secure style; as Tolstoy (1939) said in *Anna Karenina*, "Happy families are all alike; every

unhappy family is unhappy in its own way." The variability in designation clearly comes about in the insecure categories. The question of how many insecure styles there are is partially related to the measurement issues. Researchers relying on the factor analysis of questionnaire data, for example, depend on derived factors to determine the attachment style designations. For example, Brennan, Clark & Shaver (1998) report two underlying dimensions to their scale: anxiety and avoidance. Becker & Billings (1997) assembled a questionnaire based on three earlier measures, and conducted a factor analysis which revealed three main factors they labeled preoccupied, fearful and secure.

Although there is empirical evidence supporting distinctions among these many styles, the absence of any substantive agreement between researchers about both measures and number of attachment style categories is problematic. To the degree that language variables are reliably associated with particular outcomes and consequences, determination of the relationship among linguistic patterns, attachment style, and important correlates could be instructive.

Correlates of attachment styles

At the broadest level of secure and insecure attachment, across measurement techniques, there are relatively reliable differences in the attitudes and behaviors of people based on attachment styles. Closer examination of the insecure styles reveals dramatically different consequences among the styles, and interesting relationships between the insecure and secure styles. Critical correlates

– including issues of relationship and emotion – are at least theoretically related to linguistic dimensions. There are certainly categories of language that tap each dimension of consequence and that should be represented when people talk about attachment relationships.

RELATIONSHIP CONSEQUENCES

Individuals' working models of close relationships serve as a template of expectations. Securely attached people expect that others are trustworthy and good-hearted, leading them to be interpersonally oriented and desirous of intimate relationships. For people with this attachment style, relationships are characterized by high levels of trust, commitment, satisfaction, and interdependence (Levy & Davis, 1988; Simpson, 1990). Both men and women with this style of attachment find it easy to encourage their partners to open up and discuss personal information, leading to high levels of intimacy (Collins & Read, 1990). When conflict arises for these individuals, they tend to use integrating and compromising strategies (Pistole, 1989) and display a great deal of flexibility and reciprocity (Mikulincer & Nachshon, 1991). Marital relationships in which both members of the couple report secure attachment are distinguished by the highest levels of intimacy and relationship functioning (Senchak & Leonard, 1992).

The template of expectations for dismissing or avoidant individuals is that others are not trustworthy or dependable, and that their motives are suspect. This,

of course, leads them not to be interpersonally oriented, and to limit their intimacy in order to maintain the independence they need. The consequence of these expectations for close relationships is a mixed bag of effects. For example, dismissing or avoidant men rate their relationships quite negatively, but report high levels of stability in those relationships (Kirkpatrick & Davis, 1994) – perhaps because they typically avoid conflict. When conflict does arise, dismissing men and women are least likely to oblige their partners (Pistole, 1989). Additionally, these individuals are least likely to engage in self-disclosure, and report the least involvement and satisfaction in daily interactions with their partners (Feeney, 1999).

Finally, anxious/ambivalent or preoccupied individuals expect others to be complex and difficult to understand, and tend to believe that people have little control over their own lives. This leads to a very conflicted and confusing situation in which they desire extremely high levels of intimacy and fear rejection. Interpersonally, this expectation set results in possessive relationships typified by high levels of preoccupation, dependence and idealization of the partner (Feeney & Noller, 1991) Preoccupied women tend to rate their relationships negatively, but report a good deal of stability in their relationships – perhaps because they work particularly hard at them (Belsky & Cassidy, 1994).

Important linguistic markers of attachment-relevant relationship issues should be found in pronouns. Specifically, when talking about important

relationships, secure individuals should display the least distinctive patterns of pronouns because of their comfort within their relationships. However, avoidant (or dismissing) individuals, with their high need for independence and resistance to an interpersonal orientation, should use significantly lower levels of first person plural pronouns (*we, us* and *our*) than will be used by secure individuals. Furthermore, because of their distancing approach to other people, they should use significantly lower numbers of second person pronouns (*you*) than securely attached individuals. Anxious/ambivalent (or preoccupied) people are predicted to use the highest levels of first person pronouns (*I*) as well as the highest levels of second person pronouns (*you*) as a reflection of their clinging preoccupation with their relationship partners.

EMOTIONAL CONSEQUENCES

One important issue for attachment is affect regulation, particularly, the regulation of negative emotion. Differences in attachment style are thought to be reflections of experiences of regulating distress with primary caregivers. These early experiences provide the individual with strategies for organizing emotional experiences, and these strategies are generalized to other upsetting situations (Feeney, 1999). Securely attached people easily acknowledge distress and turn to their partners for support and help. Dismissing people are much more likely to restrict their expression of negative emotion, having learned self-reliance as a way of reducing conflict with insensitive caregivers. Preoccupied individuals are likely

to show heightened awareness and expression of negative feelings, learned as a way of maintaining contact with inconsistent caregivers. In a study using brief interviews with participants about their relationships with parents, as well as peer Q-sort ratings (Kobak & Sceery, 1988), secure individuals were found to be well adjusted and to handle their negative emotions in constructive ways. Dismissing people were rated as hostile by peers, but offered self-reports of social competence and low distress, providing evidence of disconnection from their own negative feelings. Finally, preoccupied individuals were characterized – by themselves and peers – as having high levels of distress and anxiety.

The emotional consequences for insecurely attached individuals are frequently profound, and rooted in difficult life situations. Evidence for clear links between attachment security and mental health were found in a recent study: while secure attachment is linked to mental health, individuals classified as Unresolved were significantly more likely than others to report suicidal ideation, emotional distress, and substance abuse. Additionally, Preoccupied and Unresolved individuals were more likely to report having experienced child abuse at the hands of a relative, as well as separation and divorce of their parents (Riggs & Jacobvitz, 2002).

Based on this literature, clear differences by attachment style should be found in the use of emotional language, particularly in *negative emotion* words. Avoidant/dismissing people should use the lowest levels of emotion language

overall, because of their tendency to distance themselves from their own emotional experience. With their hypervigilant emotional lives, preoccupied/ anxious individuals should use the highest levels of emotion words, avoidant people the lowest, with secure individuals falling in between these two categories.

Can attachment style change?

Although Bowlby conceptualized attachment styles as reflecting stable and enduring orientations to relationships, he acknowledged that they may change as a consequence of disconfirming life events or experiences (Bowlby, 1988). In a review of several stability studies of attachment in romantic relationships using the Hazan and Shaver (1997) measure, Baldwin and Fehr (1995) discovered that approximately one-third of participants changed attachment styles over various time spans. They concluded that these changes were not a function of measurement error, but rather of meaningful psychological change. Scharfe and Bartholomew (1994) found that roughly 40% of people reported changing attachment styles over an 8-month period, while Kirkpatrick and Hazan (1994) showed that 30% of their sample changed attachment style over a 4-year period. Depending on whether you view the glass as half-empty or half-full, these findings can be taken as evidence of moderate stability or significant instability. Nevertheless, they do show that a remarkable proportion of people report changes in their attachment styles over time.

Changes can occur, as Bowlby suggested, in the context of important life transitional events. In a sample of newlyweds, Davila, Karney and Bradbury (1999) found that, on average, newlyweds became more secure over time. Both cross-sectional and longitudinal studies have shown that partners become more secure with each other and less anxious over time (Fraley & Shaver, 1998; Klohnen & Bera, 1998; Hammond & Fletcher, 1991; Crowell, Treboux, & Waters, 2002). Other kinds of relationship events, such as breakups, can also produce changes in attachment security. Kirkpatrick and Hazan (1994) conducted a 4-year longitudinal study and discovered that breakups are associated with some secure people subsequently becoming less secure over time. Another life event that can have implications for attachment style is the transitional adjustment to college. A change in attachment style from secure to insecure results in the use of greater numbers of problem coping styles and increased levels of distress, while changes from insecure to secure styles are associated with lower levels of distress (Lopez & Gormley, 2002).

An additional perspective on attachment style change is that it occurs as a consequence of stable vulnerability factors instead of as a response to current life experience. Davila, Burge and Hammen (1997) studied a group of women just after graduation from high school, with follow-ups 6 months and 2 years later. Change appears to be more closely associated with insecure attachment than secure attachment, and with particular vulnerability factors: history of family

psychopathology, personality disturbance and depressive symptoms. Their results support the conceptualization of attachment style change as an individual difference rather than as a response to current circumstances.

The natural follow-up question to these findings that attachment style sometimes changes is, can a preventive intervention directed at insecurely attached individuals produce attachment style change? Two recent studies suggest that it can. Dozier and Tyrrell (1998) report successful attempts to increase mothers' sensitivity to their children by intervening at the level of the mothers' working models of attachment. Using a more elaborate approach, Kilmann and his colleagues (1999) developed a 17-hour standardized, attachment-focused intervention targeted at the attachment concerns of insecure individuals. This group-based intervention involved four segments: addressing dysfunctional relationship beliefs; childhood factors that influence partner choices and relationship styles; skills training on relationship issues; and relationship strategies. Although they had a small sample of 13 young adult women (undergraduates with an average age of 21), their intervention produced dramatic changes in the lives of these women. Compared to the control group, the 6-month follow-up found them reporting improved interpersonal styles, greater satisfaction with family relationships, lower levels of agreement with dysfunctional relationship beliefs, and more secure attachment patterns. Their findings were most impressive with women reporting a fearful-avoidant attachment pattern. The

results of this intervention suggest that an expressive writing intervention may have the power to effect similar change.

Expressive writing and language findings

Expressive writing about trauma is a therapeutic intervention studied in a variety of labs over the last 15 years. The writing paradigm consists of spending 20-30 minutes a day for several consecutive days writing one's deepest thoughts and feelings about an important or traumatic experience. Standard writing instructions suggest that, among other topics, participants write about their relationships with others, including parents, lovers, friends, or relatives. Common themes explored by participants include lost emotional relationships, deaths of loved ones, sexual or physical traumas, and deeply personal and painful failures (Pennebaker, 1997). Research on this writing technique has produced findings in two related areas: benefits gained from the intervention itself, and an unfolding understanding of the psychological dimension of language. Both areas are important for this project, and will be briefly reviewed.

EXPRESSIVE WRITING BENEFITS

Most writing studies have been conducted on people without a clinical disorder or diagnosis. For example, Lepore showed that writing reduced the impact of intrusive thoughts among people stressed over a major exam (1997) and Schoutrop et al. (1997) reported that writing brought about significant improvement in mood, fewer intrusive thoughts about a trauma, and less

avoidance behavior among people who had experienced a recent traumatic event. This exercise has been shown to bring about a wide range of physical and psychological benefits, including improvement in health (fewer visits to the doctor, fewer illness symptoms), fewer symptoms of distress (e.g., fewer intrusive thoughts, less depressive affect), and improved cognitive functioning (better working memory) (see Pennebaker, 1997 and Smyth, 1998 for reviews).

PSYCHOLOGICAL DIMENSIONS OF LANGUAGE

Recent work in this paradigm has shifted from further applications of the writing intervention to a closer look at the often surprising psychological aspects of specific words people use. For instance, the words people use to refer to themselves and others are highly diagnostic of their psychological state. The first-person pronoun *I* has proved to be a very intriguing word. College students who are currently depressed use far more of this pronoun than do students who have never been depressed (Rude, Gortner, & Pennebaker, *in press*), and poets who ultimately commit suicide also use this word at higher levels when compared to age-matched poets who do not commit suicide (Stirman & Pennebaker, 2001). Reported changes in Mayor Giuliani's personality in the popular press led to an investigation of his language as a marker of this change. In fact, significant and striking changes were noted in his use of first-person pronouns as he moved from being perceived as a somewhat nasty person (and using high levels of *I*), to a person dealing with cancer, divorce, and withdrawal from an important political

race (and using lower levels of *I* and higher levels of *we*) (Pennebaker & Lay, 2002).

Pronouns provide a window into our social connections with each other, as well. Large-scale traumatic events are said to "pull people together," and there is linguistic evidence of this phenomenon. Immediately after the death of Princess Diana, writers in online chat rooms increased their use of first-person plural pronouns (*we, us* and *our*) by 135% and decreased their use of *I* by 12% in the week following Diana's unexpected death. This linguistic style remained in place for approximately 10 days before returning to normal (Stone & Pennebaker, 2002). Similar patterns of pronominal shifts were uncovered in the language of University of Texas and Texas A&M students in the aftermath of the tragic bonfire collapse on the Texas A&M campus (Gortner & Pennebaker, 2002).

Of course, attachment interviews also explore our social connections with others. Kane (2002) examined the language of women interviewed with the AAI, using half the data from the same large data set used in Study 1. Although this small project used the entire array of categories available from the text analysis program (LIWC; Pennebaker, Francis, & Booth, 2001), specific pronoun differences were uncovered as a function of attachment style. For example, secure and preoccupied women used second-person pronouns (*you, your*) at a significantly greater rate than did dismissing women, and preoccupied women used third-person pronouns (*he, him, she, her*, etc.) significantly more often than

did secure women. Secure women used the pronoun *our* at a rate three times greater than preoccupied and dismissing women. These differences are theoretically interesting and suggest that a more sophisticated analysis could uncover constellations of words that might be useful in discriminating individuals with different attachment styles.

These recent findings have provided evidence that small words can have great importance in understanding intraindividual psychological state and interpersonal social relationships, as we move into more real-world explorations of language, such as unscripted news conferences, novels and poems, and online journal entries. This newly expanded understanding of language can also be applied to the words people use in the writing paradigm, offering a more rounded understanding of the changes that occur as people explore their thoughts and feelings.

Can expressive writing change attachment style?

No evidence has been found bearing directly on this question. No writing studies have been found that specifically examined shifts in social relationships as an important outcome variable. One study by Mehl and Pennebaker (cited in Pennebaker & Graybeal, 2001) found that students in the intervention condition changed their ways of speaking with people in natural settings, in terms of self-references and positive emotion words. However, actual changes in social relationships are not reported. Examination of the classification system for the

AAI provides suggestive evidence that expressive writing may have a beneficial effect on attachment style. Recall that adults classified as secure provide coherent and well-organized memory narratives, where adults classified as insecure produce narratives that are inconsistent, fragmentary, disjointed, or overly general. Secure adults are not Pollyannas, reporting only good and happy life events. They often report negative as well as positive early life events, but these disappointments and hurts have been thoughtfully integrated into their stories and therefore have lost much of their disruptive force. The details of the story are significantly less important than the narrative coherence. When researchers code the AAI, insecure attachment is suggested when the story breaks down. Breaks and disruptions in the story, contradictions, and inconsistencies signal linguistic efforts to manage the parts of the story that have not been integrated.

If corrective opportunities present themselves, attachment narratives can be modified: "A trusted friend, spouse, or therapist can provide a 'secure base' for exploring and working through adverse childhood experiences and can enable the adult to 'earn' a coherent and autonomous attachment representation" (van IJzendoorn, 1995, p. 399). One important approach to healing disruptive attachment-related problems within significant relationships is to create a more coherent narrative style in the family (Byng-Hall, 1999). Using this technique, the therapist acts as a narrator, creating a coherent story about the process of therapy, the meshing of styles within the relationship, and illness and loss (if relevant). By

modeling the coherent story, the therapist teaches clients how to tell their own stories. Expressive writing sessions may be another therapeutic technique for insecure individuals as they explore their experiences in a setting free from potentially negative social feedback. Participants in expressive writing studies who show improvements after writing are those who have successfully created a coherent narrative of their previously unresolved traumatic experiences (Pennebaker, 2002). Taken together, these findings suggest that a writing intervention focused closely on attachment-relevant issues may have the power to effect change in attachment style.

Summary

The importance of the construct of attachment has led to a wide array of approaches to its measurement. Aside from the fact that all these approaches purport to measure the same construct, one of the most important overarching factors tying the myriad approaches together is language. Directly or indirectly, individuals relate the story or consequences of their attachment experiences. AAI researchers have developed a very rich approach to understanding the processes and consequences of early attachment experiences. An enormous literature describes the predictable correlates of attachment style, with insecure attachment styles being characterized by a host of problematic interpersonal and emotional consequences.

Because of the intriguing research on psychological correlates of language, and because language is an important vehicle for communicating and assessing attachment style (among narrative approaches), a basic knowledge of the linguistic patterns underlying attachment style could provide a richer understanding of the mental models underlying attachment. Language is assumed to capture the mental model, so a closer look at specific elements of language has the potential to reveal important features of each model and may provide a path to resolve some of the fragmentation in insecure attachment style designations among the many researchers and measures. A model comprising pronouns, emotion words, and other linguistic categories believed to be relevant was tested as a predictor of attachment style. Finally, with evidence showing that attachment styles can change, and that change can be facilitated by improving one's narrative, a writing intervention focused on attachment issues was administered in an effort to produce important changes in attachment style.

PILOT STUDY

To prepare for these projects, a pilot study was conducted with two purposes. First, based on the findings of Kane (2002), there was strong evidence suggesting that specific linguistic categories differed as a function of AAI attachment style categorization. Because researchers have begun to identify "linguistic fingerprints" differentiating among groups of people (cf. Pennebaker & King, 1999), it was believed that such a distinctive style could be found to

underlie attachment style. The literature describing the effect of attachment style on interpersonal relationships and emotional consequences provided clear predictions of linguistic variables that should differ as a function of attachment style. Relying on a regression approach, the pilot study was designed to test the hypothesis that these linguistic categories could reliably discriminate attachment style categorizations.

The second purpose of the pilot study was to identify which of the 18 AAI questions were most predictive of attachment style. Because a writing intervention was an important part of Study 2, and participants wrote for only 20 minutes per session, it was necessary to focus the writing prompts as closely as possible on the most important issues. Therefore, the pilot study was designed to examine each of the 18 AAI questions individually to determine their validity and importance in predicting attachment style.

Method

PARTICIPANTS AND DATA

Data from participants in the pilot study and Study 1 were previously gathered in a longitudinal study (see Riggs & Jacobvitz, 2002, for a discussion of the project). Briefly, participants were married couples initially recruited in the third trimester of their first pregnancy. Several follow-up assessments were conducted with the parents and their children. The data in this pilot project come from a larger set of lengthy interviews of 125 couples who were initially

interviewed in the third trimester of a first-time pregnancy. The couples were recruited in the Austin area through birthing classes, flyers, and radio announcements. Predominantly Caucasian (85%), the mean age of participants was 30.5 years. The interviews of some participants were lost because of equipment failure or inaudibility, and only data from the women (*N*=117) were used for this pilot study.

Transcripts were prepared for text analysis by removing the language of the interviewer. Although LIWC can analyze text samples along more than 72 dimensions, several were excluded from analysis, including those that are relevant primarily to spoken language (e.g., abbreviations, emoticons, and fillers such as uh or umm) and categories with extremely low base rates (less than 0.2%). Of the remaining variables, sets were chosen that were either theoretically relevant (i.e., pronouns and emotional language categories) or that were known to be important linguistic markers in other studies (i.e., articles). Each woman in this sample provided an average of 14,302 words (*SD* = 4,795).

MEASURES AND PROCEDURE

ADULT ATTACHMENT INTERVIEW. This is a semi-structured interview consisting of 18 questions designed to assess adults' understanding of their relationships with their parents during childhood (George, Kaplan & Main, 1985/1996). For this project, the questions were

1. Could you orient me to your early family situation? If you could start with where you were born, what people in your family did for a living, whether you moved around much, things like that.

2. Describe your relationship with your parents as far back as you can remember.

3. Choose five adjectives that describe your childhood relationship with your mother. Then describe why you picked those adjectives.

4. Choose five adjectives that describe your childhood relationship with your father. Then describe why you picked those adjectives.

5. To which parent did you feel closest when you were a child, and why?

6. When you were upset as a child, what would you do?

7. What's the first time you remember being separated from your parents?

8. Did you ever feel rejected as a young child? Now, looking back on it, maybe you don't see it as rejection, but do you remember a time feeling rejected when you were young?

9. Did you ever feel worried or frightened as a child?

10. Were your parents ever threatening with you? For discipline, or even jokingly?

11. Why do you think your parents behaved as they did, when you were a child?

12. Were there any other adults, with whom you were close, like parents?

13. Did you ever experience the loss of a loved one while you were a young child?

14. Have there been many changes in your relationship with your parents, from childhood until now?

15. What's your relationship with your mother like now?

16. Imagine that the child you're expecting is now one year old. How do you imagine you will feel when you separate from the child?

17. If you had three wishes for your child, twenty years from now, what would they be, meaning what kind of future would you like to see for your child?

18. Is there one thing that you think you learned above all from your own childhood?

Assignment to attachment category (secure, dismissing, preoccupied, unresolved) is made by trained judges, according to an extensive coding system. As cited in Riggs & Jacobvitz (2002), inter-rater reliability in determining attachment style for this sample was 84% ($\kappa = .72$) for the four-way classification and 90% ($\kappa = .80$) when the three primary classifications were used (secure, dismissing, and preoccupied).

The transcripts of these interviews were prepared for analysis with LIWC (Linguistic Inquiry and Word Count; Pennebaker, Francis, & Booth, 2001). LIWC is a text analysis program with a built-in dictionary of more than 2,200 words and word stems. Organized into hierarchical categories such as language composition, psychological processes, and current concerns, each broad category comprises several subcategories, each of which relies on several specific dictionaries designed to tap particular constructs. For example, the psychological processes category is divided into emotional, cognitive, and social processes. Within the emotional category are subdivisions of positive emotion (including optimism and positive feelings) and negative emotions (including anger, anxiety, sadness, and negative feelings). A total of 72 dimensions of language use are represented and captured by the LIWC dictionary system, and the output from a LIWC analysis

(with only 3 exceptions: total word count, words per sentence, and question marks) produces a percentage of total words that fall into each category. For a description of the creation and validation of the LIWC program, see Pennebaker & Francis (1996, 1999).

Results

Two separate questions were explored in this pilot study. First, the data were split by AAI question in order to determine which of the 18 questions administered in the interview were most predictive of attachment style, using the three-way classification of secure, dismissing, and preoccupied as the grouping variable.

The determination of which linguistic categories to include in the analysis as possible discriminators was made on a theoretical basis. Although *pronouns* and *emotion* words were specifically hypothesized to be important discriminators of attachment style, LIWC comprises three other categories that were directly relevant to this project. For example, the category '*other references*' contains third-person pronouns (e.g., he, she, us) as well as words such as anyone, everybody, and anybody. The categories of *inclusive* and *exclusive* words were originally created to conceptually tap attachment issues (J. Pennebaker, personal communication, August 27, 2002) and include such words as along, also, among, together (*inclusive*) and besides, but, except, without, and unless (*exclusive*).

Three standard language categories were also included: *articles*, *prepositions*, and *six-letter words*.

The results of five separate discriminant function analyses are shown in Table 1. It was immediately clear that analyses three and four consistently produce the best predictions of attachment style and that, with one exception (question 17), they produced exactly the same level of predictive power. Examination of the independent variables submitted for both those analyses revealed that the only difference between them was the presence of the variable *self* in analysis three. Elimination of that variable provided a more parsimonious solution, since it did not provide any additional predictive ability for the function. Relying, then, on the independent variables in analysis four, questions one (λ = .46), six (λ = .56), thirteen (λ = .61), and fifteen (λ = .60) were the best predictors of attachment style. These questions were assembled into a writing prompt for use in Study 2.

The second question addressed in this pilot study concerned the power of the discriminant function to predict attachment style. A second discriminant function analysis (DFA) collapsed across individual questions, so the unit of analysis was the participant. Using the independent variables from analysis four, another DFA was conducted to determine how well this set of linguistic variables predicted attachment style, using the three-way designation of the AAI as a criterion. As shown in Table 2, 80.3% of the original grouped cases were

correctly classified, and errors in the two insecure attachment categorizations were in the direction of secure classification, rather than a misclassification of insecure style. This function was significant, χ^2 (40, N=117) = 89.9, $p < .01$.

The results of this pilot study provided evidence that a simple function of linguistic categories can reliably discriminate among attachment styles. However, prediction was made to a single criterion, the AAI attachment style designation. Although the AAI is a narrative approach to determining attachment style, researchers using the AAI do not consider the language of participants at the specific word level of analysis. Because recent data suggest that specific (and small) words are psychologically important (Campbell & Pennebaker, 2003), and the pilot study found that a function of linguistic categories could reliably discriminate attachment styles among women, Study 1 focused on the words both men and women used when being interviewed with the AAI. The discovery of specific linguistic "fingerprints" underlying each attachment style could provide a simple assessment tool for researchers, and could also flesh out the details of the mental models purported to underlie attachment styles. Additionally, if we assume that there is something universal underlying the language of attachment styles, the same function should predict attachment style reasonably well using a different criterion.

STUDY 1

The purpose of Study 1 was to evaluate the ability of the variables identified by the discriminative function in the pilot study to predict attachment style, as assessed by two different techniques (the Adult Attachment Interview (AAI; George, Kaplan & Main, 1985/1996) and an early version of the Adult Attachment Scale (AAS; Collins & Read, 1990)). There are important differences between these two assessment techniques: The AAI is a lengthy, interpersonal interview focusing on retrospective descriptions of childhood experiences, and the AAS is a short 18-item questionnaire focusing on current close relationships. Because measures of attachment style frequently do not show good levels of reliability with one another, the discovery of one linguistic function that predicts attachment style similarly well to different criteria would suggest that the lack of reliability is a function of measurement artifact, not true attachment style differences.

Additionally, Study 1 relied on the entire sample of participants – both male and female members of the couples interviewed during their first pregnancies. Since Study 2 was designed to include both male and female participants, the prediction equations needed to be as generalizable as possible. Participants between the two studies differed on a variety of dimensions: age (30 *vs* 18), current life situation (expecting a child *vs* coming to college), and experimental situation (engaging in a lengthy personal interview with an experimenter *vs* typing on a computer with no interpersonal contact, as a course requirement).

The data set from which these transcripts were taken is a significantly larger and richer sample, covering several years and including a wide variety of outcome measures, relationship information, and – years later – interviews with the children. For this study, the only variables of interest were linguistic, taken from the initial interviews conducted at the beginning of the study.

Method

PARTICIPANTS

Participants in this project were both members of 125 couples who were initially interviewed in the third trimester of a first-time pregnancy. The men and women were recruited in the Austin area through birthing classes, flyers, and radio announcements. Predominantly Caucasian (85%), the mean age of participants was 30.5 years (see Riggs & Jacobvitz, 2002, for a more thorough discussion of the project). The interviews of some participants were lost because of equipment failure or inaudibility. For the current study, interviews were retained for couples for whom classification by both the Adult Attachment Interview (AAI; George, Kaplan & Main, 1985/1996) and the Adult Attachment Scale (AAS; Collins & Read, 1990) were available for both members of the couple. The final data set represents data from 82 couples (164 individuals). The transcripts were prepared for text analysis by removing the language of the interviewer and correcting misspellings.

An additional opportunity was available in this data set for an exploratory project. When the children of participants were approximately seven years old, they were interviewed with a standardized interview protocol developed to assess young children's perceptions of their relationships with their parents and siblings (Measelle et al, 1998). Although it is normally used to evaluate family and social outcomes, it was used here as a language source to compare with the parents' language, since attachment style information was not yet available for the children. This supplementary project is reported in Appendix A.

PROCEDURES AND MEASURES

ADULT ATTACHMENT INTERVIEW. This is a semi-structured interview consisting of 18 questions designed to assess adults' understanding of their relationships with their parents during childhood (George, Kaplan & Main, 1985/1996). Some questions elicit the adult's stories of childhood and important attachment figures, some probe for circumstances in which illness, injury, rejection, or separation from parents occurred, and others ask the adult to reflect on the effects of these experiences. Assignment to attachment category (secure, dismissing, preoccupied, unresolved) is made by trained judges, according to an extensive coding system. As cited in Riggs & Jacobvitz (2002), inter-rater reliability in determining attachment style for this sample was 84% ($\kappa = .72$) for the four-way classification and 90% ($\kappa = .80$) when the three primary classifications were used (secure, dismissing, and preoccupied). There were

significant gender differences in attachment style in this sample, χ^2 (2, N = 164) = 20.8, $p < .01$. As shown in Table 3, the most unusual cell represented preoccupied males, with only 5.5% of participants falling into this category.

The interview transcripts were quite lengthy, at an average of 14,906 words (*SD* = 10,353). There were no gender or attachment style differences in length of transcript. The entire corpus comprised 2,444,672 words. Excerpts from the interviews are included in Appendix B.

ADULT ATTACHMENT SCALE. This attachment style questionnaire (Collins & Read, 1990) is an 18-item scale that categorizes participants into one of three attachment styles: secure, avoidant, or anxious/ambivalent (corresponding roughly to the AAI categorizations of secure, dismissing, and preoccupied, respectively). Participants responded to this questionnaire at the 24-month follow-up assessment, and it was used in the current study as an additional prediction criterion. Similar to the AAI, there were significant gender differences in attachment style using this measure, χ^2 (2, N = 164) = 7.1, p = .03. Again, the smallest cell represented anxious males, containing only 2.44% of participants.

As has been found in other studies, the correlation of attachment style categorizations between the AAI and AAS was not significant, $p > .05$. As shown in Table 4, the greatest agreement was found in the secure categorization (with 63 cases identified as secure by both assessments). The greatest mismatch occurred

between secure and avoidant attachment styles, with one-third of the cases (*N*=54) being classified differently.

Results

The purpose of this study was to extend the findings of the pilot study to include both males and females, and to determine whether the linguistic index predicted equally well to both criteria, the AAI and the AAS.

ANALYTIC STRATEGY

Although LIWC can analyze text samples along 90 or more dimensions (combining the default and pronoun dictionaries), specific and theoretically-relevant linguistic categories were selected *a priori* and only these variables were entered into the analysis. Specifically, the analysis focused on the linguistic variables identified in the most predictive discriminant function in the pilot study: four standard linguistic dimension (*large words, negations, articles* and *prepositions*), six emotion categories (*positive emotion, negative emotion, optimism, anxious, anger,* and *sad*), six pronoun and other social categories (*I, we, you, other, other references,* and *social*), and four additional categories (*past tense, present tense, inclusive*, and *exclusive*). The means in each category, by gender, are listed in Table 5. Additionally, breakdowns of means by attachment style are provided in Table 6 (gender x AAI designation) and Table 7 (gender x AAS designation).

The selected LIWC variables were entered in a two (sex) by three (attachment style) ANOVA. The multivariate test revealed main effects of sex (F [20, 139] = 5.18, $p < .01$) and AAI classification (F [20, 140] = 2.61, $p < .01$), qualified by an interaction (F [20, 140] = 2.67, $p < .01$). As noted in Table 5, six variables were significantly different by gender. The interaction of sex and AAI indicated mean differences in nine variables (*large words, prepositions, anger, sad, past tense, inclusive,* and *negative emotion*). Examination of the post hoc tests revealed that the specific differences all occurred within one of the two insecure categories, and that the differences were in line with traditional sex roles. For example, dismissing males used significantly more *anger* words than dismissing females; preoccupied females used more *sad* words than preoccupied males. While these differences offer intriguing insights into some sex differences in language as a function of attachment style and warrant further exploration, they did not add to our understanding of linguistic differences between attachment styles. Therefore, sex was not included as a factor in the analyses in the current projects.

The first analysis, a multinomial logistic regression, was conducted using the 20 selected LIWC categories as independent variables, predicting the three-way AAI classification. This regression produced a set of beta weights which were then multiplied by the corresponding and standardized LIWC categories and then summed to create a prediction equation. Because a multinomial logistic

regression uses one level of the dependent variable as the one against which the others are compared, secure attachment was selected as the comparison level. Therefore, two sets of beta weights were derived, yielding two prediction equations: dismissing/avoidant and preoccupied/anxious. The two prediction equations were computed, resulting in two variables (predicted anxious and predicted avoidant). Finally, a second multinomial logistic regression was conducted using the two prediction variables to predict the three-way attachment style.

CREATING THE PREDICTION EQUATIONS

The multinomial regression predicting AAI classification provided a good fit to the data, χ^2 (40, N = 164) = 86.80, $p < .01$. Examination of the beta weights (see Table 8) provides several interesting insights into the language patterns that distinguish the AAI-categorized insecure attachment styles, relative to secure. For example, the dismissing style is characterized by slightly lower levels of self references (*I*), greater use of references to others (*we, you, others)* and lower use of words that distance others *(references to others* such as *they*). Relative to securely attached language, the preoccupied style is characterized by higher levels of *negations*. This regression correctly classified 61% of the cases (secure 79.8%, preoccupied 8.3%, dismissing 52.9%). It clearly did a poor job of correctly classifying preoccupied cases, misclassifying 83.3% of them as secure. The errors in misclassifying dismissing cases occurred in placing them in the secure

category, just as errors in the secure categorizations occurred in placing them in the dismissing category. (For purposes of comparison, a multinomial regression was conducted to predict AAS classification. The model provided a good fit to the data, χ^2 (40, N = 164) = 155.55, $p < .01$. Beta weights are displayed in Table 9.)

Two prediction variables were created by multiplying the beta weights (predicting AAI classification, Table 8) by the corresponding standardized LIWC variables and summing them, including the constants for each equation. The prediction variables were then used as independent variables in a second analysis.

TESTING THE PREDICTION EQUATIONS

The two prediction variables were entered into two separate multinomial logistic regressions to predict attachment style to both criteria: the three-way attachment style of the Adult Attachment Interview (AAI: secure, preoccupied, and dismissing) and the three-way attachment style of the Adult Attachment Scale (AAS: secure, anxious, and avoidant). Note, however, that in all cases the predictors were derived from a regression model predicting AAI classification.

AAI. The model displayed a significant fit to the data, χ^2 (4, N = 164) = 25.5, $p < .01$, $R^2 = .16$. Both equations were significant predictors: anxious χ^2 (2, N = 164) = 7.78, $p < .05$; and avoidant χ^2 (2, N = 164) = 7.12, $p < .05$. As shown in Table 10, the overall classification rate was 50%, with the most accurate classification occurring in the secure attachment category.

AAS. The model provided a significant and slightly better fit to the data χ^2 (4, N = 164) = 36.64, $p < .01$, $R^2 = .23$. Only one equation was a significant predictor: avoidant χ^2 (2, N = 164) = 17.46, $p = .01$. The anxious equation was not a significant predictor, $p = 0.32$. The overall classification rate to this measure was 57.9%, with the most accurate classification occurring in the secure category (see Table 10 for complete classifications). Not surprisingly, none of the preoccupied cases were correctly classified.

A supplementary set of inductive analyses was conducted to explore the linguistic categories that predict attachment style, absent of *a priori* linguistic choices and predictions. A description of the analyses and results can be found in Appendix C.

Discussion

The power of a linguistic index to classify attachment style across criterion measures provided suggestive evidence of a stability of language underlying the three-way attachment style designations. One surprise was the similarity in predictive power of the regression between the two measures (50% for the AAI and 58% for the AAS). Although the overall classification rates were similar, the classification results differ in extreme ways between measures. Considering the AAI results, the analysis was most effective at classifying dismissing cases. This was also the classification most frequently assigned by the trained raters who originally made the AAI classifications. Within the AAS

results, the best categorized attachment style was secure, which was also the most frequently assigned classification using the AAS.

Given the lack of correspondence between the classifications assigned by the two measures (21.64% for secure, 10.53% for dismissing/avoidant, and only 1.17% for preoccupied/anxious), this finding implies that some of the misclassifications between assessment techniques may be due to measurement error in one or both of the assessment tools – most likely focusing on the AAS, since the linguistic index was initially derived to predict to the AAI. Additionally, the AAS used in this study was an older version of the scale, which has since been revised, and categorizations made using the AAI have high levels (90% [$\kappa = .80$]) of inter-rater reliability (Riggs & Jacobvitz, 2002).

The picture that emerged of the linguistic underpinnings of the three attachment styles was interesting and a good fit to many of the theoretical predictions. Focusing on the relationship-centered language first, secure individuals used a wider range of pronouns (*I, we,* and *you*), as hypothesized. Preoccupied individuals used more first person pronouns and social words than the other styles, and the lowest levels of *we.* Compared to dismissing people, preoccupied speakers used *you* and words captured by the *others* category at higher rates, although they used these words less than secure people did. The language of dismissing attachment was characterized by the lowest levels of *you* and words in the *others* category, along with fewer *social* and *we* words than

preoccupied people use. Overall, these pronominal profiles fit the predictions quite well, and give linguistic support to the mental models described in the literature.

The emotional language produced some very strong results in support of the hypotheses, and surprising findings, as well. Preoccupied individuals were predicted to use the highest levels of emotional language overall, with a specific focus on words in the *anxious* and *sad* categories, as a reflection of their hypervigilant emotional lives. While they did use the highest levels of words from the *anxious* category, they used the lowest levels of *sad* words. However, preoccupied people also used the highest levels of *negate* words, which they may have combined with emotional language. As expected, dismissing individuals used the greatest number of *anger* words and the lowest number of *negative emotion* words overall, but they also used slightly more *sad* words than securely attached people used. Nevertheless, the strongest predictors of the insecure attachment styles along the emotional language dimensions fit the literature very well: preoccupied people use the most *anxious* language, and dismissing people use the most *anger* language.

An interesting finding was the importance of verb tense in discriminating attachment style. Compared to securely attached people, individuals in both insecure attachment styles used significantly lower levels of past and present tense, with preoccupied speakers using the lowest levels overall. It is difficult to

interpret this finding, but the significance of the beta weights suggests that further explorations are warranted. In addition, preoccupied people used the smallest number of articles, which has been found to correlate with high levels of Neuroticism (Pennebaker & King, 1999).

The set of linguistic predictors showed surprising generalizability to a different criterion, and the next step must be generalizability to a different sample. Furthermore, any linguistic differences between age groups might shed light on the development, stability, and change in attachment styles. Study 2 was conducted to address this issue.

STUDY 2

The second study in this project was conducted on a sample of predominantly 18-year old college students who were in their first semester of college. There were two purposes for this study. First, the linguistic index derived in Study 1 was tested against the same criterion – the AAS – but in a different sample of participants in order to assess the generalizability of the index. An important issue is that participants in Study 2 were never administered the AAI, but rather their attachment styles were categorized using the AAS. Recall that the prediction equations were derived from regression models predicting AAI attachment style classification for adults with an average age of 30. While these important differences introduce noise and make the possibility of finding similar effects more difficult, they provide a good test of the linguistic index; if in fact the

indices are able to adequately predict attachment style across samples and criterion, such a finding would provide strong support for the importance of the selected variables in discriminating attachment style.

The second purpose of Study 2 was to explore the power of an expressive writing intervention to facilitate change in attachment style and successful adjustment to college. Based on recent findings suggesting that attachment style can be changed by an intervention addressing early and current attachment-relevant experiences, along with the accumulated findings showing the breadth of effects that can be obtained by a simple writing intervention, it was hypothesized that writing deeply about attachment issues could produce a change from insecure to secure attachment in participants in the experimental condition.

Finally, Study 2 provided the opportunity to explore factors that may be important correlates or predictors of attachment style change. Attachment style has been shown to change over time for individuals based on both current relationship experiences as well as vulnerability factors such as depression, and these factors will be examined in concert with the linguistic factors to understand potential drivers of attachment style change, from secure to insecure as well as change in the more positive direction – from insecure to secure attachment. Participants in Study 2 were typically first-semester freshmen, many of whom were away from home, family, and friends, providing a situation in which their attachment issues were very relevant.

Method

PARTICIPANTS

Undergraduates at The University of Texas (N = 201) participated in exchange for research credit. The average age was 18.63 (SD = 2.25), and males represented 44.28% (N = 89) of the sample. More than half (55.20%) the participants were White, with the remaining participants indicating Asian/Pacific Island (18.90%), Hispanic (13.90%), Arab (6.00%), Multiracial (4.00%), Black (1.00%) and other (1.00%) as their ethnicities.

Participants came from relatively stable and well-educated homes, with 77.6% of students reporting that their parents were still married to each other. Of the remaining students, 9% had parents who were divorced with neither parent remarrying, 10.9% had experienced a divorce and the remarriage of either or both parents, 1% had parents who were separated but not divorced, and 1.5% had lost one or both parents. Fathers were reported to be well-educated, with 29.4% having an advanced degree, 32.8% completing college, 21.9% having some college, and 15.9% completing high school. Mothers were similarly educated, with 17.9% holding an advanced degree, 33.8% completing college, 25.9% having some college, and 22.4% completing high school.

There were no demographic differences by condition at the beginning of the study (all $\chi^2 > .05$), nor were there significant differences in the psychological variables. In addition, participants across all experimental conditions reported

similar levels of social integration: they reported having an average of 5.36 close friends (*SD* = 5.46) and 2.41 close friends at UT (*SD* = 3.32). On a scale of 1 (not at all) to 7 (a great deal), they reported feeling moderately close to their roommates (*M* = 5.13, *SD* = 1.66) and liking their roommates (*M* = 5.55, *SD* = 1.34).

MATERIALS

Participants completed a battery of questionnaires, including a basic demographics instrument requesting information about sex, age, ethnicity, academic performance (high school GPA, SAT scores), parents' marital status, parents' education, number of close friends, number of close friends at UT, closeness to roommate, and liking of roommate. They completed seven additional questionnaires:

ADULT ATTACHMENT SCALE. This 18-item scale assesses attachment style along three dimensions: secure, avoidant, and anxious/ambivalent (Collins & Read, 1990). The AAS was administered during pretesting and the final session, and was chosen because it was also administered to couples in Study 1, providing a common criterion between studies.

CES-D. Depression was assessed using the Center for Epidemiological Studies Depression Scale (Radloff, 1977). This measure has been found to be a reliable tool for assessing depressive symptomatology in the general population. Radloff (1977) reported high levels of internal consistency (α = .85 in the general

population, and α = .90 in the clinical population). In an adult population, the clinical cutoff for depression is 16; in adolescents, a range of 16-24 has been suggested (Rushton, Forcier, & Schectman, 2002). This scale was administered during the first and last sessions. The sample mean at the beginning of the study was 19.60 (*SD* = 11.03), suggesting that this sample of young adults was mildly depressed.

PERCEIVED STRESS SCALE. The 14-item Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983; Cohen & Williamson, 1988) is a widely-used measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. Using a 5-point scale (0 = never to 4 = very often), scores can range from zero to 56. This scale was administered during the first and last sessions, and the mean score at the beginning of the study was 24.72 (*SD* = 6.14).

IMPACT OF EVENTS SCALE. The IES is a 15-item questionnaire evaluating experiences of avoidance and intrusion as individuals attempt to deal with a traumatic experience. Both the intrusion and avoidance subscales have displayed acceptable reliability (α of .79 and .82, respectively), and a split-half reliability for the whole scale of .86 (Horowitz, Weiner, & Alvarez, 1979). With items rated from 1 (not at all) to 4 (often), the range of scores for each subscale is 4 to 16. The event on which students were asked to focus as they responded to

this scale was "coming to college." This scale was administered during the first and last sessions. Subscale means at the beginning of the study were: Intrusion subscale, *M* = 8.72 (*SD* = 2.77), and Avoidant subscale, *M* = 8.15 (*SD* = 2.92).

COPE. The Coping Orientations to Problems Experienced Scale (COPE; Carver, Scheier, & Weintraub, 1989) is a theoretically-based 60 item self-report measure assessing stable styles of coping. Participants are instructed to report what they usually do under stress. Respondents choose their answers based on a four-point scale anchored with *not at all* (1) to *a lot* (4). The COPE scale consists of three main groupings with five scales per group and four items per scale: (a) problem-focused coping: active coping, planning, restraint coping, seeking social support for instrumental reasons, and suppression of competing activities; (b) emotion-focused coping: positive reinterpretation and growth, religion, humor, acceptance, and seeking social support for emotional reasons; and (c) dysfunctional coping: focus on and venting of emotions, denial, behavioral disengagement, mental disengagement, and alcohol/drug use. Carver et al. reported alpha reliabilities of 0.60 for all subscales except the mental disengagement scale (0.45). This scale was administered during the first and last sessions and was selected because of the number of items directly relevant to attachment issues. At the start of the study, the means were as follows: Problem-focused coping, *M* = 51.21, *SD* = 8.93; Emotion-focused coping, *M* = 42.29, *SD* = 8.38; and Dysfunctional coping, *M* = 31.49, *SD* = 6.77.

THE CHILDHOOD TRAUMA QUESTIONNAIRE. With this scale, students reported on six events that they may have experienced before the age of 17: death of a very close friend or family member, divorce or separation of their parents, violence, sexual abuse, serious illness, or other traumatic experience (Pennebaker & Susman, 1988). Students indicated whether the event happened to them, at what age it occurred, how traumatic the experience was (on a scale of 1 [not at all traumatic] to 7 [extremely traumatic]), and to what degree (1-7) they had discussed the experience with others. All these experiences have implications for attachment. Of the 201 participants, 100 reported having experienced the death of a friend or family member, 48 experienced parental upheaval, 16 had a traumatic sexual experience, 13 were victims of violence, 39 had been seriously ill or injured, and 61 reported have experienced another (unspecified) major upheaval. There were no differences by experimental condition (all χ^2s > .31). However, one variable differed by attachment style at the beginning of the study: significantly fewer secure participants reported having experienced an unspecified major upheaval, $\chi^2 = 6.80$, $p < .05$. This scale was administered during the first session only.

COLLEGE ADJUSTMENT. Two scales were used to assess adjustment to college. First, the College Adjustment Test (CAT; Pennebaker, Colder & Sharp, 1990) is a 19-item scale consisting of items such as "Missed family and friends," "Liked your social life," and "Worried about how you will perform academically

at college." Participants rated each item on a scale from 1 (not at all) to 7 (a great deal), indicating how true the statement was for them during the previous week. Pennebaker et al. (1990) report high levels of internal consistency (α = .79) and reliability (2-month test-retest = .65). Mean scores at the beginning of the study on each of the three subscales were: Homesickness, *M* = 13.83, *SD* = 4.32; Positive Affect, *M* = 32.85, *SD* = 6.67; and Negative Affect, *M* = 39.43, *SD* = 10.71.

The second scale assessed objective behaviors. The College Activities and Behavior Questionnaire (CABQ; Pennebaker, Colder & Sharp, 1990) is a survey of 22 behaviors and activities that are common to college students (e.g., exercised, talked on the phone to parents, talked on the phone to friends, studied). Participants indicated the number of times they had performed each behavior or activity. Three additional items at the end of the survey asked participants to indicate the number of times (in the past month) they visited a doctor or medical facility for a health problem, the number of days they were sick, and the number of days their activities were restricted due to illness. Both of these scales were administered during the first and last sessions. For both scales, the data were truncated to incorporate outliers by transforming values > 3 to 3, and < -3 to -3.

ASSESSMENT OF THE WRITING EXPERIENCE. After completing their essays on the last day of the writing week, participants in both writing conditions responded to a brief after-writing questionnaire that assessed their moods and

beliefs about the writing experience through such questions as to what degree the participants disclosed personal experiences during writing, felt emotional, found the writing experience valuable, etc. This questionnaire served as a manipulation check for the two writing conditions.

PROCEDURE

Participants were recruited through the online subject pool system, and all students were eligible to participate. The entire study was conducted online, across five sessions, and participants never saw or interacted personally with the experimenter or any other participant. From beginning to end, students remained in the study for slightly more than one month (M = 39.27 days, SD = 11.35). Attachment style was assessed in a large-scale pretesting battery at the beginning of the semester. Students were not selected for participation based on their attachment style, but this categorization was used for assignment to condition after completing the initial battery of questionnaires.

Because of the difficulty and slow sign-up in recruiting avoidantly-attached participants, extra care was taken to recruit and retain them. Participants identified as avoidantly-attached by the pretesting questionnaire were contacted by email and invited to participate. Furthermore, if they failed to participate on the day they were required to do so, they received an extra email reminder and were allowed an extra day. Similar care was taken with the slightly larger sample

of anxiously-attached participants, making it difficult to report accurate information about participants who completed and failed to complete the study.

SESSION 1. Upon logging into the study website for the first time, participants entered their social security numbers which were then matched to the database listing to obtain attachment style. Within attachment style (secure, anxious/ambivalent, avoidant), participants were randomly assigned to condition (emotional writing, control writing, no writing control). The assignments were made on a 2:1:1 basis, with twice as many participants assigned to the emotional writing condition, and this process of assignment was invisible to participants.

After indicating their consent to participate, students encountered the questionnaires, which they were required to complete before reaching the first writing prompt. After submission of the last questionnaire, a web page was presented with a box for participants to type their responses to the following prompt, which was assembled from the AAI questions identified as most predictive of attachment style in the pilot study:

> We are very interested in your personal story. Please begin by describing what it was like growing up in your family. What was your family like? We are particularly interested in your childhood experiences. When you were upset as a child, what would you do? What is the first time you remember being separated from your parents? Did you ever feel worried or frightened as a child? Although you may have come to understand some of these experiences as you've grown up, we are interested in your understanding of them when you were a child. Please write continuously for <u>at least</u> 20 minutes. The most important thing is that you really get into your writing, exploring your deepest thoughts and feelings wherever they lead you as you tell the story.

All study participants, regardless of condition, wrote essays in response to this prompt. Excerpts from these essays can be found in Appendix B.

After submitting their essays, participants saw a web page with instructions for completing the study, including the specific date of their next participation. For participants in the two writing conditions, the second participation date was approximately one week later (on a Monday). For participants in the control no-writing condition, the next participation date was at the end of the semester, the final session for all participants. Two email reminders were sent to participants, three days and one day prior to their next participation date.

SESSIONS 2, 3 AND 4. Participants in the two writing conditions received an email the day of their scheduled participation that included a link to the website. All participants in the writing conditions wrote essays on Monday, Wednesday, and Friday of one week. Participants in the emotional writing condition received attachment-focused prompts, in response to which they were instructed to write for 20 minutes. Participants in the control writing condition received time-management prompts, to which they were instructed to write for 20 minutes (see Appendix D for all writing prompts). A clock on the writing page kept participants informed about the passage of their 20-minute writing period, and they were unable to submit the page until the 20 minutes had passed.

On Friday, participants in both writing conditions completed a questionnaire after finishing their essays that assessed the responses to the writing assignments. Participants in the no writing control condition did not participate in these sessions.

SESSION 5. Participants in all three conditions returned to the study at the end of the semester for their final session, during which they completed the same questionnaires they had completed during the first session (excluding the demographics questionnaires). Afterwards, they wrote a final essay in response to the same attachment-focused prompt they wrote about in the first session. At the conclusion of their participation, participants received an email providing thorough debriefing information and personal attachment-relevant information.

Results

This study was designed to address two different sets of questions. The first purpose was to examine the generalizability of the linguistic profiles derived in Study 1, using the same criterion (the AAS). The second purpose was to investigate the power of a writing intervention focused on deep exploration of family issues to produce changes in attachment style and benefits in adjustment to college. These issues will be addressed separately.

LINGUISTIC DIMENSIONS OF ATTACHMENT STYLE

ANALYTIC STRATEGIES. The essays written by study participants were of interest in two ways. First, because all participants wrote about their family

experiences at the beginning of the study, before any manipulation occurred, the essays written in session 1 provide a baseline of language in this sample of new college students. Therefore, the two prediction variables derived in the multinomial regression analysis in Study 1 were applied to this sample in a multinomial logistic regression to determine how well they classified attachment style as assessed by the AAS. This analysis gave insight into the generalizability of the linguistic profile across studies and samples. The model was fit again on the session 5 essays to examine differences in fit.

The second analysis was exploratory, and examined the importance of flexibility in writing between the first and last essays in attachment style change. This analysis relied upon a similarity coefficient derived from an Latent Semantic Analysis (LSA) of the two sets of essays. Fundamentally, an LSA analysis may be thought of as a factor-analytic approach to determine how similar language samples are to each other, along a number of dimensions, including content, style, pronouns, and particles (see Campbell & Pennebaker, 2003 for a more in-depth explanation of LSA and the comparison dimensions). For this study, the LSA dimensions of interest were content and pronouns. Recall that the essays in sessions 1 and 5 were written in response to the same prompt, at both sessions and across all conditions. A high content similarity coefficient would reflect the fact that both essays were focused around the same topics at time 1 and 5. A low similarity coefficient – for example, a low pronoun similarity coefficient – would

reflect flexibility in pronoun use between essays. After a brief description of the language samples and manipulation check, these analyses will be addressed in order.

DESCRIPTION OF THE LANGUAGE SAMPLE. The mean number of words written in the session 1 essays was 574.5 (SD = 275.5). Session 5 essays were shorter (M = 482.4, SD = 245.7), and there were no significant differences in either session by condition. Across sessions, however, in both writing conditions the essays in session 5 were significantly shorter than the session 1 essays: emotional writing, t (101) = 3.70, $p < .01$; control writing t (48) = 3.79, $p < .01$. There was no difference in essay lengths in the no writing control condition, t (49) = 1.28, $p = .21$. The total number of words in the session 1 sample was 115,465, and in session 5 the total was 96,969. Means by gender and AAS designation for the 20 selected LIWC variables are shown in Table 11 (for session 1) and Table 12 (for session 5).

Several variables changed significantly from session 1 to session 5 as a function of condition. As shown in Figures 1, 2, and 3, the emotional writing condition produced significant changes in verb tense usage. Compared to participants in the two control conditions, the session 5 essays written by participants in the emotional writing condition were characterized by significantly greater use of present tense (F [2, 198] = 4.62, $p < .01$), lower use of past tense (F

[2, 198] = 3.31, $p < .05$), and higher use of future tense (F [2, 198] = 3.61, $p <$ .05). Means for Session 1 and Session 5 by condition are displayed in Table 13.

Finally, words in the *anxious* category were affected by experimental condition, as shown in Figure 4. Participants in the control writing condition displayed an elevated use of these words in session 5 compared to writers in the other two conditions, F (2, 198) = 1.54, $p = .01$.

MANIPULATION CHECK. To test the efficacy of the writing instructions in the two writing conditions, a one-way ANOVA was conducted on the questionnaire administered on the last day of writing in order to determine the effect of condition. As shown in Table 14, participants in the emotional writing condition reported greater levels of emotional involvement in their writing experience, for 10 of the 15 questions. These results indicate that participants followed the writing instructions appropriately.

GENERALIZABILITY OF THE LINGUISTIC PROFILE. The two predictive variables derived from the multinomial logistic regression in Study 1 were entered into a new multinomial logistic equation in the current sample, predicting AAS classification at the beginning of the study. Recall that in Study 1 the model was a significant predictor of attachment style, correctly classifying 57.9% of participants using the same criterion measure (AAS) used in this study. In the current study, the model was again a significant predictor of attachment style for the session 1 essays, χ^2 (4, N = 201) = 15.5, $p < .01$, $R^2 = .08$. As shown in Table

15, the overall classification rate was 50.7%, with the most accurate classification occurring in the secure attachment category. In fact, the strength of the secure classification appears to be largely responsible for the overall classification rate.

The model also fit the session 5 data very well, χ^2 (4, N = 201) = 18.90, p < .01, R^2 = .37. The model correctly classified 60.7% of the cases, although an examination of Table 15 reveals that this percentage is again being driven almost entirely by the overwhelming classification of the secure cases. Nearly all misclassifications are to the secure category, as well. Although it is more effective at correctly classifying securely attached cases, the model derived on the Study 1 sample provides a remarkably similar overall fit across criteria (AAI and AAS in Study 1) and across samples (adults and first-semester college students).

ESSAY SIMILARITY AND ATTACHMENT STYLE CHANGE. These analyses focused on a similarity coefficient resulting from an LSA analysis of a corpus that contained the entire set of essays at time 1 and time 5. All essays were written in response to the same prompt, and were written by all participants. The coefficient is similar to a correlation coefficient, although it ranges from 0 to 1 rather than -1 to 1. Higher numbers represent higher levels of similarity.

Attachment style changes were grouped into four categories: no change from session 1 to session 5; change from secure to either insecure; change from either insecure style to secure; and change within the insecure styles. Mean

similarity coefficients by change group are displayed in Figure 5 (content) and Figure 6 (pronoun).

The two similarity coefficients were entered into binomial logistic regressions to predict attachment style change. These coefficients were remarkably good at predicting attachment style change, in different ways. Change to secure attachment was well predicted by pronoun similarity, with 83.3% of the cases correctly classified, and $R^2 = .52$. With a negative beta ($B = -1.73$, $p < .01$), low levels of similarity– or high levels of flexibility – in use of pronouns were predictive of a change to secure attachment.

Change to insecure attachment was predicted not by the pronoun similarity coefficient, but by the content coefficient. Using only the content coefficient ($B = -4.69$, $p < .01$), 91.9% of the cases were correctly classified. Low similarity in content, then, between the first and last essays was strongly predictive of change from secure to insecure attachment style.

Neither similarity coefficient was predictive of change within attachment style. However, stability of attachment style was predicted by the content coefficient, with 69.2% of cases correctly identified. Stability was predicted by a strong similarity in content ($B = 1.51$, $p < .01$), indicating that these participants wrote about the same topics at both sessions.

INTERVENTION

The emotional writing condition was hypothesized to have an impact in two arenas: effecting positive change in attachment style (from insecure to secure), and contributing to better adjustment to college. At the beginning of the study, 104 students were securely attached, 48 were assessed as anxious/ ambivalent, and 49 were avoidant. By the end of the semester, 121 students were secure, 32 were anxious/ambivalent, and 48 were avoidant. Nearly 2/3 of participants (68.2%) did not change attachment style across the study. Of these stable participants, 87 maintained secure attachment, 28 maintained avoidant attachment, and 21 maintained anxious attachment. However, thirty-four participants (16.9%) changed from insecure to secure attachment, 17 (8.5%) changed from secure to insecure, and 13 (6.5%) changed from one insecure style to the other. There were no effects of gender, either in attachment style stability or change, all χ^2 significances $\geq$ .69.

CHANGE IN ATTACHMENT STYLE. Two approaches were taken to test the prediction that writing deeply about family issues could produce attachment style change. First, a chi-square test was conducted on condition by change group. As previously noted, the changes were categorized into four groupings: no change from time 1 to time 5 (N = 136), change from either of the insecure categories to secure (N= 34), change from secure to either of the insecure categories (N = 17), and change within insecure categories (N = 12). The chi-square test of experimental condition and attachment style change was not significant, χ^2 (6) =

3.06, p = .80. A more closely-grained test examining all possible combinations of attachment style was not significant, χ^2 (6) = 9.76, p = .64.

The second approach to this question relied on a repeated-measures ANOVA. Assignment to attachment style using the AAS does not produce a discrete categorization, but rather a value for each of the three attachment styles. The largest of the three values is then chosen to indicate attachment style. These three continuous variables (measured in session 1 and session 5) were entered in a repeated-measures ANOVA, with experimental condition and attachment style at session 1 as the between-subjects factors. Experimental condition was not a significant factor (F [3, 190] = 1.32, p = .27), nor was the interaction of condition and attachment style at session 1 (F [4, 191] = .86, p = .59).

On the basis of these two tests, it appears that changes in attachment style did not occur as a consequence of experimental condition or an interaction between condition and attachment style at the beginning of the study.

ADJUSTMENT. The writing intervention was also hypothesized to facilitate adjustment to college, along a number of dimensions. The adjustment measures were of three types: social (e.g., number and quality of friendships and relationships with roommates), psychological (including perceived stress, depression, homesickness, and positive and negative affect), and coping. These issues are addressed separately.

SOCIAL ADJUSTMENT. Twelve variables focused on social integration were examined: number of friends (male and female), number of friends at UT (male and female), number of times talked on the phone to parents, to friends not at UT, to friends at UT, attended a meeting, talked to an old boy/girlfriend, and made a new friend. Because these variables represent exact counts of numbers of instances, a social adjustment index was created by summing the values at session 1 and at session 5 ($\alpha = .8$). A difference score was created by subtracting the value at session 1 from the value at session 5; negative numbers, therefore, represent decreases over the semester. A second index was created focusing on the participant's roommate by summing two variables: closeness to roommate and liking of roommate. A difference score for the roommate index was created in the same way as the social adjustment index.

These two difference scores (social adjustment and roommate) were submitted to two separate univariate ANOVAs examining the effect of condition and the interaction of condition and attachment style at session 1. There were no differences in the social index, either in terms of main effects or interaction (all *p*s $< .2$). However, the roommate index revealed a main effect of condition (F [2, 191] = 4.48, $p = .01$, $\eta^2 = .03$) qualified by an interaction with style at session 1, F (4, 191) = 2.48, $p < .05$, $\eta^2 = .05$. As shown in Figure 7, participants in the emotional writing condition remained stable in the degree to which they liked and felt close to their roommates over the course of the study. However, avoidant

participants in the control writing condition and anxious participants in the control condition significantly dropped in the degree to which they liked and felt close to their roommates, both *p*s < .05.

All roommates were invited to participate in the study, in a very limited manner. At the beginning and end of the study, their involvement focused on answering two questions about their roommates (the study participants): how much they liked, and how close they felt to their roommates. Only 27 roommates completed both sessions, which was an insufficient number to analyze because of condition distribution.

PSYCHOLOGICAL ADJUSTMENT. Exploration of psychological adjustment was focused on five variables: the impact of coming to college (with two subscales measuring thought intrusions and avoidance of thinking about the event), perceived stress, depression, homesickness, and positive and negative affect. These variables were entered into a repeated-measures ANOVA with experimental condition and style at session 1 as the independent variables. There was an overall effect of condition, F (2, 188) = 3.05, p = .01, η^2 = .08. Closer examination of the between-subjects effects revealed that only one of the twelve variables was significantly affected by condition: thought intrusions, F (2, 191) = 3.62, p < .05, η^2 = .04. As seen in Figure 8, the drop in reported number of thought intrusions was significantly larger for participants in the emotional condition compared to those in the control condition, p < .05.

A one-way ANOVA examining these psychological adjustment variables, focusing on attachment style change group as the independent variable, revealed one important difference. An increase in depression over the semester was noted only for participants who changed from secure to an insecure attachment style, F (3, 199) = 3.14, $p < .05$, while all other participants decreased in depression by the end of the semester. Depression scores for participants who changed to an insecure attachment increased by an average of 3.47 points (SD = 7.48), while the mean scores of the other groups decreased (M decrease = 3.33 points, SD = 10.12).

COPING. Finally, the three coping subtypes (problem-focused, emotion-focused, and dysfunctional) were entered into a repeated-measures ANOVA to examine the effect of condition and attachment style at session 1 on changes in use of these ways of coping. There was an overall main effect of condition, F (3, 190) = 3.91, $p = .01$, a main effect of attachment style, F (3, 190) = 13.75, $p < .01$, and a significant interaction, F (4, 191) = 3.31, $p = .01$. Examination of the between-subject effects revealed that only the dysfunctional coping style was affected by experimental condition, F (2, 191) = 10.72, $p < .01$, qualified by a marginal interaction with attachment style, F (4, 191) = 2.05, $p = .09$. Participants decreased their use of these maladaptive coping strategies overall; however, anxious and avoidant participants in the no writing control condition decreased marginally more than those in the two writing conditions.

An examination of changes in coping style as a function of change group revealed a significant effect, but only for those participants who changed from a secure to an insecure attachment style. While all other groups decreased their use of dysfunctional coping techniques (an average of 2 points decrease), those who changed to an insecure style increased their use of these techniques (*M* difference = 3.18, *SD* 6.15), F (3, 199) = 3.64, $p < .01$.

Finally, a supplementary inductive analysis of predictors of attachment style change was conducted in order to determine which variables were important determinants of attachment style change. These analyses used all questionnaire and linguistic variables from session 1; the results can be found in Appendix E.

Discussion

Study 2 was designed with two purposes: to test the generalizability of the linguistic profile developed in Study 1, and to test the ability of a writing intervention to positively influence adjustment to college and to facilitate attachment style change. The issues raised by the extension of the linguistic profile across studies will be addressed in the General Discussion. The influence of emotional writing on adjustment and attachment style change provided very mixed results. The dearth of adjustment changes attributed to the writing intervention was surprising, although the significant findings were somewhat in line with those reported in the literature. As previously found (Lepore, 1997; Schoutrop et al., 1997), participants in the emotional writing condition reported

significantly fewer thought intrusions than did those in the control writing condition. However, participants in the no writing control condition also reported fewer intrusions than the control writing condition.

There was no effect of the intervention on social adjustment in general, although there was an effect on insecurely attached participants' relationships with their roommates. Anxiously attached participants in the no writing control group significantly decreased the degree to which they liked and felt close to their roommates over the semester, while those anxious participants in the emotional writing condition remained stable. Avoidantly attached participants in the control writing condition dropped significantly in their feelings about their roommates, and those in the emotional writing condition remained stable. Writing deeply about their families appears to have helped these insecurely attached students maintain their relationships with their roommates.

Finally, the coping findings were entirely focused on one dimension: dysfunctional coping. The changes shown in Figure 9 present a confusing picture, with the largest decreases in dysfunctional coping occurring in the no writing control condition. However, the discovery of differences by change group suggests that attachment style change may be the important factor. While it appeared that all participants reported a drop in use of dysfunctional coping techniques, participants who changed from secure to either insecure attachment style increased their use of these maladaptive techniques, by a margin of three

points. When all three factors (condition, attachment style at session 1, and change group) were entered into an analysis, only change group was a significant factor, implying that the condition effect was concealing this other important influence. Together, these findings suggest that the writing interventions were helpful along some dimensions, but it is puzzling that both the emotional and control writing conditions produced the same benefit on thought intrusions.

One explanation for this finding is that during their time management essays, control writing participants continued to discuss their families. For example, participants often wrote that they spoke with their mothers that day, and then continued to discuss her and their relationship. Monday and Friday essays often included discussions about family activities participants had just (or were going to) attend over the weekend, and these discussions typically evolved into greater levels of detail about family situations. Because they began their involvement in the study by writing deeply about their families, this may have primed participants in some way, or suggested to them that writing about how they managed their time should include information about their families.

Although participants in the emotional writing condition did report writing essays that were more emotionally revealing, an element of the study design may have been poorly chosen. As is typical in writing studies, the Last Day of Writing Questionnaire was administered after the last of three writing sessions in the middle of the study. However, all participants wrote at least twice, in emotionally

expressive ways. Insight into this explanation may have been provided had the Last Day of Writing Questionnaire been administered after the final essay in session 5. Participants were undoubtedly focusing their assessments on the three essays they had just written, as they were asked to do. A finding that participants in both writing conditions, after writing 5 times, reported similar levels of emotional disclosure would provide support for this post hoc explanation.

The intervention in Study 2 was also designed to change attachment style. The results were quite clear that the intervention did not succeed in producing the changes that did occur. Given the evidence that interventions can produce attachment style change (Dozier & Tyrrell, 1998; Kilmann et al, 1999), combined with the body of literature showing that the writing intervention can produce a variety of important changes (cf. Smyth, 1998), this was somewhat surprising. A possible explanation for the failure of a writing intervention to effect this type of change is the nature of attachment style. As an inherently social factor, it may be the case that an intervention must itself be social in nature. The intervention reported by Kilmann and colleagues (1999) was a four-segment group therapy type of program, in which young adult women interacted with each other and a group leader not only to explore problematic relationship beliefs but also to receive training on a variety of relationship issues. The writing intervention was similar to only one of the four segments in this intervention (addressing childhood

factors), and it is conceivable that the social interaction inherent in a group setting is essential to facilitating attachment style change.

Another possible explanation for the failure of the writing intervention is the short time-frame of this project. It is possible that writing about these family issues has begun the process of change, but the outcome will not be evident after such a brief period. Many of the essays in which participants were writing about very painful issues indicated that this was the first time they had really addressed them in a meaningful way. For example, an avoidantly-attached male participant (who did not change attachment style over the course of the study) wrote:

> I had 3 siblings, but we aren't very close. I remember watching my parents sometimes, but we never seemed to interact. I don't remember ever being tucked in or having them brush my teeth or playing catch with me or reading to me or anything. When I would get mad, I remember I used to cry or pout or whine, and then I would get hit. Eventually I just learned to not express my anger or discomfort and just kept it to myself. I would just think about them or cry to myself in some remote place somewhere until things didn't seem to matter anymore. As for being separated from my parents, it seemed to be the common thing. I remember going to dinner and what not, but it always seemed like I was just there but not really "with" them. I saw them, but I don't remember making eye contact or being given attention until I did something wrong and they looked angry and violent. … I didn't trust anyone as a kid, not even my family, or perhaps I did at first but learned quickly not to. My siblings always lied to me and played tricks on me and the eldest always hit me too. My parents never seemed to keep promises or be consistent and I didn't like to turn to them. When I was young, I didn't know what it was that I did that pissed them off, so I preferred to not risk it and just not go to them unless I really had to. I don't know what else to say except that to this day, my family isn't close and I don't really feel close to anyone. I've never really talked about this with anyone and I try not to think about it.

As this participant concluded at the end of his first essay, this was the first time he had thoughtfully addressed these apparently painful topics. His content similarity coefficient was quite low (.54), indicating that he wrote about different topics in his final essay. It seems possible that deeply thinking and writing about these issues five times might not effect immediate change, but rather would begin the process of change. This process of change may be enhanced with the development of a close romantic relationship, as suggested by previous literature (e.g., Fraley & Shaver, 1998). Because approximately 1/3 of college students are likely fall in love during their first year of college (Aron, Paris & Aron, 1995), the opportunity to develop an important close relationship may be an important catalyst for many of these students.

Another insight into the potentially beneficial effect of the emotional writing condition is implied by the specific language use between conditions. The changes in verb tense for participants in the emotional writing condition were quite suggestive; after deeply exploring their family histories over five writing sessions, students in the emotional writing condition ended their participation by writing about their families with much less focus on the past, and a greater focus on the present and future, relative to participants in the other two conditions. This suggests that the process of writing about family issues resolved some of their

needs to dwell on childhood issues, allowing them to address their own lives and family situations with a different perspective.

GENERAL DISCUSSION

The bigger issue for both studies in the current project was to examine the linguistic profiles of attachment style. Working with two different criteria (the Adult Attachment Interview transcripts, and the Adult Attachment Scale categorization) and two different samples (approximately 30-year old married couples pregnant with their first children, and approximately 18-year old first-semester college students), the primary purpose of these projects was to test the generalizability of a linguistic profile across criteria and sample. Given the lack of correspondence between attachment style as assessed by both criteria, it was fascinating to discover that the linguistic index fit both criteria and predicted attachment style equally well, in Study 1. Furthermore, the specific word categories underlying each attachment style were theoretically consistent – particularly in terms of pronoun and emotional language predictions. Relative to securely attached individuals, preoccupied persons display a much more self-focused way of describing their family histories (e.g., significantly greater uses of *I, me* and *my*) as well as a focus on their social settings. Their language was also characterized by the greatest number of words in the *anxious* and *negate* categories, but they did not use the greater number of *sad* words, as predicted.

An unpredicted but theoretically interesting finding was that preoccupied individuals use significantly fewer articles than secure people use. Because articles are believed to represent a concrete orientation to the world (e.g., talking about *the chair* as opposed to *chairs*) (Pennebaker & King, 1999), this result suggests that preoccupied people are significantly more general in their orientation to others and their environments. Use of articles has been found to be negatively correlated with Neuroticism, Extraversion, Agreeableness, and Conscientiousness, and positively correlated with Openness (Pennebaker & King, 1999). Preoccupied individuals' significantly low use of these three words (*a, an* and *the*) fits the literature on the emotional color of anxious/preoccupied attachment (Kobak & Sceery, 1988).

The characteristics of dismissing people appeared in the language they used to discuss their relationships, through the lowest focus on others (e.g., *you, we, social,* and *others*) and the lowest levels of *negative emotion* language overall, but the highest level of *anger* words. Because of the nature of these analyses, the only claims that can be made about the language of securely attached people is as a base of comparison to the two insecure attachment styles; however, the inductive analyses reported in Appendix C may provide some insight into their language.

Although it was predicted, it was nonetheless surprising to discover the similarity in prediction of attachment style afforded by the linguistic index, across

criteria and samples, given the extremely low levels of agreement between criteria. When predicting AAI classification, the prediction variables provided the most accurate classification of participants with the dismissing style and overclassified the remaining participants as dismissing. More participants were rated as having dismissing attachment by the judges (54.3% of the sample), and the linguistic index followed suit. On the other hand, when predicting attachment style as assigned by the AAS, the linguistic index overclassified participants into the secure category, and did the best job of classifying secure participants. It is important to remember that the prediction variables were derived from beta weights obtained by predicting AAI designations; this situation helps explain some of the misclassifications, and provides weight to the strength of the linguistic index.

In Study 1, 70.7% of participants were assigned to the secure category by the AAS, and the prediction variables assigned 78.7% to the secure category. A similar situation occurred in Study 2, with the prediction variables overclassifying secure attachment style. At session 1, 51.7% of participants were classified as securely attached, but the linguistic index classified 82.1% as securely attached. Although the predicted group memberships were biased in favor of the dominant group, the consistency in overall classification suggests that the 20 linguistic variables are important discriminators of attachment style regardless of criterion or sample. Of course, the rate of misses is important. In Study 2, the prediction

variables were very poor at classifying avoidant attachment at session 1 and anxious attachment at session 2. While the index is not accurate enough to replace other assessment tools such as the AAI or questionnaires such as the AAS, it does provide valuable insights into the mental models underlying the standard categories of secure, anxious, and avoidant attachment.

Finally, the question of factors associated with attachment style change were a nice fit with the existing literature. Individuals who changed from secure to an insecure attachment style displayed greater numbers of problem coping styles and increased levels of distress, as previously found (Lopez & Gormley, 2002). The linguistic variables associated with this type of change (reported in an exploratory investigation reported in Appendix E) provided a snapshot of this distressing progression, focusing on an increase in *sleep* and *tv* words, greater levels of *sad* and *inhibition* words, and an overall decrease in *communication* words.

The importance of content similarity between essays 1 and 5 in predicting change to insecure attachment seems suited to a rumination explanation. Discussing the same material at the end of the semester as was discussed at the beginning reflects an inability to change one's story, which is a kind of rumination. Rumination has been clearly implicated in the maintenance of depression (e.g., Lyubomirsky & Nolen-Hoeksema, 1993), as well as cognitive inflexibility (Davis & Nolen-Hoeksema, 2000), which seems to be captured by

the strong similarity coefficient for these writers. Other important factors that were discovered to predict this type of attachment style change were quite evocative; these individuals did not like or feel close to their roommates, they became more depressed, and they used increasing numbers of dysfunctional coping techniques such as denial, behavioral and mental disengagement, and alcohol and drug use. Of course, it is impossible to say whether these social elements are causes or effects of their attachment style change.

Study 2 was limited by the brief period of observation and measurement, which may have prevented the detection of experimental effects. Follow-ups in the months to come may have provided a better opportunity to capture effects of the experimental manipulation if they began a process of attachment style change. Another important factor to have considered might have been information about the existence (and quality) of current romantic relationships in this sample. Many participants were navigating a romantic relationship from a distance, with boyfriends and girlfriends in their hometowns. Others were actively dating and forming (and dissolving) relationships. This was certainly an important factor in students' lives, and important for consideration in a study of attachment style in this sample.

The natural extension of this research is in the area of natural language. Given the findings in this study, that individuals use pronouns and emotional language in relatively predictable ways as a function of attachment style, one

would expect that this kind of language use is not an artifact of the specific interview or writing assignment, but instead reflects the individuals' standard styles of speaking or writing. If this is the case, the same linguistic patterns should be evident when people speak to their relationship partners. Although it would be quite involved, a natural language study in which participants evaluate their relationships to the people with whom they spoke during the day, matched with the language they used when speaking to those people, could provide further evidence for the generalizability of the linguistic profiles developed in the current studies. Although people are believed to endorse one general style of relating to others, most report have experienced multiple styles of relating to others (Baldwin et al, 1996). The discovery of this flexibility in language, with individuals shifting from using one type of linguistic profile to another as a function of their relationship, would provide a great deal of support for separate linguistic profiles of attachment style.

CONCLUSION

There is a relatively clear and theoretically-relevant profile of attachment style in adults. The linguistic dimensions discovered to underlie attachment style can provide interesting insights into the mental models – a kind of X-Ray of the mental models – of secure, dismissing, and preoccupied attachment. The degree of generalizability across criteria and samples suggests that this pattern of words captures something enduring about attachment style. The index is not sufficiently

predictive to be used as a replacement for other assessment tools, but the current findings provide evidence for the importance of the selected linguistic categories as discriminators and indicators of attachment style.

The ability of a language-focused intervention to effect positive change in attachment style was not supported, although the lack of findings may be due to the relatively short time-frame in which participants were observed.

APPENDIX A

EXPLORATORY COMPARISON OF PARENTS' AND CHILDREN'S LANGUAGE

An additional opportunity to examine the language of children was afforded by the data set used in Study 1. Children of the couples were interviewed at age 7, using the Berkeley Puppet Interview (Measelle, Ablow, Cowan, & Cowan, 1998). While attachment style of the children was not yet assessed, an analysis of these transcripts can provide suggestive information concerning relationships between the language of children and that of their parents.

The Berkeley Puppet Interview (Measelle et al, 1998) is a videotaped and standardized interview which allows researchers to assess young children's perceptions of their relationships with their parents and siblings (Measelle et al, 1998). Although it is normally used to evaluate family and social outcomes, for the current study it was only used as a language source. Each child's transcript was an average of 1,131.08 words long (SD = 508.98), and there was not a gender difference in length of transcript. Complete language data were available for 78 children, 42 of which were male. As with the parents, only the language of the children was analyzed; the interviewers' questions to which children were responding were not part of the analysis.

Because there was no attachment style classification available for the children, and because of the absence of literature on the specific word use of children and parents, this analysis was exploratory and examined all default LIWC variables (omitting those that are not relevant to spoken language, such as abbreviations and emoticons). Two approaches were taken to examine these relationships. First, a correlational analysis was conducted on the language of all families for whom language data was available for the father, mother, and child (67 families, N = 201 individuals). Of the children, 53.73% were males. There were surprisingly few significant familial linguistic relationships, with only one relationship between parent and child. The relationship between father's and child's use of words captured by the *we* category was significant, r (74) = -.23, $p < .05$. The remaining three significant correlations were between mother and father: *other*, r (107) = .26, $p < .01$; *articles*, r (107) = .22, $p < .05$; and *home*, r (107) = .26, $p < .05$.

A second analysis was performed to further explore linguistic differences between mothers, fathers, and children. A one-way ANOVA revealed significant differences by family role (mother, father, child) for all but seven variables: *assent, optimism, inhibition, tentative, other references, body*, and *eating*. For the remaining 65 variables that did show an effect of family role, post hoc tests

revealed that the majority of effects were focused on differences between the child and both parents (e.g., mom and dad use past tense verbs to the same degree, which was different from the way their child used past tense verbs). For these variables, the parents were not significantly different from one another, but both were different from the child. Of the 18 LIWC categories that revealed a significant difference between the child and at least one parent, 15 were used differently by all members of the family (*unique, dictionary, prepositions, positive feelings, space, down, exclusive, motion, occupation, school, job, achieve, leisure, sports*, and *money*). Many of these differences are not surprising, given the different roles and interests of parents and children. Only three variables revealed a difference by parent: *articles* F (2, 200) = 20.42, $p < .01$; *see* F (2, 200) = 6.12, $p < .01$; and *nonfluencies* F (2, 200) = 6.93, $p < .01$.

Finally, to explore gender differences in the language of children, a one-way ANOVA was conducted on all the LIWC variables, by gender. Only three dimensions revealed a significant difference, in often surprising directions. Boys use more *assents* (M = 1.52, SD = 1.34) than girls (M = 0.74, SD = 0.77), F (1, 77) = 9.39, $p < .01$. Girls more frequently talk about *positive feelings* (M = 1.56, SD = 0.59) than do boys (M = 1.29, SD = 0.60), F (1, 77) = 4.22, $p < .05$. Finally, girls use significantly more *sexual* language (M = .90, SD = .42) than boys (M = .68, SD = .37), F (1, 77) = 6.21, p = .01. It should be noted that the category of *sexual* words includes the words love, hug, and kiss along with more explicitly sexual words such as breast and rape.

Although the analyses of the children's language were purely exploratory, the results were surprising – particularly because of the absence of linguistic similarity among parents and children. People engaged in conversation fall into a linguistic synchrony (Niederhoffer & Pennebaker, 2002), so it would be expected that family members who live together and talk together on a regular basis would use language in similar ways, as seen in the similarity of language between parents. One possible explanation for the lack of correlation between parents' and children's language is the nature of the children's interviews. As the interviews progressed, children frequently became bored and resorted to very short answers and sentence fragments (e.g., "yeah, my mom"), which may have caused problems for many word categories. In the future, when attachment style information becomes available for these children, it will be interesting to explore this early language of the kids to see if it predicts attachment style in ways similar to that of their parents.

Appendix B

INTERVIEW AND ESSAY EXCERPTS

From an AAI interview of a *securely* attached woman (Study 1):

I was wondering if you could illustrate with a specific example a time when you were upset?

Hm I just don't ever remember being totally emotionally blocked out, I never really did that. Oh, I don't really think, cause I always I laughed everything off, always I always I still do that cause that's the way I am, some people go on these little dives you know where they go down and they're way down but I've never done that so I don't know, I don't know, I don't think I ever really did anything that would constitute that -- don't know.

From an AAI interview of an *anxiously* attached woman:

Do you remember a specific time when you were emotionally upset about something and what happened?

Mmm . . . . . I guess there was uhm one time when my mother had gone back from, had gone back to Country 2 to visit her relatives. And had come back and uhm, I guess I was like thirteen at the time. Going through my teenage years. And uh, I don't know for some reason I got, it just, it just seemed like she didn't appreciate me when she got back. Or didn't miss me as much and. I just had my feelings hurt for a little bit. And uh, we, we were just arguing about something, and uh it just upset me more than it normally would have, and I just remember they were going off somewhere and I refused to go and to stay home and cry in my room and felt sorry for myself.

From an AAI interview of an *avoidantly* attached man:

Okay, when you were upset as a child, what would you do?...How would your parents react to that? Or would they?

Sulk, um, is probably the best word to describe it. Well, I think they sort of ignored it as if to say, "Oh, that's not important. You're making too much of it". Um, sometimes, I would get sort or chewed out if I took it too far, uh, like, "I don't care if the Tigers lost, come eat your dinner."

From an essay written by a *securely* attached woman (Study 2):

If I was ever upset about something then I would tell my parents and act upset. They would always comfort me, unless I was in trouble, but even then they weren't mean at all, just stern. I think the first time that I can remember being separated from my parents was horrible because I broke my arm. I don't think I was scared or worried as a child for anything strange. I didn't love being in the dark or leaving my family for a long time. I used to be scared of to be outside at night by myself, for example, if I had to get something from a car or out of the backyard, but that was because I watched scary movies with my brothers. I never really thought that anything bad was going to happen to me; I do the same thing now if I am somewhere at night by myself, like the parking garage. I knew that the chances of something happening to me weren't very high, but knowing that something could happen is what made me nervous.

From an essay written by an *anxiously* attached man:

When I was upset as a child I would most likely pout or try to avoid the situation or cry. Once I remembered my parents dropping me off at someone's house. First thing I remembered was that my father had woken me up from the back seat of the car picked me up and handed me to some strangers. Of course at the time I didn't realize that these were babysitters. I felt like this new couple was meant to be some sort of foster parents. I cried violently the whole night and wouldn't eat anything the next day. I was fine though when my parents picked me up that evening. There was another time that I fell and busted my lip. This happened in during a time when I had stopped attending church despite my mother's demands. At the time it happened I thought God had a part in it himself. So not only did I have a great pain to deal with but also a new found fear of God. I cried all night before passing out.

From an essay written by an *avoidantly* attached woman:

I wouldn't cry in front of anyone. I just said nothing. I didn't talk to anyone at school about it nor did I talk to my friends or their parents. I don't like to cry in front of people and I'm not very comfortable doing it. I hide my true emotions by getting angry and saying what's on my mind. I guess I can be very defensive at times and private. It's easier for me to express myself when I'm angry because it comes off as being strong and not weak. When I was a child I was often very worried and frightened. I have to say I had to grow up relatively fast.

Appendix C

INDUCTIVE ANALYSES OF AAI TRANSCRIPTS: PREDICTING ATTACHMENT STYLE AND ADJUSTMENT

Predicting Attachment Style

One additional approach was taken to uncover the specific linguistic profiles of attachment styles. A series of binomial logistic regressions was conducted in order to reveal the patterns of language that best serve to predict each attachment style individually, using a forward entry approach relying on the Wald statistic for each predictor variable. Regressions were conducted predicting to both the AAI and the AAS classifications in order to explore linguistic differences between the two sets of categorizations. Each attachment style variable was converted to three binomial variables and the entire set of LIWC variables (using the default and pronoun dictionaries) was entered predicting attachment style to each variable individually. Sex was entered as a categorical variable. For all regression models, attachment style was coded as "1" and the other two styles were coded as "0." Therefore, categories with positive coefficients are used at a greater rate by individuals in that attachment style, and those with negative coefficients are used at a lower rate. All betas and model statistics are shown in Table 16.

SECURE ATTACHMENT: AAI. Seven models were produced predicting to secure attachment. The model that best predicted secure attachment was selected (78.0% accuracy). The Nagelkerke R^2 for this model was 0.43, and the Hosmer and Lemeshow fit test reflected a good fit to the data, χ^2 (8, N = 164) = 10.88, p = .21. Five variables were important predictors: the constant, *sex*, *money*, *death*, and the pronoun categories *me* and *yours*.

SECURE ATTACHMENT: AAS. Two models were produced predicting secure attachment. The model that best predicted secure attachment classified attachment style with 70.1% accuracy. Although the proportion of variance accounted for was small (R^2 = .11), the model fit the data well, χ^2 (8, N = 164) = 6.96, p = .54. Only one variable, besides the constant, was an important predictor: the pronoun category *yours*.

ANXIOUS ATTACHMENT: AAI. The only significant predictor of anxious attachment style to the AAI designation was the constant. All other variables were excluded from the equation, which correctly classified 85.4% of the cases.

ANXIOUS ATTACHMENT: AAS. Six models were produced predicting anxious attachment. The model that best predicted anxious attachment was selected (92.7% accuracy). The R^2 for this model was .43, and the model fit the data well, χ^2 (8, N = 164) = 4.69, p = .79. Five variables were important predictors: the constant, *optimism*, *hear*, *present tense*, *money*, and the pronoun category *yours*.

AVOIDANT ATTACHMENT: AAI. The regression produced seven models, and the most accurate classification was 72.0%. The model fit the data, χ^2 (8, N = 164) = 6.14, p = .63, and R^2 = .31. As seen in Table 16, the variables that best predicted avoidant attachment were the constant, sex, *positive feelings*, *death*, *swear words*, and the pronoun categories *me*, *our*, and *yours*.

AVOIDANT ATTACHMENT: AAS. This regression produced five models, with the most accurate classification being 84.1%. The R^2 was .23, and the model fit the data, χ^2 (8, N = 164) = 6.24, p = .62. Besides the constant, four variables were important predictors of avoidant attachment style: *number*, *sad*, *inhibition*, *tv*, and the pronoun category *yours*.

The inductive exploration of predictors of attachment style in Study 1 gave additional insight into the linguistic underpinnings of the attachment styles, individually. One category was present in the models predicting both criteria, for all three attachment styles: the pronoun category *yours*. The differences were theoretically appropriate, with anxious people using these words more than avoidant individuals, who use them more than securely attached people. The emotional language findings were also a mixed fit with the literature. For secure people – as hypothesized – no emotional language categories were significant predictors. However, as predicted, avoidant individuals used significantly low numbers of positive feeling words and sad words, and high levels of inhibition language. Anxiously attached people, however, were surprisingly strong in their use of optimism words, and no negative emotion words were predictive. In fact, the category of optimism words was the strongest predictor of this attachment style, a finding that was not predicted. With their near obsessive interpersonal focus, and their constant efforts to tend and maintain close relationships, the strength of this predictor suggests that they may be frequently expressing their hope for positive outcomes. While this characteristic fits the profile of anxious attachments, it was not predicted by the literature.

However, there were some surprising findings that did not fit the predictions of this project. Specifically, using the AAI as a criterion, avoidant people use the word *our* at an extremely high rate. Because they tend not to have

a strong interpersonal orientation (Feeney, 1999), the prediction was that avoidant individuals would not discuss their relationships in terms of *our*. An explanation for this unusual finding may lie in an unusual aspect of avoidant attachment, namely, the disconnect between their own experience of themselves and the experiences others have of them. Avoidant men, for example, tend to rate their relationships quite negatively while at the same time reporting high levels of stability (Kirkpatrick & Davis, 1994). Additionally, they tend not to oblige their partners when conflict arise, suggesting that perhaps they use *our* in a habitual, unexamined way. Perhaps they speak in terms of *our* but do not behave in a way suggestive of the relationships encompassed by that pronoun.

Correlates of Adjustment

Finally, all the adjustment variables (social, psychological, and coping) at session 1 and session 5 were correlated with the predicted variables derived from multinomial regressions predicting both AAI classification as well as AAS classification. Recall that multinomial logistic regressions compare one level of a variable to the remaining levels; in all cases, the secure attachment style is the level against which the others are compared. Table 17 shows the simple correlations among these variables. As an example of interpreting these correlations, the Session 1 variable "homesick" reveals significant correlations with both AAS predicted variables. Relative to securely attached individuals, the linguistic index predicting avoidant attachment is significantly and negatively correlated with homesickness at the beginning of the semester. However, for anxiously attached students, there is a positive correlation between the linguistic index and homesickness.

Examination of Table 17 reveals very few correlates with adjustment. Only four variables in session 1 are significantly correlated with either linguistic index (AAI-derived or AAS-derived), and only three are correlated in session 5.

Appendix D

WRITING PROMPTS

Experimental Condition

[*Monday*] Over the next three days we want you to write down your deepest thoughts and feelings about important relationships in your life and their effects on you. Across all days the most important thing is that you allow yourself to really get into your writing -- in other words, follow your thoughts and feelings wherever they lead, and don't hold back in expressing everything you think and feel. This will work best if you write continuously and without stopping. Just write whatever comes to mind, and don't worry about your grammar, punctuation, or spelling.

We are very interested in your personal story. This week you will write 3 times about your childhood, focusing on three general issues: what is was like growing up in your family, how you dealt with different emotional situations such as feeling worried, frightened, or upset, and how you currently get along with your mother (or your father, if he is particularly relevant). Today, you may choose to focus on one of these issues, or you may find yourself moving from one to the other. You may want to acknowledge your feelings (be they disappointment, hurt, anger, sadness, relief, etc.) and make an attempt to reconcile these feelings with how you understand yourself, your family, and your life.

Please write about your deepest thoughts and feelings about how these experiences affected you when you were a child, and how they continue to affect you today. Really let yourself go and get into this writing. As will be true every day you write, the most important thing is that you get into your writing, exploring your deepest thoughts and feelings wherever they lead you as you tell the story. Please write for at least 20 minutes.

[*Wednesday*] This is your second day of writing. On Monday you wrote about your deepest thoughts and feelings concerning childhood issues with your parents. Today, we want you to continue this process. Write down your deepest thoughts and feelings about important relationships in your life and their effects on you. Across all days the most important thing is that you allow yourself to really get into your writing -- in other words, follow your thoughts and feelings wherever they lead, and don't hold back in expressing everything you think and feel. This

will work best if you write continuously and without stopping. Just write whatever comes to mind, and don't worry about your grammar, punctuation, or spelling.

We are very interested in your personal story. As you continue writing your story today, remember that you are focusing on three general issues: how you dealt with different emotional situations such as feeling worried, frightened, or upset when you were a child, what is was like growing up in your family, and how you currently get along with your mother (or your father, if he is particularly relevant). Today, you may choose to focus on one of these issues, or you may find yourself moving from one to the other. You may pick up where you left off on Monday, or you may focus on a new issue. You may want to acknowledge your feelings (be they disappointment, hurt, anger, sadness, relief, etc.) and make an attempt to reconcile these feelings with how you understand yourself, your family, and your life.

Please write about your deepest thoughts and feelings about how these experiences affected you when you were a child, and how they continue to affect you today. Really let yourself go and get into this writing. As will be true every day you write, the most important thing is that you get into your writing, exploring your deepest thoughts and feelings wherever they lead you as you tell the story. Please write for at least 20 minutes.

[*Friday*] This is your final day of writing this week. On Monday and on Wednesday, you wrote about your deepest thoughts and feelings concerning childhood issues with your parents. Today, we want you to complete this process. Write down your deepest thoughts and feelings about important relationships in your life and their effects on you. Across all days the most important thing is that you allow yourself to really get into your writing -- in other words, follow your thoughts and feelings wherever they lead, and don't hold back in expressing everything you think and feel. This will work best if you write continuously and without stopping. Just write whatever comes to mind, and don't worry about your grammar, punctuation, or spelling.

We are very interested in your personal story. As you tie things up today, remember that you are focusing on three general issues: how you currently get along with your mother (or your father, if he is particularly relevant), how you dealt with different emotional situations such as feeling worried, frightened, or upset when you were a child, and what is was like growing up in your family. Again today, you may choose to focus on one of these issues, or you may find yourself moving from one to the other. You may pick up where you left off on Monday, or you may focus on a new issue. You may want to acknowledge your

feelings (be they disappointment, hurt, anger, sadness, relief, etc.) and make an attempt to reconcile these feelings with how you understand yourself, your family, and your life. Try to tie things up today.

Please write about your deepest thoughts and feelings about how these experiences affected you when you were a child, and how they continue to affect you today. Really let yourself go and get into this writing. As always, the most important thing is that you get into your writing, exploring your deepest thoughts and feelings wherever they lead you as you tell the story. Please write for at least 20 minutes.

Control Writing Condition

[*Monday*] For the next 20 minutes, please write about how you manage your time. Try to be as objective and detailed as you possibly can. Do not express your opinions or write about how you are feeling or thinking, but instead focus on the mechanics of how your time is spent. Today, please focus on how you spent your day yesterday, Sunday. Please write without stopping, and don't worry about spelling, grammar, or punctuation. Remember to write continuously for the entire 20 minutes.

[*Wednesday*] For the next 20 minutes, please write about how you manage your time. Try to be as objective and detailed as you possibly can. Do not express your opinions or write about how you are feeling or thinking, but instead focus on the mechanics of how your time is spent. Today, please focus on how you have spent and/or will spend today, Wednesday. Please write without stopping, and don't worry about spelling, grammar, or punctuation. Remember to write continuously for the entire 20 minutes.

[*Friday*] For the next 20 minutes, please write about how you manage your time. Try to be as objective and detailed as you possibly can. Do not express your opinions or write about how you are feeling or thinking, but instead focus on the mechanics of how your time is spent. Today, please focus on how you will spend your day tomorrow, Saturday. Please write without stopping, and don't worry about spelling, grammar, or punctuation. Remember to write continuously for the entire 20 minutes.

Appendix E

INDUCTIVE EXPLORATIONS OF ATTACHMENT STYLE CHANGE

Partly because of the absence of experimental effects, and partly because of the exploratory nature of this project, an additional set of analyses was conducted to determine – without *a priori* expectations – which variables were important determinants of successful attachment style change. To examine the important predictors, two types of change were selected: change to secure, and change from secure. These two variables were entered separately into binomial logistic regressions with forward entry based on the Wald statistic to determine predictors of change in both directions.

CHANGE FROM INSECURE TO SECURE ATTACHMENT. A binary logistic regression was conducted to predict this type of attachment style change, with forward entry and the Wald statistic. The predictors included all the session one variables (21 demographic and psychological variables, 6 variables addressing number of friends and feelings about roommates, 6 variables about general life difficulties [e.g., sexual trauma, violence], and all linguistic variables. Seven models were produced from this analysis, with the best model correctly classifying 84.1% of cases, $R^2 = .63$. All model statistics and betas for this and the following analysis are shown in Table 18. When the set of predictor variables did not include the linguistic variables, no variables were significant predictors. Inclusion of the linguistic variables to the set of predictor variables indicated that the best predictors of change to secure attachment style include *other major upheaval* (other than death, parental upheaval, sexual trauma, violence, or illness/injury), along with the linguistic variables *discrepancies, job,* and the pronoun *they.* The most frequently cited trauma in the "other major upheaval" category is "moving" (82% of respondents who endorsed this item).

CHANGE FROM SECURE TO INSECURE ATTACHMENT. A separate binary logistic regression was conducted to predict change from secure to insecure attachment, using the same set of predictors used in the previous analysis. Again, when the set of predictor variables did not include the linguistic variables, no variables were significant predictors. This regression produced 22 models, with the best model correctly classifying 98.5% of cases, $R^2 = .96$. As illustrated in Table 18, important predictors of this type of change *include number of close male friends, number of close female friends at UT, degree of liking roommate,* and the linguistic variables *unique words, anger, sad, discrepancies, inhibition, hear, communication, humans, tv, money, sleep,* and the pronoun *his.*

The linguistic predictors of attachment style at both sessions also offer interesting insights into the process of change these participants were undergoing. Differences in the linguistic predictors at time 1 and 5 by attachment style were quite evocative. For all three attachment styles, the predictors at time 1 were completely different from the categories that predict attachment style at time 5. Secure participants shift from a focus on current concerns (time and eating) to a set of predictors that includes two pronouns: *we* and *his*. In fact, *his* is the strongest predictor for these participants in their final essays, indicating a shift to a more social perspective.

The shift in predictors for the insecurely attached participants is most interesting. Anxiously attached participants move from writing about other people (but not *home*) at the beginning of the study, to essays characterized by *anger* words and the pronoun *yours*. The inclusion of *anger* words in the final essay provides support for the idea that the process of changing was not complete. It is much more common for avoidantly attached individuals to express anger than for anxiously attached individuals to do so (Kobak & Sceery, 1988), suggesting that these anxious participants were discussing their experiences in a way that is unusual for them. Finally, the change for avoidant participants also provided insight into an important shift. In their first essays, an important predictor was *negations* and the pronoun *his*. In their final essays, however, *sad* words appear as very important predictor. Because avoidantly attached individuals are typically unwilling to communicate this kind of distress (Kobak & Sceery, 1988), the addition of this linguistic category offers an important insight into the hypothesis that participants were in the midst of changing.

The predictors of change to secure attachment were very few. One non-linguistic factor emerged as an important predictor: the *absence* of a non-specified trauma (other than parental upheaval, illness or injury, death in the family, sexual trauma, or victim of violence). As previously noted, this most often-mentioned trauma in this category is *moving*. In an examination of attachment style change, Davila, Burge and Hammen (1997) reported that change (to insecure attachment) is associated with particular vulnerability factors, including depression and history of family psychopathology. In the absence of these factors, it appears that students are able to transform from insecurely to securely attached people. The linguistic predictors are not as easily explained, although they are important predictors. The decrease in use of discrepancies is a very important predictor, perhaps reflecting a change to an easier fit in the world and within relationships. The pronoun *they* discriminates between secure and insecure participants in Study 1, and is a positive predictor of change to secure attachment style in Study 2.

Figure 1

Present tense verb changes from first to last essays, by condition

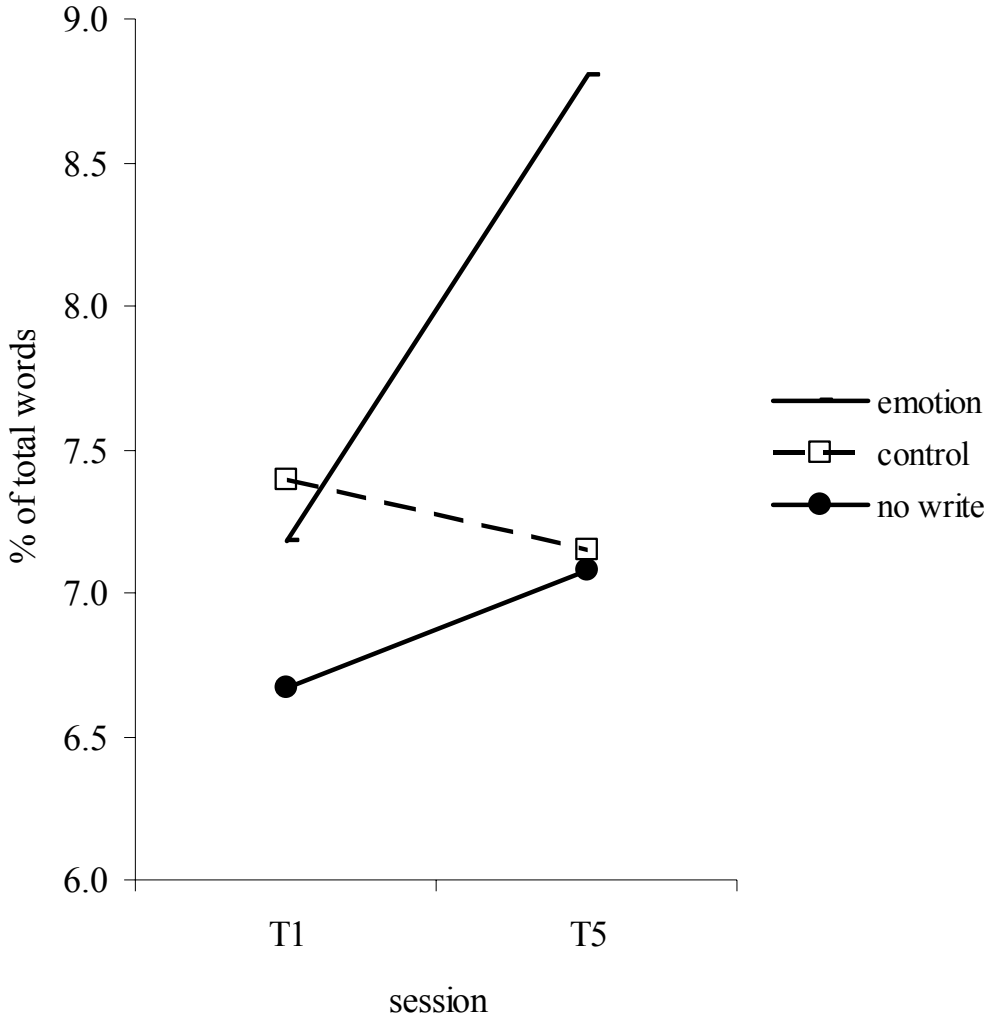

Figure 2

Past tense verb changes from first to last essays, by condition

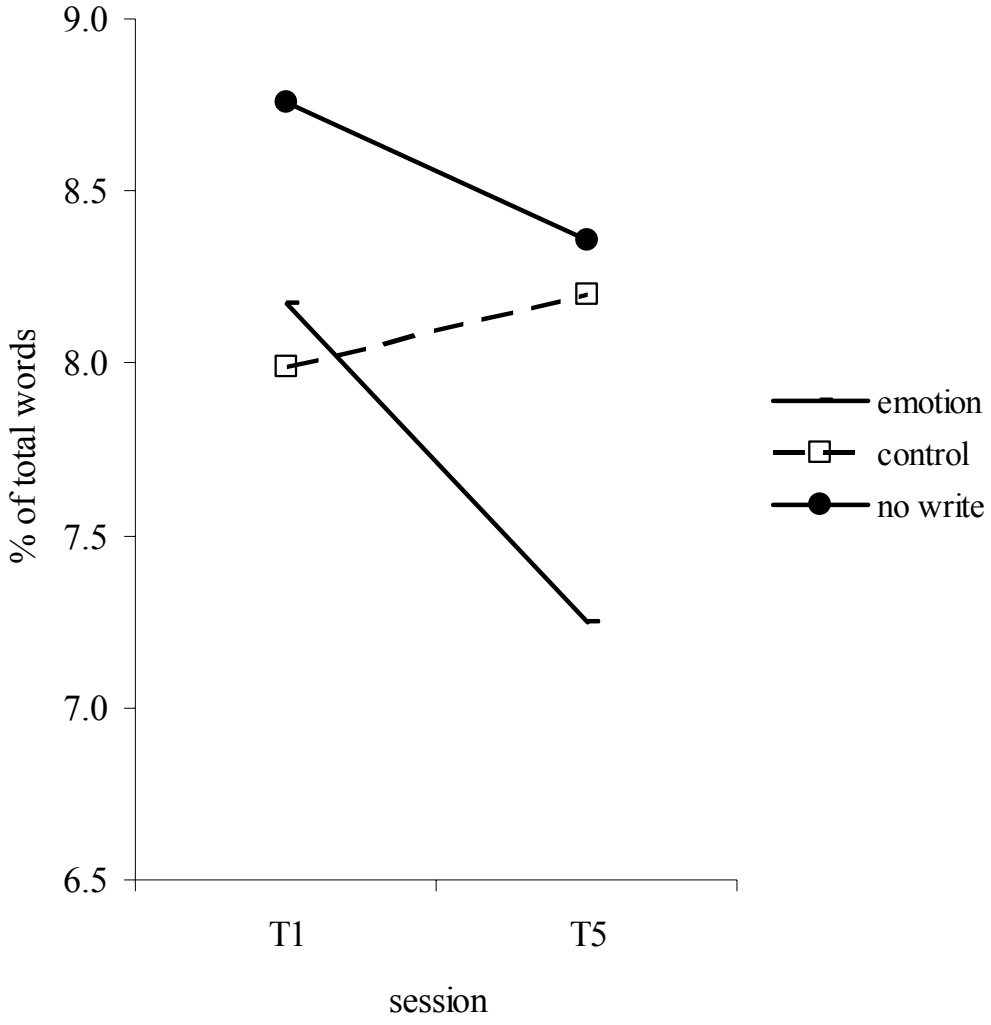

Figure 3

Future tense verb changes from first to last essays, by condition

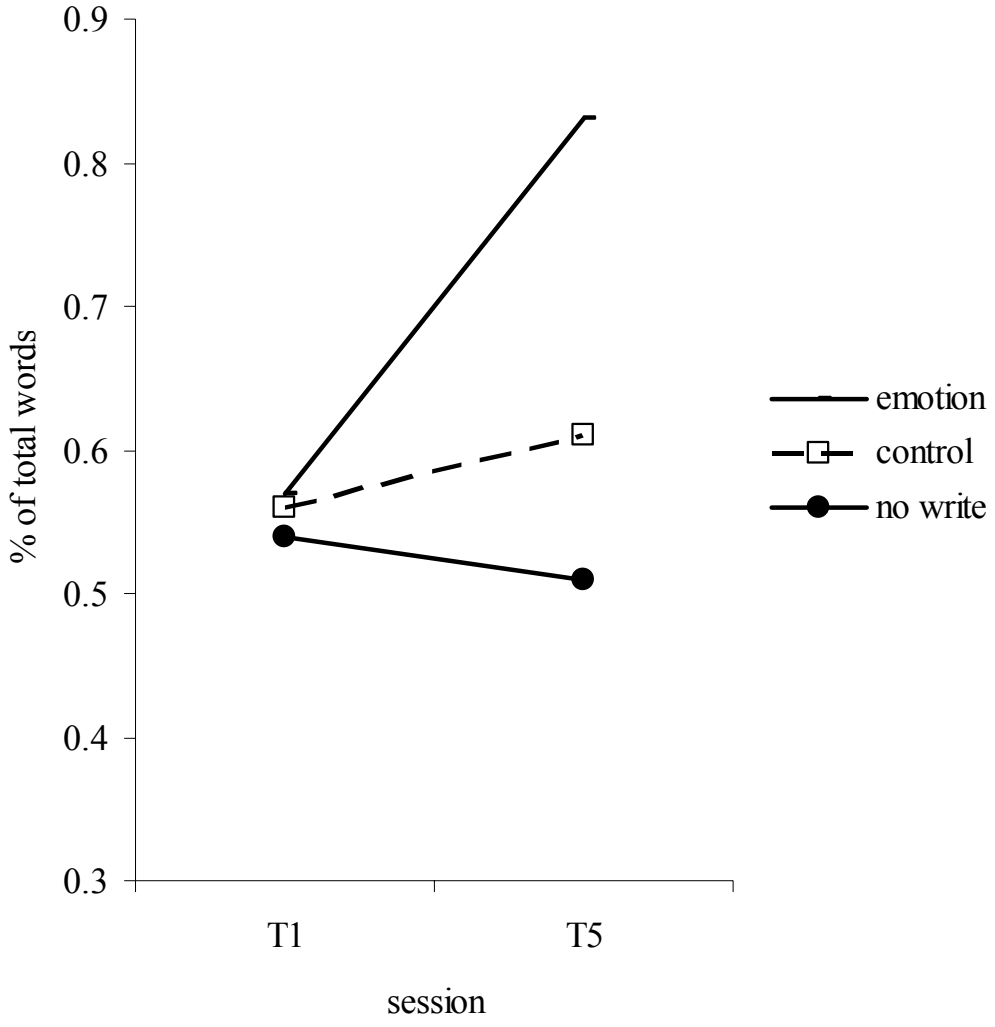

Figure 4

Changes in use of *anxious* words from first to last essays, by condition

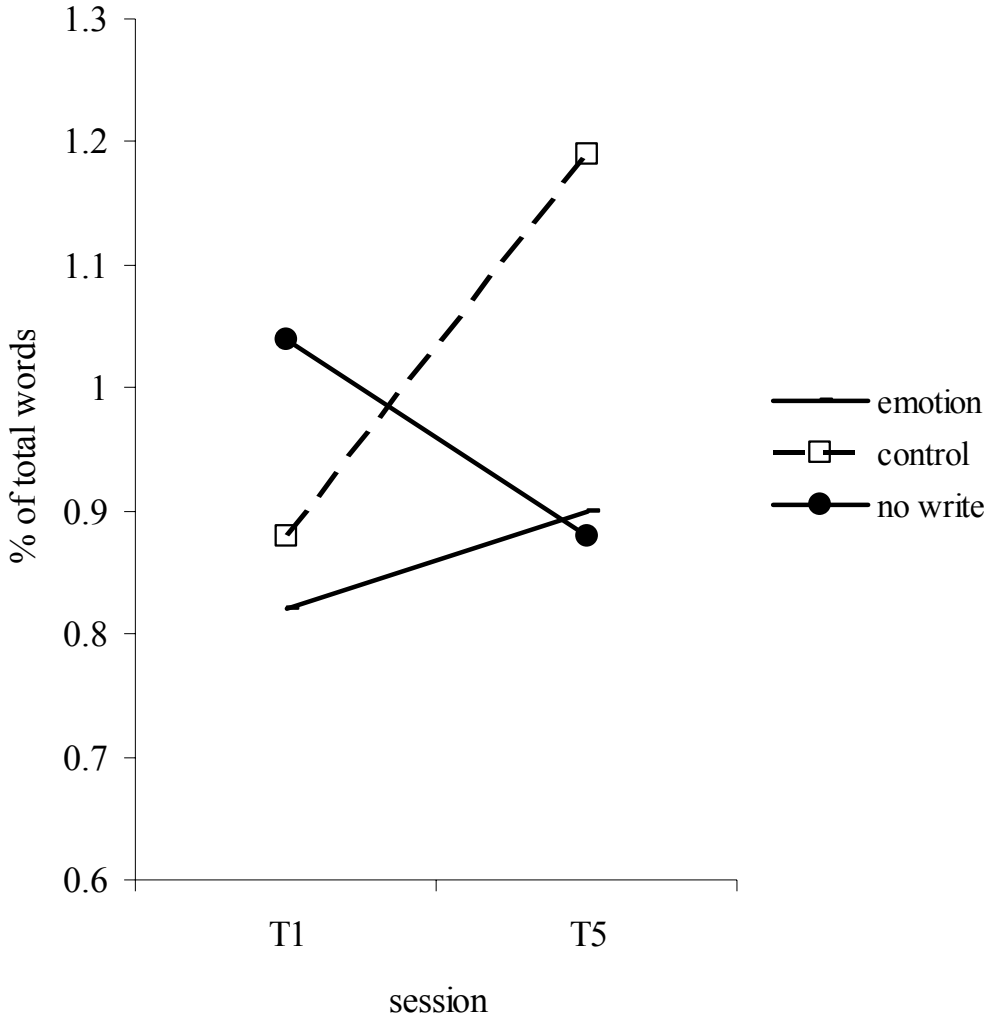

Figure 5

Mean content similarity coefficients, by change group

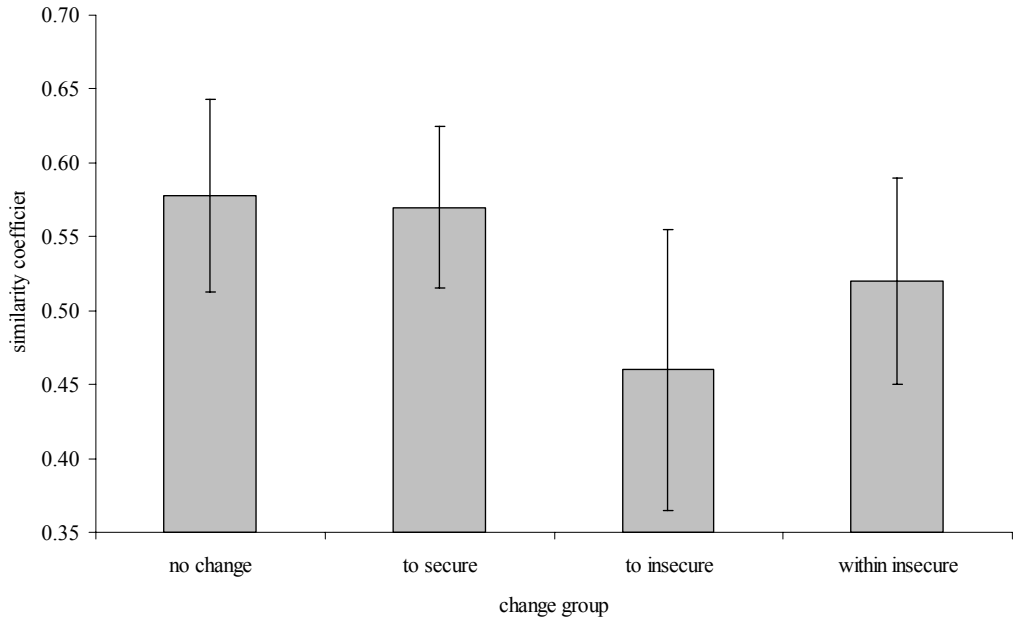

Figure 6

Mean pronoun similarity coefficients, by change group

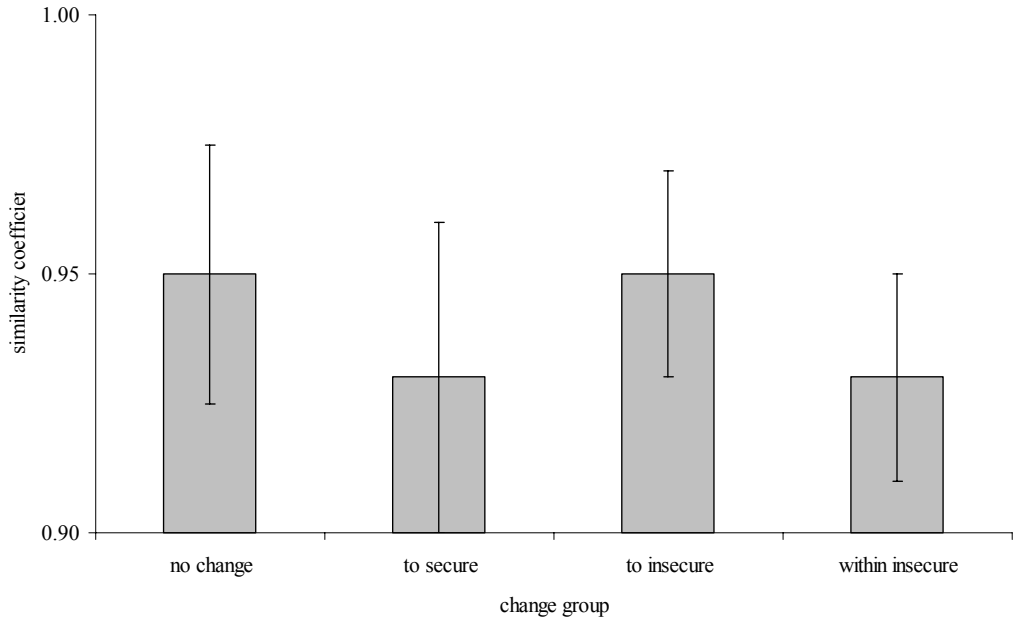

Figure 7

Mean changes on roommate index score, session 5 – session 1

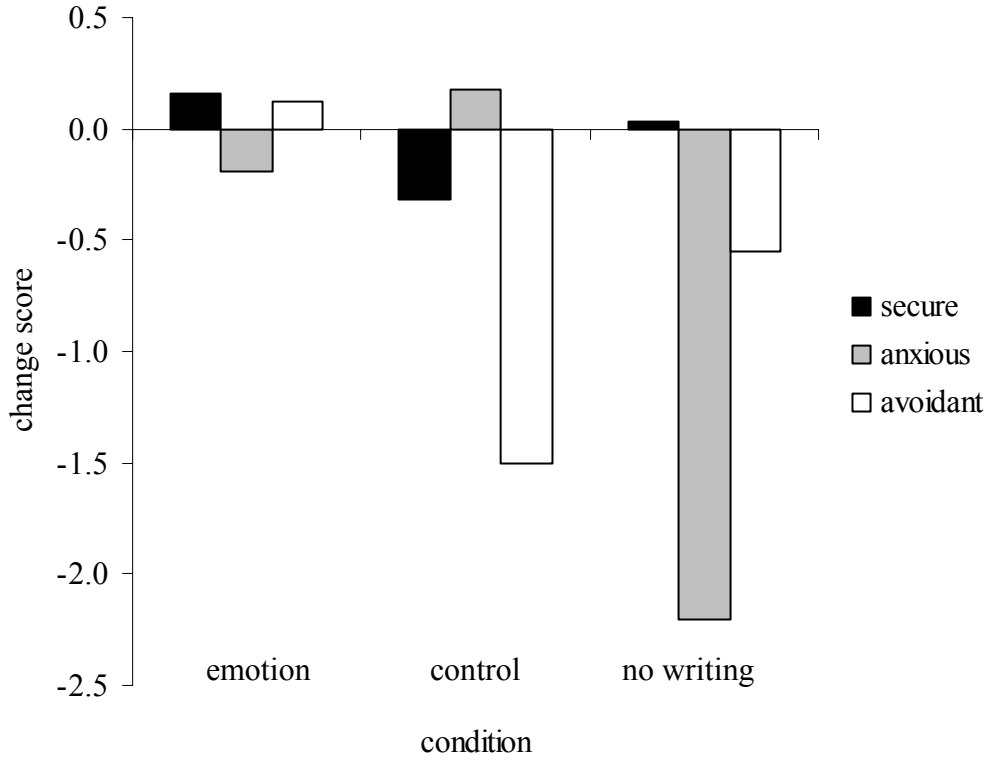

Figure 8

Mean changes in use of dysfunctional coping as a function of condition and attachment style at session 1

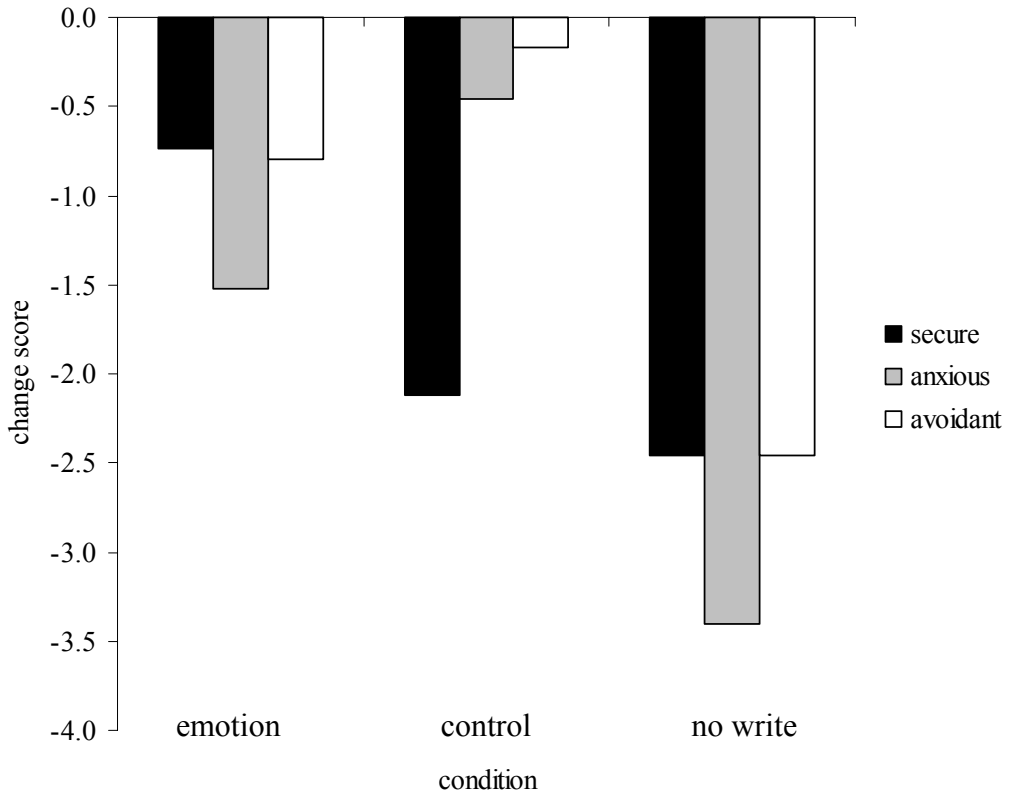

Table 1

Percentage of originally grouped cases correctly classified

AAI question	Analysis 1[1]	Analysis 2[2]	Analysis 3[3]	Analysis 4[4]	Analysis 5[5]
1	70.9	69.2	72.6	72.6**	65.0
2	54.7	58.1	60.7	60.7	55.6
3	58.1	56.4	58.1	58.1	57.3
4	56.4	60.7	61.5	61.5	55.6
5	48.7	54.7	59.0	59.0	50.4
6	60.7	65.8	67.5	67.5**	56.4
7	63.5	64.3	65.2	65.2	61.7
8	57.5	53.1	58.4	58.4	59.3
9	68.4	68.4	66.7	66.7	63.2
10	58.6	58.2	60.3	60.3	51.7
11	60.5	58.8	63.2	63.2	59.6
12	59.3	56.6	56.6	56.6	58.4
13	65.0	64.1	70.1	70.1*	63.2
14	54.3	56.9	58.6	58.6	56.0
15	60.8	55.9	67.6	67.6*	53.9
16	62.6	59.1	64.3	64.3	56.5
17	62.1	63.8	64.7	64.3	59.5
18	57.8	60.3	63.8	63.8	56.0

Independent variables for each analysis are as follows:

[1]Analysis 1: 6letter, I, we, other, articles, prepositions, optimism, anxious, anger, sad, social, other references, past, present, inclusive, exclusive

[2]Analysis 2: I, we, other, article, prepositions, optimism, anxious, anger, sad, social, other references, past, present, inclusive, exclusive, self, you, positive emotions, negative emotions

[3]Analysis 3: 6letter, I, we, other, article, prepositions, optimism, anxious, anger, sad, negations, social, other references, past, present, inclusive, exclusive, self, you, positive emotions, negative emotions

[4]Analysis 4: 6letter, I, we, other, article, prepositions, optimism, anxious, anger, sad, negations, social, other references, past, present, inclusive, exclusive, you, positive emotions, negative emotions

[5]Analysis 5: pronouns, I, we, article, prepositions, positive emotions, negative emotions, anxious, anger, sad, social, past, present, inclusive, exclusive

*Wilks' Lambdas, $p < .05$ **Wilks' Lambdas, $p < .01$

Table 2

Classification analysis for attachment style as assessed by the AAI

		Predicted group membership		
Actual group membership	n	Secure	Preoccupied	Dismissing
Secure				
n	79	63	5	11
%		**79.7**	6.4	13.9
Preoccupied				
n	19	2	17	0
%		15.8	**84.2**	0.0
Dismissing				
n	19	4	0	15
%		21.1	0.0	**78.9**

NOTE: Bolded values represent the percent of cases correctly classified by the linguistic function in the pilot study.

Table 3

Frequencies of attachment style categorizations by sex and type of assessment

	attachment style			
sex	secure[1, 2]	preocc[1]/anxious[2]	dismiss[1]/avoid[2]	Total
AAI[1]				
male	34	9	39	82
female	55	15	12	82
Total	*89*	*24*	*51*	*164*
AAS[2]				
male	56	4	22	82
female	60	11	11	82
Total	*116*	*15*	*33*	*164*

[1]Adult Attachment Interview (AAI; George, Kaplan & Main, 1985/1996)

[2]Adult Attachment Scale (AAS; Collins & Read, 1990)

Table 4

Concordance of attachment style classifications between AAI and AAS

	AAI classification			
	secure	preoccupied	dismissing	
AAS classification	*N*	*N*	*N*	Totals
secure	***63***	17	36	116
anxious	8	***2***	5	15
avoidant	18	5	***10***	33
Totals	89	24	51	171

NOTE: The bolded values represent numbers of cases assigned the same classification by both the AAI and the AAS

Table 5

Means, by gender, for LIWC categories in Study 1

		Males		Females	
Dimension	Examples	*M*	*SD*	*M*	*SD*
LINGUISTIC					
Large words	≥ 6 letters	9.19	1.50	9.04	1.11
Negations	no, never, not	1.59	0.52	1.63	0.34
Articles*	a, an, the	3.79	0.60	3.07	0.54
Prepositions*	on, around under	8.18	1.28	7.42	1.19
EMOTION					
Positive*	happy, good	1.89	0.47	1.99	0.41
Negative	afraid, grief, hate	0.94	0.27	1.63	0.34
Optimism	best, hope, easy	0.22	0.10	0.22	0.08
Anxious	afraid, worry	0.25	0.10	0.24	0.07
Anger	fight, hate	0.24	0.09	0.24	0.10
Sad	alone, cry, empty	0.24	0.11	0.26	0.09
SOCIAL					
Social	talk, us, friend	10.68	2.01	10.40	1.50
Others	anyone, let's	3.07	0.84	3.06	0.73
I	I, I'll, I'm, I've	5.65	1.07	5.53	1.05
We	we, we'll, we're	0.80	0.33	0.89	0.37
You*	you, you'll	2.95	0.92	2.69	0.64
Other Refs	they, they'll	6.97	1.50	6.78	1.15
ADDITIONAL					
Past tense	ran, saw, heard	5.35	1.08	5.32	0.87
Present tense*	run, see, hear	7.93	1.61	7.50	1.25
Inclusive	along, and, in	4.68	0.92	4.69	0.86
Exclusive*	but, except, or	4.12	0.71	3.87	0.62

Note: Mean refers to the mean percentage of words in the sample.

*sex difference, $p < .05$.

N = 82 males and 82 females

Table 6

LIWC category means, by AAI categorization and gender, for Study 1

	Secure				Preoccupied				Dismissing				
	Male[1]		Female[2]		Male[3]		Female[4]		Male[5]		Female[6]		
LIWC	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Effect
LgeWords	9.43	0.94	8.69	1.12	9.39	1.54	8.68	1.02	8.86	1.99	9.22	1.11	-
Negation	1.63	0.44	1.75	0.36	1.82	0.56	1.67	0.23	1.48	0.57	1.59	0.35	-
Articles	3.77	0.44	3.19	0.59	3.90	0.63	2.88	0.55	3.80	0.82	3.10	0.53	S
Preps	8.29	0.89	7.35	1.17	9.02	1.01	6.79	1.12	7.83	1.59	7.60	1.17	CxS
PosEmo	2.03	0.40	1.89	0.29	1.63	0.24	2.15	0.57	1.81	0.56	1.96	0.37	CxS
NegEmo	1.02	0.25	0.99	0.23	1.01	0.23	0.81	0.19	0.83	0.27	0.97	0.22	CxS
Optim	0.23	0.09	0.23	0.09	0.23	0.08	0.18	0.05	0.21	0.11	0.22	0.08	-
Anxious	0.27	0.08	0.22	0.06	0.22	0.05	0.23	0.06	0.23	0.11	0.24	0.08	-
Anger	0.25	0.09	0.30	0.11	0.28	0.08	0.18	0.07	0.21	0.09	0.24	0.10	CxS
Sad	0.28	0.11	0.24	0.08	0.24	0.12	0.24	0.09	0.20	0.10	0.27	0.10	CxS
Social	10.7	1.40	11.3	1.40	11.5	1.96	9.88	1.59	10.3	2.53	10.3	1.43	-
Others	3.23	0.75	3.75	0.72	3.19	0.79	2.81	0.70	2.86	0.92	2.97	0.67	C
I	5.90	1.09	5.90	1.21	5.97	0.96	5.26	0.96	5.29	0.99	5.52	1.03	-
We	0.83	0.35	0.79	0.48	0.73	0.33	0.77	0.39	0.80	0.33	0.95	0.33	-
You	2.80	0.69	2.77	0.54	3.28	0.65	2.89	0.82	3.04	1.17	2.62	0.59	-
OthrRefs	6.98	1.14	7.45	1.11	7.39	1.35	6.60	1.27	6.85	1.88	6.68	1.09	-
Past	5.64	0.90	5.84	0.83	5.63	0.60	4.92	0.93	4.93	1.25	5.32	0.82	C
Present	7.94	1.03	8.09	1.59	8.79	1.71	7.28	1.33	7.70	2.04	7.44	1.13	-
Incl	4.91	0.76	5.02	0.79	5.22	0.89	4.01	0.59	4.26	0.96	4.80	0.85	CxS
Excl	4.22	0.51	3.96	0.70	4.25	0.40	3.62	0.64	3.98	0.93	3.91	0.58	S

[1]$N = 34$
[2]$N = 55$
[3]$N = 9$
[4]$N = 15$
[5]$N = 39$
[6]$N = 12$

EFFECT: C = classification (attachment style);
S = sex;
CxS = classification by sex interaction

Table 7

LIWC category means, by AAS categorization and gender, for Study 1

	Secure				Preoccupied				Dismissing				
	Male[1]		Female[2]		Male[3]		Female[4]		Male[5]		Female[6]		
LIWC	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Effect
LgeWords	9.27	1.23	9.03	1.16	7.36	4.19	9.09	1.12	9.31	1.22	9.08	0.94	-
Negation	1.63	0.47	1.65	0.33	1.10	0.84	1.41	0.25	1.56	0.55	1.75	0.37	C
Articles	3.77	0.47	3.03	0.54	4.51	1.84	3.25	0.43	3.72	0.62	3.13	0.64	C, S
Preps	8.28	1.07	7.39	1.22	6.42	3.60	7.61	1.37	8.24	0.92	7.37	0.90	CxS
PosEmo	1.90	0.42	2.01	0.38	1.89	1.20	1.85	0.31	1.89	0.45	2.02	0.61	-
NegEmo	0.96	0.27	0.93	0.20	0.78	0.48	0.96	0.31	0.93	0.23	0.99	0.27	-
Optim	0.22	0.09	0.21	0.07	0.22	0.16	0.22	0.07	0.22	0.11	0.20	0.10	-
Anxious	0.25	0.09	0.23	0.07	0.19	0.10	0.27	0.10	0.26	0.10	0.24	0.04	-
Anger	0.24	0.09	0.24	0.09	0.18	0.13	0.22	0.10	0.24	0.09	0.27	0.16	-
Sad	0.26	0.11	0.25	0.09	0.25	0.19	0.30	0.10	0.21	0.08	0.27	0.08	-
Social	10.7	1.71	10.3	1.47	8.23	4.67	10.1	1.30	10.9	1.87	10.6	1.93	
Others	3.09	0.83	3.07	0.74	2.46	1.41	2.93	0.62	3.14	0.73	3.08	0.85	-
I	5.69	1.10	5.62	0.98	6.00	0.61	4.96	0.68	5.49	1.07	5.61	1.51	-
We	0.80	0.34	0.91	0.33	0.44	0.21	0.76	0.38	0.89	0.31	0.96	0.53	C, S
You	2.96	0.83	2.65	0.65	2.20	1.38	2.81	0.66	3.08	1.03	2.79	0.55	-
OthrRefs	6.99	1.32	6.77	1.09	5.17	2.97	6.62	1.11	7.26	1.47	6.99	1.53	C
Past	5.43	1.07	5.36	0.84	4.18	2.41	5.01	0.89	5.36	0.67	5.47	1.02	C
Present	8.06	1.41	7.55	1.09	5.91	3.60	6.73	0.96	7.98	1.44	8.00	1.94	C
Incl	4.80	0.86	4.70	0.88	3.67	2.01	4.63	0.86	4.54	0.72	4.66	0.82	-
Excl	4.13	0.64	3.90	0.57	3.18	1.80	3.69	0.76	4.29	0.48	3.86	0.71	C

[1]$N = 56$
[2]$N = 60$
[3]$N = 4$
[4]$N = 11$
[5]$N = 22$
[6]$N = 11$

EFFECT: C = classification (attachment style);
S = sex;
CxS = classification by sex interaction

Table 8

Results of multinomial logistic regression predicting attachment style (AAI)

		Preoccupied vs Secure		Dismissing vs Secure	
variable	χ^2 if deleted	*B*	Wald χ^2	*B*	Wald χ^2
Large words	4.38	-0.31	1.06	-0.55	3.86*
Negate	5.45*	1.52	2.91*	-0.73	1.11
Article	6.36*	-0.44	0.70	0.61	3.95*
Prepositions	3.89	0.45	1.11	-0.45	1.65
Pos Emo	0.51	0.37	0.36	0.30	0.28
Neg Emo	0.04	0.10	0.01	-0.45	0.04
Optimism	0.25	-1.22	0.11	0.72	0.07
Anxious	0.82	0.38	0.01	3.23	0.78
Anger	0.51	-2.43	0.20	1.65	0.17
Sad	0.87	-2.62	0.35	1.70	0.28
I	5.92*	0.12	0.09	-0.65	4.95*
We	0.24	-0.92	0.10	-0.47	0.18
You	1.67	1.44	0.25	1.56	1.89
Others	4.79	0.98	0.11	3.25	5.98**
Other Refs	3.59	-1.25	0.18	-2.72	4.24*
Social	0.45	0.44	0.43	0.03	0.01
Past tense	2.90	-0.04	0.01	0.68	2.57
Presnt tense	6.87*	-0.32	0.55	0.77	4.98*
Inclusive	0.33	-0.02	0.01	0.20	0.30
Exclusive	3.33	-0.70	1.23	0.61	1.33

* $p \leq .05$ ** $p \leq .01$

Table 9

Results of multinomial logistic regression predicting attachment style (AAS)

		Preoccupied vs Secure		Dismissing vs Secure	
variable	χ^2 if deleted	*B*	Wald χ^2	*B*	Wald χ^2
Large words	0.17	0.18	0.16	-0.02	0.01
Negate	0.69	0.36	0.08	-0.55	0.55
Article	0.20	0.24	0.18	0.08	0.03
Prepositions	0.29	0.32	0.21	0.12	0.10
Pos Emo	0.17	-0.14	0.02	-0.22	0.16
Neg Emo	0.15	-0.88	0.04	-0.94	0.13
Optimism	4.01	8.91	2.48	-2.77	0.77
Anxious	1.17	2.58	0.18	4.15	1.05
Anger	2.53	-9.73	1.48	3.60	0.64
Sad	3.89	12.74†	3.14	-2.07	0.33
I	0.97	0.28	0.22	-0.24	0.65
We	6.06*	7.14	1.39	-3.86	1.76
You	8.26*	9.95	2.53	-4.11	1.93
Others	7.32*	9.57	2.42	-4.13	1.93
Other Refs	5.37	-7.66	1.53	4.01	1.76
Social	0.33	-0.44	0.21	0.16	0.09
Past tense	1.52	-1.04	1.51	<0.01	<0.01
Presnt tense	6.98*	-1.83	5.48*	0.04	0.02
Inclusive	7.34*	0.80	1.37	-0.97*	4.80
Exclusive	2.69	-0.87	0.76	0.69	1.60

* $p \leq .05$ † $p < .08$

Table 10

Classification results predicting attachment style to AAI and AAS

		Predicted group membership		
Actual group membership	n	Secure	Preoccupied	Dismissing
AAI				
Secure				
n	89	60	10	19
%		**67.42**	11.24	21.34
Preoccupied				
n	24	15	4	5
%		62.50	**16.67**	20.83
Dismissing				
n	51	27	6	18
%		52.94	11.76	**35.30**
AAS				
Secure				
n	116	91	9	16
%		**78.45**	7.76	13.79
Anxious				
n	15	13	0	2
%		86.67	**0**	13.33
Avoidant				
n	33	25	4	4
%		75.76	12.12	**12.12**

Table 11

LIWC category means, by AAS categorization and gender, for Study 2, session 1

	Secure				Preoccupied				Dismissing				
	Male[1]		Female[2]		Male[3]		Female[4]		Male[5]		Female[6]		
LIWC	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Effect
LgeWords	13.8	2.86	12.8	1.89	13.7	2.86	12.0	3.31	13.9	2.57	12.5	2.06	S
Negation	2.11	0.91	2.02	0.71	2.15	1.10	1.78	0.72	2.51	1.15	2.39	0.77	C
Articles	4.80	0.98	4.56	1.13	5.16	1.44	4.59	1.46	4.34	1.58	4.53	1.13	-
Preps	12.6	1.84	12.2	1.56	12.4	2.38	11.3	2.79	12.6	1.63	12.4	1.60	-
PosEmo	2.17	1.15	2.05	0.93	2.24	1.15	2.15	1.09	2.29	1.33	2.04	0.61	-
NegEmo	2.34	1.13	2.49	1.09	2.73	1.49	2.45	1.20	2.97	1.84	2.76	0.99	-
Optim	0.47	0.44	0.36	0.36	0.37	0.55	0.43	0.42	0.43	0.45	0.36	0.28	-
Anxious	1.00	0.72	0.86	0.59	0.81	0.90	0.73	0.74	0.96	0.76	0.92	0.60	-
Anger	0.55	0.49	0.59	0.45	0.85	0.95	0.70	0.50	0.81	1.03	0.77	0.44	-
Sad	0.48	0.42	0.64	0.53	0.59	0.59	0.63	0.49	0.64	0.54	0.65	0.48	-
Social	8.89	2.20	10.5	2.35	10.2	2.85	9.97	3.55	9.55	2.14	10.7	3.18	S
Others	1.94	1.18	2.62	1.46	2.98	1.48	2.80	1.41	1.78	1.19	2.89	1.55	C, S
I	12.5	2.25	12.6	2.30	12.2	2.32	11.5	3.12	12.7	2.69	13.0	2.20	-
We	0.71	0.57	1.13	1.03	0.70	0.55	1.23	0.86	0.54	0.59	1.02	1.31	S
You	0.18	0.49	0.13	0.19	0.15	0.24	0.17	0.34	0.22	0.39	0.09	0.16	-
OthrRefs	2.99	1.41	4.14	1.78	4.10	1.64	4.47	1.86	2.84	1.18	4.33	2.18	S
Past	8.31	2.17	8.59	1.67	8.16	1.77	8.01	2.74	8.00	2.51	8.17	2.08	-
Present	6.86	2.22	7.13	1.99	6.43	1.78	7.32	2.52	7.31	2.98	7.54	2.63	-
Incl	6.37	1.50	6.38	1.24	6.60	1.45	6.34	1.68	6.44	1.60	6.05	1.26	-
Excl	3.95	1.34	4.09	0.99	3.97	1.46	3.35	1.08	4.12	1.20	3.95	1.07	-

[1]$N = 49$
[2]$N = 55$
[3]$N = 18$
[4]$N = 30$
[5]$N = 22$
[6]$N = 27$

EFFECT: C = classification (attachment style);
S = sex;
CxS = classification by sex interaction

Table 12

LIWC category means, by AAS categorization and gender, for Study 2, session 5

	Secure				Preoccupied				Dismissing				
	Male[1]		Female[2]		Male[3]		Female[4]		Male[5]		Female[6]		
LIWC	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Effect
LgeWords	13.9	3.22	12.6	2.70	13.9	2.10	13.0	2.10	14.3	3.66	12.1	3.64	S
Negation	2.42	0.89	2.23	1.15	2.39	0.97	2.40	0.63	2.11	0.94	2.53	1.11	-
Articles	4.78	1.23	4.42	1.37	5.05	1.77	4.14	1.32	4.65	1.29	4.27	1.50	S
Preps	12.1	2.37	12.0	2.26	12.1	2.61	10.9	1.55	13.4	1.43	11.4	2.83	CxS
PosEmo	2.46	1.21	2.03	1.11	1.91	1.19	2.31	1.24	2.62	1.60	2.46	1.27	-
NegEmo	2.49	1.36	2.61	1.19	2.30	1.40	3.18	1.23	2.59	1.55	2.66	1.59	-
Optim	0.41	0.40	0.31	0.29	0.25	0.30	0.40	0.43	0.48	0.51	0.53	0.49	-
Anxious	1.08	0.93	0.93	0.76	0.54	0.75	1.03	0.84	1.06	1.03	0.96	1.01	-
Anger	0.50	0.62	0.68	0.56	0.64	0.49	0.88	0.73	0.56	0.52	0.60	0.41	-
Sad	0.53	0.47	0.55	0.50	0.43	0.53	0.78	0.42	0.68	0.72	0.50	0.52	-
Social	9.29	2.20	10.2	2.99	8.37	2.46	10.2	2.47	9.06	2.08	9.52	4.29	S
Others	2.00	1.24	2.57	1.43	1.71	1.43	2.58	1.44	1.94	1.16	2.53	1.54	S
I	12.7	2.82	12.2	2.97	12.0	2.67	12.3	1.89	12.3	2.42	11.7	3.34	-
We	0.71	0.83	1.19	1.30	0.56	0.64	0.96	0.73	0.76	0.81	1.26	1.81	S
You	0.23	0.62	0.19	0.44	0.46	0.74	0.32	0.52	0.26	0.39	0.28	0.52	-
OthrRefs	3.21	1.58	4.24	2.09	3.13	1.19	4.05	1.71	3.26	1.46	4.46	2.53	S
Past	4.97	2.55	8.19	2.29	6.95	2.45	8.43	3.27	6.68	2.43	7.16	2.75	C
Present	7.50	2.50	7.90	2.99	8.94	3.69	7.62	3.11	7.82	2.98	8.82	3.72	-
Incl	6.18	1.58	6.14	1.87	6.63	1.92	6.03	1.89	6.29	1.67	5.96	1.92	-
Excl	4.27	1.39	4.04	1.39	4.16	1.73	4.23	1.35	4.11	1.64	4.48	1.41	-

[1]$N = 52$
[2]$N = 69$
[3]$N = 16$
[4]$N = 16$
[5]$N = 21$
[6]$N = 27$

EFFECT: C = classification (attachment style);
S = sex;
CxS = classification by sex interaction

Table 13

Study 2 LIWC means by condition for Session 1 and Session 5

	Session 1						Session 5					
	Exper[1]		Control[2]		NoWrite[3]		Exper[1]		Control[2]		NoWrite[3]	
LIWC	*X*	*SD*	*X*	*SD*	*X*	*SD*	*X*	*SD*	*X*	*SD*	*X*	*SD*
6ltr	13.0	2.9	13.1	2.2	13.5	2.4	13.2	3.1	12.7	2.9	13.9	3.1
Negate	2.1	0.9	2.2	0.8	2.0	0.8	2.4	1.1	2.3	0.9	2.2	1.0
Article	4.6	1.2	4.5	1.0	5.0	1.2	4.3	1.4	4.5	1.3	5.2	1.3
Preps	12.3	2.1	12.1	1.7	12.6	1.8	12.1	2.4	11.8	2.6	12.1	2.1
PosEmo	9.1	1.1	2.2	1.0	2.1	1.0	2.3	1.3	2.3	1.3	2.2	1.1
NegEmo	2.6	1.3	2.5	0.9	2.6	1.5	2.6	1.4	2.8	1.2	2.4	1.4
Optim	0.4	0.4	0.5	0.5	0.3	0.3	0.4	0.4	0.5	0.5	0.3	0.3
Anx	0.8	0.7	0.9	0.6	1.0	0.8	0.9	0.8	1.2	1.0	0.9	0.8
Anger	0.7	0.7	0.7	0.5	0.6	0.6	0.7	0.6	0.5	0.5	0.6	0.6
Sad	0.6	0.5	0.5	0.4	0.7	0.6	0.5	0.5	0.7	0.5	0.5	0.5
Social	10.0	2.7	10.7	2.7	9.1	2.7	9.5	3.1	9.8	2.5	9.7	3.0
Other	2.5	1.3	2.9	1.6	1.9	1.2	2.3	1.5	2.4	1.4	2.1	1.1
I	12.4	2.5	12.5	2.6	12.7	2.3	12.1	3.0	12.5	2.9	12.5	2.3
We	0.9	0.8	1.1	0.8	0.9	1.0	0.9	1.3	0.9	0.8	1.1	1.2
You	0.2	0.4	0.1	0.2	0.1	0.3	0.3	0.6	0.2	0.3	0.2	0.5
OthRef	3.8	1.6	4.3	1.9	3.2	1.9	3.8	2.0	3.8	1.8	3.7	2.0
Past	8.2	2.2	8.0	1.9	8.8	2.2	7.3	2.8	8.2	2.4	8.4	2.0
Present	7.2	2.5	7.4	2.2	6.7	2.1	8.8	3.2	7.1	2.9	7.1	2.2
Inclu	6.3	1.5	6.3	1.4	6.6	1.3	6.1	1.9	6.3	1.9	6.3	1.5
Exclu	3.9	1.3	4.1	0.9	3.7	1.2	4.4	1.6	3.9	1.3	4.1	1.3

[1] $N = 102$ [2] $N = 49$ [3] $N = 50$

Table 14

Mean differences by condition on the Last Day of Writing questionnaire

	emotional writing		control writing	
question	*M*	*SD*	*M*	*SD*
how personal were your essays?**	5.63	1.07	4.43	1.40
how much did you talk to others about this before writing?**	3.20	1.67	2.35	1.60
did you reveal your emotions?**	5.20	1.06	3.18	1.58
how much did you hold back from telling others what you wrote?*	4.00	1.82	3.14	1.89
how much did you want to talk about this before the experiment?**	3.37	1.80	2.47	1.58
how hard was it to write?	3.17	1.57	2.80	1.74
how sad or depressed were you?	2.84	1.71	2.59	1.70
how happy were you?	4.51	1.25	4.41	1.26
how much did you think about this during the day?*	3.13	1.38	2.65	1.32
how much did you think about it when you weren't writing?*	3.48	1.56	2.90	1.40
how much had you thought about it before the study?	3.26	1.60	2.67	1.42
how important is your anonymity?**	4.74	2.08	3.57	2.09
how much do you want others to read your essays?	3.74	1.57	3.69	1.71
do you want your essays discarded?*	3.19	1.65	3.94	1.65
was this valuable or meaningful?**	4.27	1.43	3.53	1.49

NOTE: This was a 7-item scale, where *1 = not at all* and *7 = a great deal*

* means are different, $p < .05$ ** means are different, $p < .01$

Table 15

Classification results predicting attachment style in sessions 1 and 5

		Predicted group membership		
Actual group membership (AAS)	n	Secure	Anxious	Avoidant
Session 1				
Secure				
n	104	88	15	1
%		**84.62**	14.42	0.90
Anxious				
n	48	36	12	0
%		75.00	**25.00**	0.00
Avoidant				
n	49	41	6	2
%		83.67	12.24	**4.08**
Session 5				
Secure				
n	121	118	0	3
%		**97.52**	0.00	2.48
Anxious				
n	32	27	0	5
%		84.38	**0.00**	15.62
Avoidant				
n	48	44	0	4
%		91.67	0.00	**8.33**

Table 16

Model statistics for logistic regressions predicting attachment style to AAI and AAS: Inductive analysis

predictor	Model χ^2	*B*	Wald χ^2
SECURE: AAI	59.53**		
constant		1.19	11.00**
sex		2.87	26.89**
money		-8.01	7.20**
death		7.93	9.19**
me		4.81	13.69**
yours		-5.75	11.08**
SECURE: AAS	6.97**		
constant		2.60	13.77**
yours		-3.23	6.70**
ANXIOUS: AAI	--		
constant		-1.76	63.72**
ANXIOUS: AAS	35.45**		
constant		0.38	0.05
optimism		12.23	6.16**
hear		4.58	4.26*
present		-1.45	11.95**
money		-4.20	7.00**
yours		6.61	6.64**

continued

Table 16 (*continued*)

predictor	Model χ^2	*B*	Wald χ^2
AVOIDANT: AAI	43.42**		
constant		2.27	4.73*
sex		-1.54	13.80**
positive feelings		-1.78	5.11*
death		-5.17	7.09**
swear		-21.34	4.31*
me		-2.27	4.86*
our		10.94	4.84*
yours		2.88	4.25*
AVOIDANT: AAS	25.10**		
constant		-2.12	2.78
number		-0.71	6.08**
sad		-6.19	6.31**
inhibition		9.01	5.86*
tv		16.75	3.72*
yours		4.70	7.47**

* $p \leq .05$ ** $p \leq .01$

Table 17

Simple correlations among linguistic predicted variables (AAI and AAS) and adjustment variables

	Session 1				Session 5			
Adjustmt	AAI		AAS		AAI		AAS	
Variable	S *vs* Av	S *vs* An	S *vs* Av	S *vs* An	S *vs* Av	S *vs* An	S *vs* Av	S *vs* An
sex	-.06	-.18*	-.08	.04	-.01	-.15*	-.01	-.03
SESSION1								
socindx	.01	<.01	-.07	.02				
roommate	.04	.06	.06	-.02				
IESintr	-.01	-.01	-.15*	.12				
IESavo	-.05	-.03	-.12	.06				
PSS	.09	-.04	-.04	.01				
CES-D	-.02	-.06	-.04	-.05				
homesick	-.04	.01	-.25**	.18*				
PA	-.05	.06	.09	-.06				
NA	<.01	-.13	-.12	.04				
probCOPE	-.06	.05	-.11	.08				
emoCOPE	-.04	<.01	-.05	.04				
dysCOPE	-.01	-.07	-.08	-.02				
SESSION5								
socindx	-.08	-.02	-.10	.01	.02	-.01	-.04	.07
roommate	.08	.05	.07	-.04	-.08	-.06	-.02	-.02
IESintr	.13	-.07	.01	.04	-.04	-.13	-.01	-.04
IESavo	.07	-.09	-.11	.08	-.01	-.08	-.07	.01
PSS	.11	<.01	.08	-.04	.04	-.14*	.05	-.04
CES-D	.04	-.12	.06	-.07	-.02	-.09	.01	-.08
homesick	.01	-.08	-.15*	.12	.11	.02	-.01	.09
PA	-.04	.03	-.01	.02	.02	-.07	.04	.02
NA	.08	-.06	-.05	.07	.02	-.10	.04	-.04
probCOPE	-.02	.08	-.01	.05	-.09	.01	-.04	.10
emoCOPE	.07	<.01	.06	.03	.04	.04	.03	.02
dysCOPE	.11	.04	-.10	.15*	.05	-.08	-.02	.03

* *p < .05* ** *p < .01*

N = 201

NOTE: S vs Av = avoidant as compared to secure
S vs An = anxious as compared to secure

Table 18

Results of logistic regressions predicting attachment style change: Inductive analysis

predictor	Model χ^2	*B*	Wald χ^2
TO SECURE	118.58**		
other trauma		-0.98	6.49**
discrepancies		-0.86	26.72**
job		0.92	4.23*
they		1.29	10.01**
TO INSECURE	278.65**		
# close male friends		1.62	5.75**
# close female friends at UT		-2.66	4.36*
liking roommate		-4.05	7.79**
unique		0.63	6.32**
anger		-13.60	6.04**
sad		10.07	4.25**
discrepancies		-4.53	4.93*
inhibition		15.51	6.27**
hearing		35.46	5.97**
communication		-35.36	6.30**
humans		-5.00	4.77*
tv		4.87	4.80*
money		-25.37	5.28*
sleep		11.87	6.37**
his		15.81	5.60*

* $p \leq .05$ ** $p \leq .01$

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