PRELIMINARY VALIDATION OF THE

COMPREHENSIVE ADOLESCENT-PARENT ATTACHMENT INVENTORY

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THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

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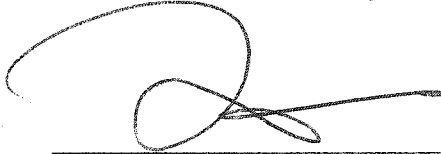
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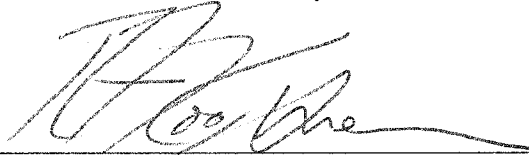
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ABSTRACT

The Comprehensive Adolescent-Parent Attachment Inventory (CAPAI; Moretti, McKay, & Holland, 2000) is a recent adaptation of Brennan, Clark, and Shaver's (1996) empirically based measure of adult romantic attachment. In its present version, the CAPAI is 56-item self-report questionnaire designed primarily to (a) target the adolescent-caregiver relationship and (b) assess attachment Anxiety and Avoidance, two dimensions of interest to contemporary researchers. The current study evaluates the structural, convergent, and discriminant validity of the CAPAI's two 18-item Anxiety and Avoidance subscales through analyses of inter-item consistency, factor structure, and the relationship of the scales to concurrent measures of intellectual and psychosocial functioning. Data were collected from a sample of 164 adolescents (91 male, 73 female) between the ages of 11 and 17 referred to a local assessment and treatment centre for youth with severe behavioral problems. The results of the current study suggest that the CAPAI's Anxiety and Avoidance scales possess good internal reliability and a factor structure consistent with Brennan et al.'s (1996; 1998) original measure. Subsequent correlational and multivariate analyses of convergent and discriminant validity, although limited somewhat by the range of concurrent measures, lend additional support to the validity of the CAPAI.

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To my friends,

especially Maya who has shared the journey with me,

your encouragement and support have made all the difference.

To my family,

your love and faith have seen me through.

I dedicate this thesis to my father, Jim Steiger,

a man of wisdom, integrity, and generous spirit.

Dad, you have taught me much more than you know.

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PRELIMINARY VALIDATION OF THE

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Introduction

The transition from childhood to adulthood is characterized by numerous changes in both intrapsychic and interpersonal functioning. Psychologists have long understood that the successful negotiation of later life challenges is influenced substantially by the security of the early attachment bond between child and caregiver (Bowlby, 1969, 1973; Thompson, 1999). However, recent research has shown that even as adolescents move towards greater autonomy and establish new attachment relationships with peers and romantic partners, attachment to primary caregivers continue to be of central importance in predicting adjustment (Allen & Land, 1999; Kerns & Stevens, 1996). Despite a growing consensus that attachment processes remain important beyond childhood, researchers have only begun to investigate the fundamental role of adolescent-parent attachment in both normative and maladaptive development (Doyle & Moretti, 2000; Rosenstein & Horowitz, 1996).

A necessary step to further investigation of adolescent-parent attachment is the development of reliable and valid assessment tools. Unfortunately, few measures are currently available that specifically assess attachment in adolescence. Recent reviews point to a scarcity of contemporary self-report measures with established reliability and validity (Crowell, Fraley, & Shaver, 1999; Lopez & Gover, 1993). More importantly, only a handful of the more established measures are designed to evaluate attachment constructs that are of interest to contemporary researchers (Lopez & Gover, 1993;

Vivona, 2000). As Vivona (2000) points out, "lack of a self-report measure of late

adolescent parental attachment style has threatened to hinder expansion of the empirical

basis of attachment theory" (p. 316). For empirical research in the area of adolescent

attachment to progress, it is desirable, if not essential, to establish viable methods of

measurement.

Moretti, McKay, and Holland (2000), realizing the need for a contemporary

measure of adolescent attachment, and more specifically a self-report measure that would

target the adolescent-caregiver relationship, adapted a preliminary version of the

Experiences in Close Relationships questionnaire (ECR, Brennan, Clark, & Shaver, 1996,

1998), a multi-item measure of adult romantic attachment. Brennan et al.'s measure

offered two important advantages over other contemporary self-report assessment tools:

(1) it was designed to be comprehensive—a unification of extant measures in the field;

(2) it provided a new method of assessing attachment Anxiety and Avoidance, two

dimensions that have emerged as central constructs underlying some of the most well-

established attachment models (Brennan et al., 1996, 1998).

Moretti et al. (2000) realized that, with minor revision, much of the item content

of Brennan et al.'s (1996) measure could be adapted to reflect central aspects of

adolescent-caregiver relationships. The overlap between these attachment domains is,

perhaps, not so surprising, given that attachment theory has long viewed the most

fundamental aspects of attachment to be important across development (Bowlby, 1973).

In its most current version, the Comprehensive Adolescent-Parent Attachment Inventory

(CAPAI) is a 56-item self-report questionnaire designed for the assessment of key aspects

of adolescent-parent attachment. Items are scored on a bipolar Likert-type scale, and

provide dimensional Anxiety and Avoidance ratings, which in turn allow for attachment prototype categorizations. The evolution and content of the CAPAI is described in more detail below.

Although the CAPAI is based on a measure of adult attachment, its provision of continuous ratings on two important attachment dimensions, while at the same time allowing categorization of recognized attachment types, is an innovation in adolescent attachment measurement. This, in addition to its self-report format and relatively short length, will, it is hoped, provide a more specific, informative, and convenient assessment tool than those currently available for assessing adolescent-parent attachment.

The purpose of the current study is to continue the work of Moretti and her colleagues by conducting a preliminary examination of the reliability, factor structure, and convergent and discriminant validity of the CAPAI. A brief orientation to attachment theory, with a focus on philosophy and research most fundamental to the design and analyses of the present study, is followed below by a discussion of hypotheses and research strategy.

An Overview of Attachment Theory

Nearly a half-century ago, Bowlby (1958, 1969) introduced attachment theory, integrating ideas from psychoanalysis, systems theory, and ethology to produce a comprehensive model of human development and personality. Bowlby theorized that within each individual there exists an innate drive to seek out a secure attachment and to maintain proximity with that object of attachment. He reasoned that disruption of the attachment bond between infant and primary care-giver results in negative internal "working models" of the self and of significant others—so-called "insecure"

attachment—which leads to vulnerability to a range of psychological problems, including depression, anxiety disorders, and conduct problems (Bowlby, 1969, 1973, 1980; Carlson & Sroufe, 1995; Holmes, 1993).

Since Bowlby's time, attachment theory has undergone considerable change. Social, developmental, and clinical psychologists alike have embraced attachment theory and have diversified its application (Cassidy, 1999; Goldberg, 2000). Once focused primarily on the infant-parent relationship, attachment theory is now used to describe a variety of close relationships across the life span (Crowell et al., 1999; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000). There is, in fact, no longer a single theory of attachment.

The attachment literature can be divided into a number of orientations or "traditions" (Bartholomew & Shaver, 1998; Simpson & Rholes, 1998). Typically, research in attachment has focused either on the relationship between child and parent during infancy and early childhood, or on "peer" attachments between adults, especially those in romantic relationships. Followers of Bowlby and Ainsworth have traditionally concentrated on the parent-child relationship and on the clinical implications of disrupted attachment (Bartholomew & Shaver, 1998). Under this approach, Sroufe, Waters, Main, and others have conducted extensive research on the interaction between mother (or other "primary caregiver") and infant or young child, and on individual differences in attachment orientation related to these early parental-attachment experiences (Ainsworth, Blehar, Waters, & Wall, 1978; Main, Kaplan, & Cassidy, 1985; Simpson & Rholes, 1998; Waters et al., 2000; Weinfield, Sroufe, Egeland, & Carlson, 1999). In contrast, researchers in the social and personality psychology traditions have concentrated on

attachment relationships outside the parent-child sphere, extending attachment theory to adult relationships and so-called "peer" attachment (Bartholomew & Shaver, 1998). For example, Hazan and Shaver (1987), two originators of this approach, applied Ainsworth's (1978) model of infant attachment to the study of adult romantic relationships.

These orientations, which we can label *child-parent centered* and *adult centered*, have generally ignored the importance of ongoing and emerging attachment relationships in *adolescent* development. The relative lack of inquiry in adolescent attachment may, in part, be due to the way attachment research developed historically, moving more or less directly from the study of early attachment relationships to the investigation of adult peer and romantic relationships. Similarly, the significance of adolescent attachment security has at times been overshadowed by research focusing on other aspects of the adolescent's interpersonal functioning (Allen & Land, 1999).

The Importance of Adolescent-Parent Attachment

Adolescence is characterized as a period of autonomy and rebellion—a movement away from dependence on parents (Allen & Hauser, 1996; Allen & Land, 1999). Perhaps for this reason, the importance of adolescent attachment to parents had been minimized in early theory and research. However, contemporary attachment and developmental theories, in contrast to traditional psychodynamic views of separation-individuation, suggest that the ability of the adolescent to explore new experiences and assert independence within the family may *rely* on, rather than act in conflict with, a secure parental attachment relationship (Allen & Land, 1999; Doyle & Moretti, 2000, Lopez & Gover, 1993). Thus, while it is clear that the nature of the child-parent attachment relationship changes as the child moves through adolescence—for example, parents are

relied on less for immediate support and direct physical proximity (Lieberman, Doyle, & Markiewicz, 1999), their attachment functions replaced in specific ways by peer and romantic relationships (Fraley & Davis, 1997, Trinke & Bartholomew, 1997)—the importance of adolescent-parent attachment security is not diminished. Adolescents still rely on their parents, especially their mothers, as attachment figures even into late adolescence (Fraley & Davis, 1997). They still benefit from the perception that their parental caregiver is available to provide *safe haven* and *secure base* when needed (Kerns, Klepac, & Cole, 1996; Lieberman, Doyle, & Markiewicz, 1999). These central aspects of parental attachment style, or orientation, appear significant across development and predict important characteristics of later interpersonal and intra-personal functioning.

Attachment and Psychopathology

One of Bowlby's original goals was to present a theory of development that would also account for maladjustment in socio-emotional functioning (Bowlby, 1944; Carlson & Sroufe, 1995). Over the last half-century, researchers have consistently verified a strong link between the child's early experiences with caregivers and later mental health (Allen, Hauser, & Borman-Spurell, 1996; Dozier, Stovall, & Albus, 1999; Greenberg, 1999). However, the relationship between attachment and developmental outcome is not a simple one. There are studies that show early attachment insecurity, alone, is not a consistent predictor of maladaptation (Carlson & Sroufe, 1995; Fagot & Kavanagh, 1990; Lyons-Ruth, Repacholi, McLeod, & Silva, 1991), nor is it a perfect predictor of later attachment orientation, especially across relationship type (e.g. romantic and close peer relationships) (Carlson & Sroufe, 1995; Main et al., 1985). Rather, attachment appears to interact with multiple other factors in determining a particular

individual's development. Furthermore, an individual's expectations or "working models" of attachment relationships, broadly defined as "attachment orientation," are subject to revision based on new experience (Bowlby, 1969; Carlson & Sroufe, 1995; Doyle & Moretti, 2000).

Despite this complexity, there is considerable evidence linking attachment insecurity to maladjustment in multiple domains of functioning (Carlson & Sroufe, 1995; Doyle & Moretti, 2000, Kobak, 1999). For example, in a recent review of the adolescent attachment literature, Doyle and Moretti (2000) summarize current research relating security versus insecurity of the adolescent-parent attachment relationship to a variety of important developmental and clinical outcomes. Across a number of studies, insecure attachment to parent predicts both externalizing problems (such as aggression, conduct disorder, drug use, and prostitution) and internalizing problems (including anxiety and depression) in adolescent populations (see Carlson & Sroufe, 1995; Doyle & Moretti, 2000; and Greenberg, 1999 for recent reviews). Furthermore, in both normative and clinical samples, attachment security in adolescence appears to act as a protective factor, predicting better social and emotional adjustment on a variety of outcome measures (e.g. Cooper, Shaver, & Collins, 1998; Kerns & Stevens, 1996; Kobak, Cole, Ferenz-Gilles, & Fleming, 1993; Kobak & Sceery, 1988; Rosenstein & Horowitz, 1996).

In answer to critics who argue that attachment is at times a poor predictor of future psychopathology, theorists counter that expected associations have sometimes been obscured by inexact measurement. More specific categorizations of attachment subtypes (Greenberg, 1999), or a movement towards dimensional ratings of attachment qualities (Fraley & Waller, 1998), may provide greater predictive power.

Attachment "insecurity" encompasses a whole range of attachment characteristics, which in turn appear to be associated with distinct pathology. For example, Main's classification model differentiates between "preoccupied" and "dismissing" attachment—roughly equivalent to (and assumed to be developmentally predicted by) Ainsworth's infant/childhood "ambivalent" and "avoidant" attachment styles (see Hesse, 1999, for a recent review). Individual differences in preoccupation or dismissiveness are thought to relate to specific difficulties in early attachment experience and subsequent expectations about the self and other in the attachment relationship (Main et al., 1985). Although preoccupied and dismissing individuals are both "insecure" in their attachment orientation, differential outcomes are expected. Preoccupied individuals tend to report lower self-esteem (Bartholomew & Horowitz, 1991), are more likely to seek support when distressed, (Ognibene & Collins, 1998), and are more likely to suffer from internalizing problems such as depression and anxiety (Allen, Moore, Kuperminc, & Bell, 1998; Carnelley, Pietromonaco, & Jaffe, 1994; Kobak & Sceery, 1988, Rosenstein & Horowitz, 1996). In contrast, dismissing attachment is typically associated with higher reported self-esteem (Brennan & Morris, 1997), greater peer-rated hostility (Bartholomew & Horowitz, 1991), antisocial personality traits (Rosenstein & Horowitz, 1996), and fewer symptoms of internalizing psychopathology (Cooper et al., 1998).

In a recent analysis, Moretti, Lessard, Scarfe, and Holland (1999), after categorizing a sample of adolescents diagnosed with conduct disorder on Bartholomew's (1990) four attachment prototypes, found higher levels of internalizing symptoms in *fearful* and preoccupied than in secure and dismissing subgroups. Lessard and Moretti (1998), using the same four-category system, also found greater suicidal ideation among

fearful and preoccupied adolescents. Findings such as these suggest that it is the

"anxious" component of attachment that best predicts internalizing problems. A system

that fails to differentiate, for example, the fearful from the dismissing adolescent, instead

labeling both as "avoidant," might not detect important relations between attachment and

psychopathology. In short, the predictive relationship between attachment and

psychosocial functioning appears to be strengthened by greater specificity in the

delineation of attachment types and dimensions. How this specificity of attachment

dimensions and types relates directly to issues of measurement is discussed in more detail

below.

Measurement Orientations

Just as there is a range of theoretical approaches in the field of attachment,

measurement orientations, too, are diverse. Method of measurement, relationship of

focus, and constructs of interest vary across measures and have important implications

for the appropriateness of a given assessment tool.

Self-Report versus Interview Methods. Researchers of child-parent attachment

have relied almost exclusively on observational and interview methods to assess

attachment (Bartholomew & Shaver, 1998; Solomon & George, 1999). In contrast,

beginning with Hazan and Shaver's (1987) innovative self-report measure of adult

attachment, researchers interested in adult attachment relationships have typically favored

questionnaire measures. There are relative advantages and disadvantages to each

approach. Unlike interviews, self-report questionnaires offer ease of administration. They

do not generally entail the complex procedures and advanced training required by typical

observational and interview-based measures of attachment (Bartholomew & Shaver,

1998; Hesse, 1999; Solomon & George, 1999), and are thus essential to researchers

wishing to collect data quickly from a large sample, or when attachment interviews are

otherwise not feasible.

However, there are two broad areas of criticism against the use of self-report

questionnaires. The first, and most relevant, is the argument that certain aspects of

attachment orientation are to a large extent unconscious and, thus, cannot be accessed

through self-reports (Crowell & Treboux, 1995; Hesse, 1999). Although this is a valid

criticism to some extent, the issue may be oversimplified. Recent research suggests that

well-designed self-report measures actually do appear to assess many of the same internal

and interpersonal dynamics in close relationships that are captured by interview

techniques (e. g. Brennan et al., 1996; Mikulincer & Nachshon, 1991). For example,

Shaver and Mikulincer (2002) point to apparent connections between self-reported

attachment style and measures of unconscious cognitive-affective functioning. Additional

research has found associations between self-reported attachment orientation and

alternative methods of attachment measurement, including interview and diary-based

measures (Crowell et al., 1999; Feeney, Noller, & Callan, 1994) and ratings by peers and

romantic partners (Bartholomew & Horowitz, 1991, Feeney, 1999)

A second, more general criticism is that self-report and interview ratings do not

tend to agree. However, recent analyses by authors such as Bartholomew and Shaver

(1998) provide convincing evidence that lack of "convergence" in previous studies may

be in part a product of poor research design—for example, faulty assumptions about

equivalence of attachment subtypes across measures, and insufficient power to detect

similarities. In sum, despite certain limitations, self-report questionnaires are increasingly

recognized to be a valid and informative method of measuring attachment-related expectations and behaviors (Crowell et al., 1999; Feeney, 2002), especially when used in conjunction with other methods of measurement (Bartholomew & Moretti, 2002).

Peer versus Parental Attachment. Besides important distinctions in the method of assessment, attachment measures vary in the relationships they target. Measures of adult attachment have generally focused on romantic relationships or on generalized close peer relationships (Crowell et al., 1999), or have asked adults to recall their early relationships to parents (Main et al., 1985). In contrast, child attachment measures are almost exclusively focused on child-parent attachment behaviors—specifically on the child-mother interaction. Researchers measuring adolescent attachment have often relied on adaptations of adult measures (Crowell et al., 1999) or on the few available measures designed specifically for adolescents. Typically, these have not allowed a full examination of the distinctions between peer attachment, emerging romantic attachment, and attachment to caregivers. In order to assess specific aspects of these qualitatively different relationship types, appropriately specific measures must be employed (Bartholomew & Shaver, 1998).

The preceding discussion illustrates the range of measurement techniques and tools for assessing attachment security. The relative quality of these measures, the theory underlying their development, the relationships they target, and even the constructs they measure can be overwhelming in their diversity (Bartholomew & Shaver, 1998; Crowell et al., 1999; Solomon & George, 1999). For this reason, the possibility that there may be common dimensions underlying different attachment models is of great interest to

contemporary researchers (Brennan et al., 1998). Such "higher order" dimensions would

allow greater integration in the fields of attachment theory and measurement.

Anxiety and Avoidance: Important Attachment Dimensions

Despite the substantial diversity across different theoretical and empirical

approaches, it can be argued that all attachment models rest, at least implicitly, on

Bowlby's concept of internalized representations, or "working models," of self and other.

Bowlby describes these working models in the following way:

> In the working model of the world that anyone builds a key feature is his
> notion of who his attachment figures are, where they may be found, and
> how they may be expected to respond. Similarly, in the working model of
> the self that anyone builds a key feature is his notion of how acceptable or
> unacceptable he himself is in the eyes of his attachment figures. (Bowlby,
> 1973, p. 203)

Brennan et al. (1998), consistent with previous authors (Scharfe, 1997), have used the

terms Anxiety and Avoidance to describe these dimensions of self and other with respect

to attachment: "A negative model of self is closely associated with *anxiety* about

abandonment and . . . a negative model of others is closely associated with *avoidant*

behavior [italics added]" with respect to caregivers (Brennan et al., 1998, p. 50).

As Brennan et al. point out, many of the most established typologies of

attachment can be recast as dimensional models with these similar underlying constructs:

"Ainsworth's three major attachment 'types' could be conceptualized as regions in a two-

dimensional space, the dimensions being Avoidance (discomfort with closeness and

dependency) and Anxiety (crying, failing to explore confidently in the absence of mother,

and angry protest directed at mother during reunions after what was probably experienced

as abandonment)" (Brennan et al., 1998, p. 48). Main and Solomon's (1990) now familiar

model of infant-attachment prototypes can also be conceptualized as a product of the two

underlying continuous dimensions of Anxiety and Avoidance (see Figure 1).

Bartholomew and Horowitz's (1991) four-prototype model of adult attachment

proposed similar dimensions. Indeed, the model was particularly innovative because it

highlighted the fact that attachment can be viewed *both* as a set of types *and* as a function

of underlying continuous dimensions related to these constructs. Figure 2 provides a

useful visual overview of the conceptual model. Although Bartholomew and Horowitz

define four prototypes, or attachment styles (*secure, preoccupied, dismissing,* and

fearful), they also theorize that underlying these four factors are two orthogonal

dimensions ("model of self" and "model of other") that are also defined as "dependence"

(or "anxiety") and "avoidance." The degree to which the self is viewed as unworthy of

love and support (i.e. dependence/anxiety) or significant others are viewed as rejecting or

unavailable (i.e. avoidance) determines one's expectations and behaviors in close

relationships (see Bartholomew & Horowitz, 1991 and Griffin & Bartholomew, 1994b

for more thorough reviews of these constructs).

Although the definition of attachment security not as a typological phenomenon

but as a function of continuously distributed dimensions is somewhat controversial,

recent theory, at least in the realm of adult attachment, suggests that the dimensional

approach may be the better way to define and measure attachment relationships (Brennan

et al., 1998; Fraley & Waller, 1998). However, given that the majority of current

theoretical models rest on the idea of attachment prototypes or categories (Griffin &

Bartholomew, 1994a), it is advantageous to have a measure that allows both dimensional

and categorical ratings. Unfortunately, the available measures of adolescent-parent attachment are, in general, designed to do neither.

Measures of Adolescent-Parent Attachment.

Of the available self-report scales of adolescent-parent attachment, only a few have been used widely enough to allow independent examinations of reliability and validity (see Lopez & Gover, 1993 for a review). The most established are the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987), the Parental Attachment Questionnaire (PAQ; Kenny, 1987) and the Parental Bonding Instrument (PBI; Parker, Tupling, & Brown, 1979). Despite the relative quality and popularity of these measures, they suffer from a number of limitations.

Some authors suggest that they may, in fact, measure something more akin to the overall affective quality of the adolescent-parent relationship than attachment per se (Heiss, Berman, & Sperling, 1996). However, a more specific shortcoming of the measures is that they are not designed to measure constructs of Anxiety and Avoidance, and thus allow neither the differentiation of Bartholomew's attachment subtypes nor the dimensional analysis of anxious and avoidant aspects of attachment (Crowell et al., 1999). In a recently published study, Vivona (2000) proposes a new scoring system for the IPPA, reconceptualizing Armsden and Greenberg's dimensions to allow classification according to Ainsworth's "ambivalent" and "avoidant" attachment styles. Her efforts have yet to be validated, but she presents a convincing argument in favor of more current measurement tools, compatible with more contemporary attachment models.

In short, it appears that there is, to date, no definitive self-report measure of adolescent-parent attachment (Crowell, et al., 1999). There is, however, an increasing

demand for research not only on the effects of parental attachment insecurity during

adolescence but also on dimensions of Avoidance and Anxiety and their relationship to

development (Doyle & Moretti, 2000). In the next decade, valid and reliable measures,

designed to address these specific issues, will be essential to adolescent-parent

attachment researchers.

Development of the CAPAI

Adaptation of the ECR

Because the field of adult attachment had been characterized by a large number of

questionnaire measures, each favored by a particular research group (Brennan et al.,

1998; Crowell et al., 1999), comparison and consolidation across studies had been

conceptually and empirically difficult. Brennan et al. (1998), realizing the need for a

current, valid self-report measure of adult romantic attachment, conducted a thorough

review of the attachment literature, surveying dozens of studies and unpublished papers

in attachment measurement, and compiling a list of 60 attachment subscales and related

items. After eliminating redundant items, Brennan et al. (1996, 1998) administered their

323-item questionnaire to a large sample of undergraduate students, and reproduced 60

subscale scores for each participant.

Principal component analysis of the subscale scores related to these items (see

Brennan et al., 1998 for a more detailed account) yielded two major underlying factors

(accounting for 62.8% of the variance). Brennan et al. (1998, p. 56) described these

"Anxiety" and "Avoidance" dimensions as "conceptually equivalent to the horizontal and

vertical axes of Bartholomew's four-category typology of attachment styles" and

developed two refined 18-item scales to measure them.

Their Avoidance scale was found to correlate highly with other similar measures of attachment avoidance and discomfort with closeness, and their Anxiety scale showed substantial correlation "with scales measuring anxiety and preoccupation with attachment, jealousy, and fear of rejection" (Brennan et al., 1996, p.11). Brennan et al. (1996) also presented discriminant functions that classified participants into one of Bartholomew's four categories, and demonstrated a reasonable degree of similarity between these categorizations and those produced by the self-report categorizations developed by Bartholomew's research group. Besides culling two major measures of Anxiety and Avoidance from their factor analysis of 60 approximated subscales, Brennan et al. (1996) also developed 12 clinical scales, which emerged from a direct component analysis of the original 323 items.

Although important questions remain about the validity and generality of the measure (issues of cross-cultural validity and the accuracy of the associated discriminant function classification rules have yet to be evaluated), Brennan et al.'s (1996, 1998) work provides a promising methodological basis for future efforts in the field of attachment measurement.

The Comprehensive Adolescent-Parent Attachment Inventory (CAPAI)

Although Brennan et al.'s (1996) scales were designed to measure aspects of adult romantic attachment, Moretti, McKay, and Holland (2000) realized that much of the item content (with minor revision) might be expected to generalize to the attachment relationships of adolescents and their caregivers. Mindful of the limitations of available adolescent attachment measures, Moretti et al. adapted this early version of the ECR to create the "Comprehensive Adolescent-Parent Attachment Inventory" (CAPAI), a new

multi-item self-report measure designed primarily for the assessment of Anxiety and

Avoidance in adolescent-parent attachment.

Moretti et al. (2000) translated Brennan et al.'s scales, adjusting for reading level

and eliminating a substantial number of items, to make the measure age and context

appropriate. For example, the item "I turn to my *partner* for many things, including

comfort and reassurance" was revised to "I turn to my *parent* for many things, including

comfort and reassurance;" the item "I need a lot of reassurance that I am loved by my

partner" became "I need a lot of reassurance that I am loved by my *parent.*" The 36

Anxiety and Avoidance items of the ECR were retained (with revision) to produce two

18-item subscales. The CAPAI's remaining 20 items were included to approximate the

12 clinical subscales originally proposed in Brennan et al.'s (1996) unpublished version

of the ECR. In its current version, the CAPAI (shown in the Appendix) is a 56-item self-

report measure, scored on a bipolar Likert-scale with values ranging from 1 to 7. In order

to make the CAPAI relationship-specific, respondents are asked to indicate the caregiver

who they feel has "played the most important part in raising" them, and to answer

questions about their relationship with that person. Since its development in 1999, the

CAPAI has been administered on an ongoing basis to adolescents (aged 11 to 18)

admitted to a local provincial treatment and assessment centre for youth with conduct-

related problems.

Although the CAPAI is a 56-item measure, the current study addresses the

validity only of the measure's two 18-item Avoidance and Anxiety scales. This is due in

part to the limited sample size available for the current study, but also due to Brennan et

al.'s (1998) decision to omit all but the Anxiety and Avoidance items from their

published version of the ECR.

Goals of the Current Study

The fundamental goal of the current study is the preliminary assessment of the

reliability and validity of the Comprehensive Adolescent-Parent Attachment Inventory

(CAPAI). Psychometric properties of the scale and its relation to concurrent measures of

intellectual and psychosocial functioning were examined in order to evaluate aspects of

the CAPAI's structural and concurrent validity. Analyses were divided into three

sequential stages: (1) *preliminary analyses*, (2) *structural validation,* and (3) *comparison*

to concurrent measures.

Preliminary Analyses. In order to justify the combining of male and female data

for further analysis, mean vectors and covariance matrices for males and females were

compared. Skewness and kurtosis of item and scale distributions were also examined to

eliminate the possibility of significant non-normality of the data.

Structural Validity. During the second stage of analysis, the reliability and factor

structure of the CAPAI were examined in order to establish structural validity of the

scale. The primary goal at this stage of analysis was to validate the presence of reliable

and reasonably unitary Anxiety and Avoidance dimensions. Inter-item consistencies of

the individual Avoidance and Anxiety scales were assessed, followed by a combination

of principal component analysis, maximum likelihood factor analysis, confirmatory

factor analysis, and "exploratory-confirmatory" factor analysis (Jöreskog, 1978).

It was expected that the exploratory analyses would produce two-factor solutions

with rotated simple structures consistent with the predicted pattern of loadings. More

specifically, it was expected that the 18 Anxiety items would load strongly on one factor and the 18 Avoidance items on another. Brennan et al. (1996) never verified that their final set of 36 items, when factor analyzed, yielded a strong two-factor structure. (Recall that their two factors were derived from a factor analysis of 60 intact scales from the literature.) Therefore, the possibility that the 36 items when factor analyzed might yield more than two factors was also considered.

Given that items had been translated from a previous measure, and that data were obtained from an adolescent clinical rather than a normative adult population, it was necessary to replicate the original structure of the ECR's Anxiety and Avoidance subscales. Therefore, confirmatory and exploratory-confirmatory factor analyses were employed in an investigative fashion to determine the degree of model misspecification and the extent to which perfect simple structure could be approximated.

Comparison to Concurrent Measures. Contingent on the presence of reliable and structurally valid Anxiety and Avoidance scales, the next stage of analysis involved the comparison of the CAPAI to concurrent measures of intellectual functioning and psychopathology. The purpose of these analyses was the investigation of the CAPAI's discriminant and convergent validity.

The key question at this stage was whether, and to what extent, attachment ratings would relate in predicted ways to these additional measures. First, it was expected that intelligence scores would not relate to differences in attachment orientation. Previous research has shown that attachment security, and more specifically attachment style, is not generally associated with intellectual functioning (Thompson, 1999), at least when IQ is within a normal range. Second, it was expected that insecure attachment scores on the

CAPAI would relate in both correlational and multivariate analyses to specific measures of psychosocial functioning. Hypotheses were based on evidence linking attachment insecurity to difficulties across a range of internalizing and externalizing symptoms (as discussed in previous sections). Generally, we predicted that indices of internalizing and externalizing symptoms and depression would correlate positively with attachment insecurity. More specifically, we predicted that attachment Anxiety would show a stronger positive correlation to internalizing and depressive symptomatology than would Avoidance. In terms of attachment types, we expected that, compared to the Fearful and Preoccupied groups, Secure attachment would predict fewer problems on all measures of maladjustment, and that internalizing and depressive symptoms would be greatest among the Preoccupied and Fearful attachment groups.

Summary of Hypotheses

To summarize, hypotheses of the current study were as follows: (1) Principal component analysis of the CAPAI's 36 Anxiety and Avoidance items would suggest two relatively uncorrelated primary components with a rotated pattern of item loadings consistent with the *a priori* model; (2) Maximum likelihood factor analysis would produce similar results, with fit indices for the two factor solution falling within the acceptable range; (3) Scores on measures of intellectual functioning would be unrelated to measures of Anxiety and Avoidance, and would not discriminate between attachment types; (4) Both externalizing and internalizing symptoms, including depression, would be associated with greater attachment insecurity; (5) Internalizing symptoms and depressive symptoms would be predicted by attachment Anxiety, and would discriminate Fearful and Preoccupied from Dismissing and Secure attachment groups.

Method

Participants

Participants were 164 adolescents (91 male, 73 female) between the ages of 11 and 17, $\overline{X} = 15.02$, $s = 1.54$, under referral at a provincial treatment and assessment centre for youth with significant behavioral problems. Although the average age for females ($\overline{X} = 15.17$, $s = 1.47$) was slightly higher than that for males ($\overline{X} = 14.91$, $s = 1.59$), this difference was not significant, $t(162) = 1.07$, $p = .378$. Approximately 77% were White, 16% Native Canadian, 3% Asian, and 4% other. Four participants, missing data on three or more of the 36 CAPAI items, were excluded from the sample, reducing the original sample size from 168 to 164. Variable means, calculated within gender, were substituted for missing responses on one (23 cases) or two (3 cases) CAPAI items.

The majority of CAPAI respondents indicated "Mom" as the parent or caregiver who had "played the most important part" in raising them (61.5% in boys; 57.5% in girls). Table 1 shows the frequency distribution of primary caregivers for male and female participants.

Measures

Comprehensive Adolescent Parent Attachment Inventory (CAPAI). Youth who completed the CAPAI between October 1999 and September 2001 were included in the initial sample. A number of concurrent measures (see below) were administered to youths who completed the CAPAI. However, not all participants completed the entire battery of concurrent measures, resulting in incomplete data across measures.

The Youth Self-Report. The Youth Self-Report (YSR, Achenbach, 1991, for 11 to 18-year olds) is a 118-item self-report inventory designed to assess psychological symptoms on a range of dimensions. Items are scored on a three-point scale ("not true," "somewhat or sometimes true," or "very true or often true") and generate scores on 8 subscales: Withdrawn, Somatic Complaints, Anxious/Depressed, Aggressive Behavior, Delinquent Behavior, Social Problems, Thought Problems, and Attention Problems. Withdrawn, Somatic Complaints and Anxious/Depressed are combined to produce the more general, or broadband, Internalizing scale. Aggressive Behavior and Delinquent behavior comprise the broadband Externalizing scale. The YSR demonstrates good reliability across a number of studies, and has been established as a reasonably valid measure of psychological symptomatology in both normative and clinical samples (Achenbach & Edelbrock, 1987; Rosenblatt & Rosenblatt, 2002). For the current study, only the Internalizing and Externalizing scales were examined.

The Beck Depression Inventory – Second Edition. The Beck Depression Inventory–II (BDI-II, Beck, Steer, & Brown, 1996) is a 21-item self-report measure of depressive symptomatology in adults and adolescents over the age of 11. Twenty-one items, each consisting of 4 statements, are scored on a scale of 0 to 3 in order of increasing severity, and are summed to produce a total index of overall level of depression. Although there are few studies reporting on test-retest reliability of the measure (for an exception, see Sprinkle et al., 2002, who report a value of .96), the BDI-II demonstrates consistently good internal reliability (Beck, Steer, & Brown (1996) report an alpha of .92 in their psychiatric outpatient sample). There is substantial research

validating the BDI–II in both clinical and non-clinical populations (Beck et al., 1996;

Osman et al., 1997; Sprinkle et al., 2002).

Wechsler Intelligence Scales. Depending on their age at the time of assessment,

participants were administered either the Wechsler Intelligence Scale for Children–Third

Edition (WISC-III; Wechsler, 1991, for ages 6 to 16) or the Wechsler Adult Intelligence

Scale–Revised (WAIS-R; Wechsler, 1981, for ages 16 and above). The Wechsler scales

are widely accepted as standard tools for the assessment of intellectual functioning, with

well-established reliability and validity (Groth-Marnat, 1997; Wechsler, 1981, 1991).

Although the Wechsler scales provide scores on a number of specific ability domains,

only the more global Performance and Verbal Indices were examined.

Procedure

All participants completed a battery of assessment questionnaires, interviews, and

other assessment procedures during an average month-long assessment period. Time and

sequence of intelligence testing and questionnaire completion were not constrained, and

thus varied across participants. In almost all cases, however, participants completed

measures within the first 2 to 3 weeks of admission. Trained assessors administered the

Wechsler Intelligence tests face-to-face to all participants. All other measures were

completed by the participants independently, with verbal instruction and support given on

an individual basis as required.

Results

Overview of Analytic Strategy

A series of analytic strategies were pursued to assess the validity of the CAPAI as a measure of adolescent-parent attachment. Analyses progressed in the following sequence: (1) *preliminary analyses*, including substitution for missing data, examinations of skew within variables, and cross-gender comparisons to allow pooling of data, (2) *analysis of structural validity*, including analyses of reliability and factor structure, and (3) *comparisons to concurrent measures* of intellectual and psychosocial functioning to evaluate discriminant and convergent validity.

Stage 1 – Preliminary Analyses

Initial examination of the data revealed that 4 of the 168 participants were missing data on three or more of the 36 CAPAI items. These participants were excluded from further analyses. Descriptive statistics were calculated on each of the 36 items. These revealed that most items had at least some degree of skew, reflecting primarily a tendency of the participants to give extreme responses (to bipolar Likert scale items scored from 1 to 7). Table 2 shows Skewness and Kurtosis statistics for the 36 items for males, and Table 3 gives comparable data for females. Although a number of individual items demonstrate some definite skewing of responses, this probably does not represent, in the final analysis, a serious problem for the use of the CAPAI. The Anxiety and Avoidance subscales, as sums of 18 items each, showed distributions that were essentially continuous and normal in shape.

Comparisons Across Gender

Given the relatively modest sample size, it was advantageous to combine data for male and female participants. However, combination of intact subgroups can produce spurious correlations when mean and/or covariance structures differ markedly across the groups being combined (Myers & Well, 1995). Consequently, prior to pooling of data for further analysis, cross-gender comparisons of mean vectors and covariance matrices were performed to evaluate (a) the statistical significance and (b) the practical importance of systematic gender-based differences across the 36 variables.

Hotelling's T^2 statistic was used to compare mean vectors on the 36 items. Results showed differences between males and females were not statistically significant, $F(36,127) = 1.45$, $p = .069$. However, Box's test of the equality of covariance matrices suggested a significant difference between the groups, $F(66,71928) = 1.124$, $p = .014$. Because the validity of Box's M as an inferential statistic may be compromised under conditions of item-level non-normality (R. F. Koopman, personal communication, February 2003), further analyses of group differences were pursued.

First, a permutation test was performed: (1) pooled male and female data were randomly permuted, with the first 91 observations assigned to group A, and the remainder to group B; (2) Box's M was then computed; (3) the above procedure was repeated 1000 times, and the values of Box's M recorded to generate a distribution; (4) the observed value of Box's M from the actual data was then compared to the distribution of values produced. The observed value of 982.71 exceeded all but 2 of the 1000 values generated from randomly permuted data. The results of the permutation test suggest that

the two groups, indeed, are not identical, at least in terms of covariance structure. The question remained, however, whether these differences were of any practical significance to further analyses.

To analyze whether the statistically significant difference in covariance matrices was indicative of a practically meaningful departure from the model of equal covariance structures, the RMSEA was computed, using a formula provided by R. F. Koopman (2003, personal communication). The resulting value (.054) and associated 90% confidence interval (with endpoints ranging from .047 to .061) suggest fairly close fit (in a practical sense) of the model of equal covariance matrices. Thus it seems that the differences between the covariance matrices for males and females, although statistically significant, may not be of great practical significance.

Mahalanobis distance is a measure of difference between two mean vectors. The squared population Mahalanobis distance is defined as

$$\Delta^2 = \left(\mu_1 - \mu_2\right)' \Sigma^{-1} \left(\mu_1 - \mu_2\right) \tag{1}$$

and is a weighted sum of squares of the mean differences on the k variables.

Using a technique described by Steiger and Fouladi (1997), it is possible to construct a confidence interval on the population Mahalanobis distance, or functions of it. As a standardized measure of discrepancy between the vectors of means for male and female groups, we can take Δ^2, divide by the number of variables, and take the square root, thus creating a "Root Mean Square Standardized Effect" (*RMSSE*, suggested by J. H. Steiger, 2003, personal communication). A 90% confidence interval on this measure ranges from 0 to .17, suggesting that differences between means for the male and female

groups are definitely on the order of .17 standard deviations or less. Indeed, the confidence interval demonstrates that one may reject the hypothesis that the *RMSSE* is greater than .17 at the .05 significance level. This suggests that the difference between male and female distributions is likely not a threat to further analyses. In conclusion, these results justified the combining of data for males and females for subsequent analyses. This decision is supported by factor analysis solutions (presented in a subsequent section) that are very similar whether male and female data are aggregated, or analyzed separately.

Stage 2 – Structural Validity

The second stage of analysis involved an examination of the psychometric properties of the scale through reliability and factor analyses. A primary objective at this stage was to establish the existence of two reliable and reasonably unitary dimensions that would explain substantial variance in the 36 scale items, and, more importantly, would reproduce expected patterns of Anxiety and Avoidance item loadings. Specific analyses included (1) measurement of inter-item consistency, (2) exploratory principal component analysis, (3) exploratory maximum likelihood factor analysis, (4) confirmatory factor analysis, and (5) exploratory-confirmatory factor analysis.

Reliability

Anxiety and Avoidance scales were constructed using item assignment based on Brennan et al.'s (1998) original categories. Internal item consistency was calculated using Cronbach's alpha. Reliability for both scales was high ($\alpha = .89$ for Anxiety, $\alpha = .91$ for Avoidance).

It is important to note that, although Cronbach's alpha is generally considered a standard measure of reliability in scale development, it should not be considered a measure of unidimensionality. High values for alpha may be obtained even when subsets of inter-item correlations are low. (For a simple illustration, see John & Benet-Martinez, 2000.) Thus, for a balanced assessment of unidimensionality, further examination of item content, specific inter-item correlations, and factor structure are advisable.

Inter-item correlations showed a substantial range, extending from .03 to .71 (with a mean of .30) for the Anxiety scale, and ranging from .10 to .70 (with a mean of .39) for the Avoidance scale. Item-total correlations (shown in Tables 4 and 5) ranged from .24 to .69 for the Anxiety scale, and from .36 to .74 for the Avoidance scale. The wide range of inter-item correlations may be due partly to the moderate sample sizes available, but also appear to be indicative of the fact that the Anxiety and Avoidance scales may not be unidimensional, an issue that will be explored in more detail in the discussion section.

Strictly speaking, alpha is a lower bound to reliability, and equals reliability only under restricted assumptions that include unidimensionality. Alpha actually underestimates the reliability of the Anxiety and Avoidance scales when unidimensionality does not hold (John & Benet-Martinez, 2000, p. 345).

Factor Analyses

Exploratory Principal Component Analysis. Exploratory principal component analysis of the 36 Anxiety and Avoidance items revealed two major principal components accounting for approximately 44% of the variance in the 36 items. No other component accounted for more than 4.1% of the variance. As can be seen in Figure 3, the

steepness of the scree plot increases sharply at component three, suggesting two primary

components (with eigenvalues of 8.8 and 6.9).

Direct oblimin rotation to oblique simple structure revealed two minimally

correlated ($r = -.02$) components with a pattern of item loadings highly consistent with

the expected pattern (see Table 6). Although results show substantial consistency

between expected and obtained patterns, inspection of the resulting matrix reveals several

problematic items. For example, item 55 ("I don't often worry about being abandoned")

did not load appreciably on either component. Item 8 ("I worry about being away from

my parent"), item 2 ("When I'm away from my parent I feel anxious and afraid"), and

item 17 ("I get frustrated when my parent is not around as much as I would like"), all

specified as Anxiety items, did not load uniquely on the obtained Anxiety component.

Finally, item 32 ("I want to get close to my parent, but I keep pulling back"), specified as

an Avoidance item, loaded positively on both components.

In sum, despite certain problematic items, the results of the current analysis are

consistent with hypothesized structure and seem to confirm the existence of two clear

dimensions underlying the 36 scale items. Table 7 compares the component pattern for

the two rotated components to the original item-scale correlations reported by Brennan et

al. (1998). Despite the modifications to the original measure, Anxiety and Avoidance

items are, for the most part, highly consistent between the two measures.

Additional exploratory principal component analyses were performed, including

separate analyses of male and female data, and an analysis of the pooled covariance

matrix for males and females. The obtained patterns, compared in Table 7, show minimal

differences. This lends further support to our decision to combine data for males and females.

Exploratory Maximum Likelihood Factor Analysis. In order to obtain an index of goodness of fit of the two-factor model, exploratory maximum likelihood factor analysis was performed using the Factor Analysis capabilities of SPSS 10.1. The resulting two-factor solution showed acceptable fit, $\chi^2(559) = 941.4$, RMSEA = .064.

Again, item loadings were consistent with the expected pattern. As with principal components analysis, items 55, 2, 8, 17 and 32 remained problematic. Table 8 displays the pattern matrix obtained from maximum likelihood factor analysis, after oblimin rotation.

Confirmatory Factor Analysis. Confirmatory factor analysis was performed using the SEPATH module of STATISTICA/W (Version 6.0) to assess the degree to which a perfect simple structure consistent with the hypothesized model could be obtained for the two-factor solution. The resulting indices, $\chi^2(593) = 1305.4$, RMSEA = .097, suggest a poor fit. This may be due to crossover; i.e. lack of clear simple structure in the two-factor solution. However, even when items with clear crossover were removed from the model, fit did not improve substantially. It is likely that two factors do not explain some important sources of variance among the items. It should also be mentioned that a restricted 2-factor model with perfect simple structure for 36 variables is a highly constrained model with a very low prior likelihood of fitting such a set of data well. Such a constrained model may well be highly sensitive to degrees of misspecification that are relatively minor from a substantive standpoint.

Exploratory-Confirmatory Factor Analysis. As an alternative to pure

confirmatory factor analysis, which, in this case, appears to demand too constrained a

model, exploratory confirmatory factor analysis (ECFA), following the approach of

Jöreskog (1978), was employed. Applying this approach to the current data, an

exploratory factor analysis with rotation to oblique simple structure was first performed,

and then confirmatory factor analysis was employed to test the statistical significance of

each factor loading. Non-significant loadings were restricted to be zero and the revised

simple structure was then tested for fit using confirmatory factor analytic methods. The

fit indices for the revised model, $\chi^2(577) = 978.5$, RMSEA = .063, were approximately

the same as the original model, thus allowing the achievement of cleaner simple structure

without decreased goodness of fit (see Table 9 for the final matrix of item loadings).

Summary. The results of the first stage of psychometric analyses suggest that,

despite problems with content specificity on a few items and apparent lack of scale

unidimensionality, both principal components analysis and factor analysis suggest two

underlying dimensions consistent with those proposed by Brennan et al. (1998). Given

the results of the first stage of analyses, we felt justified in continuing with further

examinations of discriminant and convergent validity.

Stage 3 – Comparison to Concurrent Measures

In the final stage of analysis, discriminant and convergent validity were assessed

through comparison of Anxiety and Avoidance component scores to concurrent measures

of intellectual and psychosocial functioning. Observed relationships between attachment

ratings and concurrent measures were compared to predicted outcomes. Dimensional

analysis of Anxiety and Avoidance scales were performed using simple Pearson

correlations. Categorical analyses, using multivariate analyses of variance (MANOVAs), involved the comparison of attachment prototype groups.

Component scores were used in these analyses, rather than (unit weighted) scale scores, for two reasons: (a) the analyses were primarily exploratory, and unit weighting might cause slight reductions in reliability that would further attenuate already low validity coefficients, thus obscuring significant relationships; (b) the use of varimax-rotated component scores guaranteed uncorrelated measures of Anxiety and Avoidance, thus making correlational relationships less ambiguous.

Thus, standardized Anxiety and Avoidance component scores, following orthogonal (Varimax) rotation of the two major components, were generated for each participant. The first two columns of Table 7 list the item loadings for these two components. Figure 4 shows a plot of participant's component scores. Additionally four attachment prototype groups (Secure, Dismissing, Preoccupied, Fearful), were approximated, with categorization based on the standardized component scores on the two Anxiety and Avoidance factors. Median splits were used to divide the Anxiety vs. Avoidance scatterplot into four quadrants. A score above the median on a given factor was considered "high," below the median, "low." Figure 5 illustrates the decision rule for categorization of attachment styles.

We chose to categorize participants using median splits in order to ensure adequate sample size in each of the four cells, and with the assumption that the assigned categories would also represent a fair approximation of each participant's attachment style relative to the other participants. Following categorization, a greater percentage of males than females were rated as Dismissing (30.8% versus 16.4%) and Secure (31.9%

versus 12.8%), whereas a greater percentage of females than males were rated Fearful

(37.0% versus 16.5 %) and Preoccupied (28.8% versus 20.9%). This is primarily a

function of males' tendency to score lower on Anxiety than females. Not surprisingly, the

percentage of participants rated as securely attached appears higher than would be typical

of a clinical population, especially for males. This is probably due in large part to our

categorization procedure, which most likely underestimated attachment insecurity by

scoring participants by simple within-sample median splits. A more externally valid

system might involve, instead, comparison to a normative sample.

Discriminant Validity

It was expected that intellectual functioning, as measured by the Wechsler Verbal

and Performance scales, would not be significantly related to attachment ratings. It

should be noted that Full Scale IQ scores, although generally more reliable than subscale

scores, were not examined due to their redundancy and relative lack of specificity

compared to Verbal and Performance scale scores. In addition, all participants with Full

Scale IQ scores below 70 were eliminated from analyses.

Consistent with predictions, Performance IQ was not significantly correlated with

either of the CAPAI's major subscales ($r(98) = -.14$, $p = .164$ for Anxiety; $r(98) = .16$,

$p = .113$ for Avoidance). Also consistent with predictions, Verbal IQ was not

significantly correlated with Anxiety ($r(98) = -.14$, $p = .156$). However, contrary to our

hypotheses, the Verbal IQ scale showed a small but significant correlation to Avoidance

($r(98) = .24$, $p = .017$). See Table 10 for a summary.

Univariate analyses of the interactions between attachment group and gender,

were not significant for either Verbal IQ ($F(3,92) = 1.46$, $p = .231$) or Performance IQ

($F(3,92) = 1.58$, $p = .199$). Gender main effects were also non-significant. Consistent

with hypotheses, there was no main effect for Performance IQ, $F(3,92) = 1.21$, $p = .309$.

However, there were unexpected differences between mean Verbal IQ scores across the

four groups, $F(3,92) = 3.22$, $p = .026$. Pairwise comparisons of means, using Tukey's

HSD procedure (with a family wise error rate of .05), revealed that the Preoccupied

attachment group had significantly lower mean Verbal IQ than the Fearful, Dismissing,

and Secure groups. See Table 11 for a summary.

It is important to note that when individuals with *Verbal IQ* scores below 70 were

eliminated from analyses (7 cases in total), all correlations and mean differences became

statistically insignificant. Possible interpretations of these results are outlined in the

discussion section.

Convergent Validity

In contrast to the analyses of discriminant validity described above, our *a priori*

hypotheses for convergent validity were "Reject-Support" tests (i.e. our theoretical

hypotheses would be supported by rejection of the null hypothesis). To guard against

Type I errors favoring our theoretical position, we chose a relatively more stringent alpha

(.01, two-tailed), despite limited power.

Consistent with predictions, attachment insecurity was associated with

significantly greater psychosocial dysfunction. More specifically, both Anxiety and

Avoidance predicted externalizing problems (Anxiety, $r(140) = .35$, $p = .000$;

Avoidance, $r(140) = .28$, $p = .001$). Anxiety predicted both depression ($r(115) = .51$,

$p = .000$) and internalizing symptoms ($r(140) = .49$, $p = .000$). The corresponding

correlations for Avoidance were substantially lower and did not reach significance at the

.01 level ($r(115) = .20$, $p = .030$ for depression, $r(140) = .19$, $p = .023$ for internalizing

symptoms). To test whether the correlations for Avoidance were significantly lower than

those for Anxiety, a test of dependent correlations (Williams, 1959) was performed. The

correlation between Avoidance and internalizing symptoms was significantly lower than

the correlation between Anxiety and internalizing symptoms, $t(140) = -2.87$, $p = .005$,

and the correlation between Avoidance and depression was significantly lower than the

correlation between Anxiety and depression, $t(140) = -2.92$, $p = .004$. Table 10

summarizes the correlations between Anxiety and Avoidance and concurrent measures of

depression and internalizing and externalizing symptoms. The standard Fisher z-test was

performed on all significant correlations, to assess whether there were statistically

significant differences across gender. None of the comparisons reached statistical

significance.

MANOVAS of attachment prototypes and gender in relation to concurrent

measures also supported *a priori* hypotheses. The interactions between gender and

attachment group, on all three dependent measures were not significant,

$F(9,297) = 1.27$, $p = .254$. Multivariate main effects for both attachment group

($F(9,297) = 3.92$, $p = .000$) and gender ($F(3,97) = 5.87$, $p = .001$) were significant.

Tests of univariate between-subjects effects showed significant differences across

attachment groups on all three dependent measures: BDI-II Total score ($F(3,99) = 5.75$,

$p = .001$) and YSR Internalizing ($F(3,99) = 11.48$, $p = .000$) and Externalizing

($F(3,99) = 7.17$, $p = .000$) scale scores. Post hoc comparisons using Tukey's HSD (with

familywise error rate of .05) revealed that means for the Secure group were significantly

lower than those for the Preoccupied and Fearful groups across all three measures.

Although means for the Dismissing group were consistently lower than those of the

Fearful and Preoccupied groups, these differences were not always statistically

significant. Table 11 summarizes these group differences.

Discussion

Results of the current study generally supported the validity of the CAPAI as a measure of adolescent-parent attachment. Analyses of *structural validity* were consistent with predictions, producing clear two-factor solutions and patterns of loadings consistent with our a priori model. Analyses of *convergent validity* were also consistent with hypotheses, revealing expected associations between the CAPAI and measures of psychopathology. *Discriminant validation* results were somewhat less promising, showing an unexpected association between attachment Avoidance and verbal intellectual functioning. However, on the whole, preliminary findings suggest that the CAPAI's Anxiety and Avoidance scales possess good psychometric properties and perform in expected ways in relation to a range of concurrent measures. Interpretations of these results, limitations of the current study, and suggestions for future research are discussed in more detail below.

Structural Validity

Preliminary analyses of the psychometric properties of the CAPAI's Anxiety and Avoidance items suggest that these scales possess good structural validity. Both principal component analysis and maximum likelihood factor analysis of the scale's 36 Anxiety and Avoidance items produced two primary dimensions with patterns of item loadings consistent with our theoretical model. In addition, inter-item consistencies of both the Anxiety and Avoidance scales were high. In light of these early results, Moretti et al. (2000) appear to have been successful in preserving the factor structure and reliability of the ECR while adapting its use for adolescents. Although the current data do not allow a full investigation of structural validity, initial results are promising.

Despite generally positive results, there were some minor problems with several scale items that failed to load uniquely on either the Anxiety or Avoidance dimensions. It may be that the statistical properties or construct validity of these items have been altered during scale modification. If so, they may best be excluded from future versions of the measure. However, given the analytical limitations imposed by small sample size in this study (an issue discussed in more detail below), it may be better to do further analysis with a larger more representative sample prior to any major scale adjustments.

It is also important to note that, although there is strong support for the existence of expected Anxiety and Avoidance dimensions, these scales may not be strictly unidimensional. The results of our factor analyses suggest that there is a non-negligible proportion of item variation that cannot be accounted for by only two dimensions. In addition, patterns of inter-item correlations of the Anxiety and Avoidance scales suggest that there may be differentiable clusters of items within these scales. Although a larger sample would be required for further analysis, early results point to the possibility of "second order" dimensions within each of the Anxiety and Avoidance scales. This is perhaps not surprising given the original development of the CAPAI. Recall that Brennan et al.'s original (1996) principal component analysis of items yielded twelve scales, not two. There was substantial overlap between several of these clinical subscales and the ECR's Anxiety and Avoidance scales. This overlap may explain the possible lack of unidimensionality we now observe in the CAPAI's Anxiety and Avoidance scales.

Multidimensionality is not necessarily a threat to the validity of the CAPAI. Attachment theorists conceptualize internal working models as complex, multidimensional entities. Thus, it should not be surprising if higher order factors meant

to reflect these constructs are also dimensionally complex. These results do raise interesting theoretical questions about the use of broad-spectrum attachment dimensions such as Anxiety and Avoidance. One could argue that, although these general attachment dimensions provide theoretical clarity and greater reliability of measurement, their use may obscure important, clinically meaningful relationships between more specific dimensions of attachment. That said, if Anxiety and Avoidance are truly multidimensional constructs, then attempts to achieve scale unidimensionality through attenuation of item content would *threaten* rather than improve the construct validity of these scales. It would be interesting to pursue more detailed examinations of possible secondary dimensions in future analyses of the CAPAI. However, a larger and more representative sample would be advisable for exploratory analyses such as these.

In terms of the goals of the current study, our structural analyses suggest that the CAPAI's Anxiety and Avoidance scales have good inter-item consistency and a reliable factor structure. However, although analyses of the CAPAI's structural characteristics are an important first step in establishing scale validity, these results do not allow strong inferences about the construct validity of the measure. For this, a more direct investigation of discriminant and convergent validity is required.

Convergent Validity

Subsequent to structural analyses, we investigated the convergent validity of the CAPAI's Anxiety and Avoidance scales by comparing attachment ratings to concurrent measures of psychopathology. Consistent with our hypotheses, attachment insecurity predicted greater depression and more general internalizing and externalizing problems than did less insecure attachment. More specifically, attachment Anxiety not only

predicted internalizing and depressive symptoms, but also was more predictive of these symptoms than was Avoidance. As expected, dimensional ratings of Anxiety and Avoidance were equally predictive of externalizing problems. These findings are consistent with previous research that has found similar associations between self-report measures of attachment and general indices of psychopathology (Carnelly et al., 1994; Doyle & Moretti, 2000; Dozier et al., 1999).

Categorical analyses of concurrent measures in relation to attachment "types," using Bartholomew's four-prototype classification system (Bartholomew, 1990; Bartholomew & Horowitz, 1991), also supported our hypotheses. Compared to the Secure attachment group, Preoccupied and Fearful attachment groups scored consistently higher on measures of internalizing and externalizing problems. Individuals classified as Dismissing were also generally less prone to psychopathology than were Preoccupied or Fearful individuals. Again, these results are consistent with research suggesting that individuals with attachment styles characterized by a higher degree of attachment anxiety (styles which involve a negative model of self with respect to attachment) are more likely to report internalizing problems than are individuals with less attachment anxiety.

In sum, these results demonstrate that the CAPAI's Anxiety and Avoidance scales relate in expected ways to concurrent measures of general symptomatology, raising our confidence in the validity of the scales. However, given the limited range of measures available for evaluating convergent validity, it would be premature at this early stage to draw strong conclusions about the construct validity of the CAPAI. This issue is expanded on in our discussion of limitations and suggestions for future research.

Discriminant Validity

In a final set of analyses, we compared the CAPAI's Anxiety and Avoidance scales to measures expected to be *unrelated* to attachment. Specifically, we hypothesized that both verbal and nonverbal intellectual ability would fail to predict differences in attachment orientation. In general, our hypotheses were supported. However, we did observe a small but significant correlation between verbal intellectual functioning and attachment insecurity. Specifically, problems in verbal intellectual functioning were negatively associated with Avoidance, and the mean Verbal IQ for the Preoccupied group was significantly lower than that of other groups. Thus, it appears that lower verbal intelligence is associated with a pattern of decreased Avoidance and a Preoccupied attachment style as measured by the CAPAI.

In retrospect, we may have been too conservative in demanding a complete absence of significant correlations between intelligence and attachment. Previous studies reporting such findings (see Thompson, 1999) generally use normative samples without the lower range of intellectual functioning expected in a high-risk sample. Interestingly, in the current sample, individuals whose intellectual functioning was well below average were most likely to report Preoccupied attachment (high Anxiety and low Avoidance). One plausible interpretation of these findings is that *very* low intellectual functioning in adolescents is associated with increased desire for proximity and a greater tendency to rely on caregivers for support, what we might call a "dependency" factor. Alternatively, it may be that attenuation of correlations resulting from a narrower range of IQ scores, typical of previous studies, obscures a more general but subtle relationship between attachment and IQ.

In conclusion, although discriminant validity analyses did not entirely support our hypotheses, the results are probably not a large threat to the validity of the CAPAI. The observed correlations were relatively small, ranging in absolute value between .14 and .24. In a practical sense, moderate differences in intellectual ability should have relatively little impact on scale scores. In addition, correlations between attachment ratings and intelligence, especially verbal functioning, are generally a more serious threat to interview-based attachment measures than to self-report measures. The Adult Attachment Interview (AAI, George, Kaplan, & Main, 1985) and related measures (Crowell et al., 1999) classify respondents as securely or insecurely attached based on the *coherence* of their interview transcripts. Therefore, the scoring systems of such interview measures, to be valid, must not be influenced directly by general verbal ability (Crowell et al., 1996; Hesse, 1999). In contrast, self-report measures are generally less dependent on quality of verbal reasoning, requiring only that respondents have sufficient intellectual ability to comprehend item content.

In sum, the results of the current study support the structural, convergent, and discriminant validity of the CAPAI. Aside from an unexpected association between attachment Avoidance and verbal intellectual functioning, all research hypotheses were supported. These results are promising, and encourage further evaluation and development of this measure. However, it should be emphasized that this study is only a preliminary investigation of validity. The nature of our sample and the restricted range of comparison measures available for the current analyses limit the generality of our findings.

Limitations and Suggestions for Future Research

It is widely accepted that factor analytic techniques require a large number of participants. The sample size of the current study, although adequate for our purposes, was suboptimal, and limited the range of analyses that could be performed. For example, the CAPAI's full set of 56 items could not be included in our factor analyses, preventing an evaluation of the measure's 12 secondary subscales. Future research verifying the reliability and validity of these subscales is an essential next step in the development of the CAPAI.

Analyses were also limited by the absence of a normative comparison sample. The factor structure of the CAPAI has yet to be verified in a non-clinical population, as have the scale's convergent validity and its ability to discriminate attachment styles in normally functioning adolescents. Prior to use of the CAPAI in normative samples, such analyses are highly recommended. Second, lack of a normative comparison group required the use of within-sample variation to establish levels of attachment insecurity. Among other things, this procedure probably led to an underestimate of attachment insecurity in the sample. This, combined with the fact that the current sample was characterized by a degree of symptom homogeneity (i.e. the majority of participants had histories of family disruption and moderate to serious conduct problems), may have obscured more subtle differences between secure and insecure attachment groups. In conclusion, without access to a normative comparison sample, the external validity of the CAPAI, including the degree to which the Anxiety and Avoidance scales differentiate between normally functioning adolescents and those with problems in interpersonal and psychosocial functioning, could not be fully evaluated.

In addition to problems with the nature of our sample, a limited range of concurrent measures limited our evaluations of scale validity. There is evidence from Brennan et al's (1996, 1998) work that the ECR's Anxiety and Avoidance scales relate in expected ways to criterion measures (for example, concordance with similar dimensions underlying established attachment scales). Thus we might expect that because many of the psychometric properties of the ECR are replicated by the CAPAI, then the CAPAI should relate in comparable ways to similar criterion measures. However, this line of reasoning ignores the possibility that some of the scale's items may have taken on new meaning in the context of adolescent-parent relationships. Substantial differences in the interpretation of items could influence the validity of the CAPAI scales, including their relationship to outcome measures. This possibility makes critical evaluations of scale validity essential. Unfortunately, the concurrent measures used in the present study were somewhat limited.

For example, one shortcoming of the current study is that no alternate measure of attachment was administered. Ideally, validation of a new measure should include comparisons to other measures of the same construct. These might include alternative self-report measures, measures completed by observers (such as parents or peers), and alternative assessment approaches (for example, interview-based measures). Considering that there are no definitive tools currently available for the measurement of adolescent-parent attachment, it is difficult to specify a suitable criterion instrument. However, it would be worthwhile to examine convergence between the CAPAI and measures such as the Relationship Scales Questionnaire (RSQ; Griffin & Bartholomew, 1994a) and the AAI (Main et al., 1985). A "parent version" of the CAPAI (which asks caregivers to rate

their child's attachment on parallel items) is currently in development and should offer another interesting point of comparison for future research.

The narrow range of *non*-attachment measures in the current study further limited analyses of convergent and discriminant validity. Contemporary research has demonstrated clear associations between measures of attachment and indices of interpersonal and individual functioning, including self-esteem (Brennan & Morris, 1997), relationship satisfaction (Bartholomew & Horowitz, 1991; Simpson, 1990), interpersonal behavior (Allen et al., 2002; Kenny & Gallagher, 2002; Kobak et al., 1993), suicidal ideation (Lessard & Moretti, 1998) and aspects of personality (Shaver & Brennan, 1992). Future evaluations of the CAPAI should investigate whether or not the Anxiety and Avoidance scales behave in predicted ways in relation to measures of such traits. Additionally, future investigations of discriminant validity should rule out the influence of factors such as social desirability. In conjunction with the results of the current study, the research suggested above would allow definitive conclusions regarding validity of the CAPAI.

Conclusion

The present study is an important first step towards validation of the Comprehensive Adolescent-Parent Attachment Inventory (CAPAI; Moretti, McKay, & Holland, 2000). Results suggest that the CAPAI's Anxiety and Avoidance scales possess good psychometric properties, including acceptable inter-item reliability and a factor structure consistent with our *a priori* model. Also encouraging were preliminary examinations of convergent validity, which demonstrated that the CAPAI's Anxiety and Avoidance scales relate in expected ways to concurrent measures of internalizing and

externalizing symptomatology. Analyses of discriminant validity, although largely in keeping with hypotheses, were not entirely supportive. However, the relatively small correlations observed between the Avoidance scale and verbal intelligence were not considered a major threat to the validity of the scale.

There are limitations to the current study, including an insufficient sample size for analysis of the full scale and a range of concurrent measures too narrow for thorough investigations of convergent and discriminant validity. Future studies exploring the structural validity of the CAPAI's clinical subscales and the relationship between the CAPAI and other measures of attachment and interpersonal functioning are suggested prior to wide use of the measure. Validation of the CAPAI in a normative sample is also highly recommended.

There is a great demand among contemporary researchers for valid and reliable self-report measures of adolescent attachment, especially those designed for the assessment of Anxiety and Avoidance. The CAPAI, designed specifically to address this need, shows early promise as a comprehensive and informative assessment tool. The results of the current study support the validity of the CAPAI's Anxiety and Avoidance scales, and provide a foundation for future research and development of this measure.

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Table 1

Frequency Distribution of Primary Caregivers for Male and Female Participants

| | Gender of Youth | | | |
| | Male | | Female | |
Parent	Frequency	Percent	Frequency	Percent
Mom	56	61.5	42	57.5
Foster Mom	3	3.3	3	4.1
Step-mom	1	1.1	1	1.4
Other female relative	2	2.2	2	2.7
Dad	9	9.9	12	16.4
Foster Dad	2	2.2	0	0
Other Male Relative	2	2.2	0	0
More than one parent	14	15.4	12	16.4
Other	1	1.1	1	1.4
Missing	1	1.1	2	2.7

Table 2

Skewness and Kurtosis (Males)

Item[a]	N	Mean	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
01 (v)	91	4.33	2.01	-.122	.253	-1.014	.500
02 (x)	91	2.12	1.67	1.321	.253	.604	.500
04r (v)	91	3.24	1.96	.480	.253	-.804	.500
05 (x)	91	3.13	2.07	.530	.253	-.878	.500
07 (v)	91	3.24	2.22	.556	.253	-1.133	.500
08 (x)	91	2.54	1.88	1.064	.253	.126	.500
09 (x)	91	2.90	2.06	.720	.253	-.799	.500
10 (x)	91	2.23	1.74	1.308	.253	.642	.500
12 (x)	91	2.03	1.80	1.744	.253	1.935	.500
13 (v)	91	4.01	2.27	.015	.253	-1.425	.500
16 (v)	91	3.08	2.10	.687	.253	-.793	.500
17 (x)	91	2.78	1.87	.763	.253	-.468	.500
19r (v)	91	4.90	2.26	-.593	.253	-1.192	.500
20 (v)	91	3.36	2.28	.434	.253	-1.307	.500
22 (x)	91	2.64	1.89	.970	.253	.014	.500
23r (v)	91	3.77	2.10	.202	.253	-1.117	.500
25 (x)	91	3.36	2.17	.348	.253	-1.228	.500
26 (v)	91	3.36	2.17	.516	.253	-1.029	.500
27 (x)	91	2.84	2.05	.801	.253	-.614	.500
28r (v)	91	4.70	2.20	-.378	.253	-1.297	.500
29 (x)	91	2.24	1.64	1.237	.253	.725	.500
32 (v)	91	2.40	1.79	1.230	.253	.632	.500
33 (x)	91	2.71	1.80	.817	.253	-.222	.500
35r (v)	91	4.42	2.18	-.117	.253	-1.423	.500
36r (v)	91	3.66	2.08	.316	.253	-1.106	.500
37 (x)	91	2.47	1.95	1.102	.253	-.028	.500
38r (v)	91	3.80	2.18	.187	.253	-1.330	.500
41 (x)	91	2.51	1.96	1.073	.253	-.158	.500
43 (x)	91	4.02	2.26	-.069	.253	-1.434	.500
44r (v)	91	4.29	2.05	-.078	.253	-1.196	.500
47 (v)	91	3.16	2.11	.519	.253	-1.026	.500
48 (x)	91	3.66	2.16	.168	.253	-1.321	.500
50r (v)	91	3.64	2.18	.282	.253	-1.299	.500
53 (x)	91	2.24	1.71	1.240	.253	.507	.500
55r (x)	91	3.40	2.40	.374	.253	-1.471	.500
56 (v)	91	2.90	2.16	.750	.253	-.833	.500

[a] (v) indicates a pre-specified Avoidance item, (x) a pre-specified Anxiety item

Table 3

Skewness and Kurtosis (Females)

Item[a]	N	Mean	Std. Dev.	Skewness	Std. Error	Kurtosis	Std. Error
01 (v)	73	4.45	1.94	-.328	.281	-.842	.555
02 (x)	73	3.07	2.25	.657	.281	-1.105	.555
04r (v)	73	3.44	2.16	.346	.281	-1.257	.555
05 (x)	73	3.75	2.01	.001	.281	-1.153	.555
07 (v)	73	3.73	2.21	.073	.281	-1.379	.555
08 (x)	73	3.44	2.40	.334	.281	-1.462	.555
09 (x)	73	3.85	2.18	.049	.281	-1.384	.555
10 (x)	73	3.21	2.13	.426	.281	-1.097	.555
12 (x)	73	2.81	2.22	.880	.281	-.767	.555
13 (v)	73	3.95	2.36	.048	.281	-1.481	.555
16 (v)	73	3.77	2.26	.090	.281	-1.410	.555
17 (x)	73	4.04	2.24	-.091	.281	-1.432	.555
19r (v)	73	5.00	2.13	-.694	.281	-.874	.555
20 (v)	73	3.58	2.22	.205	.281	-1.395	.555
22 (x)	73	3.41	2.16	.257	.281	-1.240	.555
23r (v)	73	3.74	2.19	.122	.281	-1.431	.555
25 (x)	73	3.93	2.21	-.077	.281	-1.481	.555
26 (v)	73	3.78	2.15	.111	.281	-1.340	.555
27 (x)	73	3.73	2.27	.144	.281	-1.418	.555
28r (v)	73	4.63	2.12	-.400	.281	-1.160	.555
29 (x)	73	2.81	2.06	.697	.281	-.920	.555
32 (v)	73	3.12	2.17	.486	.281	-1.201	.555
33 (x)	73	3.11	1.98	.565	.281	-.781	.555
35r (v)	73	4.47	2.23	-.324	.281	-1.313	.555
36r (v)	73	4.32	2.33	-.177	.281	-1.460	.555
37 (x)	73	2.92	2.24	.707	.281	-1.022	.555
38r (v)	73	3.74	2.32	.086	.281	-1.538	.555
41 (x)	73	3.10	2.08	.495	.281	-1.024	.555
43 (x)	73	4.27	2.31	-.240	.281	-1.465	.555
44r (v)	73	3.74	2.09	.159	.281	-1.170	.555
47 (v)	73	3.27	2.06	.459	.281	-1.024	.555
48 (x)	73	4.27	2.18	-.156	.281	-1.293	.555
50r (v)	73	3.56	2.10	.244	.281	-1.262	.555
53 (x)	73	2.84	2.24	.787	.281	-.984	.555
55r (x)	73	4.52	2.32	-.386	.281	-1.349	.555
56 (v)	73	2.89	2.28	.793	.281	-.938	.555

[a] (v) indicates a pre-specified Avoidance item, (x) a pre-specified Anxiety item.

Table 4

Item-total Correlations for the Anxiety Scale

Item[a]	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
02 (x)	53.1768	441.0299	.5598	.6163	.8814
05 (x)	52.3110	445.1481	.4911	.3034	.8836
08 (x)	52.7805	442.4546	.4921	.6259	.8836
09 (x)	52.3963	429.3941	.6485	.5283	.8781
10 (x)	53.0549	431.5982	.6890	.5616	.8772
12 (x)	53.3415	443.0729	.5267	.3470	.8824
17 (x)	52.3780	430.1507	.6479	.5297	.8781
22 (x)	52.7378	434.8327	.6215	.4917	.8792
25 (x)	52.1037	440.5352	.5058	.3921	.8832
27 (x)	52.4878	430.1900	.6297	.5427	.8787
29 (x)	53.2256	451.9917	.4656	.3990	.8844
33 (x)	52.8293	446.0443	.5342	.3636	.8823
37 (x)	53.0488	447.1633	.4594	.4469	.8847
41 (x)	52.9512	448.8442	.4541	.3573	.8848
43 (x)	51.5854	436.5264	.5286	.4040	.8824
48 (x)	51.7866	445.9235	.4491	.3134	.8852
53 (x)	53.2134	446.0094	.5050	.4720	.8832
55r (x)	51.8232	461.5698	.2366	.1366	.8937

[a] (v) indicates a pre-specified Avoidance item, (x) a pre-specified Anxiety item.

Table 5

Item-total Correlations for the Avoidance Scae

Item[a]	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
01(v)	63.1707	597.6271	.3760	.3194	.9206
4r (v)	64.2256	569.8690	.6533	.5496	.9143
07 (v)	64.0976	579.9782	.4948	.3878	.9182
13 (v)	63.5732	563.9271	.6282	.4832	.9148
16 (v)	64.1707	579.7007	.5049	.4898	.9179
19r (v)	62.6098	571.7241	.5846	.5360	.9159
20 (v)	64.0976	567.9168	.6044	.4756	.9154
23r (v)	63.7988	572.8488	.5919	.4814	.9157
26 (v)	64.0061	559.9938	.7150	.6305	.9126
28r (v)	62.8841	564.1889	.6717	.5861	.9137
32 (v)	64.8354	598.5187	.3629	.4548	.9210
35r (v)	63.1159	559.1337	.7125	.6945	.9126
36r (v)	63.6037	556.5720	.7330	.6034	.9120
38r (v)	63.7805	555.1172	.7371	.6072	.9119
44r (v)	63.5122	572.2391	.6173	.6370	.9151
47 (v)	64.3415	569.3673	.6453	.4680	.9144
50r (v)	63.9512	570.3780	.6151	.4937	.9151
56 (v)	64.6585	580.4839	.4948	.4402	.9182

[a] (v) indicates a pre-specified Avoidance item, (x) a pre-specified Anxiety item.

Table 6

Principal Components Analysis, 2 Components Extracted, Direct Oblimin Rotation

Items[a]	Component[b]	
	1	2
38r I don't mind asking my parent for comfort, advice, or help (v)	.781	−.097
36r I find it relatively easy to get close to my parent (v)	.769	.054
35r I usually discuss my problems and concerns with my parent (v)	.763	−.161
26 I try to avoid getting too close to my parent (v)	.738	.249
28r I tell my parent just about everything (v)	.732	−.119
04r I am very comfortable being close to my parent (v)	.706	−.207
44r I turn to my parent for many things, including comfort and reassurance (v)	.693	−.303
47 I prefer not to be too close to my parent (v)	.688	−.038
13 I don't feel comfortable opening up to my parent (v)	.672	.149
50r It helps to turn to my parent in times of need (v)	.664	−.209
23r I feel comfortable depending on my parent (v)	.654	−.092
19r I feel comfortable sharing my private thoughts and feelings with my parent (v)	.649	−.087
20 I get uncomfortable when my parent wants to be very close (v)	.630	.040
07 I find it difficult to depend on my parent (v)	.551	.227
16 Just when my parent starts to get close to me I find myself pulling away (v)	.538	.308
56 I am nervous when my parent gets too close to me (v)	.537	.221
01 I prefer not to show my parent how I feel deep down (v)	.414	.091
10 I worry that my parent won't care about me as much as I care about my parent (x)	.179	.757
27 I worry a lot about my relationship with my parent (x)	−.021	.699
09 I need a lot of reassurance that I am loved by my parent (x)	−.051	.695
22 I often wish that my parent's feelings for me were as strong as my feelings are for my parent (x)	.114	.692
17 I get frustrated when my parent is not around as much as I would like (x)	−.372	.665
53 I find that my parent doesn't want to get as close as I would like (x)	.277	.618
12 I worry about being abandoned by my parent (x)	.084	.602
43 I worry a fair amount about losing my parent (x)	−.255	.580
33 I resent it when my parent spends time away from me (x)	−.105	.572
25 When my parent disapproves of me, I feel really bad about myself (x)	−.198	.570
02 When I'm away from my parent I feel anxious and afraid (x)	−.449	.568
37 Sometimes I feel that I have to force my parent to show that my parent cares about me (x)	.281	.559
05 If I can't get my parent to show interest in me, I get upset or angry (x)	.058	.557
29 I often want to be really close to my parent and sometimes this makes my parent back away (x)	.202	.545
41 My desire to be very close sometimes scares people away (x)	.135	.544
08 I worry about being away from my parent (x)	−.482	.504
48 I get frustrated if my parent is not available when I need my parent (x)	−.178	.499
32 I want to get close to my parent, but I keep pulling back (v)	.409	.462
55r I don't often worry about being abandoned (x)	−.097	.251

[a] (v) indicates a pre-specified Avoidance item, (x) a pre-specified Anxiety item. Items marked "r" are reverse-coded.

[b] Absolute values greater than .35 are highlighted for ease of readability.

Table 7

CAPAI Component Loadings Compared with ECR Item-scale Correlations

Item Number and Description[c]	CAPAI[a] All Data		CAPAI[a] Pooled Covariances		CAPAI[a] Males Only		CAPAI[a] Females Only		ECR[b]	
	Av	Anx	Av	Anx	Av	Anx	Av	Anx	Av	Anx
38r - I don't mind asking my parent for comfort, advice, or help	.78	-.10	.78	-.09	.77	-.15	.81	.02	.63	
36r - I find it relatively easy to get close to my parent	.77	.05	.77	.02	.75	.00	.79	.06	.67	
35r - I usually discuss my problems and concerns with my parent	.76	-.17	.77	-.16	.78	-.12	.77	-.16	.64	
26 - I try to avoid getting too close to my parent	.74	.24	.72	.24	.77	.22	.69	.28	.68	
28r - I tell my parent just about everything	.73	-.13	.73	-.11	.73	-.14	.76	-.06	.64	
04r - I am very comfortable being close to my parent	.71	-.21	.71	-.23	.70	-.20	.73	-.23	.71	
44r - I turn to my parent for many things, including comfort and reassurance	.70	-.31	.70	-.27	.69	-.24	.74	-.27	.60	
47 - I prefer not to be too close to my parent	.69	-.04	.69	-.04	.64	.06	.74	-.11	.66	
13 - I don't feel comfortable opening up to my parent	.67	.14	.67	.17	.61	.28	.72	.13	.69	
50r - It helps to turn to my parent in times of need	.67	-.22	.67	-.21	.62	-.03	.74	-.34	.62	
23r - I feel comfortable depending on my parent	.65	-.10	.66	-.09	.62	-.14	.70	-.00	.64	
19r - I feel comfortable sharing my private thoughts and feelings with my parent	.65	-.09	.65	-.09	.62	-.04	.69	-.12	.68	
20 - I get uncomfortable when my parent wants to be very close	.63	.03	.63	.03	.60	.11	.66	-.02	.70	
07 - I find it difficult to depend on my parent	.55	.22	.54	.21	.58	.06	.51	.36	.67	
16 - Just when my parent starts to get close to me I find myself pulling away	.54	.30	.53	.28	.47	.36	.59	.23	.70	
56 - I am nervous when my parent gets too close to me	.54	.22	.53	.24	.54	.38	.52	.13	.68	
01 - I prefer not to show my parent how I feel deep down	.41	.09	.41	.09	.36	.11	.46	.10	.73	
10 - I worry that my parent won't care about me as much as I care about my parent	.17	.76	.16	.74	.25	.70	.06	.79		.65
27 - I worry a lot about my relationship with my parent	-.03	.70	-.04	.68	-.11	.62	-.01	.75		.65
09 - I need a lot of reassurance that I am loved by my parent	-.06	.70	-.07	.68	-.03	.59	-.14	.77		.56
22 - I often wish that my parent's feelings for me were as strong as my feelings are for my parent	.11	.69	.10	.68	.10	.64	.07	.73		.62
17 - I get frustrated when my parent is not around as much as I would like	-.38	.67	-.41	.63	-.35	.60	-.50	.63		.51
53 - I find that my parent doesn't want to get as close as I would like	.27	.61	.27	.61	.19	.65	.29	.61		.52
12 - I worry about being abandoned by my parent	.08	.60	.07	.58	-.02	.44	.12	.70		.67
43 - I worry a fair amount about losing my parent	-.26	.58	-.27	.59	-.26	.55	-.31	.61		.63
33 - I resent it when my parent spends time away from me	-.11	.57	-.12	.57	.05	.49	-.32	.59		.50
25 - When my parent disapproves of me, I feel really bad about myself	-.20	.57	-.21	.56	-.18	.56	-.27	.56		.50
02 - When I'm away from my parent I feel anxious and afraid	-.45	.57	-.48	.53	-.41	.53	-.57	.50		.51
37 - Sometimes I feel that I have to force my parent to show that my parent cares about me	.28	.56	.27	.56	.30	.55	.22	.57		.55
05 - If I can't get my parent to show interest in me, I get upset or angry	.05	.56	.04	.54	.06	.52	-.00	.58		.52
29 - I often want to be really close to my parent and sometimes this makes my parent back away	.20	.54	.19	.53	.15	.48	.19	.57		.60
41 - My desire to be very close sometimes scares people away	.13	.54	.12	.53	.12	.45	.10	.62		.57
08 - I worry about being away from my parent	-.49	.51	-.51	.47	-.29	.58	-.72	.34		.60
48 - I get frustrated if my parent is not available when I need my parent	-.18	.50	-.19	.48	-.19	.27	-.21	.67		.51
32 - I want to get close to my parent, but I keep pulling back	.41	.46	.40	.44	.34	.58	.43	.34	.68	
55r - I don't often worry about being abandoned	-.10	.25	-.11	.19	-.02	.12	-.22	.23		.54

[a]Entries in these columns represent principal component loadings after Varimax rotation. (Absolute values greater than .35 are highlighted for ease of readability.)

[b]Entries in these two columns represent the item-scale correlations reported by Brennan et al. (1998). [c]Items marked "r" are reverse-coded.

Table 8

Exploratory Maximum Likelihood Factor Analysis, 2 Components Extracted, Direct Oblimin Rotation

Items[a]	Factor[b]	
	1	2
38r I don't mind asking my parent for comfort, advice, or help (v)	.774	-.090
35r I usually discuss my problems and concerns with my parent (v)	.759	-.158
36r I find it relatively easy to get close to my parent (v)	.756	.048
28r I tell my parent just about everything (v)	.720	-.116
26 I try to avoid getting too close to my parent (v)	.717	.244
44r I turn to my parent for many things, including comfort and reassurance (v)	.687	-.305
04r I am very comfortable being close to my parent (v)	.686	-.207
47 I prefer not to be too close to my parent (v)	.658	-.041
50r It helps to turn to my parent in times of need (v)	.647	-.202
13 I don't feel comfortable opening up to my parent (v)	.646	.147
23r I feel comfortable depending on my parent (v)	.633	-.098
19r I feel comfortable sharing my private thoughts and feelings with my parent (v)	.631	-.089
20 I get uncomfortable when my parent wants to be very close (v)	.598	.029
07 I find it difficult to depend on my parent (v)	.524	.210
56 I am nervous when my parent gets too close to me (v)	.509	.207
16 Just when my parent starts to get close to me I find myself pulling away (v)	.503	.280
01 I prefer not to show my parent how I feel deep down (v)	.387	.091
10 I worry that my parent won't care about me as much as I care about my parent (x)	.187	.747
27 I worry a lot about my relationship with my parent (x)	-.012	.676
09 I need a lot of reassurance that I am loved by my parent (x)	-.044	.673
22 I often wish that my parent's feelings for me were as strong as my feelings are for my parent (x)	.114	.663
17 I get frustrated when my parent is not around as much as I would like (x)	-.354	.657
53 I find that my parent doesn't want to get as close as I would like (x)	.264	.580
02 When I'm away from my parent I feel anxious and afraid (x)	-.426	.565
12 I worry about being abandoned by my parent (x)	.076	.561
25 When my parent disapproves of me, I feel really bad about myself (x)	-.183	.554
43 I worry a fair amount about losing my parent (x)	-.244	.552
33 I resent it when my parent spends time away from me (x)	-.099	.531
05 If I can't get my parent to show interest in me, I get upset or angry (x)	.059	.520
37 Sometimes I feel that I have to force my parent to show that my parent cares about me (x)	.264	.517
29 I often want to be really close to my parent and sometimes this makes my parent back away (x)	.194	.507
08 I worry about being away from my parent (x)	-.459	.507
41 My desire to be very close sometimes scares people away (x)	.122	.502
48 I get frustrated if my parent is not available when I need my parent (x)	-.168	.470
32 I want to get close to my parent, but I keep pulling back (v)	.376	.421
55r I don't often worry about being abandoned (x)	-.087	.230

[a] (v) indicates a pre-specified Avoidance item, (x) a pre-specified Anxiety item.

[b] Absolute values greater than .35 are highlighted for ease of readability.

Table 9

Factor Loadings following Exploratory-Confirmatory Factor Analysis

Item[a]	Factor I	Factor II
01 (v)	.370	
02 (x)	−.562	.504
04r (v)	.709	
05 (x)		.516
07 (v)	.456	.276
08 (x)	−.579	.445
09 (x)	−.220	.671
10 (x)		.773
12 (x)		.558
13 (v)	.592	.228
16 (v)	.417	.343
17 (x)	−.517	.604
19r (v)	.640	
20 (v)	.589	
22 (x)		.670
23r (v)	.642	
25 (x)	−.324	.528
26 (v)	.636	.333
27 (x)	−.187	.673
28r (v)	.732	
29 (x)		.539
32 (v)	.256	.465
33 (x)	−.237	.515
35r (v)	.778	
36r (v)	.740	
37 (x)		.562
38r (v)	.780	
41 (x)		.517
43 (x)	−.382	.522
44r (v)	.751	−.208
47 (v)	.657	
48 (x)	−.286	.441
50r (v)	.673	
53 (x)		.622
55r (x)		.205
56 (v)	.441	.271

[a](v) indicates an Avoidance item; (x) indicates an Anxiety item.
Note: Blank entries represent a factor loading constrained to be zero.

Table 10

Pearson Correlations between Anxiety and Avoidance scales and Concurrent Measures of Intellectual Functioning (WISC-III and WAIS-R Verbal and Performance IQ) and Psychosocial Functioning (BDI-II Total score and YSR Internalizing and Externalizing scales)

		Avoidance	Anxiety
Intellectual Functioning			
Verbal IQ	Pearson Correlation	.239[a]	−.143
	Sig. (2-tailed)	.017	.156
	N	100	100
Performance IQ	Pearson Correlation	.159	−.140
	Sig. (2-tailed)	.113	.164
	N	100	100
Psychosocial Functioning			
BDI Total	Pearson Correlation	.201	.507[b]
	Sig. (2-tailed)	.030	.000
	N	117	117
YSR-Internalizing	Pearson Correlation	.191	.494[b]
	Sig. (2-tailed)	.023	.000
	N	142	142
YSR-Externalizing	Pearson Correlation	.278[b]	.348[b]
	Sig. (2-tailed)	.001	.000
	N	142	142

[a]correlation meets pre-specified significance level (alpha=.05)
[b]correlation meets pre-specified significance level (alpha=.01)

Table 11

Group Means and Pairwise Contrasts between Anxiety and Avoidance Scales and Concurrent Measures of Intellectual Functioning (WISC-III and WAIS-R Verbal and Performance IQ) and Psychosocial Functioning (BDI-II Total score and YSR Internalizing and Externalizing scales)

Concurrent Measures	Group Means				Pairwise Contrasts[a]
	Attachment Groups				
	Secure	Dismissing	Preoccupied	Fearful	
Discriminant Validity Analyses					
Verbal IQ	91.04	91.00	80.80	91.00	P < D,F,S
Performance IQ	92.38	94.37	89.45	93.11	
Convergent Validity Analyses					
BDI-II	9.92	15.62	25.43	24.12	S,D < F,P
YSR-I	46.38	55.12	63.43	67.03	S < P,F S,D < F
YSR-E	57.50	64.92	67.67	72.71	S < P S,D < F

[a]This column summarizes mean differences based on Tukey's HSD, with familywise error rate of .05. For example, S,D < F,P indicates that means for the Secure and Dismissing groups were not significantly different from one another, but were significantly lower than those of both the Fearful and Preoccupied groups.

Figure 1. Diagram of Anxiety and Avoidance in relation to Main and Solomon's (1990) Infant-Caregiver Attachment Types (reproduced from Brennan, Clark & Shaver, 1998).
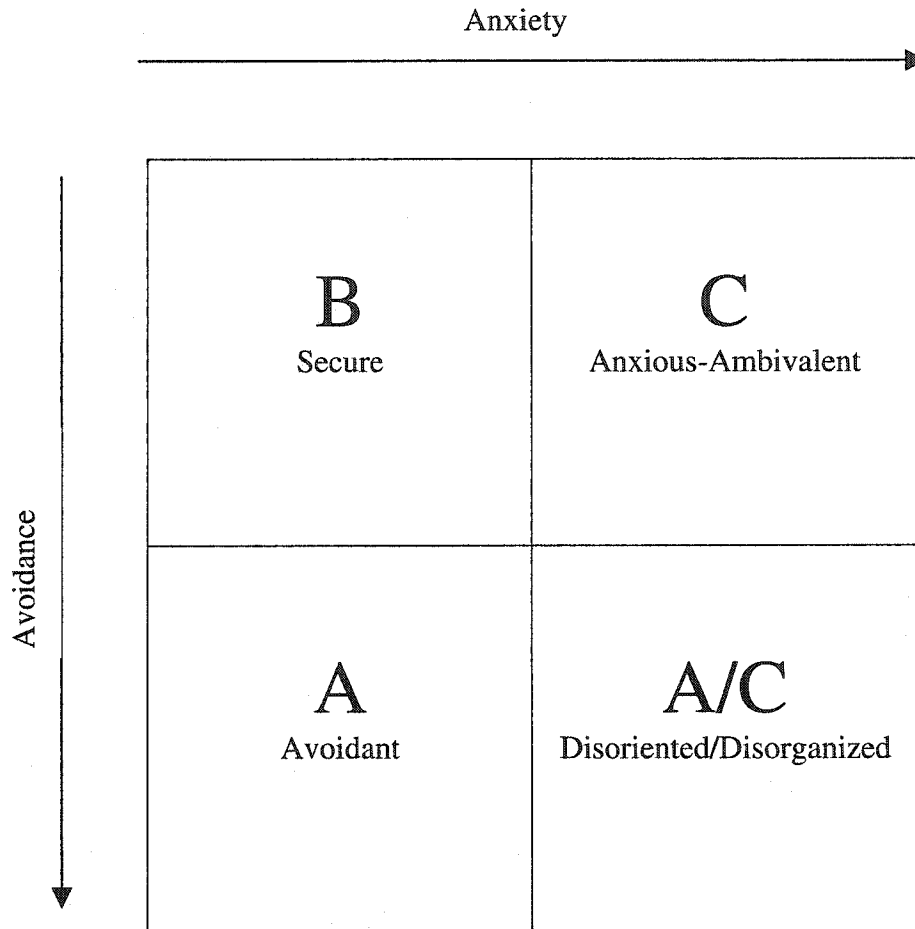
Figure 2. Bartholomew's Attachment Model reproduced from Brennan, Clark, and
Shaver (1998)

Model of Self

	positive	negative
positive	**SECURE** Comfortable with intimacy and autonomy	**PREOCCUPIED** Preoccupied with relationships
negative	**DISMISSING** Dismissing of intimacy Counterdependent	**FEARFUL** Fearful of intimacy Socially avoidant

Model
of Other

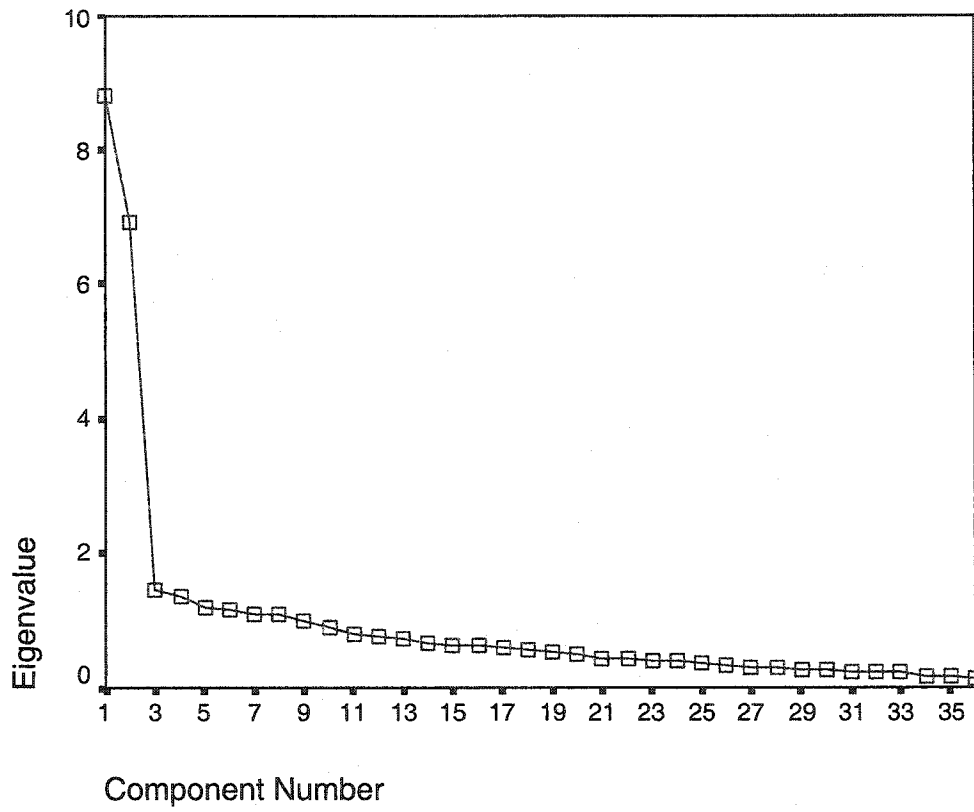*Figure 3.* Scree plot of principal components

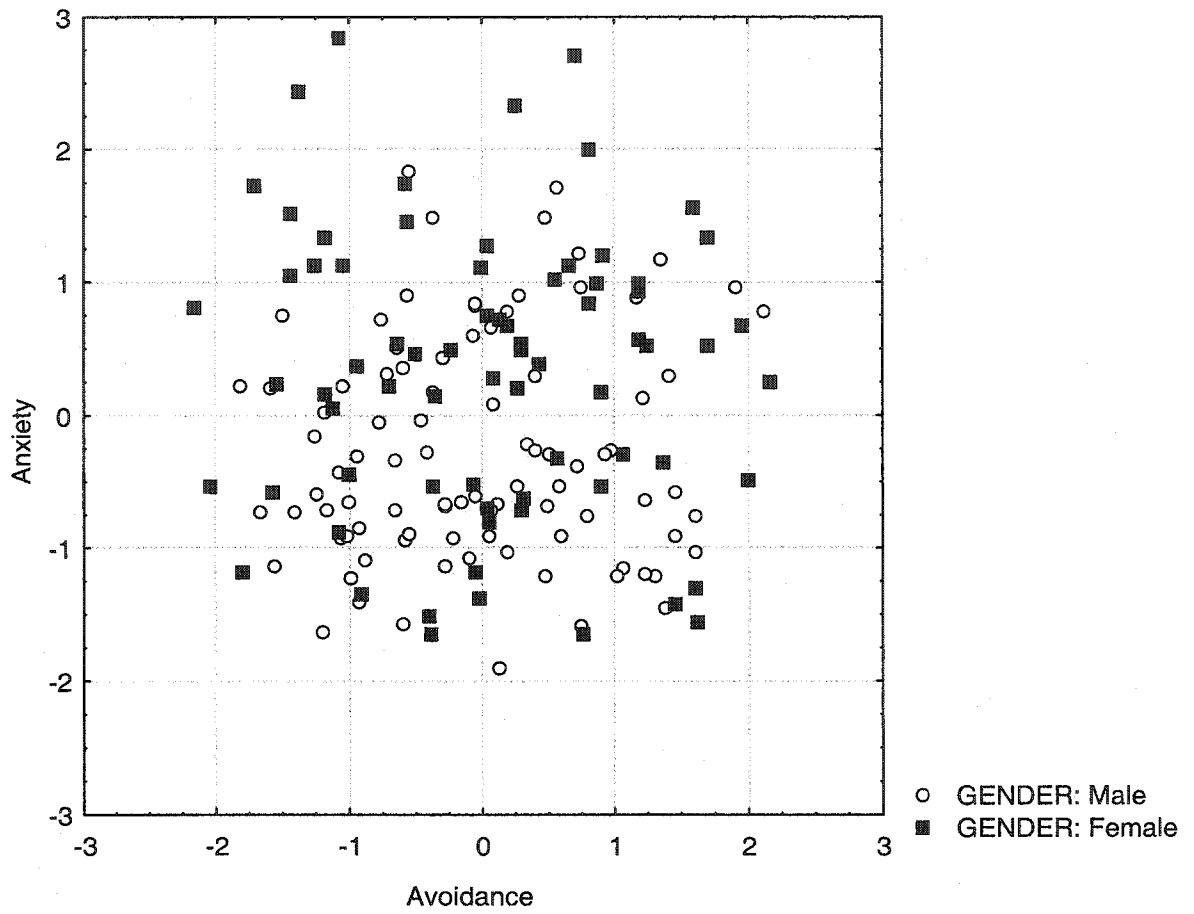*Figure 4.* Plot of principal component scores following Varimax rotation.

Figure 5. Decision rule for attachment prototype categorization based on median splits of component scores for Anxiety and Avoidance

Anxiety

		$Anx \leq Md_{anx}$ (low)	$Anx > Md_{anx}$ (high)
Avoidance	$Avo \leq Md_{avo}$ (low)	**Secure** (low Anxiety, low Avoidance)	**Preoccupied** (high Anxiety, low Avoidance)
	$Avo > Md_{avo}$ (high)	**Dismissing** (low Anxiety, high Avoidance)	**Fearful** (high Anxiety, high Avoidance)

Appendix

CAPAI-Y

DATE:_____NAME:_____

ID# (office only)_____

Please think about one parent or caregiver that has played the <u>most important part in raising you</u>.   You most likely live with this parent now, but you may be living somewhere else and still have contact with this parent. Answer all the questions based on how you feel about this parent.   <u>Before you start, who is this parent</u>?

<u>Circle ONE</u>:

MOM   DAD   STEPMOM   STEPDAD

FOSTER MOM   FOSTER DAD   AUNT   UNCLE

OTHER PERSON (who is this?):_____

Read each sentence and circle the number to show how much you agree or disagree.

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

1.   I prefer not to show my parent how I feel deep down.

       1   2   3   4   5   6   7

2.   When I'm away from my parent I feel anxious and afraid.

       1   2   3   4   5   6   7

3. I would rather take care of myself than depend on my parent.

       1   2   3   4   5   6   7

4. I am very comfortable being close to my parent.

       1   2   3   4   5   6   7

5. If I can't get my parent to show interest in me, I get upset or angry.

       1   2   3   4   5   6   7

6. I have very mixed feelings about my parent.

       1   2   3   4   5   6   7

7. I find it difficult to depend on my parent.

       1   2   3   4   5   6   7

8. I worry about being away from my parent.

       1   2   3   4   5   6   7

9. I need a lot of reassurance that I am loved by my parent.

       1   2   3   4   5   6   7

10. I worry that my parent won't care about me as much as I care about my parent.

       1   2   3   4   5   6   7

11. Often, just when you think you can depend on my parent, my parent doesn't come through for me.

       1   2   3   4   5   6   7

12. I worry about being abandoned by my parent.

       1   2   3   4   5   6   7

13. I don't feel comfortable opening up to my parent.

       1   2   3   4   5   6   7

14. I don't like it when my parent and I have to be separated.

       1   2   3   4   5   6   7

15. It is very important to me to feel independent.

       1   2   3   4   5   6   7

16. Just when my parent starts to get close to me I find myself pulling away.

       1   2   3   4   5   6   7

17. I get frustrated when my parent is not around as much as I would like.

       1   2   3   4   5   6   7

18. My feelings about my parent seem to change often.

       1   2   3   4   5   6   7

19. I feel comfortable sharing my private thoughts and feelings with my parent.

       1   2   3   4   5   6   7

20. I get uncomfortable when my parent wants to be very close.

       1   2   3   4   5   6   7

21. I have often had to get angry to get my parent's attention.

       1   2   3   4   5   6   7

22. I often wish that my parent's feelings for me were as strong as my feelings are for my parent.

       1   2   3   4   5   6   7

23. I feel comfortable depending on my parent.

       1   2   3   4   5   6   7

24. I have learned from bitter experience that my parent is not to be trusted.

       1   2   3   4   5   6   7

25. When my parent disapproves of me, I feel really bad about myself.

       1   2   3   4   5   6   7

26. I try to avoid getting too close to my parent.

                1   2   3   4   5   6   7

27. I worry a lot about my relationship with my parent.

                1   2   3   4   5   6   7

28. I tell my parent just about everything.

                1   2   3   4   5   6   7

29. I often want to be really close to my parent and sometimes this makes my parent back away.

                1   2   3   4   5   6   7

30. When I'm away from my parent, I miss my parent a great deal.

                1   2   3   4   5   6   7

31. I rely on myself, not my parent, to solve my problems.

                1   2   3   4   5   6   7

32. I want to get close to my parent, but I keep pulling back.

                1   2   3   4   5   6   7

33. I resent it when my parent spends time away from me.

                1   2   3   4   5   6   7

34. I'm often not sure how I feel about my parent.

                1   2   3   4   5   6   7

35. I usually discuss my problems and concerns with my parent.

                1   2   3   4   5   6   7

36. I find it relatively easy to get close to my parent.

                1   2   3   4   5   6   7

37. Sometimes I feel that I have to force my parent to show that my parent cares about me.

                1   2   3   4   5   6   7

38. I don't mind asking my parent for comfort, advice, or help.

                1   2   3   4   5   6   7

39. I find it difficult to trust my parent.

                1   2   3   4   5   6   7

40. I'm confident that my parent likes and respects me.

                1   2   3   4   5   6   7

41. My desire to be very close sometimes scares people away.

                1   2   3   4   5   6   7

42. I'm in no hurry to make my relationship with my parent better.

                1   2   3   4   5   6   7

43. I worry a fair amount about losing my parent.

                1   2   3   4   5   6   7

44. I turn to my parent for many things, including comfort and reassurance.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

45. I would like to spend much more time with my parent.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

46. I do not need my parent to take care of me.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

47. I prefer not to be too close to my parent.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

48. I get frustrated if my parent is not available when I need my parent.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

49. I often have trouble figuring out whether I really love my parent or not.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

50. It helps to turn to my parent in times of need.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

51. It's best to be on your guard when you're dealing with my parent.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

52. I often feel that I am not good enough for my parent.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

53. I find that my parent doesn't want to get as close as I would like.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

54. If you've got a job to do, you should do it no matter who gets hurt.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

55. I don't often worry about being abandoned.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

56. I am nervous when my parent gets too close to me.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |