

# Assessing Attachment in Adolescence: A Psychometric Study of the Child Attachment Interview

Amanda Venta  
University of Houston

Yael Shmueli-Goetz  
University College London

Carla Sharp  
University of Houston

Research has established the quality of attachment as an important correlate and predictor of psychological well-being. Adolescence represents an important transitional period and is associated with considerable changes in psychosocial functioning and centrally in attachment relationships. However, measures of attachment are rarely examined for their psychometric properties in adolescence. In an attempt to address this limitation, the current study reports on the use of the Child Attachment Interview (CAI) in adolescents. Our broad aim was to explore the psychometric properties of the CAI classifications and subscales among adolescents with psychiatric disorder in the United States by (a) evaluating interrater reliability of the CAI, (b) examining the factor structure of the CAI subscales in adolescents, (c) examining relations between CAI classifications and subscales, (d) evaluating concurrent validity by assessing relations between the CAI and established questionnaire-based measures of attachment routinely used in adolescent samples, and (e) evaluating convergent validity by exploring relations between the CAI and parent- and self-reported psychopathology and peer relations. One hundred ninety-four inpatient adolescents were recruited. Analyses revealed adequate interrater agreement and revealed 3 factors that generally mirror those associated with the Adult Attachment Interview. Concurrent and convergent evidence to support the use of CAI attachment classifications and subscale scores in adolescents was provided.

*Keywords:* attachment, adolescent, dimensional, Child Attachment Interview

Attachment theory has generated a considerable body of work and its appeal lies, in part, in the possibility of empirically testing its central ideas. At its core, attachment theory posits that in early development, the emotional and physical needs of a child and whether or not they are met inform the development of internal working models of the self and others. These representations are suggested to underlie the development of subsequent self-reliance and social competence (Bowlby, 1969, 1973). Both John Bowlby and Mary Ainsworth emphasized the link between an individual's early experience with caregivers and the individual's capacity to form relationships (Ainsworth, 1989; Bowlby, 1979), thereby influencing many aspects of later functioning. Bowlby (1969, 1982) introduced the term *goal-corrected partnership* to capture the process of negotiation between parent and child in making decisions, particularly those pertinent to the child's sense of security.

The parents' capacity to maintain a goal-corrected partnership with their child is particularly important at times of conflict, which increase considerably during adolescence (Allen, Hauser, Bell, & O'Connor, 1994). Establishing a goal-corrected partnership during the early years is thought to foster the creation of flexible strategies for negotiation with parents (particularly around increased autonomy) during the transition through adolescence and hence security (Kobak, Cole, Ferenz-Gillies, Fleming, & Gamble, 1993).

Attachment security is central for adolescent well-being with the greatest consequences of attachment insecurity in the interpersonal domain, that is, negative consequences in family, friend, and romantic relationships (Berlin, Cassidy, & Appleyard, 2008). This has been borne out by a recent meta-analytic study from nearly 6,000 children, confirming that children with a secure attachment in the early years are significantly less likely to develop behavior problems across childhood (Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010). In addition, early security has been associated with lower rates of delinquent behavior and more positive peer interactions in adolescence (Allen, Porter, McFarland, McElhaney, & Marsh, 2007; Fearon et al., 2010). Concurrent assessments of adolescent attachment have also provided compelling evidence for the importance of attachment security. Attachment insecurity has been shown to be associated with suicide-related behaviors (Adam, Sheldon-Keller, & West, 1996), greater use of residential treatment (Allen, Hauser, & Borman-Spurrell, 1996) and inpatient admissions (Rosenstein & Horowitz,

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Amanda Venta, Department of Psychology, University of Houston; Yael Shmueli-Goetz, Department of Clinical and Health Psychology, University College London, London, England; Carla Sharp, Department of Psychology, University of Houston.

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Correspondence concerning this article should be addressed to Carla Sharp, Department of Psychology, University of Houston, 126 Heyne Building, Houston, TX 77204. E-mail: csharp2@uh.edu

1996), and a range of psychopathology including internalizing and externalizing problems (Allen, 2008; DeKlyen & Greenberg, 2008). Together, these findings highlight the importance of secure attachments to later adaptation and the need for further elucidation of their developmental correlates beyond the early years. Moreover, these findings suggest that the assessment of attachment security constitutes an important component of treatment and prevention research, enabling the better targeting of these consequences of attachment insecurity (Kobak & Madsen, 2008; Slade, 2008).

But how might attachment in adolescence be best assessed? Well-established behavioral measures of attachment, such as the Strange Situation paradigm (Ainsworth, Blehar, Waters, & Wall, 1978), are available for infants and preschool children but have not been extensively used, nor rigorously evaluated in older children (Shmueli-Goetz, Target, Fonagy, & Datta, 2008). Beyond infancy, and alongside the behavioral approach, assessments of attachment have largely involved the use of semiprojective play techniques such as the story stem procedure (e.g., Emde, Wolf, & Oppenheim, 2003; Green, Stanley, Smith, & Goldwyn, 2000). The central notion is that attachment-related stories provide an accurate assessment of the representation of attachment the children hold and will thus reflect their attachment organization in the same way that behavioral patterns do. Although these approaches hold great merit in assessing attachment through the early school years, they are unlikely to sufficiently activate the attachment system and hence are developmentally inappropriate in middle childhood and adolescence.

A possible alternative would be to use the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985), a semistructured interview designed to elicit attachment representations in adulthood. However, there are inherent methodological issues in administering adult measures to populations in which their psychometric properties have not been evaluated. Moreover, using the AAI in younger populations may lead to over- or underrepresentation of attachment patterns that may not necessarily reflect true development (e.g., Ammaniti, van IJzendoorn, Speranza, & Tambelli, 2000). Indeed, Kobak and colleagues (Kobak, Cassidy, Lyons-Ruth, & Ziv, 2006; Kobak, Cassidy, & Ziv, 2004) asserted that threats to secure attachment differ across the life span, changing from physical separations in infancy to verbal threats of rejection or abandonment in later developmental periods. Further, Allen and Land (1999) described the development of autonomy as a core feature of adolescence due to transitions in the role of attachment figures with maturity. Such developmental changes in attachment relationships suggest the need for relevant and developmentally appropriate assessment tools. Still, in a review of studies exploring adolescent attachment (Kobak et al., 2006), more than half of studies noted (e.g., Allen et al., 1996; Kobak, Sudler, & Gamble, 1991; Marsh, McFarland, Allen, McElhaney, & Land, 2003; Nakash-Eisikovits, Dutra, & Westen, 2002) relied upon adult attachment classifications, highlighting this measurement gap. Notwithstanding the above limitations, the strength of the AAI, as an assessment of attachment in adulthood, is that it is not reliant on self-report and is therefore more likely to elicit attachment representations that are outside conscious awareness. Indeed, the value of assessing attachment via implicit measures has been well documented (see Crowell, Fraley, & Shaver, 2008).

Numerous self-report based measures have also been used among adolescents, and perhaps due to the prevailing view that attachment security cannot be directly observed but rather inferred from what is observable (Solomon & George, 2008), each measure carries a slightly different operational definition of attachment security and taps into different components of attachment. For instance, the Security Scale developed by Kerns, Klepac, and Cole (1996) is a self-report measure that has separate forms for mother and father and produces continuous indices of security based on availability and dependability. The Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1989), however, produces a continuous index of security based on trust, communication, and alienation. There has also been a tendency for studies of adolescent attachment to rely upon general indices of interpersonal functioning (related to, but not consistent with, attachment) in order to operationalize attachment. Specifically, attachment research frequently assesses separation anxiety (Brown & Wright, 2003; Wright, Briggs, & Behringer, 2005), parental bonding (Rossow & Wichstrøm, 2010; Wichstrøm, 2009), and family functioning (Lyon et al., 2000) as proxies for attachment security.

A recent development in the landscape of attachment measures may hold some promise. The Child Attachment Interview (CAI; Target, Fonagy, Shmueli-Goetz, Datta, & Schneider, 2007) was originally developed to address the measurement gap in middle childhood but may also prove valuable for addressing the aforementioned gap in the measurement of adolescent attachment. The CAI owes much to the AAI but has notable conceptual and methodological differences. It was designed to access children's mental representations of their attachment relationships through direct questioning and calls on children to describe and reflect on their current attachment relationships and experiences. The CAI captures information about the current availability and responsiveness of attachment figures, as perceived by the child, as well as the child's valuing of attachment relationships. There is a focus on times of illness, loss, abuse, and separation—times when the attachment system is likely to be more readily activated. Further, the CAI acknowledges unique structural and temporal aspects of attachment narratives among children and adolescents, in order to avoid confounding immaturity with preoccupation or disorganization in attachment. Unlike with the AAI, assessment of attachment strategies is independent for each attachment figure and includes an analysis of both verbal and nonverbal behavior. The CAI incorporates both dimensional and categorical variables in its coding scheme, making this measure well suited for detailed analyses of individual differences (captured dimensionally) as well as broad differences related to attachment classifications.

The strength of the CAI lies in its rigorously evaluated psychometric properties, as it appears to be the only interview-based measure of attachment security (acceptable for youth) that reports a complete psychometric evaluation (Shmueli-Goetz et al., 2008). In the original publication, Shmueli-Goetz et al. (2008) assessed a large cohort comprising a community sample and a clinical sample. Interrater agreement on scale scores ranged from .7 to .9 (reflecting good agreement), and agreement for the four classifications (i.e., Secure, Dismissing, Preoccupied, and Disorganized) ranged from 78% to 85% for mother, with slightly lower agreement for father classifications. High concordance (92%) between classification with respect to mother and father was noted. Test-retest reliability of both scale scores and attachment classifications

across a 3-month period and 1 year was shown to be good ( $\alpha = .7$ – $1.0$  and  $\alpha = .7$ – $.8$ , respectively). Adequate internal consistency of the scale scores and classifications was also noted ( $\alpha = .8$ – $.9$  for two-way and  $\alpha = .74$ – $.89$  for four-way; see also Humfress, O'Connor, Slaughter, Target, & Fonagy, 2002). Good criterion validity has also been demonstrated with CAI classifications and the coherence subscale, discriminating community- from clinic-referred children with effect sizes in the range of 0.60–0.70. Attachment classifications derived from the CAI significantly correlate with the Separation Anxiety Test (64% agreement; Wright, Binney, & Smith, 1995) and with measures of social adaptation. Further, mothers' state of mind with respect to attachment assessed with the AAI significantly predicts their children's attachment status on the CAI (69% agreement). Critically, attachment classifications are independent of age, gender, socioeconomic status, ethnicity, language ability, and family composition (Shmueli-Goetz et al., 2008; Target, Fonagy, & Shmueli-Goetz, 2003). In keeping with expected associations, CAI insecurity has been associated with greater internalizing and externalizing behavior problems.

The recent development of the CAI may open new possibilities for exploring attachment in adolescence, as it may provide access to internal representations of attachment that are outside conscious awareness and not easily assessed with self-report measures. Considering separately attachment to mother and father will redress the imbalance in existing literature, as it has largely focused on the mother–child dyad (Freeman, Newland, & Coyl, 2010), despite the unique role of fathers in child development (Grossmann et al., 2002; Grossmann, Grossmann, Kindler, & Zimmermann, 2008). Perhaps for these reasons, studies using the CAI with adolescents have begun to emerge. For instance, Scott, Briskman, Woolgar, Humayun, and O'Connor (2011) used the CAI in a large community-based sample to show association between secure attachment and psychological adjustment. Additionally, Fearon, Shmueli-Goetz, Viding, Fonagy, and Plomin (2013) completed a large-scale study assessing the behavioral genetics of attachment in adolescence in a large sample of adolescent twin pairs (the Twin Early Development Study) in order to examine concurrent links between attachment insecurity, antisocial behavior, and several other psychosocial variables. However, neither of these studies has systematically and rigorously evaluated the psychometric properties or factor structure of the CAI in this age group. Moreover, these samples were based in the United Kingdom and were drawn from the community, and it is thus unclear whether similar findings would be replicated in other cultures and among clinical populations. Cronbach and Meehl (1955), the first to advocate for a system of validity testing, which they termed the nomological net, emphasized that validity testing must evaluate a measure across multiple settings and situations in order to create a comprehensive network of knowledge regarding its accuracy to correctly classify individuals. It is not enough to take validity research conducted with one population and assume the measure is equally applicable to another population under different circumstances.

With the above considerations in mind, the broad aim of the current study was to explore the psychometric properties of the CAI classifications and subscales among adolescents with psychiatric disorder in the United States for the first time. This study represents the first attempt to extend use of the CAI to older children and those with a high level of psychopathology. In this

respect, the study builds on, and adds to, the validation work reviewed above. Under this broad aim, several specific aims were subsumed: (a) evaluating interrater reliability of the CAI; (b) examining the factor structure of the CAI subscales in adolescents; (c) examining relations between CAI classifications, subscales, and factors; (d) evaluating concurrent validity by assessing relations between the CAI against self-report measures of attachment routinely used in adolescent samples, each tapping into slightly different conceptualizations of attachment; and (e) evaluating convergent validity by exploring relations between the CAI and psychopathology and peer relations. Broadly, it was expected that adolescents with insecure attachment patterns on the CAI would score lower for attachment security on self-report measures, although these relations were not expected to be universal or large, based on aforementioned differences between interview- and self-report-based measures. Further, it was expected that attachment status, as determined by the CAI, would distinguish adolescents with higher rates of psychopathology and poorer peer relations.

## Method

### Participants

One hundred ninety-four adolescents between the ages of 12 and 17 were recruited from an inpatient unit that serves adolescents with severe treatment-refractory, psychiatric disorders. Approximately 80% of adolescents in the sample were taking psychiatric medications at the time of admission, and approximately 50% had been previously admitted to a psychiatric hospital. The modal number of psychiatric diagnosis in this sample was 2. The most common psychiatric diagnoses (nonmutually exclusive) were major depressive disorder (39%), obsessive-compulsive disorder (25%), and oppositional defiant disorder (22%). The present study adopted the following exclusion criteria: (a) diagnosis of any psychotic disorder and/or (b) mental retardation. Inclusion criteria were age between 12 and 17 and English fluency. The sample was 59.30% ( $n = 115$ ) female, and the average age was 15.97 years ( $SD = 1.40$ ). The ethnic breakdown of the sample was as follows: 90.2% White, 3.1% Hispanic, 2.1% Asian, 2.1% bi- or multiracial, 0.5% Black, and 2.0% who identified as "other." The sample was generally of high socioeconomic status, with approximately 70% of parents reporting an annual household income greater than or equal to \$100,000.

### Measures

**Child Attachment Interview.** The CAI (Target et al., 2007) was used to assess attachment security by accessing adolescents' mental representations of attachment relationships. The interview was originally intended for use with 8- to 12-year-olds, but has been used with adolescents up to the age of 16. The development of the interview and coding system was informed by existing methodologies including the AAI's focus on discourse analysis, the Strange Situation procedure's (Ainsworth et al., 1978) focus on meaningful behaviors in context, and Luborsky and Crits-Christoph's (1990) system of partitioning a narrative into discreet relationship episodes. Although the CAI draws quite heavily on the AAI, there are some critical differences. A more flexible and developmentally appropriate approach is advocated to assist chil-



dren with its demands without compromising validity. Additionally, because of children's limited attentional capacities, the interview is considerably shorter, with a focus on recent events or episodes as opposed to retrospective accounts.

The interview protocol contains 17 questions designed to elicit children's self-representations and representations of primary attachment relationships. The focus of the interview is on times of conflict, hurt, illness, distress, separation, and loss. Although this produces a bias toward "negative" events, it is at those times that children are more likely to call upon their attachment figure as a secure base. Children are assessed on their ability to describe their experience coherently and collaboratively and on their capacities to reflect on these experiences and their impact on them. Throughout the interview, prompts are used to scaffold or help children tell their stories with a focus on emotional processing, that is, how they feel, how others might feel, what they think about situations, and so forth. The interview must be videotaped and transcribed to aid in coding, which may only be conducted by individuals who have completed training and established reliability with the measure's authors.

The CAI coding and classification system comprises nine subscales, all designed to assess the child's overall current state of mind with respect to attachment, as reflected in both narrative and nonverbal behavior. The subscales, described in greater detail in the Appendix, include emotional openness, balance of positive and negative reference to attachment figures, use of examples, preoccupied anger, idealization, dismissal, resolution of conflicts, and overall coherence. A score between 1 and 9 is assigned for each of the scales, based on a careful analysis of the narrative. It is important to note that these subscales are used by the coder to quantify the interview narrative along content areas thought to relate to attachment security. In that sense, these subscales represent nonmutually exclusive domains relevant to an ultimate attachment classification, rather than theoretical or statistically derived dimensions underlying attachment security. According to the distribution of these subscale scores (detailed in Appendix), the coder makes a determination about the child's attachment classification with each caregiver, choosing from secure, insecure-dismissing, insecure-preoccupied, and insecure-disorganized.

Three of the scales—namely, preoccupied anger, idealization, and dismissal—are rated separately for each attachment figure (for a total of 11 subscales), with the remainder of the scales rated across the narrative as a whole. These three scales are assigned to each caregiver independently based on the rationale that these scales capture distinct, context-specific attachment strategies that may be different in each relationship. Moreover, these scales are highly determinant of the ultimate attachment classification with a given caregiver, such that a high score on the dismissing scale with respect to mother will invariably lead to a dismissing classification with mother. The other scales, however, are viewed as capturing a general capacity reflected in the whole interview narrative and are not as clearly reflective of a particular attachment classification. That is, the resolution of conflict score will provide valuable information regarding security, but a high score is not essential for a secure classification with either caregiver. Additionally, these three scales are considered indicators of insecurity, and therefore are scored opposite to the other five scales (which are considered indices of security).

**Measures to assess concurrent validity.** Because it is well documented that self-report measures of attachment each tap into slightly different aspects of attachment, three measures were used independently. Specifically, adolescents completed the Kerns Security Scale (KSS; Kerns et al., 1996), a 15-item self-report measure assessing an attachment figure's (in this case both mother and father) responsiveness and availability and the child's perceived ability to depend upon the parent. The measure is rated on a 4-point scale in which responses are selected based on Harter's (1982) format (i.e., "some kids . . ." vs. "other kids . . ."). There is a separate form for mothers and fathers, though the questions are identical. A sample item is "Some kids find it easy to trust their mom, but other kids are not sure if they can trust their mom." After deciding which statement applies most to them, they select *really true for me* or *sort of true for me*. The measure produces an index of perceived availability, perceived dependability, and total security. Adequate psychometric properties have been previously demonstrated (Kerns, Schlegelmilch, Morgan, & Abraham, 2005), and in the present study, internal consistency was good, with  $\alpha = .91$  (mother form) and  $\alpha = .90$  (father form).

The mother and father subscales of the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1989) were also used. These subscales measure the extent to which children view their parents as sources of psychological security. Twenty-five mother and 25 father items are scored on a 5-point Likert scale (ranging from 1 = *almost never or never true* to 5 = *almost always or always true*), yielding a total score and trust, communication, and alienation (reversed such that higher scores correspond to less alienation) subscales for each parent. Sample items include "I can count on my mother when I need to get something off my chest" and "I like to get my father's point of view on things I'm concerned about." Previous research demonstrated adequate internal reliability (Armsden & Greenberg, 1989), as does the present study ( $\alpha = .80$  for mother and  $\alpha = .74$  for father items).

The Parental Bonding Instrument (PBI; Parker, Tupling, & Brown, 1979) was also used to assess concurrent validity. This 25-item self-report measure includes two scales measuring the respondent's perceived care and overprotection regarding each parent. Each item is rated on a 4-point Likert scale (3 = *very like* to 0 = *very unlike*). The respondent is asked to remember interactions with caregivers (separate forms for mother and father), and sample items include "spoke to me in a warm and friendly voice," "seemed emotionally cold to me," and "appeared to understand my problems and worries." The measure has demonstrated adequate internal consistency and retest reliability (Parker et al., 1979), and in the present study, internal consistency was adequate ( $\alpha = .67$  for mother and  $\alpha = .68$  for father).

**Measures to assess convergent validity.** Questionnaire-based measures of psychopathology and attachment to peers were selected in light of evidence suggesting that parent attachment influences attachment to peers (Berlin et al., 2008) and previous research tying attachment insecurity to more prevalent psychopathology (Allen, 2008).

Therefore, the peer scales of the IPPA (Armsden & Greenberg, 1989) were used to evaluate the extent to which children view their close friends as sources of psychological security. This scale consists of 25 items scored on a 5-point Likert scale (ranging from 1 = *almost never or never true* to 5 = *almost always or always true*), yielding a total score and trust, communication, and alien-

ation (reversed such that higher scores indicate less alienation) subscales. A sample item includes “I can tell my friends about my problems and troubles.” Internal reliability for this scale in the present study was  $\alpha = .80$ .

Psychopathology was assessed continuously with both parent and self-report. The Youth Self-Report (Achenbach & Rescorla, 2001) is a self-report questionnaire for use with adolescents between the ages of 11 and 18. The measure contains 112 problem items, each scored on a 3-point scale (0 = *not true*, 1 = *somewhat or sometimes true*, 2 = *very or often true*). The measure yields a number of scales, some empirically derived (the Syndrome Scales) and some theoretically based (the DSM-Oriented Scales). In this study, the DSM-Oriented Scales assessing affective, anxiety, somatic, attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), and conduct problems were used to best approximate clinically used diagnostic categories. The Child Behavior Checklist (Achenbach & Rescorla, 2001) is a parent report measure for use with children ages 6 to 18. Like the Youth Self-Report, it contains 112 problem items rated on the same scale. The DSM-Oriented Scales of the Child Behavior Checklist were also used.

## Procedure

This study was approved by the appropriate institutional review board. All adolescents admitted to an inpatient psychiatric unit were approached on the day of admission about participating in this study. Informed consent from the parents was collected first, and if granted, assent from the adolescent was obtained in person. Adolescents were then consecutively assessed by doctoral-level clinical psychology students, licensed clinicians, and/or trained clinical research assistants. Interviews were conducted independently and in private. They were videotaped, transcribed, and coded by certified coders. Because this study was conducted in a naturalistic setting, the order of assessments was random, and all adolescents were assessed within 2 weeks of admission. Average length of stay in this program was 4–6 weeks.

## Results

### Descriptive Results

Overall, 30.4% of the sample was classified as secure with their mother, and 69.5% were classified as insecure (38.1% dismissing, 14.4% preoccupied, and 17.0% disorganized). The same general distribution was found for attachment classifications with respect to father. Concordance between maternal and paternal attachment was high, with 94.8% of adolescents having the same two-way classification (secure vs. insecure) for both parents and 87.9% of adolescents showing agreement in the four-way classification (secure, dismissing, preoccupied, and disorganized). Nevertheless, all comparisons in the sections below were made separately for mother and father to remain true to the aim of evaluating the CAI as originally intended. No significant attachment group differences were noted with regard to sex, ethnicity, age, household income, psychiatric medication use, or previous psychiatric hospitalization. These variables were therefore not included in subsequent analyses.

### Interrater Reliability of the CAI

Interrater agreement for the CAI classifications was computed based on approximately 20% of the sample (38 randomly selected interviews), as rated by two independent coders who had completed the reliability training with the measure’s authors. With regard to mother, interrater agreement was substantial (according to Viera & Garrett, 2005):  $\kappa = .64$  for the two-way classification and  $\kappa = .59$  for the four-way classification. With regard to father, interrater agreement was somewhat lower:  $\kappa = .56$  for the two-way classification and  $\kappa = .52$  for the four-way classification (moderate agreement in both cases; Viera & Garrett, 2005). This translated to agreement 84.2% of the time in the two-way classification and 73.7% of the time in the four-way classification for mother and reduced proportions, 81.6% and 65.8%, respectively, for father. Interclass correlations between the two raters’ CAI subscale scores showed significant correlations on all subscales ( $p \leq .001$  in all cases) and ranged between .53 (dismissing with regard to father) and .90 (idealization with regard to father). The average correlation was .66. Ten percent of interviews were also evaluated by the lead author on the development study of the CAI (Shmueli-Goetz et al., 2008). Results showed substantial agreement: 85.7% for the two-way classifications and 71.4% for the four-way classifications.

### Internal Factor Structure of the CAI

A maximum likelihood factor analysis with oblique, promax rotation was used to gain a better understanding of the factor structure underlying the CAI. Oblique rotation was selected because we expected that the emerging factors would be correlated (Thompson, 2004, Chapter 6), given previously noted correlations among CAI subscales (Shmueli-Goetz et al., 2008). All subscales of the CAI were analyzed together; that is, the factor analysis was conducted with scale scores for maternal preoccupied anger, maternal dismissing, maternal idealizing; paternal preoccupied anger, paternal dismissing, paternal idealizing; and general emotional openness, use of examples, balance of positive and negative, resolution of conflicts, and overall coherence. The preoccupied anger, dismissing, and idealization subscales were reverse coded prior to factor analyzing, so that for all subscales, higher scores are associated with indicators of security. As can be seen in Table 1, three components were extracted from the 11 CAI subscales. Kaiser’s (1960) eigenvalue-greater-than-1 rule was used to extract three factors—all others had eigenvalues less than 1.00. A cutoff score of 0.4 was used to analyze factor loadings according to convention, such that items with a loading greater than or equal to 0.4 with one factor were retained on that factor. No subscale loaded onto multiple factors.

The first factor was named the “coherence” factor (eigenvalue = 5.09), given that, conceptually, all subscales that loaded onto it are associated with an adolescent’s ability to coherently, or authentically and realistically, discuss his or her attachment relations. The second factor, named “anger” (eigenvalue = 1.66), was associated with Preoccupied Anger with regard to both parents. High scores on this factor indicate less preoccupied anger. The third factor (eigenvalue = 1.62) was associated with Idealization to both parents and was therefore named the “idealization” factor. High scores on this factor indicate less idealizing. Overall, higher scores on any of these factors are indicators of greater security.

Table 1  
Rotated Pattern Matrix of the Child Attachment Interview

Scale	Factor		
	1	2	3
Emotional Openness	0.91	-0.04	0.11
Balance of Descriptions	0.61	0.38	0.14
Use of Examples	0.92	-0.06	0.00
Preoccupied Anger With Mother	-0.15	0.83	-0.24
Preoccupied Anger With Father	-0.09	0.62	0.03
Idealization With Mother	-0.05	-0.18	1.03
Idealization With Father	0.03	-0.02	0.44
Dismissal of Mother	0.87	-0.31	-0.31
Dismissal of Father	0.82	-0.23	-0.05
Resolution of Conflict	0.66	0.38	0.00
Overall Coherence	0.80	0.19	0.14

Note. Extraction method: maximum likelihood. Rotation method: promax with Kaiser normalization. Prior to completing factor analysis, the Preoccupied Anger, Idealization, and Dismissal scales were reversed so that all scales were rated with the same direction, with higher scores indicating more positive outcomes (e.g., higher scores indicate higher emotional openness and lower preoccupied anger).

The coherence factor was correlated with the anger factor at  $r = .43$  and with idealization factor at  $r = .20$ , and the anger factor was correlated with the less idealization factor at  $r = .21$ . Together, the three factors, rotated with the promax with Kaiser normalization method, explained 66.43% of the variance of all 11 scales. Nonetheless, all 11 subscales were used for subsequent analyses, given the focus of the current article on examining the psychometric properties of the CAI as it is typically used. These derived factors were also used in subsequent analyses by summing the subscale scores associated with each of the aforementioned factors.

### Relations Between CAI Classifications, Subscales, and Factors

Point biserial correlations were used to explore relations between CAI classifications and dimensional ratings on the CAI subscales as well as the three aforementioned factors. These results are presented in Table 2, mirroring theoretical relations between the CAI subscales and classifications presented in the Appendix. To that end, a secure classification was positively correlated with subscale indicators of security and negatively correlated with insecure subscales (i.e., anger, idealizing, and dismissal). Similarly, all three insecure classifications were negatively correlated with most indicators of security and positively correlated with their respective subscale (preoccupied anger or dismissal and idealization).

Expected relations between the factors and CAI classifications were also noted such that a secure classification was associated with higher coherence, less anger, and less idealization. Likewise, the dismissing and disorganized classifications were both associated with decreased coherence, and the preoccupied classification was, as expected, associated with greater anger.

### Concurrent Validity of CAI Classifications

**Mothers.** Independent samples  $t$  tests and univariate analyses of variance were used to compare adolescents across maternal attachment classifications on the basis of several measures of

Table 2  
Point Biserial Correlations Between Child Attachment Interview (CAI) Categorical Classifications, Subscales, and Factors

Classification	CAI subscale											Factor		
	Openness	Balance	Examples	Anger M	Anger P	Idealize M	Idealize P	Dismiss M	Dismiss P	Conflict	Coherence	Coherence	Anger	Idealize
Secure	.66***	.73***	.65***	-.39***	-.29***	-.15*	-.17*	-.50***	-.51***	.70***	.72***	.75***	.40***	.19**
Dismissing	-.37***	-.29***	-.36***	-.18*	-.02	.16*	.05	.52***	.41***	-.28***	-.31***	-.46***	.12	-.13
Preoccupied	-.02	-.19**	-.03	.60***	.33***	-.13	.05	-.24**	-.11	-.17*	-.06	.00	-.55***	.05
Disorganized	-.33***	-.35***	-.29***	.15*	.07	.11	.10	.16*	.19**	-.33***	-.41***	-.34***	-.13	-.12
Secure	.68***	.73***	.64***	-.29***	-.33***	-.19**	-.15*	-.42***	-.60***	.71***	.74***	.76***	.37***	.19**
Dismissing	-.37***	-.24**	-.37***	-.07	-.19**	.12	.17*	.42***	.54***	-.26***	-.31***	-.45***	.16*	-.16*
Preoccupied	-.02	-.25***	-.01	.32***	.62***	-.02	-.13	-.20**	-.15*	-.22***	-.10	-.01	-.56***	.09
Disorganized	-.33***	-.35***	-.29***	.15*	.07	.11	.09	.16*	.12*	-.34***	-.41***	-.34***	-.13	-.12

Note. With regard to extracted factors, higher scores are associated with indicators of security (i.e., more coherence, less anger, and less idealization). Openness = Emotional Openness; Balance = Balance of Positive and Negative; Examples = Use of Examples; Anger = Preoccupied Anger; Idealize = Idealization; Dismiss = Dismissal; Conflict = Resolution of Conflict; M = maternal; P = paternal.  
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

self-reported attachment security: KSS security, perceived availability, and perceived dependability; IPPA total attachment, trust, and communication; and PBI care and overprotection. These results, which are presented in Tables 3 and 4, revealed higher self-report means on indices of security among adolescents with a secure classification. The only exceptions to this pattern were the IPPA Alienation and PBI–Mother Overprotection scales, which did not differentiate between groups. Group means on all other self-report scales revealed a general trend from highest to lowest as follows: secure, disorganized, dismissing, and preoccupied.

Post hoc Tukey honestly significant difference comparisons were made in order to evaluate pairwise differences between maternal attachment classifications. With regard to the KSS, adolescents in the secure group had higher scores than those coded as dismissing and preoccupied for total security, availability, and dependability. Adolescents with a secure classification also reported significantly higher total attachment, trust, and communication on the IPPA than preoccupied adolescents. Unexpectedly, the disorganized group reported significantly greater trust than the preoccupied group on this measure. Finally, on the PBI care subscale, both the secure and the dismissing groups reported greater care than the preoccupied group.

**Fathers.** Independent samples *t* tests and univariate analyses of variance were also used to compare adolescents across paternal attachment classifications on the basis of several measures of self-reported attachment security, and these results are presented in Tables 3 and 4. Overall, self-report measures were less reflective of CAI classifications for fathers, with four out of nine comparisons (IPPA total, communication, and alienation and PBI overpro-

tection) failing to detect group differences. Still, adolescents with a secure classification demonstrated higher mean scores, as expected, on all KSS scales as well as the IPPA trust scale.

Post hoc Tukey honestly significant difference comparisons again showed that the secure group had significantly higher scores on KSS total security, availability, and dependability than both the preoccupied and dismissing groups. Secure adolescents also reported greater IPPA trust and greater PBI care than the preoccupied. Again, the disorganized group mean on IPPA trust was significantly higher than for the preoccupied group.

### Concurrent Validity of the CAI Subscales

Correlations between the CAI's 11 subscales and several self-reported measures of attachment are presented in Table 5. Broadly, the CAI subscales corresponding to indices of security (i.e., emotional openness, balance, use of examples, resolution of conflict, and coherence) correlated in the expected directions with the KSS, although many nonsignificant correlations were noted. Agreement between self-report and CAI subscales was generally stronger with regard to maternal measures. As expected, the CAI Preoccupied Anger and Dismissal subscales were negatively correlated with self-report indices of security and positively correlated with self-report scales relating to alienation and overprotection. Unexpectedly, though, the CAI Idealization subscales were positively correlated with self-report indices of total security as well as availability, dependability, and care, indicating that individuals rated as more idealizing on the CAI produced self-report responses typically associated with greater security. Nonsignificant relations included

Table 3  
*Independent Samples *t* Tests Comparing Adolescents Classified as Secure and Insecure on the Child Attachment Interview (CAI) on the Basis of Several Measures of Self-Reported Attachment Security*

Measure	Secure		Insecure		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Maternal CAI						
KSSM Total	3.20	0.59	2.74	0.75	4.54	<.001
KSSM Availability	3.13	0.61	2.63	0.78	4.75	<.001
KSSM Dependability	3.16	0.60	2.68	0.76	4.62	<.001
IPPAM Total	83.44	13.36	60.32	36.03	2.61	.014
IPPAM Trust	36.22	5.56	24.82	16.20	2.91	.007
IPPAM Communication	29.00	5.94	19.95	12.44	2.73	.011
IPPAM Alienation	17.78	4.41	13.91	8.84	1.62	.117
PBIM Care	29.58	7.22	24.31	9.75	3.54	.001
PBIM Overprotection	15.53	7.55	18.24	8.31	-1.78	.077
Paternal CAI						
KSSF Total	2.83	0.75	2.50	0.72	3.77	<.001
KSSF Availability	2.78	0.78	2.45	0.72	3.51	.001
KSSF Dependability	2.80	0.75	2.47	0.70	3.65	<.001
IPPAF Total	78.67	19.77	65.95	39.63	1.73	.095
IPPAF Trust	35.44	9.21	27.64	17.27	2.12	.043
IPPAF Communication	25.33	6.86	22.14	14.77	1.44	.161
IPPAF Alienation	18.11	5.33	14.91	8.54	0.71	.481
PBIF Care	23.24	11.13	20.31	10.70	3.43	.001
PBIF Overprotection	13.37	8.82	12.39	9.08	0.73	.470

*Note.* KSSM = Kerns Security Scale–Mother; KSSF = Kerns Security Scale–Father; IPPAM = Inventory of Parent and Peer Attachment–Mother; IPPAF = Inventory of Parent and Peer Attachment–Father; PBIM = Parental Bonding Inventory–Mother; PBIF = Parental Bonding Inventory–Father.



**Table 4**  
*Univariate Analyses of Variance Comparing Attachment Groups With Regard to Child Attachment Interview (CAI) Classifications on Various Other Measures of Self-Reported Attachment Security*

Measure	Secure		Dismissing		Preoccupied		Disorganized		F	p
	M	SD	M	SD	M	SD	M	SD		
Maternal CAI										
KSSM Total	3.20	0.59	2.79	0.65	2.48	0.83	2.85	0.85	7.42	<.001
KSSM Availability	3.13	0.61	2.65	0.73	2.44	0.81	2.72	0.86	6.99	<.001
KSSM Dependability	3.16	0.60	2.70	0.68	2.48	0.85	2.80	0.86	6.94	<.001
IPPAM Total	83.44	13.36	59.78	39.88	39.33	30.79	79.00	28.01	3.24	.037
IPPAM Trust	36.22	5.56	24.44	17.71	13.83	11.04	34.71	12.78	4.64	.010
IPPAM Communication	29.00	5.94	20.11	14.03	11.83	3.33	26.71	9.32	3.96	.018
IPPAM Alienation	17.78	4.41	12.78	8.39	10.33	9.73	18.43	7.87	1.88	.157
PBIM Care	29.58	7.22	25.71	8.16	19.39	11.08	25.25	10.85	6.16	.001
PBIM Overprotection	15.53	7.55	19.18	7.96	18.83	10.15	15.68	7.07	2.33	.077
Paternal CAI										
KSSF Total	2.90	0.71	2.47	0.67	2.19	0.81	2.67	0.72	6.36	<.001
KSSF Availability	2.85	0.73	2.40	0.66	2.19	0.83	2.66	0.72	5.97	.001
KSSF Dependability	2.86	0.72	2.44	0.66	2.22	0.77	2.62	0.69	5.56	.001
IPPAF Total	82.60	22.41	54.75	39.89	46.67	38.63	87.86	29.09	2.85	.056
IPPAF Trust	36.80	9.68	22.75	17.36	17.17	15.34	39.14	11.14	4.53	.011
IPPAF Communication	27.10	8.54	17.38	14.16	16.67	15.29	29.29	11.91	2.07	.128
IPPAF Alienation	17.30	5.64	12.38	8.33	17.17	10.93	16.57	7.32	0.70	.560
PBIF Care	25.95	8.97	20.75	9.92	14.75	11.49	21.25	11.33	5.38	.002
PBIF Overprotection	13.73	7.64	13.33	9.46	12.30	9.92	10.75	9.66	0.72	.544

*Note.* KSSM = Kerns Security Scale–Mother; KSSF = Kerns Security Scale–Father; IPPAM = Inventory of Parent and Peer Attachment–Mother; IPPAF = Inventory of Parent and Peer Attachment–Father; PBIM = Parental Bonding Inventory–Mother; PBIF = Parental Bonding Inventory–Father.

relations between the CAI (most subscales) and IPPA total attachment, trust, communication, and alienation and PBI care and overprotection.

Correlations between the three factor-analytically derived factors and self-report measures of attachment security were also computed and are presented in Table 5. The coherence factor was significantly correlated in the expected direction, with KSS maternal total security, availability, and dependability as well as KSS paternal total security, availability, and dependability and father care on the PBI.

The anger factor was significantly, negatively correlated such that less anger was associated with greater KSS father total security, availability, and dependability as well as KSS mother total security, availability, and dependability. It was also correlated in the expected direction, with both father care and mother care on the PBI.

The idealizing factor was significantly, negatively correlated such that greater idealizing was associated with KSS father greater total security, availability, and dependability as well as KSS total security with mother. Greater idealizing was also associated with greater father care and mother care on the PBI.

**Convergent Validity of CAI Classifications**

Self-report and parent report measures of psychopathology were used to assess the convergent validity of CAI attachment classifications in light of evidence suggesting that psychopathology is associated with attachment insecurity. Similarly, previous research has shown that a child’s attachment to caregivers is related to his or her attachment to peers, and hence the peer subscale of the IPPA was also used to assess convergent validity.

Independent samples *t* tests were used to compare adolescents classified as secure and insecure on the basis of these variables. These

results are presented in Table 6 and reveal that maternal insecurity was associated with self-reported affective and conduct problems as well as parent-reported oppositional defiant problems. Paternal insecurity was associated with self-reported conduct problems and all parent-reported externalizing subscales (ADHD, ODD, and conduct problems). No significant group differences in peer attachment, trust, communication, or alienation were noted. Univariate analyses of variance revealed that there were no significant group differences in peer relations or psychopathology in the four-way classifications.

**Convergent Validity of CAI Subscale Scores**

Correlations between CAI subscales, the three factor-analytically derived factors, and psychopathology are presented in Table 7. Generally, both parent-reported and self-reported externalizing symptoms (i.e., ODD, conduct problems, ADHD) were negatively correlated with CAI subscales associated with security and positively correlated with the Preoccupied Anger and Dismissing subscales. Unexpectedly, the Idealizing subscales were negatively correlated with externalizing problems, indicating that greater idealizing was associated with less psychopathology. With regard to the factor-analytically derived factors, the coherence factor was negatively correlated with self-reported conduct problems and parent-reported ADHD, ODD, and conduct problems. The anger factor was negatively associated with self-reported affective, ODD, and conduct problems and parent-reported ADHD, ODD, and conduct problems such that less anger was associated with less psychopathology. The idealizing factor was not significantly related to any psychopathology.

Correlations between CAI subscales, the three factors, and self-report peer attachment are also presented in Table 7. Less peer

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Table 5  
Pearson Correlations Between Child Attachment Interview (CAI) Scales and Several Self-Reported Measures of Attachment

Measure	CAI subscale											Factor			
	Openness	Balance	Examples	Anger M	Anger P	Idealize M	Idealize P	Dismiss M	Dismiss P	Conflict	Coherence	Coherence	Coherence	Anger	Idealize
<b>KSSM</b>															
Total	.11	.21**	.14	-.53***	-.03	.37***	-.06	-.25***	-.05	.21**	.12	.19**	.34***	-.16*	
Availability	.14*	.25**	.18*	-.49***	.01	.35***	-.09	-.29***	-.05	.23**	.15*	.22**	.30***	-.14	
Dependability	.12	.22**	.16*	-.50***	-.01	.35***	-.09	-.28***	-.05	.21**	.13	.20**	.31***	-.14	
<b>IPPAM</b>															
Total	-.06	.15	.05	-.33	.01	.25	-.00	-.03	-.06	.15	-.05	.06	.18	-.15	
Trust	-.02	.17	.11	-.38*	-.07	.31	.01	-.06	-.06	.20	-.01	.10	.26	-.19	
Communication	-.04	.20	.10	-.37*	-.03	.16	-.03	.04	-.01	.23	.01	.08	.23	-.08	
Alienation	-.07	.06	.06	.15	.11	-.32	-.14	.10	.08	-.01	-.11	-.05	-.15	.29	
<b>PBIM</b>															
Care	-.02	.15	.05	-.51***	-.15	.29***	.00	-.06	-.01	.17*	.10	.09	.40***	-.17*	
Overprotection	-.06	-.07	-.13	.23**	-.02	-.16*	.10	.25**	.09	-.03	-.01	-.13	-.13	.03	
<b>KSSF</b>															
Total	.07	.17*	.04	-.15	-.48***	.09	.36***	-.09	-.31***	.31***	.15*	.20**	.37***	-.27***	
Availability	.06	.14	.06	-.13	-.48***	.07	.38***	-.06	-.29***	.27***	.14	.18*	.36***	-.27***	
Dependability	.07	.15*	.04	-.13	-.48***	.08	.36***	-.08	-.30***	.28***	.15*	.19*	.36***	-.26***	
<b>IPPAF</b>															
Total	.01	.22	.13	.07	-.37*	-.03	.41*	-.15	-.29	.28	.07	.22	.19	-.26	
Trust	.05	.24	.22	.01	-.43*	.03	.41*	-.17	-.26	.34	.11	.25	.25	-.30	
Communication	-.06	.19	.06	.06	-.39*	-.05	.44*	-.10	-.28	.28	.04	.18	.20	-.27	
Alienation	-.04	.08	.01	-.00	.43*	-.02	-.30	.16	.09	.04	-.05	-.05	-.26	.21	
<b>PBIF</b>															
Care	.07	.17*	-.01	-.13	-.39***	.04	.26**	-.03	-.18*	.28**	.17*	.17*	.34***	-.16*	
Overprotection	.09	.11	.02	.05	.22**	.05	-.08	-.04	-.09	.11	.05	.10	-.15	.03	

Note. CAI scales that are not labeled M (maternal) or P (paternal) are based on interview content relating to both parents. Moderate to high correlations between self-report measures of attachment were noted. With regard to extracted factors, higher scores are associated with indicators of security (i.e., more coherence, less anger, and less idealization). Openness = Emotional Openness; Balance = Balance of Positive and Negative; Examples = Use of Examples; Anger = Preoccupied Anger; Idealize = Idealization; Dismiss = Dismissal; Conflict = Resolution of Conflict; KSSM = Kerns Security Scale-Mother; KSSF = Kerns Security Scale-Father; IPPAM = Inventory of Parent and Peer Attachment-Mother; IPPAF = Inventory of Parent and Peer Attachment-Father; PBIM = Parental Bonding Inventory-Mother; PBIF = Parental Bonding Inventory-Father.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 6  
*Independent Samples t Tests Comparing Adolescents Classified as Secure and Insecure on Measures of Convergent Validity*

Measure	Secure		Insecure		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Maternal attachment						
IPPA Peer Total Attachment	94.22	10.21	95.59	17.10	-0.22	.825
IPPA Peer Trust	40.56	6.04	41.00	9.36	-0.13	.897
IPPA Peer Communication	31.89	3.98	30.68	6.53	0.51	.611
IPPA Peer Alienation	20.22	3.83	18.09	4.30	1.33	.196
YSR Affective Problems	65.54	11.42	69.31	12.25	-1.98	.049
YSR Anxiety Problems	60.48	9.21	61.28	9.06	-0.55	.581
YSR Somatic Problems	57.09	9.34	57.44	9.44	-0.24	.813
YSR ADHD Problems	60.32	8.75	61.36	7.80	-0.80	.422
YSR ODD Problems	59.04	8.13	61.36	9.22	-1.73	.086
YSR Conduct Problems	59.79	8.21	63.33	9.99	-2.54	.012
CBCL Affective Problems	73.89	9.20	75.95	8.59	-1.45	.148
CBCL Anxiety Problems	66.72	8.21	66.55	8.10	0.13	.898
CBCL Somatic Problems	63.09	9.18	62.35	11.32	0.47	.641
CBCL ADHD Problems	62.52	7.27	64.51	8.31	-1.53	.127
CBCL ODD Problems	61.41	8.20	64.72	8.12	-2.51	.013
CBCL Conduct Problems	63.00	8.14	65.68	8.98	-1.90	.059
Paternal attachment						
IPPA Peer Total Attachment	93.90	9.68	95.81	17.49	-0.32	.751
IPPA Peer Trust	40.50	5.70	41.05	9.58	-0.17	.869
IPPA Peer Communication	32.00	3.77	30.57	6.67	0.63	.535
IPPA Peer Alienation	20.60	3.41	17.81	4.19	1.83	.077
YSR Affective Problems	66.79	11.99	69.01	12.19	-1.15	.251
YSR Anxiety Problems	60.82	9.53	61.37	8.91	-0.38	.708
YSR Somatic Problems	57.09	9.62	57.62	9.35	-0.35	.723
YSR ADHD Problems	60.14	8.47	61.49	7.95	-1.05	.296
YSR ODD Problems	59.21	8.02	61.19	9.19	-1.49	.140
YSR Conduct Problems	59.00	7.94	63.63	9.95	-3.40	.001
CBCL Affective Problems	73.93	9.30	76.19	8.44	-1.60	.111
CBCL Anxiety Problems	66.41	8.21	66.97	7.94	-0.43	.667
CBCL Somatic Problems	62.72	9.55	62.50	11.33	0.13	.898
CBCL ADHD Problems	61.74	7.20	64.79	8.31	-2.34	.020
CBCL ODD Problems	60.80	7.77	64.94	8.13	-3.18	.002
CBCL Conduct Problems	62.44	7.94	64.83	9.04	-2.39	.018

*Note.* IPPA = Inventory of Parent and Peer Attachment; YSR = Youth Self-Report; CBCL = Child Behavior Checklist; ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder.

alienation was associated with higher scores on several CAI subscales indicative of security as well as the coherence factor. Higher peer trust was associated with greater idealization toward fathers. Neither the anger nor idealization factors demonstrated any relation to peer functioning.

### Discussion

The main aim of the current study was to explore the use of the CAI in a clinical sample of adolescent inpatients in the United States. In undertaking this work we sought to further establish the psychometric properties of the CAI, building on and extending the validation work reported by Shmueli-Goetz et al. (2008). This aim was accomplished by evaluating (a) interrater reliability, (b) internal factor structure, (c) relations between CAI classifications and subscales, (d) concurrent validity, and (e) convergent validity. Findings of this study, discussed in greater detail below, converge in support of using the CAI as a representational measure of attachment in adolescents.

First, classification distribution (30.4% secure, 38.1% dismissing, 14.4% preoccupied, and 17.0% disorganized) in the current study generally mirrored the distribution of Shmueli-Goetz et al.'s (2008) original validation study in a clinical sample (26% secure, 59% dismissing, 15% preoccupied, and 9% disorganized). The slightly larger proportion of disorganized cases in the present sample may be related to more severe psychopathology in an inpatient sample, compared to a referred sample, given the association between attachment disorganization and a slew of clinically significant problem behaviors (DeKlyen & Greenberg, 2008). The creators of the CAI suggested a number of areas for improvement to the measure, including research on indicators of disorganization in youth as well as the possible addition of an anxious preoccupation subscale (Target et al., 2007), which may suggest that the proportion of adolescents in both of those categories is underrepresentative. Though initially surprising, the presence of secure classifications in this sample (and the Shmueli-Goetz et al., 2008, referred sample) is unlikely to reflect a measurement problem. On

Table 7  
Pearson Correlations Between the Child Attachment Interview (CAI) Subscales, Factors, and Measures of Convergent Validity

Measure	CAI subscale										Factor			
	Openness	Balance	Examples	Anger M	Anger P	Idealize M	Idealize P	Dismiss M	Dismiss P	Conflict	Coherence	Coherence	Anger	Idealize
Peer Total	.10	-.05	-.16	-.01	.17	.04	-.35	.10	.23	-.16	-.02	-.13	-.10	.21
Peer Trust	.19	.04	-.04	.04	.17	.01	-.38*	.05	.22	-.05	.10	-.03	-.12	.25
Peer Communication	.28	.11	.05	.03	.10	-.11	-.26	-.04	.03	-.06	.09	.07	-.08	.24
Peer Alienation	.39*	.42*	.60***	.17	-.16	-.30	.16	-.32	-.34	.43*	.41*	.50**	.00	.07
YSR Affective	-.01	-.15*	.00	.18*	.08	.09	.07	-.05	.07	-.10	-.07	-.05	-.15*	-.09
YSR Anxiety	.06	-.01	.10	.03	-.02	.09	.11	-.11	.02	.03	.02	.06	.00	-.11
YSR Somatic	.00	.02	.04	.10	.01	-.03	.13	-.04	.02	.00	-.01	.01	-.06	-.05
YSR ADHD	.02	-.05	-.02	.06	.08	.00	-.04	.02	.08	-.05	-.03	-.05	-.08	.03
YSR ODD	-.08	-.16*	-.10	.21**	.12	-.16*	-.04	.12	.05	-.13	-.08	-.14	-.21**	.11
YSR Conduct	-.13	-.18*	-.14*	.12	.12	-.15*	-.02	.22**	.22**	-.19*	-.15*	-.24**	-.15*	-.10
CBCL Affective	-.08	-.15*	-.10	.05	.14	.09	.01	.00	.04	-.07	-.05	-.08	-.11	-.05
CBCL Anxiety	.02	.02	-.04	-.07	.03	.02	.02	-.11	.02	.02	-.01	.02	.04	-.01
CBCL Somatic	.06	.06	.04	.05	.02	-.03	-.03	-.05	-.08	.00	.02	.06	-.04	.03
CBCL ADHD	-.15*	-.18*	-.13	.12	.12	.05	.06	.07	.07	-.18*	-.15*	-.15*	-.15*	-.07
CBCL ODD	-.24**	-.23**	-.24**	.23**	.14	-.09	.07	.22**	.16*	-.22**	-.23**	-.28***	-.23**	.01
CBCL Conduct	-.17*	-.17*	-.17*	.17*	.07	-.16*	.04	.28***	.19**	-.19*	-.14	-.24**	-.15*	.06

Note. CAI scales that are not labeled M (maternal) or P (paternal) are based on interview content relating to both parents. Moderate to high correlations between self-report measures of attachment were noted. With regard to extracted factors, higher scores are associated with indicators of security (i.e., more coherence, less anger, and less idealization). Openness = Emotional Openness; Balance = Balance of Positive and Negative; Examples = Use of Examples; Anger = Preoccupied Anger; Idealize = Idealization; Dismiss = Dismissal; Conflict = Resolution of Conflict; YSR = Youth Self-Report; CBCL = Child Behavior Checklist; ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

the contrary, research with the AAI has proven that it is, in fact, very common to assign secure classifications within psychopathological samples. Indeed, of more than 25 studies evaluating AAI classifications among diagnostic groups reviewed by Dozier, Stovall-McClough, and Albus (2008), the vast majority included at least some autonomous (i.e., secure) participants. Moreover, in many such studies, the proportion of autonomous participants is around 25%–30%, as in this study. Together, these studies seem to suggest that attachment insecurity is not a prerequisite for psychopathology in either adults or adolescents (although insecurity is certainly overrepresented in these samples, as would be expected). Rather, it is likely that attachment insecurity represents one pathway to psychopathology and that, as the developmental principle of equifinality would suggest, there are many other pathways to the emergence of psychopathology that do not necessitate attachment insecurity.

Second, findings suggest that overall, interrater reliability for CAI classifications and CAI subscales was good, both between the two “naive” raters and between the “expert” rater and the naive raters. Such agreement is particularly impressive, as the current sample not only is much older in age but also represents a more severe population than that on which the CAI was originally validated. Very high concordance between maternal and paternal attachment classifications was noted in this study, but interrater agreement was somewhat higher with regard to maternal classifications. These findings mirror those of Shmueli-Goetz et al. (2008), who suggested that perhaps some difficulty in rating paternal attachment classifications reflects the reality that the father portions of the interview are often more impoverished (Shmueli-Goetz et al., 2008). Indeed, the CAI depends upon the adolescent recalling and sharing memories of interactions with each caregiver in order to provide ratings. Because interactions with fathers may be more limited and are likely regarded differently, they may require unique consideration in coding. Thus, the CAI, which comes from a literature base largely focused on maternal attachment, may be measuring interactions with fathers less accurately than maternal attachment.

Third, the CAI demonstrated similar factor structure to what has been demonstrated for adults. The three factors identified in this study—named coherence, anger, and idealization—are reminiscent of those identified in principal component analyses of the AAI conducted by Roisman, Fraley, and Belsky (2007). Their analyses supported both two-component and three-component solutions. In the two-component model, one component was conceptualized as reflecting the ability to “freely evaluate” childhood experiences with caregivers, echoing the coherence factor identified in the present study. The other component in Roisman et al.’s two-component solution was explained as reflecting preoccupation, mirroring the anger factor identified in this study. In their three-component solution, however, Roisman et al. noted two forms of preoccupation, one active and one passive, which were not mirrored in the present study. This distinction in the factor structures of the AAI and CAI might be attributed to the fact that the CAI currently only rates preoccupied anger and has not yet developed an anxious preoccupation rating scale, although this has been suggested (Target et al., 2007) and may prove promising given Roisman et al.’s findings.

Fourth, the CAI classifications demonstrated expected relations with the CAI subscales as well as the factor-analytically derived

factors. That is, a secure classification was positively correlated with subscales pertaining to indices of security (e.g., resolution of conflicts) and negatively correlated with the insecurity subscales (e.g., preoccupied anger). Expected relations between insecure classifications and CAI subscales were also noted. The factor-analytically derived subscales behaved in much the same way. Together, these findings indicate that the theoretical relations between CAI subscales and the overall classifications described by the measure’s authors (see Appendix; Shmueli-Goetz et al., 2008; Target et al., 2007) are indeed being reflected by the coders used in this sample.

Fifth, evidence of concurrent validity was demonstrated. Specifically, CAI classifications demonstrated agreement with several self-reported measures of parental availability (KSS–Mother, KSS–Father), dependability (KSS–Mother, KSS–Father), trust (IPPA–Mother, IPPA–Father), care (PBI–Mother, PBI–Father), and total attachment security (KSS–Mother, KSS–Father, IPPA–Mother), as expected. No group differences were noted with regard to IPPA Alienation and PBI Overprotection for either parent or with IPPA Total and IPPA Communication for fathers. Although the lack of agreement between CAI and self-report for paternal attachment will be discussed in more detail below, the lack of relations between CAI and alienation and overprotection for both parents may be explained by developmental transitions toward privacy and independence seeking among adolescents (Allen, 2008). For instance, it is expected that adolescents seek a greater degree of privacy from their parents and begin to rely upon other relationships for emotional support (Allen, 2008), suggesting that some emotional disconnection from parents during adolescence is a normative developmental change rather than reflective of attachment insecurity, as in other developmental stages.

Subscales of the CAI correlated significantly with self-reported total attachment, availability, and dependability (KSS) for both fathers and mothers in the expected directions. Generally, relations between CAI subscales and self-report measures were stronger (i.e., more significant correlations and correlations of greater magnitude) with regard to maternal attachment, lending further evidence to the aforementioned notion that the CAI may be more accurate in assessing maternal attachment. The factor-analytically derived scales also correlated with self-report measures of attachment security. Specifically, the coherence factor was correlated with total attachment, availability, and dependability toward both parents, suggesting that it may be a useful composite of overall attachment security. Importantly, the coherence factors correlated with self-report measures for both parents, suggesting that the coherence subscale may be used to represent overall attachment security across both parents. Similarly, less anger was associated with indices of attachment to both parents in the expected direction—less anger was associated with higher attachment security, availability, and dependability. Notably, concurrent validity analyses also produced a number of nonsignificant findings including very few significant relations between the CAI subscales and IPPA total attachment, trust, communication, and alienation and PBI care and overprotection.

Finally, evidence of convergent validity was noted and, broadly, reflected associations between attachment insecurity and both self- and parent-reported externalizing problems (i.e., ODD, ADHD, and conduct problems) as well as between insecurity and self-reported affective problems. This general pattern was evident



when comparing across CAI classifications as well as when examining relations between psychopathology and CAI subscales. The relation between attachment insecurity and externalizing problems detected in this study is echoed by a great deal of prior research. Specifically, Bowlby (1973), Sroufe (1983), and Rubin, Hymel, Mills, and Rose-Krasnor (1991) all associated attachment insecurity with hostility and anger that manifests in aggressive, disruptive, or antisocial behaviors. Indeed, many studies have identified conduct and behavior problems as correlates of attachment insecurity in youth (see DeKlyen & Greenberg, 2008). Although the literature exploring the role of attachment insecurity among depressed youth is considerably smaller, previous research has also documented this relation (Essau, 2004; Nada Raja, McGee, & Stanton, 1992). Contrary to expectations, CAI-rated insecurity was not associated with other forms of psychopathology, like anxiety, nor with peer problems (discussed in more detail below).

Despite excellent indices of validity, the aforementioned unexpected findings require consideration and seem to center on two broad themes: (a) a few unexpected and/or nonsignificant correlations between self-report measures and the CAI and (b) few significant relations between attachment security and peer functioning and an unexpected null finding for anxiety. Although there are many possible explanations for these findings, perhaps the most obvious explanation for unexpected (or absent) relations between the CAI and self-report measures is the key difference between these two modes of assessment—level of processing being assessed. Indeed, a meta-analysis (Roisman, Holland, et al., 2007) of studies using the AAI and self-report measures of attachment revealed small correlations (.09) and differential prediction of outcomes by the AAI and self-report measures. Typically, these discrepancies are attributed to the fact that the AAI is generally viewed as accessing *representations* of attachment figures (which operate automatically and unconsciously), whereas self-report measures are viewed as requiring conscious processing of feelings and behaviors (Crowell et al., 2008). Indeed, the findings of this study suggest that adolescents high in idealizing are actually able to look secure (and less ill) on self-report measures—likely because self-reports are not able to assess the plausibility of their idealizing responses, as the CAI does. Importantly, this finding suggests that self-report measures of attachment security are limited in that they access a superficial reporting of security that cannot stand up to the scrutiny of the CAI. Similarly, the CAI and AAI are intended to activate the attachment system in a way that will elicit indicators of disorganization in a way that self-report measures may not be able to. Moreover, the sheer fact that self-report measures are completed without any behavioral observation makes concordance with CAI disorganization (which is largely based on behavioral observations of incompatible affect, dissociation, etc.) unlikely. Taken together, analyses relating to concurrent validity in this study suggest that narrative- and self-report-based attachment measures may be tapping different, and yet related, constructs, which must be recognized in clinical and research applications.

The relations between different methods of assessing attachment are still not well understood in large part because of “broad and largely different nomothetic networks” associated with each one (Crowell et al., 2008, p. 624). As a result, there has been a call to encourage research using various methods for assessing attach-

ment security with the caveat that two kinds of measures may produce valuable insights without correlating with one another highly, or at all (Crowell et al., 2008). The need for multiple modes of assessment is further supported by ongoing disagreement about the underlying structure of attachment security. This debate, whose focal point was in a 2003 special issue of *Developmental Psychology* (see Cassidy, 2003; Cummings, 2003; Fraley & Spieker, 2003; Waters & Beauchaine, 2003), brought to light existing tension regarding whether attachment should be conceptualized dimensionally (as suggested by Bartholomew & Horowitz, 1991) or categorically (as originally conceived by Ainsworth et al., 1978). Although the present study did not aim to pit dimensional and categorical uses of the CAI against one another, the findings of the present study add to the growing consensus that using multiple approaches to the measurement of attachment is most likely to yield a true picture of attachment security, particularly among adolescents, in which the measurement of attachment has been limited.

Perhaps the most striking way in which CAI classification failed to correlate with self-report measures of attachment in the current study was for disorganized attachment. Although these findings stand in contrast to a long history of attachment theory and research showing the poorest outcomes associated with a disorganized attachment (DeKlyen & Greenberg, 2008), this work has primarily been conducted with children and adults, whereas disorganization in adolescents “remains a fertile, relatively untapped area” (Allen, 2008, p. 429) of research. Indeed, perhaps developmental changes in the manifestations and consequences of disorganization are at play. Research in early and middle childhood has shown that attachment disorganization in infancy, often reflected in helplessness and/or bizarre and disoriented behaviors, appears to diminish and transforms into controlling behavior toward parents instead (Bureau, Easlerbrooks, & Lyons-Ruth, 2009). Solomon, George, and De Jong (1995) suggested that a controlling stance serves to manage caregiver behavior so that the child is able to regulate his or her own emotions and behaviors. In addition to pointing out important variation *within* a disorganized classification, this research suggests that disorganization can in some cases be adaptive, helping a child regulate his or her emotions by controlling a source of fear or distress (i.e., a caregiver). This may help explain why adolescents in the disorganized classification did not report the poorest relationships with their parents, although this notion would require much future research.

The second broad area of unexpected findings related to limited correlations between attachment security and anxiety as well as peer functioning. Anxiety is considered by some “the fundamental condition underlying insecure attachment” (Bowlby, as cited by DeKlyen & Greenberg, 2008, p. 650). One explanation for our null finding may be that previous studies, such as Warren, Huston, Egeand, and Sroufe (1997), have made use of community samples, wherein anxiety might be more closely aligned with attachment disturbance. The present study reports on an inpatient population, in which individual differences in anxiety are less readily detected due to the overall severity of the sample. Nolte, Guiney, Fonagy, Mayes, and Luyten (2011) recently proposed an attachment-based developmental model of anxiety disorders. Notably, this multidisciplinary developmental framework stresses the interplay between social neuroscience, biological and genetic factors, and family factors (such as attachment) in the etiology of

anxiety disorders. They posit that these factors *together* confer risk for anxiety disorder by interacting with one another and contributing to a cumulative risk. The literature reviewed by Nolte et al. in formulating this model suggests that there is great variation in the degree to which anxiety and attachment are related based on a number of factors that were not included in this study, and thus, it is possible that the present study's relatively gross consideration of the relation between attachment and psychopathology obscured important interactions.

The null finding for peer relations and attachment in the current study may well be accounted for by aforementioned differences between the CAI and self-report. Previous research (albeit predominantly with child samples) has identified clear relations between parental attachment security and more positive interactions with friends (Kerns, 1994), increased ability to make close friendships (Freitag, Belsky, Grossmann, Grossmann, & Scheuerer-Englisch, 1996), and greater likelihood of having securely attached friends (Elicker, Englund, & Sroufe, 1992). However, attachment research has also demonstrated the opposite with regard to peer relations, suggesting that these relationships are typically characterized by affectional, rather than attachment, bonds (Berlin et al., 2008). Indeed, among adolescents, Zeifman and Hazan (2008) argued that peer relations function distinctly from attachments to parents and are therefore presumed to be regulated by a different behavioral system, which may explain why peer attachment was unrelated to parental attachment in the present study. Alternatively, the lack of significant relation between parental attachment and peer attachment may represent a developmental transition in adolescence that is not yet complete. Indeed, Allen (2008) called upon the work of many attachment researchers (Buhrmester, 1996; Collins, van Dulmen, Crouter, & Booth, 2006; Hartup, 1992) in explaining that the development of peer relationships in adolescence reflects the gradual emergence of the capacity for adult-like intimacy and supportiveness. This suggests that perhaps adolescents stand in a state of attachment-limbo where they have begun to separate from their parents as attachment figures but have not yet developed the skills needed for emotional security in peer relationships. Ultimately, this finding points to an important area for future research—the differential role of attachment in adolescents' peer and friend relations, a question that has not been addressed in the literature.

Taken together, the findings of this study suggest that the CAI is a psychometrically strong instrument for assessing attachment style in adolescents. The conclusions of the present study are, however, tempered by the absence of taxometric analyses. Specifically, the present study did not examine the distributional properties of individual differences in attachment security directly and therefore is unable to draw conclusions about whether attachment security is best captured using categorical or dimensional data. The analyses conducted here provide psychometric evaluation of both the CAI's classifications and subscales. However, further taxometric analyses, like those described by Meehl and Yonce (1994, 1996) and conducted on the AAI by Roisman, Fraley, and Belsky (2007), are called for in uncovering whether variation in attachment security among adolescents is best explained using dimensional or categorical models.

In addition, other limitations are of note. First, the temporal stability of the CAI in its original publication was viewed as somewhat problematic, a problem that may be exacerbated by the

possibility that attachment in the adolescent developmental phase may be less stable in itself. Indeed, a limitation of this study is that test–retest reliability was not evaluated and therefore study findings cannot speak to stability in adolescent attachment classifications. Further, the relation of adolescent attachment classifications to infant and adult classifications as well as psychopathological outcomes remains a much needed area of research that can only be addressed through longitudinal designs. Additionally, attachment classifications in this study were assigned for only two attachment figures per child and therefore analyses may have ignored attachment security (or insecurity) that occurred in the context of additional caregivers (e.g., nonparental relationships with nannies, other family members, or close others). To our knowledge, no study thus far has explored the role of attachment security to nonparents among adolescents, but these relationships can certainly be of great importance to adolescents and, therefore, warrant further attention.

In sum, the present study succeeds in extending the psychometric evaluation of the CAI to an inpatient, adolescent sample but also identifies areas of research needed to develop this measure further. Potential areas for future research should include (a) studying how the CAI's assessment of paternal attachment can be refined, (b) evaluation of possible benefits derived from adding an anxious preoccupation subscale, and (c) greater consideration of the ways in which disorganization affects adolescents and closer examination of how the CAI captures disorganization. Moreover, the present study underscores the great necessity for a taxometric study of attachment among adolescents, which can shed further light on how the CAI is best used (i.e., dimensionally vs. categorically) in future research. Although the absence of taxometric analyses precludes definitive conclusions for the present study, we encourage future research to make use of the CAI in two of the ways analyzed in the present study. First, researchers seeking dimensional attachment variables may benefit from using the three factor-analytically derived subscales identified in this study, as they capture most of the variance present in the 11 CAI subscales while substantially reducing the number of variables in question. Moreover, use of the coherence factor may prove beneficial as an index of overall attachment security that is not tied to a specific caregiver and is measured along a continuum of security. Second, researchers wanting to conduct categorical analyses on attachment are encouraged to use the four-way classification (i.e., secure, preoccupied, dismissing, and disorganized) rather than a two-way classification, since the former identified important within-insecure-group differences in the present study. According to the results of this study, it seems that these two strategies for using the CAI are best until taxometric analyses are conducted and provide greater information in this regard.

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## Appendix

### Child Attachment Interview Subscales

The Preoccupied Anger scale was based on the Adult Attachment Interview (AAI) scale but adapted to reflect developmentally appropriate responses. At the low end of the scale, children are able to describe negative or conflictual events with little angry preoccupation, and at the high end, anger is pervasive and uncontained. The Idealization scale, also based on the AAI, assesses how plausible, consistent, and truthful are children's attachment representations. At the low end, children are able to consistently support and illustrate how they described the relationship, and no distortions are present. At the high end of the scale, very positive generalized statements are not supported and may be actively contradicted. The Dismissal scale measures the extent to which children minimize the importance of attachment figures and relationships by active dismissal and/or derogation. At the low end, children affectively acknowledge the impact of events and appear comfortable with expressing vulnerability in response to separation and loss. At the high end of the scale, affect is deliberately and systematically excluded, and vulnerability is strongly denied. The Use of Examples scale was informed by the AAI's Insistence on Lack of Recall scale, but the Child Attachment Interview (CAI) scale additionally reflects children's ability to provide relevant and elaborated examples. At the low end of this scale, children provide either no examples or very impoverished descriptions. At the high end, children give detailed and clear examples that vividly illustrate the adjectives. The Emotional Openness scale was developed to assess children's ability to express and label emotions and to ground them in descriptions of interactions with attachment figures. At the low end of the scale, children show a very limited range of emotional terms and make few references to emotional states even when encouraged to do so. At the high end, children use a range of appropriate emotional terms and reflect an appreciation of their temporary nature. They may also show an understanding that different people may have different feelings about the same event. The Balance of Positive and Negative References to Attachment Figures scale was based on the assumption that secure children would more readily recognize and integrate positive and negative aspects of parental figures, thus presenting more balanced descriptions. At the low end of the scale, children are heavily biased toward either positive or negative aspects of the relationship. At the high end of the scale, children present a picture containing both positive and negative descriptions, so that the overall impression is of a balanced view. The Resolution of Conflict scale, which considers children's ability to describe construc-

tive resolutions to conflict that do not escalate into catastrophe, has been closely linked to attachment security and is conceptualized in the CAI. At the low end of this scale, children describe situations that seem to have no resolution. At the high end, children describe situations in which they actively sought to resolve a conflict. Overall Coherence is rated similarly to the AAI's Coherence scale, on the basis of scores on all the other scales, together with a consideration of the overall consistency, development, and reflection. A low score is given to children showing marked idealization, poor use of examples, and strong involving anger. A high score would indicate an absence of any distortions, together with positive qualities of emotional openness, use of examples, balance of representations, and conflict resolution. Attachment Disorganization or atypical behavior is currently captured as present or absent, and the manual contains a detailed, albeit not exhaustive, list of behaviors and discourse violations that are considered as markers of this. Under the same category heading are subsumed behaviors and representations that reflect a controlling strategy, either punitive or caregiving.

These subscales are used, together, to assign an overall attachment classification for each relationship identified in the interview (e.g., one for mother and one for father). Relations between the CAI subscales and overall classifications are largely based on previous work with the AAI. The Secure classification is indicated by relatively high Emotional Openness, Balance of Positive and Negative, Use of Examples, Resolution of Conflicts, and Overall Coherence as well as relatively low scores on the Idealization, Dismissal, and Preoccupied Anger subscales. The Insecure-Dismissing classification is indicated by elevations on the Idealization or Dismissal scales and relatively low scores on all other subscales. Similarly, the Insecure-Preoccupied classification is associated with an elevated Preoccupied Anger score and relatively low scores on all other subscales. Finally, the Insecure-Disorganized classification is assigned when the aforementioned signs of disorganization are noted. These "constellations" of expected scores are provided in the CAI coding and classification manual (Target et al., 2007) for use in assigning overall classifications, although it should be noted that these are general guidelines and there may be some exceptions.

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