Structure and validity of people in my life: A self-report measure of attachment in late childhood

T. A. Ridenour,
Research Associate in the Prevention Research Center at Pennsylvania State University. He received his Ph.D. in Educational/School Psychology from Ball State University in 1996 and his Masters in Psychiatric Epidemiology from Washington University in St. Louis, School of Medicine in 1999, He completed post-doctoral training in Psychiatric Epidemiology at Washington University School of Medicine, Dept. of Psychiatry. His major research interests are etiology of problem behaviors, psychological assessment, and prevention science

M. T. Greenberg, and
Professor of Human Development and Family Studies at Pennsylvania State University. He received his Ph.D. in Developmental Psychology from the University of Virginia in 1978 and is the Edna Peterson Bennett Chair of the Prevention Research Center. His major research interests are developmental psychopathology and prevention science. To whom correspondence should be addressed at Edna Peterson Endowed Chair in Prevention Research, Prevention Research Center, Pennsylvania State University, 109 S, Henderson Building, University Park, Pennsylvania 16802; e-mail: mxg47@psu.edu

E. T. Cook
Currently a licensed psychologist at Washington State University Vancouver providing Student Counseling Services. She received her Ph.D. in 1996 from the University of Washington

Abstract

No self-report measure of attachment is well validated for middle-childhood. This study examined the validity and factor structure of the People in My Life (PIML) measure in 320 urban, fifth and sixth graders. Validity analyses consisted of correlational analyses between PIML subscales and the Child Behavior Checklist, Delinquency Rating Scale for Self and Others, Heath Resources Inventory, and Reynolds Child Depression Scale. Validity correlations were consistent with a-priori hypotheses. Confirmatory factor analyses consisted of comparison of model fit indices between seven models. Two models fit the data well and both models were consistent with the traditionally used PIML scoring protocol. Moreover, both models were consistent with the Inventory of Parent and Peer Attachment (IPPA), on which the PIML is modeled, as well as the theoretical underpinnings of attachment in childhood. The PIML and IPPA provide instruments for obtaining a continuous self-report measure of attachment from middle-childhood through adulthood.

Keywords

People in my life; Attachment; Late childhood; Factor analysis; Validity

Attachment, defined as the type of enduring emotional bond that an individual has toward significant others such as family, friends, and close associates, has long been considered an important factor in social and psychological healthiness (Ainsworth *et al.*, 1978; Bowlby, 1969/1982/1973; Hinde, 1982; Sroufe, 1978). Secure attachment with parents and/or peers in

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adolescents is associated with life satisfaction, school achievement, self-esteem, and psychological adjustment (Armsden and Greenberg, 1987; Buhrmester, 1990; Bukowski *et al.*, 1993; Hartup, 1996; Nickerson and Nagle, 2004). Children who form insecure attachments are at greater risk for experiencing psychopathology when they are older, even into adulthood (Allen and Land, 1999; Dozier *et al.*, 1999). Hence, children's quality of attachment to others is associated with emotional and behavioral well-being in critical ways.

Parental attachment

Attachment theory and research describe types of emotional bonds between parents and children, individuals and their friends and significant others. Some of the central goals of attachment theory and research are to specify the ideal types of attachments, how attachment to others might evolve developmentally as people mature, and the consequences of optimal and non-optimal attachments (Ainsworth, 1991; Bowlby, 1969/1982/1973; Elicker *et al.*, 1992). A child's attachment to a parent appears to serve as a model for other close relationships (Ainsworth, 1989; Bowlby, 1973; Hazan and Shaver, 1994). Secure attachment to a parent often is a prelude to successful interpersonal skills and intimate relationships (Black and McCartney, 1997; Madden-Derdich *et al.*, 2002) and attachment to a parent remains even after attachments to peers are established (Hazan and Shaver, 1994; Hazan and Zeifman, 1994).

However, the association between parental attachment and peer attachment appears to be complex and evolves with maturity. Freeman and Brown (2001) reported that among adolescents with insecure parental attachment, most selected a peer as their primary attachment figure, a finding replicated by other researchers (Hazan and Zeifman, 1994; Schneider and Younger, 1996). Crowell and colleagues (1999) reported correlations between parental attachment and peer attachment to be small (less than 0.35), suggesting that the two forms of attachment are separate constructs and occur within individuals in relatively independent levels. Furman and Wehner (1997) argued that although attachment to others is affected by past experience, attachment occurs somewhat independently for each relationship that a child experiences. Hence, theoretical hypotheses regarding how parental attachment and peer attachment should be associated vary considerably.

Peer attachment

Part of the discrepancies between theoretical implications about how parental and peer attachment should be correlated may be due to the apparent developmental burgeoning of peer attachment. Several studies have suggested that in contrast to the early childhood occurrence of parents serving as children's primary (and dominant) attachment figure, specific aspects of attachment gradually shift to peers over the course of mid-childhood to late adolescence (Crowell and Waters, 1994; Fraley and Davis, 1997; Freeman and Brown, 2001; Furman and Wehner, 1997; Hazan and Shaver, 1987; Hazan and Zeifman, 1994; Schneider and Younger, 1996; Sroufe and Waters, 1977). Improved clarification of this maturational process of children's reorienting aspects of attachment from parents to peers could provide insight as to how attachment is associated with healthy and unhealthy emotional, behavioral, and relationship development. One critical impediment to clarification of development of children's attachment to others is the lack of a self-report assessment of children's peer and parental attachment during mid- to late-childhood. Ideally, such an assessment would provide measurement of attachment that closely resembles assessment of adolescent attachment. Hopefully, a continuum of measurement of peer and parental attachment could eventually be used to specify maturation of attachment from mid-childhood to early adulthood.

Attachment assessment

Early empirical and theoretical work regarding attachment focused largely on attachment styles in infancy and early childhood (e.g., Ainsworth and Wittig, 1969; Ainsworth *et al.*, 1978; Arend *et al.*, 1979; Bowlby, 1969/1982; Easterbrooks and Lamb, 1979). The focus in more recent research on attachment has expanded to include older age groups including adolescents and adults (Alexander *et al.*, 2001; Allen and Land, 1999; Armsden and Greenberg, 1987; Bloom, 1980; Buhrmester, 1992; Cyranowski *et al.*, 2002; George *et al.*, 1985; Greenberg *et al.*, 1984; Rholes *et al.*, 2001; Weiss, 1982). This shift in developmental focus enabled researchers to utilize self-report instruments and interviews for assessing attachment in adolescents and adults. Examples of adolescent self-report instruments to measure attachment include the *Inventory of Parent and Peer Attachment* (IPPA; Armsden and Greenberg, 1987), *Adolescent Attachment Questionnaire* (West *et al.*, 1998), and *Parental Attachment Questionnaire* (Kenny, 1987). Although there has been substantial development of attachment instruments for early childhood, adolescence, and adulthood, there has been little attention paid to the assessment of attachment in middle-childhood (Greenberg, 1999).

Recent research regarding attachment in middle-childhood suggests that developmental changes may impact children's quality of attachment to mothers, teachers and peers (Lynch and Cicchetti, 1997), that quality of attachment interacts with other family factors to impact child rearing dynamics (Kerns *et al.*, 2001), and that security of the mother-child attachment impacts quality of peer relationships possibly by enhancing emotional self-regulation and coping (Contreras *et al.*, 2000; Kerns *et al.*, 1996). Kerns and colleagues (2000) examined the associations between child participants' self-reports of concepts related to attachment (perceived security, coping strategies, separation anxiety), projective interview of concepts pertaining to attachment, parent reports of willingness to serve as an attachment figure, observers' ratings of parental responsiveness to children, and teacher ratings of children's adaptation to school. Although moderate to high stability in the measures was found, only modest associations occurred between the different measures. Although it appears that children are able to provide reliable and valid self-reports of concepts similar to attachment, there is still a need for a self-report measure of attachment in middle-childhood. The goal of the current study is to examine the structure and validity of a self-report measure of attachment for use in mid-to-late childhood.

One of the most widely-used and best psychometrically researched attachment self-report instruments is the IPPA (Amsden and Greenberg, 1987), which was developed to measure young adults' and adolescents' attachment to their parents and friends (excluding romantic partners). The IPPA was designed to assess the behavioral and affective dimensions of attachment using the Communication scale and the Trust and Alienation scales, respectively (Armsden and Greenberg, 1987; Hinde, 1982; Parkes and Stevenson-Hinde, 1982). Trust provides a measure of positive affective and cognitive experience associated with accessible and responsive attachment figures. In contrast, Alienation measures the negative affective and cognitive experiences associated with unresponsive or inconsistently responsive attachment figures. Communication measures the behavioral interactions between children and attachment figures (Armsden and Greenberg, 1987).

Theoretically, Parental Attachment of the IPPA is distinct from measures of family functioning or atmosphere because it measures one individual's "internal working model" of his or her experience of attachment with other persons (Armsden and Greenberg, 1987). In a sample of undergraduate students, Armsden and Greenberg (1987) found that IPPA Parent Attachment correlated with family self-concept (0.78), cohesion (0.56), expressiveness (0.52), organization (0.38), control (−0.20), and conflict (−0.36) suggesting that although attachment is related to family functioning, they are distinct constructs. Correlations between Peer Attachment and

these measures of family functioning were small. Numerous additional studies support of the reliability and validity of the IPPA (Adams and Chase-Lansdale, 2002; Amsden *et al.*, 1991; Black and McCartney, 1997; Formoso *et al.*, 2000; Paterson *et al.*, 1995; Pavlidis and McCauley, 2001).

Armsden and Greenberg's (1987) factor analysis of IPPA data using undergraduate students resulted in three factors for questions pertaining to both parents and peers (Trust, Communication, and Alienation). They reported high internal consistencies for the three parent factors, Peer Trust, and Peer Communication as well as good internal consistency for the Peer Alienation factor. Both peer attachment and parent attachment accounted for unique variances in self-esteem, life satisfaction, and depression/anxiety, after accounting for recent life stress. Peer Attachment uniquely predicted self-ratings of irritability and guilt. Moreover, Peer Attachment and Parent Attachment correlated only .36, suggesting that these are separate, but partially overlapping, internal constructs.

Research with the IPPA has indicated that insecure attachment is associated with depression and anxiety (e.g., Papini and Roggman, 1992; Papini *et al.*, 1991), psychological distress and adjustment (Bradford and Lyddon, 1993; Burge, *et al.*, 1997), and antisocial behavior (Marcus and Betzer, 1996). Academic achievement and identity formation have been reported to be associated with secure attachment (Lapsley *et al.*, 1990; Schultheiss and Blustein, 1994, respectively).

A confirmatory factor analysis of the IPPA was recently conducted by Feske and colleagues using data collected from adolescents who ranged in age from 12 years to 18 years (in submission). Feske and colleagues used a version of the IPPA in which parental attachment questions (and Trust, Communication, and Alienation scores) were separated for the mother and the father (Armsden, 1986). Five competing factor models were tested. Three models had a combined Communication/Trust scale (from Armsden and Greenberg's 1987 separate Communication/Trust subscales) and an alienation scale. The best fitting model of these three allowed the Mother and Father Communication/Trust scales to correlate. In the two remaining models, the Communication and Trust subscales were analyzed as separate measures (six scales total). Of these two models, the better fitting model allowed the three scales to correlate. The internal consistencies for each of the Trust, Communication, and Alienation subscales were good to excellent.

People in my life (PIML)

Largely based on the IPPA, the PIML instrument was recently developed to obtain 10- to 12-year old children's self-reports of attachment to parents, peers, teachers and school, and neighborhood (Cook *et al.*, 1995). The PIML follows the model of the IPPA, but items were deleted or altered to be more easily comprehended by younger children. PIML questions regarding teachers were adapted from the parent IPPA scale. PIML items regarding school bonding were based on prior theory and research concerning school bonding (Hirschi, 1969; Hawkins and Catalano, 1992). School bonding questions measure positive school bonds and negative perceptions about the school environment that the child attends. Estimates of the psychometric properties of the PIML teacher and school measures have been provided previously (Murray and Greenberg, 2000, 2001). One characteristic of the PIML that could assist in clarification of maturational processes from mid- to late-childhood is that attachment is measured on a continuum (as opposed to categorizing attachment as secure vs. insecure).

The purpose of the present study was to estimate the internal consistency, discriminant validity, and factor structure of the Parent Attachment and Peer Attachment measures of the PIML instrument using confirmatory factor analysis. The models of the PIML that were tested also served to examine the theoretical structure of attachment in mid-to-late childhood. Two central

conceptual questions were addressed. By middle childhood, have children's internal representations of their relations with others become global and singular, rather than differentiated (implying that attachment is best represented by a single factor rather than separate factors for peers and parents; Model 1)? The alternative model would indicate that children see the nature of their relations with parents and peers as separate. A second conceptual question focuses on the dimensionality of perceived relationships. One model, again more global, would indicate only one dimension is needed to gauge variability in children's attachment relations (implying that attachment is best represented by a single factor for peers and another for parents rather than with three separate factors for Trust, Communication, and Alienation; Model 2). A second model would show differentiation of dimensions of attachment as indicated in previous research with adolescents using the IPPA. We hypothesized that the best fitting model would reflect the PIML scoring protocol which differentiations attachment to parents and peers, as well as multiple dimensions of each relation. This model implies that attachment is impacted both by an individual's internal representations of parents and peers as well as specific aspects of the individuals' interactions with parents and peers. In addition, we examine the validity of the PIML using correlations with parent, teacher, and self-reports of symtomology and well-being.

Methods

Participants

Participants were a diverse sample of 320 fifth and sixth grade students who attended public schools in Washington State[1]. The data collection was part of a longitudinal study of a preventive intervention and the PIML data were collected during the final wave of data collection in the fourth year of the project. Seventy-four percent of eligible students participated in the study. Table 1 presents the demographical composition of the sample. Participants were in fifth or sixth grade at the time these data were collected. Two hundred and nine students were from regular education classes and 111 students were from special education classes; 1/3 of the sample received special education services. The proportion of students with disabilities in this sample is greater than national estimates; however, this is not uncommon for samples recruited from urban settings (U.S. Department of Education, 1996). Nearly 39% of the students represented minority populations. As suggested by the mean Holling-shead Index scores collected from a subset of participants, the sample generally represented lower socioeconomic strata (Table 1).

Procedures

Classrooms were initially selected for the study based on the early elementary grade teachers' willingness to participate in a treatment versus no-treatment intervention study three years earlier. A randomly-selected half of the teachers' classrooms were chosen to receive the PATHS curriculum. Written consent was obtained from the parents of all participants. All assessments were administered during the spring of fifth or sixth grade by trained interviewers.

Instruments

People in my life (PIML)—The PIML is a self-report measure of attachment to parents and peers that is modeled after the IPPA (Armsden and Greenberg, 1987). The PIML attempts to measure internal representations of relationships with parents and peers by measuring the positive affective/cognitive experience of trust in the accessibility and responsiveness of parents and peers and the negative affective/cognitive experiences of anger or hopelessness resulting from unresponsive or inconsistently responsive attachment figures. The PIML

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[1]These data were collected as part of a preventive intervention trial (Greenberg *et al.*, 1995).

measures attachment in terms of scores on three specific dimensions (Trust, Communication, and Alienation) which are combined into a summative Attachment score. Each of these four scores are measured separately for Parental Attachment and Peer Attachment. Similar PIML measures are available regarding attachment to school (Murray and Greenberg, 2000; 2001); however, School Attachment was not studied presently. The PIML also measures peers' delinquent behavior. Peer Delinquency was included in the present study to (a) test the discriminant validity of the Peer Attachment measures and (b) to learn how Peer Delinquency might be associated with Peer Attachment.

The PIML (Cook *et al.*, 1995) questions were adapted from the IPPA for the comprehension of 10- to 12-year olds. Sample items from each of the Parent Attachment and Peer Attachment subscales are presented in Table 2. The PIML includes three questions to measure the delinquent behavior of a respondent's friends. This may be an important consideration when interpreting an individual's score on the Peer Attachment scales. To illustrate, an individual who has a secure attachment to delinquent peers may, as a result, be at greater risk for experiencing psychopathology whereas an individual who has a secure attachment to non-delinquent peers may, as a result, be at lower risk for experiencing psychopathology.

PIML measures are continuous as opposed to specifying thresholds used to identify "secure" attachment versus other types of attachment. Greater PIML scores indicate greater levels of the measure (Trust, Communication, Alienation, or Attachment). Hence, Alienation is expected to correlate negatively with the other scales and Alienation scores are reverse-scored when combining measures into the Attachment scores. It should be noted that the PIML has been used to identify individuals with "high" versus "low" security attachment (Armsden and Greenberg, 1987).

Reynolds child depression scale (RCDS)—The RCDS is a children's self-report measure designed to assess depressive symptoms in children (Reynolds, 1989). Sample items are "I feel sad" and "I feel lonely." High internal consistency (0.90) and split-half reliability (0.89) were reported for over 1,600 elementary students from western and Midwestern regions of the United States. Reynolds and Graves (1989) reported a four-week test-retest reliability for the RCDS of 0.85. Convergent validity has been reported for the RCDS when correlated with other measures of depression, self-esteem, and anxiety (Reynolds *et al.*, 1985). The RCDS total raw score was used for analyses with PIML scores.

Health resources inventory (HRI)—The Health Resources Inventory (HRI; Gesten, 1976) was developed for use in the Rochester Primary Mental Health Project (Cowen *et al.*, 1975). The HRI provided a measure of competencies in children (parent report and teacher report) to balance out the measures of affective and behavioral problems. The HRI was developed for use with elementary school-aged children and its psychometric properties have been reported to be acceptable to good (Cohen *et al.*, 1988; Gesten, 1976; Koegh *et al.*, 1989; Weissberg *et al.*, 1987). The HRI factor structure has been reported to be similar between parents and teachers. However, parents' HRI reports correlate only modestly with teachers' HRI reports (Koegh *et al.*, 1989). The modest correlation between parent and teacher ratings suggested that differences occur between settings because of children's differential use of competencies, adults' different perceptions of children's competencies, or both. In the present study, the Cronbach's alpha internal consistencies of the HRI parent rating scales were: 0.92 for Frustration Tolerance, 0.87 for Assertiveness, 0.93 for Task Orientation, and 0.89 for Peer Sociability. The Cronbach's alpha internal consistencies of the HRI teacher rating scales were: 0.96 for Frustration Tolerance, 0.91 for Assertiveness, 0.97 for Task Orientation, and 0.95 for Peer Sociability.

Delinquency rating scale for self and others (DRSSO)—The DRSSO (Greenberg and Kushe, 1992) is a children's self-report measure modeled after questions from the National Youth Survey (Elliot *et al.*, 1985). Items that were inappropriate for 10- to 12-year olds were removed from the DRSSO. Items were worded to ask about the same 28 delinquent behaviors of friends and self. Responses to each item could be never, one or two times, three or four times, or more than four times. High internal consistency estimates have been reported for the DRSSO self ($\alpha = 0.89$) and friends ($\alpha = 0.94$) subscales (Greenberg and Kushe, 1992).

Child behavior checklist (CBCL)—The CBCL (Achenbach, 1978, 1991) is a widely used measure of children's and adolescents' behavioral and emotional adjustment that is completed by a parent. The CBCL has undergone extensive psychometric evaluation. Two overarching scale scores (externalizing symptomology and internalizing symptomology) are the most commonly used scores and were used for the analyses presented below. The externalizing score consists of items measuring aggression and delinquency. The internalizing score consists of items measuring anxious/depressed symptoms, somatic complaints, and withdrawing from relationships.

Analyses

The psychometric properties of the PIML were estimated using Cronbach's alpha for internal consistency, Pearson correlations for discriminant validity, and confirmatory factor analysis for construct validity. These statistics also were computed separately for students recruited from regular education vs. special education settings, African Americans vs. Caucasians, and genders. Confirmatory factor analysis (CFA) was used to compare the fit of a number of competing models that implied (a) different theoretical interpretations of attachment and (b) different scoring schemes for the PIML. It was hypothesized that PIML Communication and Trust sub-scales would correlate positively with Health Resources Inventory scores and negatively with the CBCL, Reynolds Child Depression Inventory, and the Delinquency Rating Scale. The Alienation subscale was hypothesized to correlate with the same instruments, but in the opposite directions as Communication and Trust.

CFA was conducted using maximum likelihood estimation in Amos 4.0 (Arbuckle and Wothke, 1999). The last model to be tested was the model representing the intended scoring of the PIML (Model 7). In Model 7, the two second-order factors (representing Parent Attachment and Peer Attachment) were freed to correlate. Each of the second-order factors was modeled to include three first-order factors which represent the Trust, Communication, and Alienation subscales of the Parent and Peer Attachment scales (with an additional Peer Delinquency scale for Peer Attachment). In the other six models, the PIML scoring model was simplified to test if the PIML factor structure could be more parsimonious. This approach also provided a test of the similarity between the IPPA and PIML factor structure.

The correlation matrix between the PIML items was used as the dataset for the CFA analyses. The results of this CFA are intended to be generalized to other samples. In this situation, analysis of the correlation matrix is preferred to analysis of the covariance matrix (Bollen, 1989; Joreskog and Sorbom, 1989; Loehlin, 1992). The correlation matrix was calculated in SPSS 11.0 using the reliability procedure, which outputted a new dataset with the correlation estimates. For the CFA, both means and intercepts were estimated. Model analyses were limited to 500 iterations, which was sufficient to achieve model convergence for each model. For the purpose of computing fit measures with incomplete data, a saturated model and an independence model were fitted.

Factor models

Several models were tested because of their important implications for PIML scoring as well as attachment theory. The first three models that were tested were the most parsimonious models; they included the fewest latent factors and the latent factors were not allowed to correlate. *Model 1—Common Attachment Model*: Model 1 is a standard reference model in which all of the PIML items loaded onto a single, Common Attachment factor (often referred to as the General Factor model or "G" model). Model 1 was used to compare the other models' fit to the data. Theoretically, the Common Attachment factor model implies that attachment is a trait that occurs within the individual that generalizes to both parents and peers regardless of the parents' or peers' characteristics. Regarding the PIML scoring, the Common Attachment model implies that an overall PIML score should be used rather than separating PIML items into subscales. *Model 2—Uncorrelated Parent Attachment and Peer Attachment*: Model 2 separates children's attachments to parents and peers and these attachments were forced to be uncorrelated. This model implies that children's attachment to others is differentiated by source. If this model best fit the data, scoring of the PIML should consist of two scores, one for parental attachment and the other for peer attachment. *Model 3—Uncorrelated Dimensions of Attachment*: In Model 3, the three attachment dimensions of trust, communication, and alienation were uncorrelated and specific to parents and peers. Theoretically, Model 3 implies that attachment to others is experienced as having three separate, uncorrelated dimensions. Model 3 also implies that the level of attachment felt toward others is specific to the type of individual (parent versus peer). The PIML scoring scheme implied by Model 3 is that separate scales should be scored for the three underlying dimensions of attachment for different persons. A fourth peer subscale also was modeled that was specifically focused on the reported delinquency of peers.

Two additional models were tested in which the latent factors that were specified in Models 2 and 3 were allowed to correlate. *Model 4—Correlated Parent Attachment and Peer Attachment:* A fourth model was identical to the second model except that the parent attachment and peer attachment factors free to correlate. Theoretically, Model 4 implies that children's attachment to others has both a global or personological component and is influenced by the other individual. The PIML scoring scheme indicated by this model would be three scores: a parental attachment score, a peer attachment score, and a total attachment score that would be calculated by combining the two. *Model 5—Correlated Dimensions of Attachment*: The fifth model was identical to the third model except that each of the dimensions of attachment were allowed to be correlated between the types of persons that children were reporting about. The fifth model implied that the dimensions of attachment (trust, communication, and alienation) are (a) independent characteristics that generalize to some degree across peers and parents and (b) variation within these characteristics is due largely to children's style of internal representations of others.

Finally, two more sophisticated models were tested that were combinations of Models 2,3,4, and 5. *Model 6—Domains of Parent and Peer Attachment*: In the sixth model, the dimensions of attachment were specific to the type of person that a child was reporting about; however, the dimensions of attachment were allowed to correlate within that relationship. Hence, mutual trust with a parent was hypothesized to correlate with quality of communication with the parent and level of alienation with the parent but not with any dimension of peer attachment. Like Model 2, Model 6 theoretically implies that children's attachment to others is differentiated by relationship and that there is little evidence of generalized representation across types of relationships. Model 6 also implies that attachment to a parent or peer occurs by way of three broad dimensions and that nine separate scores should be calculated. One score for Parent Attachment would be calculated as a combination of the scores for Parent Trust, Communication, and Alienation subscales. Another score would be calculated for Peer

Attachment by combining the scores for Trust, Communication, Alienation, and Delinquency sub-scales. *Model 7—Correlated Parent and Peer Attachment Domains*: The seventh model was identical to Model 6 except that the Parent Attachment and Peer Attachment factors were allowed to correlate. This model implies not only that domains of attachment exist, and that children's experience of these domains are specific to children's types of relationships, but also that children's style of internal representations of one set of relationships impacts their representations of others. The PIML scoring that is implied by Model 7 is that one score would be calculated in addition to the scores of Model 6; a PIML Total score that is a combination of the Parent Attachment and Peer Attachment scores.

CFA fit statistics

The relative fits of the competing models to the observed data were compared using several model fit indices because different fit indices evaluate the fit of models based on different criteria. The χ^2 and χ^2/df tests were used to test the discrepancy between the data that are predicted by the model and the observed data. Good fit is indicated by a non-significant χ^2 test. A shortcoming of the χ^2 test is that as sample size increases (and model estimates become more accurate) the probability of the difference between the hypothesized data and the observed data being significant also increases (Tabachnick and Fiddell, 2001). An alternative calculation of the χ^2 test is to control for sample size by dividing the χ^2 by the degrees of freedom (also referred to as the minimum discrepancy or CMIN test). A conservative criterion for determining good fit is a χ^2/df ratio of 2.0 or less (Arbuckle and Wothke, 1999). Some of the competing models were nested within one another. When one model was nested within another model, the differences in their fit to the data were tested statistically using the likelihood ratio χ^2 test (Bollen, 1989). In addition to these summative fit indices, factor loadings of the best fitting models were inspected to identify weaknesses in the factor structure.

Several additional widely-used fit indices were used which compare the fit of the hypothesized model to a model that is known to provide poor fit (in this case the typically used independence model; Arbuckle and Wothke, 1999). The Tucker-Lewis Index (TLI; Bentler and Bonett, 1980) is derived from the analysis of moment structures. TLI generally ranges from zero to one with better fit indicated by values closer to 1.0. The Comparative Fit Index (CFI; Bentler, 1990) compares the hypothesized model to the independence model in terms of the discrepancy between the models and observed data, the degrees of freedom, and the noncentrality of the models. The CFI ranges from zero to one with better fit indicated by values closer to 1.0.

Three additional fit indices were used because they take into account the relative parsimony of factor models (with simpler or more parsimonious models preferred). The Parsimony-adjusted Comparative Fit Index (PCFI) adjusts the CFI to account for the number of degrees of freedom in the hypothesized model. Better PCFI fit is indicated by values closer to 1.0. The Parsimonious Fit Index (PFI) also provides preference to models with fewer parameters (all other things being equal) by accounting for the degrees of freedom of the factor models. Better PFI fit is indicated by values closer to 1.0. The RMSEA (Browne and Cudeck, 1993) is derived by fitting the model to the population moment structures (cf. the sample moments of TLI). Browne and Cudeck (1993) advise that an RMSEA = 0.1 or greater indicates a poor fitting model, an RMSEA = 0.08 is a reasonable fit, and an RMSEA = 0.05 or less indicates a good fitting model.

One assumption of CFA is that multivariate normality exists for the data. This assumption is rarely met in analyses of large matrices such as the one used for the CFA described presently (Micceri, 1989). Violations of the assumption of multivariate normality are commonly ignored (Byrne, 2001).

In the present study we investigated univariate normality, which is a necessary (though not sufficient) condition for multivariate normality (West *et al.*, 1995). A normal distribution will provide a skewness score of zero. For a sample of 320, skewness scores ranging from 0.2739 to −0.2739 are considered to deviate from normality due to chance (Tabachnick and Fidell, 1996). PIML items ranged in skewness from −4.788 to 6.361 and only one PIML item had a skewness score between 0.2739 and −0.2739. Regarding kurtosis, a normal distribution produces a kurtosis score of zero and for a sample of 320, kurtosis scores ranging from −0.5477 to 0.5477 are considered to deviate from normality due to chance. Eleven PIML items had kurtosis scores between 0.5477 and −0.5477. The remaining PIML items ranged in kurtosis from (−1.514 to 43.116). Hence, it was not surprising that the Kolmogorov-Smirnov statistic with the Lilliefors test indicated that each item departed from normality. The effects of nonnormality on the CFA results is that the chi-square statistic is inflated, resulting in the rejection of good fitting models, as well as a narrowing of the confidence intervals around parameter estimates (West, Finch and Curran, 1995). An additional fit statistic was used, the Bollen-Stine χ^2, which is based on bootstrap analyses, to test for model fit accounting for nonnormality.

Results

The means and standard deviations as well as Cronbach's alpha estimates of internal consistency for each of the PIML measures are presented in Table 2. The alpha for the Parent Attachment Scale was 0.88 and for the Peer Attachment Scale was 0.90; both were excellent. Alphas for the Trust, Communication, Alienation, and Delinquency sub-scales were generally only slightly lower and ranged from 0.65 for Parent Alienation to 0.90 for Peer Trust. Each of the PIML scales demonstrated at least adequate internal consistency. Table 2 also presents the mean interitem correlations for each PIML measure because Cronbach's alpha is heavily weighted by the number of items in a measure.

Validity analyses consisted of correlations between PIML subscale scores and measures of characteristics that should be associated with attachment (Tables 3 and 4). Correlations between the Parent Attachment and Peer Attachment scales were in the hypothesized directions, yet were small enough to support the discriminant validity of the PIML scales. Only three of the correlations were not statistically significant.

The correlations involving Trust, Communication, and Alienation measures and parent and teacher ratings of behavioral and emotional illness and well-being were in the hypothesized directions. Children's self-reports of parental trust were more strongly negatively correlated with their own reports of depression and behavioral problems than were the correlations with parents' and teachers' ratings of behavior. Parent Communication was uncorrelated with parent or teacher ratings, but was negatively correlated with children's self-reported depression and delinquency. Peer Communication correlated less strongly with parent and teacher ratings as well as the Child Depression Inventory than did Peer Trust and Peer Alienation. One possible reason for the differences in correlations is that Communication measures a more behaviorally-oriented characteristic of relationships whereas Trust and Alienation measure affective qualities of relationships that are internal to the child. Parent and Peer Communication correlated most strongly (negatively) with one's own and friends' levels of delinquency.

Special education students vs. regular education students

Participants recruited from Special Education settings had lower attachment and greater alienation on parent and peer subscales as well as greater Peer Delinquency (Table 5). No differences were found between Special Education students and Regular Education students in terms of the internal consistencies of PIML scales (Table 5). Although differences in

correlations between PIML subscales were observed, none of the correlations were statistically significantly different.

Ethnicity differences

Although demographic differences were found between African-Americans and Caucasians (Table 1), no differences were found between these ethnic groups in terms of mean PIML scores, internal consistencies of PIML scales, or correlations between PIML scales. Hence, ethnic-specific results are not presented for other analyses.

Gender differences

Few mean differences on PIML scales were observed between genders (Table 5). The mean differences that were found (Parental Trust, Peer Attachment Total, and Peer Communication) were not meaningfully different. Internal consistencies of PIML subscales were similar between genders with the exception of Peer Delinquency on which boys had a lower internal consistency than girls (Table 5). Correlations between PIML subscales were not statistically different between the two genders.

Confirmatory factor analyses

The confirmatory factor analyses suggested that the PIML scoring scheme is appropriate for summarizing PIML information. Model 7 (model of the PIML scoring scheme) generally best fit the data (Table 6). However, Model 6 (in which the Parent Attachment and Peer Attachment factors were uncorrelated) provided similar fit to the data as Model 7 and the CFI and PCFI goodness of fit indices suggested that Model 6 best fit the data. The likelihood ratio χ^2 test (Table 7) indicated that Model 7 fit the data only somewhat, but statistically significantly, better than Model 6 ($\chi^2 = 45.11$, 1df, $p < .001$). Regardless of which of these models is preferred, both models are consistent with the PIML scoring scheme in that two higher-order measures are indicated (Parent Attachment and Peer Attachment) with several subscales (Trust, Communication, Alienation, and for Peer Attachment the subscale of Delinquency). The standardized factor loadings for Model 6 (Table 8) and Model 7 (Table 9) differed very little from one model to the next, suggesting that the PIML has robust factor structure. The correlation between Parent Attachment and Peer Attachment in Model 7 was 0.478, a medium-sized correlation (Cohen, 1988), which indicates that the two constructs are separate. Moreover, the factor loadings of Trust, Communication and Alienation were similar for Parent Attachment and for Peer Attachment.

Discussion

The results of the internal consistency estimates, validity analyses, and factor analyses were consistent with the PIML providing a valid measure of attachment. Because the PIML was based largely on the IPPA, and the PIML results are generally consistent with the IPPA findings, these results also are consistent with the theoretical underpinnings of attachment for children. No ethnic or gender differences were found that suggested the PIML should be scored or interpreted differently for the subgroups included in this study. The only ethnic groups that could be examined with these data included African-Americans and Caucasians. Qualifying for special education services appears to be associated with lower attachment to parents and peers, greater alienation from parents and peers, and greater delinquency in peer associations. It is possible that children receiving special education services might benefit from intervention designed to enhance attachments with parents and peers; however this line of research should be better understood before specific recommendations are made (Murray and Greenberg, 2001). Whereas these results suggest that the factor structure of the PIML generalizes across genders, ethnicities, and educational settings, this implication should be specifically tested with

larger samples that could provide greater statistical power. Before these results are discussed further the study limitations should be understood.

Study limitations

The sample for this study included some diversity regarding gender, ethnicity, and special education services versus regular education services. For an initial examination of the psychometric properties of a measure, inclusion of subgroups can be helpful to initially test if differences exist between subgroups. However, further research should be conducted to more thoroughly test for differences between different levels of social strata or ethnicities.

The validity analyses were restricted to correlations of PIML scores with measures of constructs that were considered to be related to, but separate from, attachment. Future studies should compare PIML scores with other measures of attachment, including those that are done by interviews (Target *et al.*, 2003).

As with nearly all other factor analytic studies, the assumption of multivariate normality was violated in the present analyses. To evaluate the impact that nonnormality in the data distributions might have on the results and conclusions of this study, the Bollen-Stine fit index was used in addition to the other fit indices. This fit index was based on a bootstrap resampling of the raw data (200 resamplings for each model) to obtain a mean χ^2 for each model. This procedure accounts for nonnormality and was therefore expected to generate lower χ^2 values than the standard χ^2 calculations (Table 6). The fact that the Bollen-Stine χ^2 fit indices generated results that were consistent with the other fit indices suggested that nonnormality in the data did not generate incorrect conclusions about the model fits to the data.

Study strengths

This study also could be characterized by a number of strengths in its design. Preliminary tests for differences between genders, ethnic groups, and education type were conducted. The PIML scores were correlated with self-reports, parent reports, and teacher reports of child characteristics that should be related to attachment. The characteristics that were considered included problems with behavior and mood as well as competencies. These findings with this range of measures suggests that a) the PIML measure of attachment is associated with a large nomological network of other psychological constructs and b) that the theoretical underpinnings of the PIML are correct in asserting that attachment impacts children through a broad range of functioning. An additional strength of this study was that a wide range of alternative factor structure models were compared to the original PIML structure. A range of fit indices were used to compare the models and the tests of goodness of fit provided consistent results.

Conclusions

The results of this study indicate that the PIML is a valid instrument for measuring attachment in pre-adolescent children. Correlates of attachment in pre-adolescent children include behavior problems and affective problems, as estimated from self-reports, parental reports, and teacher reports. Although these correlations were quite consistent when comparing parental reports to teacher reports, the correlations between self-reported children's attachment with depression and delinquency were greater than the adults' reports on the CBCL internalizing and externalizing scales. This may be in part due to the differences in measures with delinquency and depression being more specific, and the CBCL being more global. The correlations were in the same direction, regardless of reporter. Regarding child competencies, there was high consistency in the correlations between attachment and competencies when comparing parent reports to teacher reports on the HRI. All of these results suggest children's

self reports of attachment on the PIML provide a measure of attachment that is valid and consistent with attachment theory.

The original PIML scoring scheme does not require alteration and the subscale structure provides accurate measures of the dimensions of attachment, according to the results of the factor analyses. The factor loadings suggested that attachment largely consists of trust in an individual as well as communication with that individual. Alienation from an individual is associated with attachment (negatively); however, the size of the correlation is not as large as the other two dimensions of attachment. Perhaps Alienation is a measure that more strongly reflects the characteristics of the person other than the respondent in the relationship compared to Trust or Communication. Peer delinquency was included in the factor analyses because the three PIML questions that are used to measure peer delinquency are a part of the scale. The factor loadings indicated that peer delinquency is largely independent of peer attachment (only 3.6% of variance in Peer Delinquency was accounted for by Peer Attachment).

The present factor analysis results with the PIML closely resemble previous findings with the IPPA. Moreover, results of the validity analyses were generally consistent with findings from adolescent samples. It appears that attachment measures of Trust, Communication, Alienation, Parental Attachment, and Peer Attachment can now be measured using self-reports from late elementary school through adulthood.

Theoretical implications of results

These results also provide theoretical implications regarding children's emotional bonds to others. Model 7 was the overall best fitting model. This model implies that a child's attachment is a result of his or her style of internal representation of others and other persons' impact on the relationship. Also, the emotional bond that a child feels toward others is better understood in light of specific dimensions (trust, communication, and alienation). This summary of attachment could not be simplified and was surprisingly consistent between parents and peers.

The dimensions of attachment as measured by the PIML are similar for children's attachment to parents and peers. The factor loadings from Models 6 and 7 (Tables 7 and 8) indicate that the level of trust that a child places in another person virtually equals the level of attachment that the child feels toward that person. The amount of communication that a child perceives as occurring with another person also is very highly correlated with the level of attachment felt toward that person. As theorized, the level of alienation that a child feels toward another person overlaps (in the opposite direction) with the level of attachment felt toward that person. However, alienation was not as highly associated with attachment as trust or communication. The correlation between Peer Delinquency and Peer Attachment was small, suggesting that the ratings of peer delinquency were not skewed by children's attachment toward peers. This small correlation also suggested that children's attachment to peers is not conditional on their peers' behavior.

Although communication appears to be strongly associated with Parent Attachment and Peer Attachment, Peer Communication was not strongly associated with adults' ratings of psychopathology or competencies and Parent Communication was not significantly associated with adults' ratings. The first implication of this finding is that communication is a dimension of attachment which is distinct from trust. The second implication of this finding, which should be clarified with further study, is that adults' perceptions of children's psychopathology is not based on the child's patterns of communication with others. This appears to be particularly true regarding Parental Attachment because the correlations of Peer Communication with CBCL scores and HRI scores are greater than correlations of Parent Communication with CBCL scores and HRI scores. In contrast, children's self ratings of depression and delinquency are much more highly correlated with Parent Communication, suggesting that children's

psychopathology and delinquency are in fact correlated with their communication with parents. Interestingly, Parent Communication correlated more highly with CDI and delinquency than did Peer Communication. It appears that from children's perspective, communication with parents is more strongly associated with lower delinquency and depression than adults might perceive. The third implication of this finding is that parents might be able to curb depressive and delinquent tendencies by use of communication patterns that children will perceive as improving attachment with the parent.

Future research using the PIML could provide valuable insight to better theoretical understanding of children's attachment as well as possible implications for intervention. One interesting research question is: how dissimilar are parents' ratings of their children's attachment from the children's self-reported ratings of their attachment toward parents? This question could be addressed by comparing PIML results with parental ratings of attachment. Additional important research questions could be addressed by comparing PIML results to other measures of attachment such as: what is the validity of the PIML measures for measuring attachment in late childhood? or what would be the optimal threshold level of attachment on PIML measures to categorize children into attachment types? Perhaps we can better understand the type of communication that is associated with stronger attachment from children's perspective and parents can use that type of communication to build better attachment with their children. Two basic research questions that could be addressed using the PIML are: how variable is attachment to a particular individual over time? and what other characteristics are associated with the variation in attachment? Clarification of attachment differences between genders, ethnicities, and economic strata may have direct implications for preventive intervention. Another important research question to address is can children younger than age 10 reliably and validly complete the PIML?

In summary, the results of this study indicate that the PIML is a valid self-report measure of attachment for preadolescent children. The original PIML scoring scheme was confirmed by the CFA described in this study. The PIML could prove a valuable instrument for clarification of the development, influence, and associated characteristics of attachment.

Acknowledgements

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Table 1

Demographic composition of the sample

	Total sample	African-American vs. Caucasian (respectively)	Special education vs. regular education (respectively)
Mean age (standard deviation)	11.02 (0.79)	11.01 vs 11.02	11.15 vs 10.95[*]
Gender (percent female)	42.2%	42.8% vs 44.8%	28.8% vs 49.3%[**]
Race			
Caucasian	58.4%	na	68.5% vs 53.1%[**]
African-American	30.0		18.9 vs 35.9
Asian or Filipino	5.6		0.9 vs 4.8
Other	6.0		11.7 vs 6.2
Disability (Washington state classification)			
Behavior disorder	6.6	6.3% vs 7.0%	na
Orthopedic handicap	0.3	0.0 vs 0.5	
Other health impaired	6.3	1.0 vs 9.1	
Specific learning disability	14.1	5.2 vs 17.1	
Mental retardation	5.9	8.3 vs 4.8	
Multi-handicapped	1.6	4.3 vs 2.1	
Mean Hollingshead			
Socioeconomic status ($n = 162$)	2.82 (1.32)	2.92 vs 2.80	3.94 vs 2.37[**]

Notes. $N = 320$.

[*]
$p < .05$;

[**]
$p < .01$.

Table 2

People in my life item examples

Subscale name and example items	Cronbach's alpha	Mean inter-item *r*	Mean & (Std. Dev.)
Parent attachment	.88	.270	42.2 (8.79)
Trust (10 items)	.87	.404	36.0 (4.71)
My parents respect my feelings			
I trust my parents			
Communication (5 items)	.76	.400	16.0 (3.10)
My parents listen to what I have to say			
I talk to my parents when I am having a problem			
Alienation (5 items)	.65	.266	9.7 (3.23)
I feel angry with my parents			
I feel scared in my home			
Peer attachment (not including Peer Delinquency)	.90	.280	39.2 (12.26)
Trust (12 items)	.90	.441	40.0 (7.10)
My friends accept me as I am			
My friends can tell when I am upset about something			
Communication (5 items)	.80	.445	14.4 (3.95)
I share my thoughts and feelings with my friends			
My friends can tell when I am upset about something			
Alienation (7 items)	.70	.266	12.1 (3.98)
I feel angry with my friends			
I wish I had more friends			
Peer delinquency (3 items)	.68	.396	3.5 (1.18)
If one of my friends asked me to skip school, I would do it			
If a friend asked to copy my test, I would let him or her do it			

Notes. Response options for PIML items are: Almost never or never true, sometimes true, often true, and almost always or always true. Std. dev. = standard deviation. *r* = Pearson correlation.

Table 3

Pearson correlation validity analyses: parent and peer attachment

	PIML Subcales	
	Parent attachment	**Peer attachment**
Child behavior checklist		
Parent ratings[a]		
Internalizing	−.09	−.21[**]
Externalizing	−.13[*]	−.23[***]
Teacher ratings[b]		
Internalizing	−.16[**]	−.27[***]
Externalizing	−.19[***]	−.28[***]
Health resources inventory		
Parent ratings[a]		
Frustration tolerance	.19[**]	.22[**]
Assertiveness	.11	.08
Task orientation	.12[*]	.20[**]
Peer sociability	.14[*]	.24[***]
Teacher ratings[b]		
Frustration tolerance	.13[*]	.22[***]
Assertiveness	.17[**]	.21[***]
Task orientation	.17[**]	.27[***]
Peer sociability	.15[**]	.29[***]
Reynolds child depression Inventory[c] (Self report)	−.41[***]	−.29[***]
Delinquency rating scale[c] (Self report)		
Self	−.29[***]	−.24[***]
Others	−.23[***]	−.22[***]

Notes.

[*] $p < .05$;

[**] $p < .01$;

[***] $p < .001$;

[a] $n = 184$–185;

[b] $n = 263$—265;

[c] $n = 310$.

Table 4

Pearson correlation validity analyses: trust, communication, and alienation

PIML Subscales					
Parent			**Peer**		
Trust.	Commun.	Alien.	Trust	Commun.	Alien.
Child behavior checklist					
Parent ratings[a]					
Internalizing	-.15*	.07	.10	-.21**	-.12*	.15*
Externalizing	-.12*	.02	.19**	-.18**	-.14*	.23***
Teacher ratings[b]					
Internalizing	-.16**	-.05	.15**	-.20***	-.16**	.31***
Externalizing	-.18**	-.09	.17**	-.21***	-.16**	.28***
Health resources inventory					
Parent ratings[a]					
Frustration tolerance	.21**	.03	-.20**	.21***	.14	-.11
Assertiveness	.10	-.05	-.19**	.04	.01	-.13*
Task Orientation	.11	-.03	-.20**	.15*	.15*	-.16**
Peer sociability	.13*	.01	-.17	.22**	.12*	-.21
Teacher ratings[b]					
Frustration tolerance	.15**	.09	-.06	.20**	.13*	-.16**
Assertiveness	.13**	.06	-.23***	.15**	.09	-.27***
Task orientation	.15**	.08	-.17**	.21**	.18**	-.24***
Peer sociability	.13**	.08	-.15**	.25**	.19**	-.26***
Reynolds child depression inventory[c] (Self Report)	-.31***	-.23***	.46***	-.22**	-.09	.41***
Delinquency rating scale[c] (Self report)					
Self	-.24***	-.30***	.16**	-.19***	-.22***	.10*
Friends	-.16**	-.25***	.16	-.19***	-.16**	.12*

Notes.

*
$p < .05$;

**
$p < .01$;

***
$p < .001$;

[a] $n = 184–185$;

[b] $n = 263–265$;

[c] $n = 310–320$. Commun = Communication. Alien = Alienation.

Table 5

PIML mean and internal consistency differences between educational settings and genders

Measures	Educational type			Gender		
	Regular	Special	*p-value*	Male	Female	*p*-value
Mean differences:						
Parent attachment						
Total	43.2	40.4	0.007	42.5	41.7	ns
Trust	36.3	35.3	ns	36.2	35.6	0.021
Communication	16.0	15.8	ns	15.9	16.1	ns
Alienation	9.2	10.7	>0.001	9.6	10.0	ns
Peer attachment						
Total	40.7	34.9	>0.001	36.9	41.1	0.003
Trust	40.5	38.6	0.022	39.1	40.9	ns
Communication	14.7	13.9	ns	13.5	15.6	0.000
Alienation	11.2	13.8	>0.001	12.1	12.1	ns
Delinquency	3.3	3.8	>0.001	3.6	3.3	ns
Cronbach's alpha differences:						
Parent attachment						
Total	0.88(0.28)	0.85(0.25)		0.85(0.25)	0.88(0.30)	
Trust	0.86(0.40)	0.87(0.41)		0.84(0.36)	0.89(0.46)	
Communication	0.76(0.39)	0.76(0.39)		0.75(0.37)	0.78(0.41)	
Alienation	0.66(0.28)	0.58(0.21)		0.64(0.26)	0.65(0.27)	
Peer attachment						
Total	0.92(0.30)	0.92(0.28)		0.91(0.28)	0.93(0.32)	
Trust	0.89(0.41)	0.91(0.47)		0.90(0.43)	0.90(0.44)	
Communication	0.80(0.44)	0.80(0.44)		0.79(0.43)	0.78(0.41)	
Alienation	0.64(0.22)	0.70(0.26)		0.68(0.25)	0.72(0.28)	
Delinquency	0.61(0.42)	0.65(0.38)		0.59(0.33)	0.76(0.59)	

Notes. Parenthetical values are the mean interitem correlation (provided because Cronbach's alpha is heavily weighted by the number of items in a measure).

Table 6

Goodness of fit indices for competing confirmatory factor analysis models

Model	χ^2	p	df	χ^2/df	NFI	TLI	CFI	PCFI	RMSEA	Bollen-Stine χ^2
1	3572.10	.000	1034	3.46	.913	.931	.937	.859	.090	1097.05
2	2626.37	.000	1034	2.54	.936	.957	.960	.880	.072	1097.96
3	2500.27	.000	1035	2.42	.939	.960	.961	.884	.069	1098.75
4	2582.94	.000	1033	2.50	.937	.958	.963	.880	.071	1096.64
5	2372.35	.000	1032	2.29	.943	.964	.976	.884	.066	1095.58
6	1971.53	.000	1027	1.92	.952	.974	.978*	.889*	.055	1092.09
7	1926.42*	.000	1026	1.88*	.953*	.975*	.967	.867	.054*	1090.40*

Notes. The best fit statistic among the seven models is italicized for each goodness-of-fit statistic. For the χ^2/df fit index, ratios of 2.0 or smaller are considered to be good fit. NFI = Normed Fit Index (better fit is indicated by values closer to one). TLI = Tucker-Lewis Index (better fit is indicated by values closer to one). CFI = Comparitive Fit Index (better fit is indicated by values closer to one). PCFI = Parsimony-adjusted CFI (better fit is indicated by values closer to one). PFI = Parsimonious Fit Index (better fit is indicated by values closer to one). RMSEA = Root Mean Square Error of Approximation (better fit is indicated by values closer to zero). Bollen-Stine χ^2 is interpreted the same way as the χ^2 fit statistic; however, bootstrap analyses of raw data are used to account for nonnormality in the data which results in lower χ^2 values.

Table 7

Likelihood-ratio χ^2 tests of differences between nested models

Model number	2	3	4	5	6	7
1		n/a	n/a	989.16 (1)	n/a	n/a	1645.68 (8)
2			n/a	43.42 (1)	n/a	654.83 (7)	699.94 (8)
3				n/a	127.92 (3)	n/a	573.85 (9)
4					n/a	611.41 (6)	656.52 (7)
5						n/a	445.93 (6)
6							45.11 (1)

Notes. Table entries are the Likelihood ratio χ^2 (difference in χ^2 s) between models that are nested (indicated by the intersection of the row model and the column model). To illustrate, the χ^2 difference between model 1 (row) and model 4 (column) was 989.16. Parenthetical values indicate the differences in the degrees of freedom between the two models. All differences were statistically significant ($p < .001$). n/a = calculation of the Likelihood ratio χ^2 is not appropriate between the corresponding models because they are not nested.

Table 8

Standardized factor loadings for model 6

Parent attachment			Peer attachment		
Parent subscale	**Attachment loading**	**Subscale loading**	**Peer subscale**	**Attachment loading**	**Subscale loading**
Parent trust	0.911		Peer trust	1.000	
PAT 1		0.592	PET 1		0.697
PAT 2		0.633	PET 2		0.708
PAT 3		0.653	PET 3		0.627
PAT 4		0.603	PET 4		0.729
PAT 5		0.692	PET 5		0.770
PAT 6		0.699	PET 6		0.681
PAT 7		0.554	PET 7		0.681
PAT 8		0.717	PET 8		0.594
PAT 9		0.612	PET 9		0.767
PAT 10		0.448	PET 10		0.478
			PET 11		0.638
			PET 12		0.490
Parent communication	0.811		Peer communication	0.794	
PAC 1		0.589	PEC 1		0.640
PAC 2		0.505	PEC 2		0.799
PAC 3		0.694	PEC 3		0.637
PAC 4		0.635	PEC 4		0.787
PAC 5		0.713	PEC 5		0.473
Parent alienation	−0.489		Peer alienation	−0.470	
PAA 1		0.394	PEA 1		0.425
PAA 2		0.549	PEA 2		0.499
PAA 3		0.650	PEA 3		0.679
PAA 4		0.610	PEA 4		0.579
PAA 5		0.430	PEA 5		0.694
			PEA 6		0.436
			PEA 7		0.240
			Peer delinquency	−0.191	
			PED 1		0.758
			PED 2		0.561
			PED 3		0.652

Notes. N = 320.

Standardized factor loadings for model 7

Parent attachment			Peer attachment		
Parent subscale	**Attachment loading**	**Subscale loading**	**Peer subscale**	**Attachment loading**	**Subscale loading**
Parent trust	0.833		Peer trust	0.950	
PAT 1		0.590	PET 1		0.700
PAT 2		0.636	PET 2		0.705
PAT 3		0.650	PET 3		0.623
PAT 4		0.607	PET 4		0.728
PAT 5		0.690	PET 5		0.771
PAT 6		0.699	PET 6		0.680
PAT 7		0.558	PET 7		0.682
PAT 8		0.716	PET 8		0.594
PAT 9		0.609	PET 9		0.767
PAT 10		0.453	PET 10		0.481
			PET 11		0.637
			PET 12		0.494
Parent communication	0.894		Peer communication	0.843	
PAC 1		0.596	PEC 1		0.639
PAC 2		0.507	PEC 2		0.797
PAC 3		0.683	PEC 3		0.636
PAC 4		0.642	PEC 4		0.789
PAC 5		0.709	PEC 5		0.479
Parent alienation	−0.479		Peer alienation	−0.481	
PAA 1		0.392	PEA 1		0.426
PAA 2		0.557	PEA 2		0.495
PAA 3		0.654	PEA 3		0.679
PAA 4		0.606	PEA 4		0.580
PAA 5		0.421	PEA 5		0.695
			PEA 6		0.438
			PEA 7		0.235
			Peer delinquency	−0.232	
			PED 1		0.753
			PED 2		0.565
			PED 3		0.654

Notes. N = 320. The correlation between Parent attachment and Peer attachment equaled .478