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## Antecedents and Outcomes of Joint Trajectories of Mother-Son Conflict and Warmth during Middle Childhood and Adolescence

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### Abstract

This study investigated the development of mother-son relationship quality from ages 5 to 15 in a sample of 265 low-income families. Non-parametric random effects modeling was utilized to uncover distinct and homogeneous developmental trajectories of conflict and warmth; antecedents and outcomes of the trajectory groups also were examined. Four conflict trajectory groups and three warmth trajectory groups were identified. Difficult temperament in early childhood discriminated both conflict and warmth trajectory group membership (TGM), and adult relationship quality in early childhood was related to warmth trajectories. In addition, conflict TGM differentiated youth antisocial behavior during adolescence, and warmth trajectories predicted adolescent peer relationship quality and youth moral disengagement. Implications for socialization processes are discussed.

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Numerous theories posit a central role for the parent-child relationship in children's social and behavioral adjustment. For example, attachment theorists suggest that secure bonds between children and caregivers lead to positive internal working models and more adaptive relationships throughout the lifespan (Ainsworth, Blehar, Waters, & Wall, 1978; Bretherton & Munholland, 1999). Moreover, social learning theorists (e.g., Patterson, Reid, & Dishion, 1992; Shaw, Bell, & Gilliom, 2000) have posited that early deviant behavior often results from coercive parent-child interchanges beginning in early childhood. These theories and other perspectives on child socialization (e.g., Maccoby & Martin, 1983) have differentiated positive aspects of the parent-child relationship such as warmth and support from negative dimensions such as conflict and restrictive control. The distinction between the warm/support and conflict/restrictive control attributes has been supported by factor analytic research (e.g., Denissen, van Aken, & Dubas, 2009) and is consistent with the literature examining extra-familial relationships (e.g., teachers, peers; Barrera, Chassin, & Rogosch,

1993; Furman & Buhrmester, 1985; Pianta, 1999). While evidence from some short-term longitudinal studies has demonstrated significant changes in conflict and warmth in the parent-child dyad during adolescence (e.g., Laursen, Coy, & Collins, 1998), there have been no published long-term longitudinal studies examining the stability and change of both dyadic attributes during middle childhood through adolescence. In addition, no investigations have examined whether child, family, or community factors in early childhood are predictive of distinct patterns of relationship quality, or whether patterns of parent-child relationship quality are associated with specific adolescent outcomes. Accordingly, the first goal of this study was to identify developmental trajectories of conflict and warmth between mothers and their sons from ages 5–15 years. We also examined the degree of association between conflict and warmth trajectories. The second goal was to examine antecedents of conflict and warmth trajectories, including individual, family, and broader contextual factors that may distinguish group classification. The third objective was to link patterns of change in conflict and warmth during middle childhood and adolescence to youth behavioral, social, and cognitive outcomes.

### Developmental Trajectories of Conflict and Warmth

Rather than remaining static, parent-child relationships during middle childhood and adolescence are characterized by transformations and realignments (Collins, Madsen, & Susman-Stillman, 2002; Steinberg & Morris, 2001). Indeed, research has demonstrated significant changes in both conflict and warmth during this developmental period. For example, a meta-analysis of the literature indicated that conflict frequency declined across adolescence while the intensity of conflict-related affect increased between early- and mid-adolescence (Laursen et al., 1998). Shanahan, McHale, Osgood, and Crouter (2007) also reported a significant decline in parent-child conflict frequency from middle childhood to adolescence in both older and younger siblings following the older sibling's transition to adolescence. Although longitudinal patterns of parent-child warmth have received comparatively less empirical attention, the limited research suggests that parent-child warmth may stabilize during middle childhood, decline during the transition to adolescence, and stabilize or increase later in adolescence (Shanahan, McHale, Crouter, & Osgood, 2007).

The empirical research summarized above has increased the understanding of the normative development of conflict and warmth, but two limitations are noteworthy. The first limitation is the emphasis on *population mean-level changes* when there may be considerable variations in some sub-populations (McGue, Elkins, Walden, and Iacono, 2005; Stoolmiller, 1994). That is, it is unlikely that all or even most parent-child dyads follow a precisely similar normative developmental trend. Evidence from recent studies of parenting behaviors has supported this notion (Herrenkohl, Hill, Hawkins, Chung, & Nagin, 2006; Laird, Criss, Pettit, Bates, & Dodge, 2009; Lansford et al., 2009). For example, Herrenkohl and colleagues (2006) reported three distinct trajectories of adaptive family management practices (e.g., positive reinforcement) from ages 11 to 14: high stable (42.7% of sample), low increasing (14%), and low decreasing groups (43.3%). Follow-up analyses indicated that members of the high stable and low increasing trajectory groups were less likely to engage in chronic violent behavior compared to the low decreasing group. In addition, Lansford and colleagues (2009) reported three trajectory groups for physical discipline in middle childhood and adolescence: high stable (or high decreasing), moderate decreasing, and minimal ceasing. Post-hoc analyses indicated that families with high and stable levels of physical discipline were characterized by high levels of ecological disadvantage and child externalizing behavior (both assessed in early childhood) and high levels of antisocial behavior and low levels of positive parent-child relations (both measured in adolescence).

No studies have yet simultaneously identified developmental trajectories of parent-child conflict and warmth.

Secondly, studies have rarely tracked parent-child relationship quality across numerous data points in a cohort followed from middle childhood into adolescence (for an exception, see Stattin & Klackenberg, 1992). This developmental period is critical as it covers two key transitions in children's lives that may shape both their relationships with their parents and their long-term behavioral and social outcomes. At the beginning of this period, children's entry into school results in new demands placed on children's self-regulation, academic abilities, and social skills (Collins et al., 2002). The transition to adolescence leads to physical, neurobehavioral, and social changes among youth (Gross, Shaw, & Moilanen, 2008; Steinberg & Morris, 2001). Both transitions likely result in major shifts in the amount of time parents and children spend together and, perhaps more importantly, how parents and their children view and interact with each other. Finally, it is important to note that not all families are equally successful in adapting to the developmental transformations that occur during middle childhood and adolescence.

### **Antecedents and Outcomes of Conflict and Warmth**

For families that have difficulty adapting to the transitions of middle childhood and adolescence, a wide array of factors across genetic, biological, and psychosocial domains may impact aberrant developmental trends in conflict and warmth. For example, genetic factors have been found to be associated with levels of conflict and negativity that adolescents receive from their parents (Reiss, Neiderhiser, Hetherington, & Plomin, 2000). Child characteristics and family psychosocial factors during early childhood also may play an important role in shaping the emerging parent-child relationship. For instance, social learning perspectives on the development of antisocial behavior highlight the role of coercive exchanges between mothers and their young children in at-risk families (Patterson et al., 1992). Such theories rely heavily on child effects approaches (e.g., Bell, 1968) that posit a central role for child difficult temperament in initiating coercive exchanges that can lead to escalating behavior problems (Shaw & Bell, 1993). In addition to negative child behaviors, harsh/rejecting parenting also is theorized to be involved in escalating and maintaining levels of conflict within the parent-child dyad (Shaw et al., 2000). Moreover, child and parent negative behaviors are embedded within and influenced by the broader ecological context, including community factors such as neighborhood risk (Capaldi, DeGarmo, Patterson, Forgatch, 2002; Ingoldsby & Shaw, 2002). This evidence suggests that factors such as child temperament, rejecting parenting, and neighborhood risk may discriminate developmental trajectories in parent-child conflict during middle childhood and adolescence. In turn, trajectories characterized by high and persistent levels of conflict should predict antisocial behavior during adolescence.

Compared to parent-child conflict, trajectories of parent-child warmth may be more reliably discriminated by early childhood family process factors (e.g., parent's adult relationships, parental socialization efforts). Attachment theorists and emotional security perspectives stress that sensitivity and security in parent-child relationships are influenced by other salient family relationships but also shape later social competence (Ainsworth et al., 1978; Bretherton & Munholland, 1999; Davies & Cummings, 1994). In particular, children whose parents have supportive relationships may develop positive views or internal working models of relationships and learn cooperative and prosocial behavioral styles from observing their parents' daily interactions that, in turn, may foster warm and supportive relationships with their mothers (Emery, 1988). In addition, parents who engage in low levels of rejecting parenting may be more responsive to their toddler's needs which may facilitate the development of a secure attachment (Ainsworth et al., 1978) and subsequently a warm,

synchronous interaction style (Isabella & Belsky, 1991). In turn, consistently high levels of warmth in parent-child relationships are related to successful peer relationships (Ladd & Pettit, 2002) and the internalization of rules/morality (Kochanska, 1997). Therefore, it is likely that trajectories characterized by high and stable levels of warmth would be linked to positive peer relationships and low levels of moral disengagement during adolescence.

## The Present Study

In the current study, we investigated early childhood antecedents of trajectories in mother-son conflict and warmth from ages 5 to 15 years and how specific trajectories were related to adolescent outcomes. Sons and their mothers were the focus of the study due to the constellation of risks that they more frequently confront. For instance, evidence suggests that compared to girls, boys sometimes report more conflict and less intimacy in their relationships with parents (Furman & Buhrmester, 1985; McGue et al., 2005) and are at greater risk for demonstrating serious antisocial behavior during adolescence (Lahey et al., 2000). In addition, mothers typically are the sole caregiver in at-risk, low-income families (Serbin, et al., 2004), and maternal care is viewed as the best target for approaches to promote healthy relationships and prevent the intergenerational transmission of problematic behaviors (Côté, 2009).

We first examined developmental trajectories in mother-son conflict and warmth using a non-parametric random effects model, also called latent class growth modeling or semiparametric mixture modeling (Nagin, 1999; Vermunt, 2008). This person-centered technique is designed to uncover distinct longitudinal patterns and was used in previous studies examining trajectories of parenting behaviors (e.g., Laird et al., 2009; Lansford et al., 2009). Thus, this was considered an appropriate and relevant approach to examine unique trajectories of conflict and warmth. We hypothesized that the majority of mother-son dyads would follow trajectories of declining conflict and warmth that coincides with the child's transition away from the home and into extra-familial contexts (Steinberg & Morris, 2001). For conflict, we expected a subset of mother-son dyads to demonstrate persistently elevated levels; for these dyads, conflict is likely to be a defining feature of their relationship regardless of the son's developmental status and time spent outside the home. As some mother-son dyads may experience a high level of conflict prior to school entry that very rapidly desists as the son spends less time in the home, we also expected a relatively small group of high desistant dyads. For warmth, in addition to the hypothesized group showing a normative decline, we expected a group of persistently stable and high dyads that may be unaffected by the challenges of school entry and emerging adolescence. Finally, it was anticipated that one group would show consistently low levels of warmth, reflecting the dyad's difficulties in forming a close bond early in the child's life.

We also analyzed the degree to which trajectories of conflict and warmth were similar or discrepant over time. Although there have been no published studies specifically examining this issue, we expected some but not strong levels of similarity as reflected by the moderate and negative degree of association for these two constructs. Next, we examined early childhood antecedents of mother-son conflict and warmth. High levels of neighborhood risk, rejecting parenting, and difficult temperament during early childhood were expected to predict high and stable levels of mother-son conflict during middle childhood and adolescence. In contrast, we predicted that low levels of marital satisfaction and high rejecting parenting would be linked to low and decreasing levels of warmth from ages 5 to 15 years. Finally, we studied how trajectory group classification related to adolescent outcomes. Given the established link between parent-child relationship quality and child behavioral, social, and cognitive competence, we focused on three factors: antisocial behavior, peer relationship quality, and moral disengagement. We predicted that high and

stable levels of mother-son conflict would be especially predictive of antisocial behavior, and that low and decreasing levels of warmth would be associated with high levels of moral disengagement and low levels of positive peer relationship quality.

## Method

### Participants

The sample consisted of families from the Pitt Mother & Child Project (PMCP), an ongoing longitudinal project examining vulnerability and resilience in low-income boys (e.g., Shaw, Gilliom, Ingoldsby, & Nagin, 2003). Boys rather than girls were selected because of the former's higher rates of serious antisocial behavior in later childhood and adolescence, a primary focus of the study. Toddler-aged boys and their primary caregivers were recruited in the early 1990s from the Women, Infants, and Children (WIC) Nutritional Supplement Program in Pittsburgh, Pennsylvania, USA. The WIC program provides monetary supplements to purchase food for income-eligible families from pregnancy until children are 5 years old. The initial sample consisted of 310 families with 1½ year old sons. Subsequent laboratory and home assessments were conducted at ages 2, 3½, 5, 5½, 6, 8, 10, 11, 12, and 15 years. The sample was ethnically diverse (51.3% European American, 39.2% African American, .3% Hispanic, 9.2% other). Furthermore, the mean Hollingshead (1979) socioeconomic status (SES) of 23.32 ( $SD = 9.29$ ) indicates that the sample was largely working class. Because a SES index based on occupational prestige may not be the most valid indicator of the resources available to children residing in diverse contexts (Entwisle & Astone, 1994), the following indicators of financial, human, and social capital also support the disadvantaged nature of the sample: *mean* family yearly income was \$12,567 ( $SD = 7,689.02$ ); 45% of primary caregivers had no more than a high school education at the initial assessment; and 33% were single parent-headed families.

The present study's final subsample consisted of 265 families (51.2% European American, 38.8% African American, 9.1% other; 33.9% single parent-headed families; *M* family yearly income at age 1½ = \$12,472,  $SD = 7,482.01$ ; *M* family SES at age 1½ = 23.37,  $SD = 9.10$ ) who had mother-son conflict or warmth data from at least three data assessments. Initially, mothers were recruited as the primary caregivers for all families enrolled in the study, but in some families the primary caregiver changed temporarily (e.g., father or grandmother served as the primary caregiver for a single assessment) or permanently (e.g., father gained custody of the child following divorce). Given the focus on mother-son relationships and the inclusion of antecedent data on mothers' parenting skills and intimate relationships, we restricted our inclusion of parent-child relationship data to assessments where mothers served as primary caregivers. Families included in the present report ( $n = 265$ ) were compared with enrolled families who had data on mother-son relationship quality from fewer than three time points ( $n = 45$ ) on age 1½ demographic variables (family yearly income, family economic status, marital status, child ethnicity) and on the early childhood antecedents of mother-son relationship quality (neighborhood risk, adult relationship quality, rejecting parenting, and difficult temperament). No significant differences were found.

### Overview

Early childhood antecedents were assessed during lab and home assessments at ages 1½ and 2 years. Mother-son conflict and warmth were measured during lab and home assessments at ages 5, 6, 8, 10, 11, 12, and 15. Adolescent outcomes were collected during a home assessment at age 15 years. For the 265 families included in the present analyses, there was a limited amount of missing data for the early childhood antecedent variables and the adolescent outcomes. However, over 98% of the sample had data for each of the early childhood antecedents, and the percentage of missing data on the adolescent outcomes (16%

missing for peer relationship quality; 10% missing for antisocial behavior and moral disengagement) was consistent with overall attrition in the study.

### Measures: Mother-Son Relationship Quality

Mother-son relationship quality was assessed using the Adult-Child Relationship Scale (ACRS). The ACRS was adapted for use with parents and children based on the Student-Teacher Relationship Scale (STRS; Pianta, 2001). The STRS taps the adult's feelings about the child and attachment-related behavior, and it was designed to assess multiple distinct characteristics of their relationship. Two factors were included in the ACRS adaptation of the STRS: conflict and warmth. *Mother-son conflict* assesses the frequency of conflict in the dyad and consists of 10 items (e.g., "This child and I seem to be always struggling with one another."). The 5-item *mother-son warmth* scale reflects the extent to which the relationship is positive and open, especially regarding the child's emotional needs (e.g., "It is easy to be in tune with what he is feeling."). Each item was rated on a 5-point Likert scale (1 = "definitely not" to 5 = "definitely").

Each ACRS factor was created by averaging the items on the scale, and each scale demonstrated acceptable internal reliability (conflict  $M \alpha = .87$ , Range = .83 – .90; warmth  $M \alpha = .75$ , Range = .69 – .82). Mother-son conflict and warmth were assessed at ages 5 (conflict  $M = 2.52$ ,  $SD = .80$ ; warmth  $M = 4.47$ ,  $SD = .52$ ), 6 (conflict  $M = 2.32$ ,  $SD = .79$ ; warmth  $M = 4.36$ ,  $SD = .56$ ), 8 (conflict  $M = 2.12$ ,  $SD = .81$ ; warmth  $M = 4.35$ ,  $SD = .64$ ), 10 (conflict  $M = 2.06$ ,  $SD = .78$ ; warmth  $M = 4.34$ ,  $SD = .68$ ), 11 (conflict  $M = 2.06$ ,  $SD = .80$ ; warmth  $M = 4.38$ ,  $SD = .63$ ), 12 (conflict  $M = 1.96$ ,  $SD = .81$ ; warmth  $M = 4.33$ ,  $SD = .69$ ), and 15 (conflict  $M = 1.90$ ,  $SD = .86$ ; warmth  $M = 4.02$ ,  $SD = .87$ ). Previous analyses indicate that maternal reports of conflict and warmth demonstrate modest yet statistically reliable correlations with parenting and child behavior (antisocial behavior and social skills) in the present sample. For example, mother-child positive synchrony was positively correlated with warmth, and harsh discipline was positively correlated with conflict (Criss, Shaw, & Ingoldsby, 2003). In support of the distinction between conflict and warmth, concurrent correlations between the conflict and warmth scales ranged from  $r = -.35$  to  $r = -.53$ , with a mean  $r$  of  $-.41$ . Furthermore, tests of longitudinal factorial invariance for conflict and warmth were largely supportive of factor loading invariance. A thorough presentation of analyses of longitudinal factorial invariance is beyond the scope of this report, but details of these analyses are available from the corresponding author.

### Measures: Early Childhood Predictors of Parent-Child Relationship Quality

*Neighborhood risk* ( $M = .00$ ,  $SD = .88$ ) was based on a composite of mother reports and U.S. census data ( $r = .55$ ,  $p < .001$ ). Using a 3-point Likert scale (1 = "not a problem," 2 = "somewhat a problem," 3 = "big problem"), mothers rated the extent to which activities such as prostitution, vandalism, illicit drug use, and gambling were problematic in their neighborhoods. The mother-reported neighborhood risk factor at age 2 ( $\alpha = .95$ ) was created by summing the 17 items. In addition, the family addresses at ages 1½ and 2 years were geocoded according to the 1990 US census data at the block group level (see Vanderbilt-Adriance & Shaw, 2008 for description of this approach) based on methods developed by Wikström and Loeber (2000). Seven block group level characteristics were used in the construction of this variable: median family income, percent families below poverty level, percent households on public assistance, percent unemployed, percent single-mother households, percent African American, percent Bachelor degree and higher. These individual variables were standardized, summed, and then averaged (after reverse scoring median family income and percent Bachelor's degree) to create an overall neighborhood disadvantage score for each block group at ages 1½ and 2 years. Data from ages 1½ and 2 were averaged ( $r = .95$ ,  $p < .001$ ) to create the census neighborhood factor.

*Adult relationship quality* ( $M = 100.88$ ,  $SD = 29.12$ ) was based the mean of maternal reports on the Marital Adjustment Test (Locke & Wallace, 1959) at ages 1½ and 2 ( $r = .66$ ,  $p < .001$ ). This measure has been shown to be successful at discriminating harmonious and distressed marriages (Locke & Wallace, 1959) and demonstrated adequate internal consistency at ages 1½ ( $\alpha = .77$ ) and 2 ( $\alpha = .80$ ) in the current study. If the mother was recently separated, they were instructed to report on that period within the last year when she and her partner were living together. Mothers who were not married were asked to rate their closest intimate relationship (e.g., live-in boyfriend) and the word “relationship” or “close relationship” was substituted for “marriage.” When the relationship was nonsexual in nature, the item regarding sexual relations was omitted. This strategy was in response to the sizeable portion of mothers in the study who identified themselves as being single (33%).

*Rejecting parenting* ( $M = -.02$ ,  $SD = .82$ ) was based on the mean of observer and interviewer ratings ( $r = .29$ ,  $p < .001$ ). During lab assessments at ages 1½ and 2 years, mothers and their sons participated in a clean-up task where the child was asked to clean up a number of toys he was playing with. Maternal behavior during the task was coded using the Early Parenting Coding System (EPCS) which was designed to capture a range of parenting behaviors typically exhibited in interactions with young children (e.g., hostility, punitiveness). For the present study, a composite rating was created by averaging ( $r = .37$ ,  $p < .001$ ) observation scores from the age 1½ and 2 assessments. The second component of the rejecting parenting factor was based on examiner reports on the Home Observation for Measurement of the Environment (age 2 only; HOME; Caldwell & Bradley, 1984) which assesses the quantity and quality of support and stimulation in the child’s home environment using semi-structured observation and a parent interview. The eight-item *acceptance of child’s behavior* subscale assesses the parent’s responses to child misbehavior (e.g., “Parent does not express annoyance with or hostility to the child.”). The HOME has demonstrated good reliability and validity properties (Caldwell & Bradley, 1984). Trained graduate student research assistants completed the HOME during home visits when boys were 2 years old. Items from the Acceptance scale ( $\alpha = .68$ ) were reverse scored and summed to create the HOME factor. Prior research indicates that items from the HOME and behaviors coded from the EPCS comprise a rejecting parenting factor that longitudinally predicts child behavioral maladjustment (Trentacosta & Shaw, 2008).

*Child difficult temperament* ( $M = .00$ ,  $SD = .79$ ) was based on a composite of mother and observer ratings ( $r = .22$ ,  $p < .001$ ). Maternal reports of negative emotionality were measured using the 9-item Difficulty factor of the Infant Characteristics Questionnaire (ICQ; Bates, Freeland, & Lounsbury, 1979) at ages 1½ ( $\alpha = .80$ ) and 2 ( $\alpha = .79$ ), and the composites from each assessment were averaged ( $r = .63$ ,  $p < .001$ ). Observations of negative emotionality (see Owens, Shaw, & Vondra, 1998 for scoring and reliability information) were coded from molecular counts and global observations (i.e., intensity) of fussing and crying during several mother-son interaction tasks conducted when the child was 1½ years old.

### Measures: Adolescent Behavioral Outcomes

Using a 3-point Likert scale (0 = “not true” to 2 = “very true or often true”), mothers and alternative caregivers separately completed the Child Behavior Checklist (CBC, Achenbach, 1991). The 33 items from the externalizing behavior subscale were summed to create the mother- and alternative caregiver-reported factors ( $\alpha$ s = .95 for both reports, respectively). In addition, adolescents and their best friends (98.4% male; 58.4% European American, 41.6% ethnic minorities;  $M$  age = 15.14 years,  $SD = 1.09$ ) provided information on the target youth’s level of antisocial behavior using a measure that was adapted from the Self-Report of Delinquency questionnaire (SRD; Elliott, Huizinga, & Ageton, 1985). Using a 3-point rating scale (1 = “never,” 2 = “once/twice,” 3 = “more often”), youth and their friends rated

the extent to which the target youth engaged in different types of antisocial behaviors (e.g., hitting person, smoking cigarettes). Adolescent ( $\alpha = .91$ ) and best friend ( $\alpha = .94$ ) reports on the 55 items were averaged. Finally, mother, alternative caregiver, adolescent, and peer ratings were standardized and averaged ( $\alpha = .68$ ) to create the final *adolescent antisocial behavior* factor ( $M = -.01$ ,  $SD = .76$ ).

*Peer relationship quality* ( $M = 4.18$ ,  $SD = .39$ ) was based on the mean of target youth's and best friend's impressions of the level of trust, conflict, and happiness in their relationship ( $r = .21$ ,  $p < .01$ ). The original measure was developed by Dishion and colleagues and validated with observer impressions of relationship quality during structured peer interactions (Poulin, Dishion, & Haas, 1999). The adapted version of the measure includes 7 items (e.g., "How often do you trust your friend with something important?") which were each rated on a 5-point Likert scale (1 = "never" to 5 = "very often"). The target youth ( $\alpha = .62$ ) and best friend ( $\alpha = .60$ ) scale scores were each created by averaging the 7 items.

*Moral disengagement* was assessed with the Mechanisms of Moral Disengagement scale (MDS; Bandura, Barbaranelli, Caprara, & Pastorelli, 1996) at the age 15 assessment. This measure has demonstrated validity as a predictor of aggression and delinquency in multiple samples (Bandura et al., 1996; Pelton, Ground, Forehand, & Brody, 2004). For each of 32 statements (e.g., "It is alright to beat someone who bad mouths your family."), the adolescents were asked to state whether they disagree, neither agree nor disagree, or agree with its meaning. As past research has supported a single factor solution (Bandura et al., 1996; Pelton et al., 2004), the 32 items were averaged ( $\alpha = .85$ ) to create the final factor ( $M = 1.42$ ,  $SD = .25$ ).

### Analytic Plan

The analyses were conducted in four steps. First, developmental trajectories for mother-son conflict and warmth were identified using a non-parametric random effects model (Nagin, 1999; Petras & Masyn, 2009; Vermunt, 2008). The SAS procedure called PROC TRAJ was used to run the statistical analyses (Jones, Nagin, & Roeder, 2001). Similar to hierarchical linear modeling, this approach uses polynomial functions to model the association between a longitudinal outcome (e.g., conflict) and age. In contrast, non-parametric, mixture, or latent class approaches provide a way to identify population heterogeneity in developmental processes focusing on inter-individual differences in intra-individual change. Missing data are handled in PROC TRAJ using a Full-Information-Maximum Likelihood approach which is suitable when missing data are missing at random (MAR). The Bayesian Information Criterion (BIC) was used to select the most parsimonious model based on the number of trajectory groups and the type of slopes (i.e., quadratic, linear, zero; Brame, Nagin, & Wasserman, 2006). BIC scores that are closest to zero are considered to have the best fit. To determine the optimal number of trajectories for mother-son relationship quality (conflict or warmth) from ages 5 to 15, models with two, three, or four groups showing quadratic trends were estimated. The most parsimonious quadratic model was adjusted to eliminate non-significant growth parameters.

After the number and shape of trajectories were determined with individual models for conflict and warmth, we next examined the co-occurrence of conflict and warmth groups over time with a joint trajectory modeling approach (Nagin & Tremblay, 2001). The joint model was used as the final model for assignment of individual cases to conflict and warmth groups and for subsequent analyses of antecedents and outcomes. This model also provided conditional probabilities of the membership in each warmth group given membership in each conflict group and vice versa. Third, multinomial logistic regressions were computed to examine which early childhood antecedent variables incrementally discriminated mother-son dyads with divergent developmental trajectories of conflict or warmth. Finally, we



analyzed adolescent behavioral outcomes of conflict and warmth trajectory membership using ANCOVAs (with pairwise deletion to handle missing data) while controlling for early childhood temperament.

## Results

### Examination of Developmental Trajectories

The trajectory groups for conflict and warmth are presented in Figures 1 and 2, respectively. For conflict, a four-group model with two quadratic trajectories, one linear trajectory, and one intercept-only trajectory group provided the best, most parsimonious fit for the data ( $BIC = -1668.51$ ). For warmth, a four-group solution had a better BIC score, but it contained two high warmth trajectory clusters. Furthermore, one of these groups represented a very small number of families ( $n = 9$ ; less than 4% of the sample). As these two warmth trajectory groups demonstrated high levels of warmth and a similar developmental pattern across time, we followed the recommendation of Nagin (2005) and selected a three-group solution with one quadratic trajectory and two linear trajectories as the most parsimonious model ( $BIC = -1649.73$ ). The joint trajectory modeling approach was then used to examine the degree of similarity between warmth and conflict trajectory groups ( $BIC = -3278.24$ ).

For mother-son conflict (see Figure 1), the smallest group (9.4% of sample; constant = 3.47,  $SE = .08$ ,  $p < .001$ ) had relatively high and stable levels of conflict throughout middle childhood and into adolescence. The high decreasing group (29.4%) started high and significantly decreased over time (intercept = 3.30,  $SE = .10$ ,  $p < .001$ ; linear slope =  $-.75$ ,  $SE = .10$ ,  $p < .001$ ). Approximately 47% of the sample displayed a moderate quadratic slope (constant = 3.03,  $SE = .21$ ,  $p < .001$ ; linear slope =  $-2.00$ ,  $SE = .45$ ,  $p < .001$ ; quadratic slope =  $.71$ ,  $SE = .23$ ,  $p < .01$ ), and 14% of the sample displayed a low quadratic slope (constant = 2.54,  $SE = .39$ ,  $p < .001$ ; linear slope =  $-2.30$ ,  $SE = .85$ ,  $p < .01$ ; quadratic slope =  $.86$ ,  $SE = .42$ ,  $p < .05$ ).

For mother-son warmth (see Figure 2), the level of warmth in the high quadratic group (28.3% of sample; constant = 3.86,  $SE = .32$ ,  $p < .001$ ; linear slope = 2.80,  $SE = .74$ ,  $p < .001$ ; quadratic slope =  $-1.47$ ,  $SE = .37$ ,  $p < .001$ ) increased slightly until age 11 at which point it decreased somewhat, although still remaining relatively high. More than half of the sample displayed a moderate decreasing warmth linear slope (55.1% of sample; constant = 4.61,  $SE = .07$ ,  $p < .001$ ; linear slope =  $-.25$ ,  $SE = .07$ ,  $p < .001$ ). Finally, 16.6% of the sample displayed a low linear slope (constant = 4.48,  $SE = .13$ ,  $p < .001$ ; linear slope =  $-1.03$ ,  $SE = .14$ ,  $p < .001$ ) with the level of warmth declining sharply over time.

### Co-occurrence of Mother-Son Conflict and Warmth

Table 1 presents the conditional probabilities of group membership from the dual trajectory analyses. The upper portion of the table shows the probability of following a specific conflict trajectory contingent on warmth trajectory group membership, and the lower portion of the table shows the converse probabilities. Although there is substantial overlap between membership in extreme groups (e.g., high stable conflict and low decreasing warmth), the degree of convergence is less than might be expected. For example, members of the low decreasing warmth group show similar likelihood of membership in the high stable conflict group (34.6%) and the high decreasing conflict group (40.7%). Similarly, members of the high stable conflict group were likely to be members of the low decreasing warmth group (62.3%), but a substantial proportion were classified into the moderate decreasing warmth group (31.2%).

## Early Childhood Antecedents of Mother-Son Conflict and Warmth

To examine the antecedents of mother-son conflict and warmth trajectory group membership (TGM), two separate multinomial logistic regressions (MLG) were computed. For MLG, one first determines whether the analysis is significant using  $\chi^2$  as the test statistic. Next, one can examine whether the predictors are significantly and incrementally related to group membership (e.g., conflict TGM) when examined simultaneously. Third, MLG provides group-specific odds ratio estimates that allow one to make comparisons regarding group membership. Following the recommendations of Brendgen, Wanner, Morin, and Vitaro (2005), we interpreted the odds ratio estimates only for significant predictors of TGM.

**Mother-son conflict**—The MLG for mother-son conflict was significant,  $\chi^2(12) = 48.65$ ,  $p < .001$ , Nagelkerke  $R^2 = .19$ . As indicated in Table 2, only child difficult temperament was significantly and incrementally related to conflict TGM. The group-specific odds ratio estimates showed that high levels of child difficult temperament significantly decreased the odds of being in the moderate quadratic and low quadratic groups compared to the high stable and high decreasing groups. Findings also indicated that high levels of difficult temperament significantly decreased the odds of being in the low quadratic conflict trajectory group in comparison to the moderate quadratic cluster.

**Mother-son warmth**—The MLG for mother-son warmth was significant,  $\chi^2(8) = 31.02$ ,  $p < .001$ , Nagelkerke  $R^2 = .13$ . Both adult relationship quality and child difficult temperament were significant and incremental predictors of warmth TGM (see Table 3). Specifically, low levels of adult relationship quality and high levels of difficult temperament both increased the odds of being in the moderate quadratic and low decreasing mother-son warmth trajectory groups in comparison to the high quadratic cluster.

## Adolescent Outcomes of Mother-Son Conflict and Warmth

We next examined whether mother-son conflict and warmth trajectories were significantly and incrementally related to adolescent adjustment at age 15 years. A series of ANCOVAs were computed separately for each outcome variable to investigate (adjusted) mean differences across trajectory groups with child difficult temperament entered as a covariate. The conflict and warmth TGM factors were entered simultaneously in each ANCOVA. The findings indicated that mother-son conflict TGM, but not warmth TGM, was significantly and incrementally related to adolescent antisocial behavior (see Table 4). Bonferroni post-hoc analyses indicated that the high stable and high decreasing groups had significantly higher levels of antisocial behavior compared to the low quadratic cluster. The results also demonstrated that only mother-son warmth TGM was significantly and additively related to peer relationship quality and moral disengagement. Adolescents in the high quadratic warmth trajectory group had significantly higher levels of peer relationship quality compared to those in the low decreasing warmth group. None of the post-hoc analyses involving moral disengagement were significant.

## Discussion

In the current investigation, we examined antecedents and outcomes of developmental trajectories in conflict and warmth among mother-son dyads. In line with our predictions, group-based trajectory modeling supported unique trajectories of mother-son conflict and warmth. Furthermore, there was moderate overlap between extreme warmth and conflict groups (i.e., low decreasing warmth and high stable conflict), but there was also some variability in the probability of membership in extreme groups. Findings indicated that toddler difficult temperament distinguished both mother-son conflict and warmth trajectory group membership (TGM). Furthermore, adult relationship quality predicted warmth

trajectories. Analyses of adolescent outcomes of TGM also provided some support for distinct outcomes. Compared to low levels of conflict, high and stable levels of conflict were linked to higher levels of antisocial behavior. Relative to high and stable levels of warmth, low and decreasing levels of warmth were related to poorer peer relations.

### **Developmental Trajectories of Mother-Son Conflict and Warmth**

Previous investigations have found mean changes in conflict and warmth within the parent-child dyad during middle childhood and adolescence (e.g., Laursen et al., 1998). For our first research goal, we examined whether there was variation in such change. The three largest mother-son conflict trajectory groups varied in the level of conflict, albeit all showed significant declines from middle childhood to mid-adolescence that were consistent with Laursen and colleagues' (1998) meta-analysis of conflict frequency during the transition to adolescence. On the other hand, group-based trajectory modeling uncovered a modestly-sized group that started with the highest levels of conflict and remained elevated throughout middle childhood and into adolescence. This pattern of change is consistent with the high/stable physical discipline trajectory groups found in Lansford et al. (2009) and suggests that there may be a relatively small percentage of parents and children who experience chronic hostility, conflict, and coercion throughout middle childhood and adolescence. For these families, children's entry into school and subsequent transition into adolescence may be particularly problematic issues.

Although there is less empirical research on developmental changes in parent-child warmth, two of the trajectory groups were relatively consistent with recent findings of little or no change in warmth during middle childhood and a modest decline at the transition to adolescence (Shanahan, McHale, Crouter, & Osgood, 2007). Furthermore, we extended these findings to show that for the majority of dyads the highest level of warmth occurs around the time of the school transition. Subsequently, most boys' closeness with their mothers declines as they transition to spending more time in extra-familial contexts, including a small group that showed the lowest initial levels of warmth and a marked decrease across middle childhood and adolescence. However, a modestly-sized group of mother-son dyads showed a quadratic trend that included slight *increases* in warmth until early adolescence.

Collectively, the trajectory group models for both warmth and conflict highlight the value of person-centered data analytic approaches in identifying distinct developmental patterns that may be atypical yet meaningful in understanding at-risk families. Furthermore, the dual trajectory models indicated that the similarity between conflict and warmth trajectory group membership was in the expected direction but at the same time provided support for the differentiation of these constructs. For example, dyads that followed the low decreasing warmth trajectory were slightly more likely to be classified into the high decreasing conflict trajectory than the high stable trajectory. This finding suggests that some mother-son dyads began with aberrant levels of warmth and conflict, but showed substantial declines in *both* conflict and warmth across middle childhood and adolescence. Overall, these results demonstrate the importance of considering both aspects of relationship functioning to obtain a complete picture of the mother-son dyad and the youths' risk for problematic outcomes.

### **Antecedents of Trajectories of Mother-Son Conflict and Warmth**

Another research objective of the current investigation focused on predictors of mother-son conflict and warmth trajectories. Overall, the findings suggested some distinct early childhood antecedents. For instance, when the predictors were examined concomitantly in multinomial logistic regressions, only child difficult temperament significantly and incrementally predicted mother-son conflict TGM. Specifically, high levels of difficult

temperament increased the odds of being in the high stable and high decreasing trajectory groups compared to the other trajectory groups. This finding supports social learning and transactional models (Bell, 1968; Patterson et al., 1992) that highlight the central role of child temperament in the emergence of coercive exchanges that occur between mothers and their sons in at-risk families (Shaw & Bell, 1993). The results also may reflect the inability of families with difficult children to effectively adapt to the critical transitions that occur between the ages of 5 and 15. Indeed, difficult children often are slow to adapt to new experiences (Rothbart & Bates, 2006) which coupled with intense negative emotionality appear to increase the likelihood of chronic parent-child conflict during middle childhood and adolescence.

In contrast, trajectories of mother-son warmth were significantly and incrementally predicted by adult relationship quality and difficult temperament. That is, low levels of adult relationship quality and high levels of difficult temperament increased the odds of being in the moderate and low decreasing groups in comparison to the high quadratic trajectory group. The link between marital satisfaction and warmth trajectories is consistent with attachment and emotional security perspectives that stress the importance of the marital relationships, especially in early childhood, in shaping the parent-child bond (Bretherton & Munholland, 1999; Davies & Cummings, 1994). Although contrary to our expectations, the results also suggest that the unpredictable and intense emotionality that characterizes children with difficult temperaments (Rothbart & Bates, 2006) may make it especially challenging for mothers to form warm and supportive relationships with their sons.

Also contrary to expectations, the results indicated that rejecting parenting was not significantly related to either mother-son conflict or warmth trajectories. One possibility is that parenting may serve as a mediator in the link between early childhood family factors and later parent-child relationship quality. In a set of analyses not included in the present report, rejecting parenting was significantly related to trajectories of conflict and warmth when examined separately as an antecedent. However, these links were not significant when rejecting parenting was examined simultaneously with neighborhood risk, adult relationship quality, and difficult temperament. It is equally plausible, however, that child temperament and adult relations may be more salient predictors of parent-child relationship quality than parenting.

### Outcomes of Conflict and Warmth Trajectories

A final goal of the current investigation was to examine adolescent outcomes of trajectories in mother-son conflict and warmth. The findings showed that trajectories of conflict were significantly and incrementally related to adolescent antisocial behavior. Specifically, youth in the high stable conflict group *and* the high decreasing group demonstrated elevated antisocial behavior relative to those in groups characterized by initially lower levels of conflict. It appears that experiencing high levels of conflict in the mother-son relationship prior to the school transition may have long-term ramifications for boys' involvement in antisocial behavior even when there is a significant decrease in conflict over time. This pattern of findings may reflect a child attribute (e.g., negative emotionality) or contextual factor (e.g., maternal depression) that remains stable and continues to influence child behavior across development.

As predicted by attachment theory's emphasis on positive internal working models for relationships (e.g., Ainsworth et al., 1978), consistently high levels of mother-son warmth predicted positive peer relationship quality. It appears that mother-son dyads who maintain a relatively high level of warmth over time may provide children with positive socialization experiences regarding the complex, give-and-take nature of dyadic interactions that can be transferred to interpersonal relationships outside of the family (Ladd & Pettit, 2002). Also in

line with our hypotheses based on early mutually-responsive orientation and sensitivity between caregivers and young children (Kochanska, 1997), moral disengagement was more strongly linked to patterns in mother-son warmth compared to conflict. Thus, it appears that mutually responsive parent-child relationships may continue to predict moral development in adolescence.

### **Conclusions, Limitations, and Directions for Future Research**

In sum, the pattern of findings from this study provide further evidence for the distinction between positive and negative relationship attributes such as conflict and warmth (e.g., Denissen et al., 2009; Pianta, 1999). Developmental patterns of mother-son conflict were linked to the temperamental characteristics of the son during early childhood and deviancy training (i.e., antisocial behavior) during adolescence. In contrast, it appears that the quality of adult relationships and child temperamental characteristics shape patterns of mother-son warmth during middle childhood and adolescence, which in turn were related to social competence and socio-cognitive reasoning during adolescence. Overall, the results suggest that successful family adaptation to the transitions that characterize this developmental period may require parents and children to maintain relatively high levels of warmth and openness while minimizing and decreasing conflict and coercion in their relationships. In addition, the findings suggest that some at-risk families may be less skilled at adapting to these milestones relative to other at-risk families.

The findings also suggest that family-focused prevention and intervention programs targeting youth antisocial behavior may be most effective if they address conflict in the parent-child relationship, whereas programs aimed at improving peer relationships or morality may benefit from approaches that foster closeness in the parent-child relationship. These suggestions are tentative and somewhat speculative; replication of the present findings and rigorous empirical evaluations of these possibilities within the context of prevention and intervention research can further increase our understanding of how mother-son relationships unfold over time.

This study was strengthened by a longitudinal design and a multi-method approach involving caregiver, child, peer, interviewer, and observer ratings, but several study limitations are noteworthy. First, we were limited to primary caregiver reports of warmth and conflict because target youth reports were not available during the early waves of the study. In addition, some of the composite antecedent and outcome variables were created by averaging components that had relatively modest correlations with each other (e.g., maternal and observer ratings of difficult temperament), albeit in the range one would expect across method and informant (Bates & Bayles, 1984; Goldsmith, Rieser-Danner, & Briggs, 1991). These composites permitted us to utilize a more robust multi-method framework with different sources providing unique information for many constructs.

This longitudinal study focused on mother-son dyads recruited from WIC nutrition supplement centers in a large urban area, and it is possible that an examination of girls and/or fathers would lead to different conclusions. Furthermore, findings may differ with a sample that is more representative of the broader United States population or that is recruited from a suburban or rural location. However, it is important to note that previous research with the present sample documented substantial variability on demographic factors such as neighborhood disadvantage, and standardized measures of child and parent psychopathology (e.g., Vanderbilt-Adriance & Shaw, 2008). Thus, restriction of range is an unlikely explanation for the non-significant findings involving the neighborhood risk variable.

The study's design also did not permit exploration of the role of biological or genetic factors in the relations among the antecedents, conflict and warmth trajectories, and outcomes. Genetic factors have been shown to play an important role in the association between parent-child relationship quality and adolescent adjustment (e.g., Neiderhiser, Reiss, Hetherington, & Plomin 1999), and future research should incorporate genetically-informative research designs into person-centered longitudinal research on the parent-child relationship. Lastly, it is important to track the trajectory of mother-son relationships later in adolescence and into adulthood as the quality of their relationship may be associated with important life outcomes such as educational attainment, occupational decisions, and life satisfaction.

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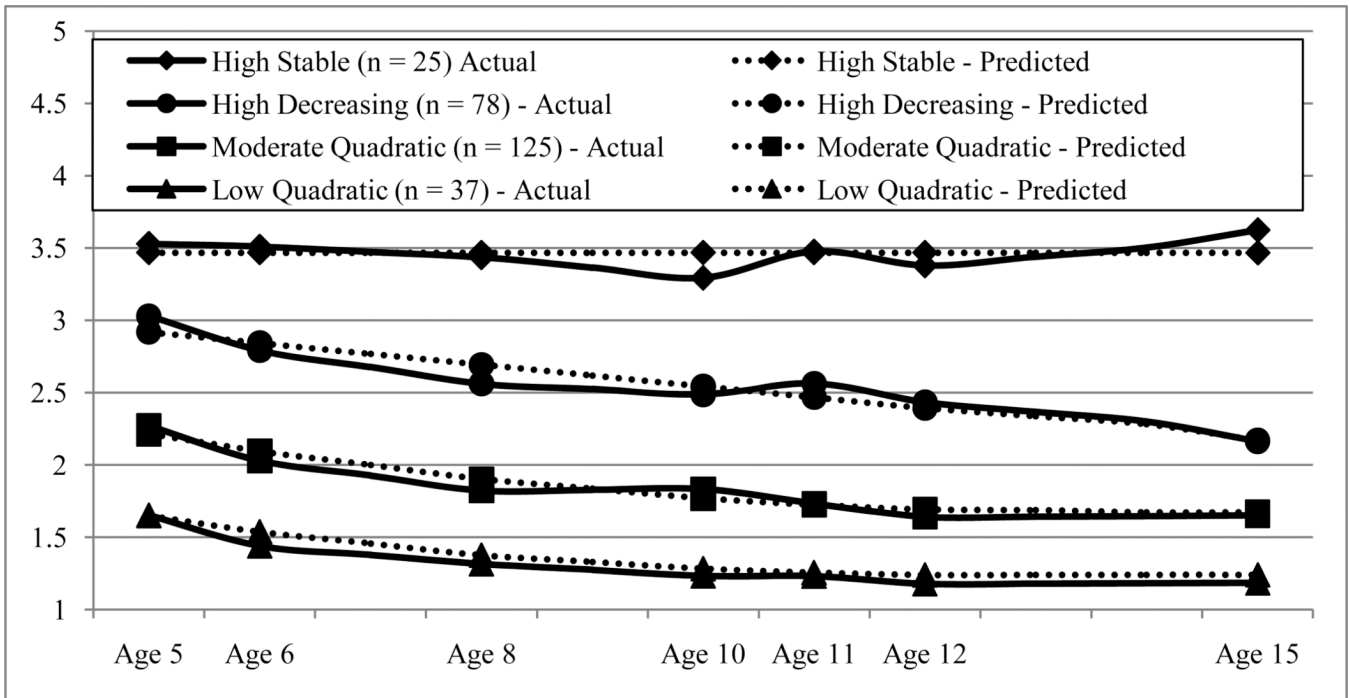
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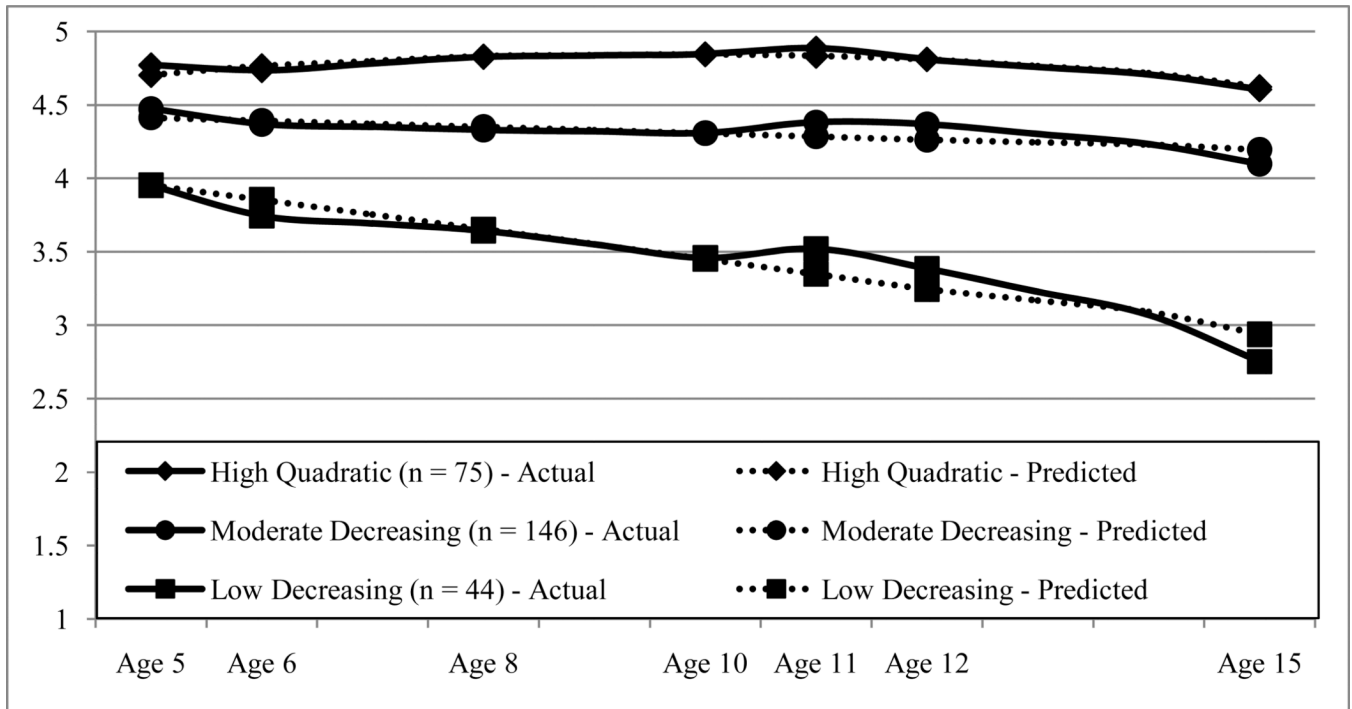
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**Figure 1.**  
Developmental trajectories of mother-son conflict



**Figure 2.**  
Developmental trajectories of mother-son warmth

**Table 1**

Co-occurrence of mother-son conflict and warmth

<b>Probability of conflict group conditional on warmth group</b>				
<b>Group</b>	<b>Low Quadratic</b>	<b>Moderate Quadratic</b>	<b>High Decreasing</b>	<b>High Stable</b>
<i>Low Decreasing</i>	.017	.230	.407	.346
<i>Moderate Decreasing</i>	.056	.506	.387	.051
<i>High Quadratic</i>	.427	.515	.037	.021
<b>Probability of warmth group conditional on conflict group</b>				
	<i>Low Decreasing</i>	<i>Moderate Decreasing</i>	<i>High Quadratic</i>	
<i>Low Quadratic</i>	.018	.205	.777	
<i>Moderate Quadratic</i>	.081	.608	.311	
<i>High Decreasing</i>	.228	.737	.035	
<i>High Stable</i>	.623	.312	.065	

**Table 2**

Multinomial logistical regressions examining predictors of mother-son conflict trajectory group membership

Predictors	Predictor $\chi^2$ (df) <sup>a</sup>	Group-Specific	Odds Ratio	Estimates
<u>Comparison Group: High Stable</u>		Group 2	Group 3	Group 4
Neighborhood Risk	2.84 (3)	.89	.78	.61
Adult Relationship quality	7.66 (3)	1.01	1.02*	1.02*
Rejecting Parenting	4.91 (3)	.79	.60	.56
Child Difficult Temperament	28.08*** (3)	.58	.36**	.17***
<u>Comparison Group: High Decreasing</u>		Group 1	Group 3	Group 4
Neighborhood Risk		1.13	.88	.68
Adult Relationship quality		.99	1.01	1.01
Rejecting Parenting		1.27	.76	.71
Child Difficult Temperament		1.72	.62*	.30***
<u>Comparison Group: Moderate Quadratic</u>		Group 1	Group 2	Group 4
Neighborhood Risk		1.29	1.14	.78
Adult Relationship quality		.98*	.99	1.00
Rejecting Parenting		1.67	1.32	.93
Child Difficult Temperament		2.79**	1.62*	.48**

Note:

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

Group 1 = High Stable, Group 2 = High Decreasing, Group 3 = Moderate Quadratic, Group 4 = Low Quadratic;

<sup>a</sup> = The predictor  $\chi^2$  was the same for each comparison.

**Table 3**

Multinomial logistical regressions examining predictors of mother-son warmth trajectory group membership

Predictors	Predictor $\chi^2$ (df) <sup>a</sup>	Group-Specific	Odds Ratio Estimates
<u>Comparison Group: High Quadratic</u>			
		Group 2	Group 3
Neighborhood Risk	1.08 (2)	1.11	1.28
Adult Relationship quality	9.99** (2)	.99**	.98**
Rejecting Parenting	5.84 (2)	1.03	1.66*
Child Difficult Temperament	9.00* (2)	1.69**	1.95*
<u>Comparison Group: Moderate Decreasing</u>			
		Group 1	Group 3
Neighborhood Risk		.90	1.16
Adult Relationship quality		1.01*	.99
Rejecting Parenting		.97	1.61*
Child Difficult Temperament		.59**	1.16

Note:

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

Group 1 = High Quadratic, Group 2 = Moderate Decreasing, Group 3 = Low Decreasing;

<sup>a</sup> = The predictor  $\chi^2$  was the same for each comparison.

**Table 4**

ANCOVAs examining the incremental effects of parent-child conflict and warmth trajectories on adolescent adjustment

Trajectory Groups	Adolescent Antisocial Behavior	Peer Relationship Quality	Moral Disengagement
Mother-Son Conflict Trajectories			
Group 1: High Stable	.87 (.25)	4.15 (.15)	1.44 (.09)
Group 2: High Decreasing	.22 (.17)	4.29 (.10)	1.40 (.06)
Group 3: Moderate Quadratic	-.24 (.09)	4.18 (.05)	1.45 (.03)
Group 4: Low Quadratic	-.36 (.15)	4.28 (.08)	1.44 (.06)
<i>F</i>	7.07***	.42	.30
Significant Group Differences	1 & 2 > 4		
Mother-Son Warmth Trajectories			
Group 1: High Quadratic	.16 (.21)	4.43 (.12)	1.38 (.08)
Group 2: Moderate Decreasing	.11 (.10)	4.17 (.06)	1.41 (.04)
Group 3: Low Decreasing	.24 (.11)	4.00 (.07)	1.53 (.04)
<i>F</i>	.06	4.41*	3.22*
Significant Group Differences	1 > 3		

Note:

\*\*\*  
 $p < .001$ ;

\*  
 $p < .05$ ;

*F* statistic reflects associations with mother-son conflict and warmth trajectory group membership which were entered simultaneously in each ANCOVA. Means and standard errors (in parentheses) for each group were adjusted controlling for child difficult temperament (ages 1½ and 2 years). Significant group differences were tested using Bonferroni post-hoc comparisons ( $p < .05$ ).