

Maternal Warmth Mediates the Relation Between Mother-Preadolescent Cohesion and Change in Maternal Knowledge During the Transition to Adolescence

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SYNOPSIS

Objective. This study assessed the relation between prior mother-preadolescent cohesion and changes in maternal knowledge during the transition to adolescence. **Design.** Questionnaire data were gathered from 148 mother-preadolescent dyads. Data were collected once per year for three years, beginning when the preadolescents were in fourth grade and aged 9–11 years. Participants completed measures of mother-preadolescent relational cohesion, maternal warmth, and maternal knowledge of the preadolescents' acquaintances, whereabouts, and behavior. **Results.** Longitudinal mediator model analysis indicated that when preadolescent reports were used, higher levels of mother-preadolescent relational cohesion at Time 1 were associated with greater knowledge at Time 3. The relation between prior cohesion and changes in knowledge was mediated by maternal warmth at Time 2. Alternative models with different time-orderings of the variables did not fit as well as the original hypothesized model. When maternal reports were used, there were no significant relations between prior cohesion and change in maternal knowledge over time. Alternative models using maternal reports also were not supported. **Conclusion.** Mother-preadolescent cohesion and maternal warmth play central roles in the prediction of change in maternal knowledge over time.

INTRODUCTION

As children approach adolescence within Western, industrialized societies, they are typically granted more freedom from direct parental supervision (Collins, Harris, & Susman, 1995; Collins, Madsen & Susman-Stillman,

2002). This freedom follows growth of children's competencies and deepening immersion in contexts outside the family, such as peer relationships, school, and extracurricular activities (Collins et al., 2002; Holmbeck, Paikoff, & Brooks-Gunn, 1995). As early adolescent behavioral autonomy increases, parents experience concomitant decreases in their first-hand, immediate knowledge about their children's day-to-day activities, acquaintances, and behavior (Collins et al., 2002; Crouter & Head, 2002; Crouter, Helms-Erikson, Updegraff, & McHale, 1999; Kerr & Stattin, 2003; Li, Stanton, & Feigelman, 2000). Although direct parental supervision and immediate knowledge normatively decrease in early adolescence, parents can maintain a sense of their children's daily experiences. Furthermore, such distal parental knowledge has been associated with better adjustment among adolescents, including greater school achievement and lower problem behavior (for reviews, see Crouter & Head, 2002; Holmbeck et al., 1995). Given the importance of parental knowledge to adolescent adjustment, it is essential to examine factors that predict knowledge during the period from late middle childhood to early adolescence.

Determinants of Parental Knowledge

In a review and conceptual paper, Crouter and Head (2002) asserted that although parental knowledge is multiply determined, the quality of the parent-child relationship is the foundational predictor. These authors speculated that positive parent-child relationships promote behaviors that lead to knowledge in the absence of direct parental supervision, such as parental sensitivity in noticing a child's demeanor, parental nurturance, and child willingness to disclose pertinent information to parents (see also Crouter et al., 1999; Dishion & McMahon, 1998; Formoso, Gonzales, & Aiken, 2000; Jacobson & Crockett, 2000; Kerns, Aspelmeier, Gentzler, & Grabill, 2001; Patterson & Stouthamer-Loeber, 1984; Spring, Rosen, & Matheson, 2002). Kerr and Stattin (2003) also articulated a complex model in which dimensions of parent-adolescent relational quality are ultimately linked to parental knowledge. Of most interest to the current study, Kerr and Stattin (2003) speculated that dimensions of parent-adolescent relationship quality (e.g., trust) promote parental warmth. In turn, warm parenting engenders adolescents' positive reactions to parents, ultimately influencing parental knowledge. Although knowledge has been described by some authors as a potential relationship property (Crouter, MacDermid, McHale, & Perry-Jenkins, 1990; Patterson & Stouthamer-Loeber, 1984), it appears to be conceptually and empirically distinct from measures of

global relationship quality and parenting practices (Kerr & Stattin, 2000; Stattin & Kerr, 2000). Thus, it is possible that a process may be articulated that involves predicting knowledge from relational quality and from warmth.

Relational Quality and Knowledge

A considerable body of research has indicated that cohesive parent-adolescent relationships, characterized by emotional connection, positive affect, and positive interaction, are associated with greater parental knowledge. For instance, a cross-sectional study revealed that indicators of parent-adolescent attachment were positively associated with parents' knowledge of their sixth graders' day-to-day experiences (Kerns et al., 2001). Laird, Pettit, Dodge, and Bates (2003) also reported that parental perceptions of parent-adolescent relationship quality (e.g., how well they got along with their adolescents and how much they enjoyed being with them) were positively associated with their ninth graders' concurrent perceptions of parental knowledge. Additional cross-sectional studies of high school students have indicated that relational cohesion in the parent-adolescent dyad was an important correlate of parental knowledge (Kerr & Stattin, 2000; Stattin & Kerr, 2000). Furthermore, research focused on problematic family relationships has indicated that parents who appear indifferent or unattached vis-à-vis their children exhibit low parental knowledge (Dishion & McMahon, 1998; Patterson, 1982; Patterson & Stouthamer-Loeber, 1984; see also Montemayor, 1986). Taken together, these studies support the idea that relational cohesion, or a sense of emotionally positive connectedness between parents and adolescents, is an important correlate and perhaps predictor of parental knowledge.

The connection between relational cohesion and knowledge may be direct, or may be indirect and perhaps mediated by other individual and dyadic variables. In accordance with Kerr and Stattin (2003) and Crouter and Head (2002), we believe that relational cohesion may ultimately be associated with knowledge, because it influences other individual and dyadic behaviors that may be more proximal to knowledge. More specifically, we believe that a cohesive, affectively positive dynamic between parents and preadolescents sets the stage for the day-to-day enactment of positive parenting. In turn, positive parenting, characterized by high levels of expressed warmth, may promote the preadolescent's cooperation and openness (Crouter & Head, 2002; Kerr & Stattin, 2000, 2003; Stattin & Kerr, 2000), ultimately promoting knowledge.

Warmth as a Mediator

In order for warmth to mediate the connection between relational cohesion and knowledge, it must be associated with indicators of both constructs. Turning first to the connection between relational cohesion and warmth, research has revealed that parents and adolescents who describe their relationships as emotionally secure and supportive also report high levels of parental warmth (Allen & Hauser, 1996; Becker-Stoll & Fremmer-Bombik, 1997; Kobak, Cole, Ferenz-Gilles, Fleming, & Gamble, 1993; Yau & Smetana, 1996). Furthermore, indicators of parent-child attachment are associated with warm parenting, whether attachment and parenting during infancy, childhood, or adolescence is considered (Allen & Land, 1999; Belsky, 1999; Thompson, 1999). In contrast, low levels of parent-adolescent cohesion and high levels of negative parent-adolescent conflict behavior have been linked to harsh parenting (Brody, Arias, & Fincham, 1996; Conger, Ge, Elder, Lorenz, & Simons, 1994; Patterson, 1982; Metzler, Biglan, Ary, & Fuzhong, 1998). Although findings that link relational cohesion and warmth together are largely based on cross-sectional data, it is certainly possible that an underlying positive relationship may promote warmth in daily parenting situations.

Turning to the second path in this particular mediating view, research indicates that parental warmth and knowledge are associated, both longitudinally and concurrently. Pettit and colleagues (Pettit & Laird, 2002; Pettit, Laird, Dodge, Bates, & Criss, 2001) found that higher levels of parental warmth and nurturance and a noncoercive parenting style during kindergarten were positively associated with maternal knowledge of adolescent behavior during eighth grade. A recent cross-sectional study of Belgian families revealed that parental responsiveness (indicated by items assessing warmth and nurturance) was positively associated with knowledge whether mother, father, or adolescent reports were considered (Soenens, Vansteenkiste, Luyckx, & Goossens, 2006). Similarly, Fletcher, Steinberg, and Williams-Wheeler (2004) found that adolescents' reports of combined mother and father warmth were positively correlated with knowledge in a large sample of U.S. high school students. In addition, Bumpus, Crouter, and McHale (2006) reported that paternal acceptance and knowledge were positively associated in a cross-sectional study of parents of preadolescents. In interpreting the connection between aspects of warmth and knowledge, authors have suggested that parenting that is responsive, child-centered, and affectively warm creates a dyadic and family climate in which adolescents remain cooperative with parental socialization and are willing to disclose information (Crouter & Head, 2002; Kerr & Stattin, 2000, 2003; Soenens et al., 2006).

Limitations of the Literature and Aims of the Present Study

Previous findings indicate that relational cohesion and warmth are correlates of knowledge and further suggest that warmth could mediate the connection between relational cohesion and knowledge. However, in considering the literature which links the three constructs, it is important to note that authors have sometimes grouped findings pertaining to relational cohesion and warmth together, using these constructs somewhat interchangeably (see Crouter & Head, 2002). That is, authors may note that relational cohesion is important for knowledge and then cite studies that have measured warmth and other aspects of positive parenting. Alternatively, authors may suggest that warmth is important for knowledge and then cite studies that have measured parent-adolescent relational cohesion or other aspects of positivity in parent-adolescent dyadic interaction. Scholars have begun to articulate process models that predict knowledge that include both parent-child relational variables and parenting variables conceptualized as distinct constructs (e.g., Kerr & Stattin, 2003; see also Crouter & Head, 2002). Therefore, it is now important to measure relational and parenting variables within the same study and to empirically test their relations with each other and with knowledge. In the present study, we attempt to measure maternal warmth and mother-preadolescent relational cohesion as separate variables, and we link these variables to each other and to maternal knowledge.

Previous research has also been limited by only including either parent (Crouter, Bumpus, Davis, & McHale, 2005; Pettit, Keiley, Laird, Bates, & Dodge, 2007) or adolescent (Fletcher et al., 2004; Laird et al., 2003) reports of parental knowledge and by relying on parental composites rather than separate mother and father assessments (Fletcher et al., 2004; Kerr & Stattin, 2000; Stattin & Kerr, 2000). Because it is not uncommon for family members to have different perceptions of parenting and family relationships (Larson & Richards, 1994), it is important to collect separate reports of maternal knowledge. Much previous research has also focused on older adolescent samples (Crouter et al., 2005; Fletcher et al., 2004; Laird et al., 2003; Kerr & Stattin, 2000; Soenens et al., 2006; Stattin & Kerr, 2000) and has utilized cross-sectional (Kerr & Stattin, 2000; Soenens et al., 2006; Stattin & Kerr 2000) or incomplete longitudinal data (Fletcher et al., 2004; Pettit et al., 2007). It is important to examine foundational aspects of parental knowledge within a young adolescent sample and to use longitudinal data that incorporate key variables measured identically across time for all participants. Such data permit more powerful tests of hypothesized processes. Therefore, in the present study, we obtained mother and preadolescent reports of relational cohesion, warmth and knowledge.

We collected these reports annually over a 3-year period. Because we obtained complete longitudinal data, we were able to test a particular mediating perspective, as well as plausible alternatives.

Consistent with conceptual models articulated in previous efforts (e.g., Crouter & Head, 2002; Kerr & Stattin, 2003), we theorized that an emotionally close, affectively positive dyadic relationship between mothers and children provides a context that engenders warm parenting, leading subsequently to greater maternal knowledge. We believe that mothers with an overarching positive view or experience of the dyadic relationship are more likely to express warmth in parenting. Similarly, children who have positive perceptions of their relationships with their mothers are likely to elicit warm parenting and to perceive their mothers as warmer during daily parenting situations. In turn, we theorized that maternal warmth may be a proximal predictor of knowledge and that it may in fact mediate the link between relational cohesion and knowledge (Kerr & Stattin, 2003).

In accordance with these ideas, we examined whether maternal warmth mediated the connection between prior mother-preadolescent relational cohesion and change in maternal knowledge during the transition to adolescence. More specifically, we hypothesized that mother-preadolescent relational cohesion at Time 1 (fourth grade) would be positively associated with change in maternal knowledge at Time 3 (sixth grade). Furthermore, we hypothesized that the association between cohesion and change in knowledge would be mediated by maternal warmth at Time 2 (fifth grade). We note that it is also possible that warm parenting may lead to a cohesive relationship, which in turn leads to knowledge. In addition, it is possible that knowledge might lead to a more positive mother-child relationship or to greater maternal warmth (Kerr & Stattin, 2003). We examined these possibilities in a series of alternative models.

METHODS

Participants

Three years of data were drawn from a longitudinal study of parenting during the transition to adolescence. In year one of the study, self-report questionnaire data were gathered from 165 married, never-divorced mothers and their firstborn fourth graders (71 boys, 94 girls) during a visit to a university research facility. The sample was primarily European American (95%). The mothers' mean age was 37.70 ($SD = 4.29$). The pre-adolescents were between the ages of 9 and 11 years, $M = 9.64$, $SD = 0.52$.

The mothers reported that they had been married an average of 13.18 years and had an average of 2.45 children in their families. The mothers were generally well-educated and primarily middle-class, although poor dyads from urban and rural neighborhoods were also represented. Eighteen percent of the mothers completed a graduate or professional degree, 36% obtained a bachelor's degree, 19% had an associate's degree, 26% received a high school diploma, and 1% did not receive a high school diploma. Sixty-seven percent of the mothers reported working full- or part-time. The annual household incomes of the study participants ranged from \$5,400 to \$400,000, with an average annual income of \$79,593, $SD = \$51,917$.

Procedure

During the first year of the study, participants were recruited from primary schools in a medium-sized, midwestern U.S. city. Potential participants were contacted either by giving the fourth graders letters about the study to take home or by direct mailings to their home addresses, if provided by the schools. The contact letters briefly described the study and instructed mothers to call the research office if interested. Five hundred thirty-seven mother-child dyads contacted the research office. Eligibility was determined by screening questions administered over the phone by the first author and doctoral-level research assistants. Participants were eligible if the fourth grader was the oldest child in the family and the mother was currently married to the target child's father and had never been divorced. Of the 537 who contacted the research office, 182 met the criteria. One hundred sixty-five (91%) of the eligible dyads completed the study at year one; 13 dyads (7%) refused to participate after hearing more about the study, and four dyads (2%) dropped out after repeatedly canceling the laboratory appointment.

The present analyses were based on 148 mother-preadolescent dyads (64 boys, 84 girls) that completed years one through three of the study (90% of the original sample). Six of the original 165 dyads were lost to attrition during years two and three of the study; four dyads could not be located, and two refused to continue. In addition, data were excluded from the present analyses for five dyads that continued in the study, but experienced marital divorce at years two or three, and six cases in which only the mother completed all three years of data collection. The six mother-only cases were completed by mail and were the result of family relocation or preadolescent refusal to continue at years two or three. Because we were concerned that the relocated preadolescents would not be able to complete their surveys properly without assistance, an issue

that might subsequently jeopardize their confidentiality, we chose to not have them complete their surveys by mail.

At each year of data collection, a packet consisting of self-report parenting measures was mailed to the mother to be completed one week before attending the laboratory visit. This was done to reduce the amount of material the mother had to complete during the visit. Mothers and their preadolescents independently and separately completed additional self-report measures during each laboratory visit. The dyads were paid \$30 for their participation in year one, \$40 in year two, and \$50 in year three.

The study measures were administered in identical forms each year. Demographic information was provided by the mothers. In addition, preadolescents and their mothers completed measures to assess mother-preadolescent relational cohesion, maternal warmth, and maternal knowledge.

Mother-Preadolescent Relational Cohesion

Cohesion in the mother-preadolescent relationship was measured with a 10-item scale developed for our longitudinal study (Sturge-Apple, Gondoli, Bonds, & Salem, 2003). The items assessed the extent to which preadolescents and their mothers experienced positive interaction, a sense of togetherness, and emotional closeness within their relationship. Sample items include "my mom and I have fun together," and "my child and I get along really well together." The preadolescents and mothers indicated how often they experienced each item using a 5-point Likert-type response scale that ranged from 0 (*never*) to 4 (*always*). Higher scores indicated greater cohesion. Coefficient alpha across the three waves of data collection ranged from .83 to .90.

Maternal Warmth

Maternal warmth was measured with preadolescent and mother versions of a 13-item scale developed for our longitudinal project (Blodgett Salafia, Gondoli, & Grundy, in press; Bonds, Gondoli, Sturge-Apple, & Salem, 2002). The scale was closely based on the 10-item Acceptance versus Rejection subscale of the revised Child Report of Parental Behavior Inventory (CRPBI; Barber & Thomas, 1996; Gondoli & Silverberg, 1997). The original CRPBI (Schaefer, 1965) was developed to assess children's perceptions of parenting, but has been adapted to obtain parental ratings of parenting as well (Barber & Thomas, 1996; Fauber, Forehand, Thomas, & Wierson, 1990; Gondoli & Silverberg, 1997). Our warmth scale

measured warm affect, affection, and nurturance. Sample items include "my mom smiles at me," "my mom gives me a hug or a pat on the back," and "I make my child feel that he/she is really important to me." The preadolescents were instructed to indicate how often their mothers acted like each statement on a 5-point Likert-type response scale that ranged from 0 (*never*) to 4 (*always*). The mothers were instructed to indicate how often they acted like each statement on the same 5-point scale. Higher scores indicated higher levels of warmth. Coefficient alpha across the three years of data collection ranged from .87 to .92.

Maternal Knowledge

Maternal knowledge was measured with a 9-item scale that assessed the degree to which the mother was aware of the preadolescent's whereabouts, acquaintances, and behaviors (Grundy, Gondoli, & Blodgett Salafia, 2007; Sturge-Apple et al., 2003). Preadolescent and mother perceptions of maternal knowledge were measured with identical items. Our knowledge scale was closely based on similar scales that have previously been used to assess parental "monitoring" with older adolescents (e.g., Barber & Thomas, 1996; Brown, Mounts, Lamborn, & Steinberg, 1993; Jacobson & Crockett, 2000). Following recent reconsiderations of measurement issues in the monitoring literature (e.g., Crouter & Booth, 2003; Crouter & Head, 2002; Kerr & Stattin, 2000; Stattin & Kerr, 2000), such measures are currently considered to be measures of perceived knowledge, rather than assessments of parental monitoring behaviors, and thus have been labeled measures of "knowledge." Sample items included "how often does your mom know where you go when you are not at home?" and "how often do you know who your child's friends are?" Preadolescents and mothers answered each item using a 5-point Likert-type response scale that ranged from 0 (*never*) to 4 (*always*). Items were scored such that higher scores indicated greater knowledge. Coefficient alpha across the three waves of data collection ranged from .68 to .81.

RESULTS

Descriptive Statistics and Correlations

Descriptive statistics and correlations are presented in Table 1. As depicted, correlations between the model variables were statistically significant and in the expected directions. For instance, among preadolescents and mothers, relational cohesion at Time 1 (T1) was positively associated

TABLE 1
Means, Standard Deviations, and Correlations of Study Variables

Variable	Preadolescent reports								
	1	2	3	4	5	6	7	8	9
Maternal reports									
1. Relational cohesion T1	.37*	.64*	.49*	.62*	.59*	.43*	.30*	.27*	.31*
2. Relational cohesion T2	.71*	.41*	.63*	.42*	.73*	.55*	.17*	.41*	.38*
3. Relational cohesion T3	.71*	.74*	.38*	.39*	.51*	.76*	.19*	.31*	.54*
4. Maternal warmth T1	.66*	.57*	.60*	.31*	.59*	.42*	.39*	.25*	.34*
5. Maternal warmth T2	.53*	.66*	.60*	.59*	.43*	.61*	.20*	.36*	.35*
6. Maternal warmth T3	.54*	.62*	.70*	.67*	.81*	.43*	.16*	.26*	.54*
7. Maternal knowledge T1	.23*	.11	.15	.36*	.15	.14	.09	.42*	.32*
8. Maternal knowledge T2	.19*	.25*	.12	.23*	.25*	.15	.60*	.14	.56*
9. Maternal knowledge T3	.16*	.14	.16*	.27*	.20*	.24*	.58*	.60*	.04
Preadolescents									
M	32.97	32.89	32.24	45.40	45.19	44.39	32.07	32.67	31.89
SD	4.56	4.29	5.13	5.94	5.70	6.74	4.20	3.57	3.87
Mothers									
M	31.15	30.98	30.41	41.90	41.51	41.53	33.66	33.71	33.34
SD	4.20	4.25	4.05	5.24	5.20	5.32	2.27	2.07	2.55

Notes. $N = 148$. Correlations using preadolescent reports appear above the diagonal. Correlations using maternal reports appear below the diagonal. Correlations between preadolescent and maternal reports of the same construct appear directly on the diagonal.

* $p < .05$.

with knowledge at Time 3 (T3). The correlations between the model variables appeared more robust among preadolescents than among mothers. In addition, there was somewhat greater over-time stability in mothers' versus preadolescents' reports. For example, mothers' reports of knowledge from T1 to T3 were correlated at .58, whereas preadolescents' reports of knowledge from T1 to T3 were correlated at .32.

Correlation analysis also revealed that the warmth and cohesion scales were substantially related, particularly for preadolescents' reports at T3 ($r = .76, p < .05$). Given this level of association, it was important to demonstrate that the measures were not assessing identical constructs. Consideration of correlations in conjunction with internal consistency reliability (alpha) values can help determine whether two measures are correlated so highly as to be considered parallel forms of each other. Following classical test theory, the alpha of a measure reflects the correlation between two parallel forms of the measure (Nunnally, 1967; see also Wolraich, Lambert, Doffing, Bickman, Simmons, & Worley, 2003). When two measures are to be evaluated for measurement equivalence, the product of the square root of the alpha for each measure may be compared to the observed correlation between the two measures. The product of the square roots of the alphas represents the correlation of the measures with their parallel forms. If the observed correlation between the two measures is not identical to the estimated relation between parallel forms of the measures, then the observed measures are not parallel forms of each other, and the measures therefore do not assess identical constructs. In other words, in a very large sample, the observed correlation between the two measures should be equal to the product of the square roots of their respective alphas if they are actually measures of a single construct. Using this method of comparison, warmth and cohesion did not appear to be identical in any wave of data. For example, the square root of the alpha for preadolescents' report of warmth at T3 was .96, and the square root of the alpha for cohesion at T3 was .95. The product of the values of .96 and .95 ($\rho = .91$) was compared to the correlation between adolescents' reports of warmth and cohesion at T3 ($r = .76$), using the formula for z provided by Howell (2007, p. 260), an extension of Fisher's test of whether a correlation equals a specific value (Fisher, 1921; Howell, 2007). If the value of z equals ± 1.96 or larger, we can reject the null hypothesis of no difference between ρ and r . These calculations yielded a value of -6.40 , and we therefore rejected the null hypothesis of no difference between .91 and .76. That is, our sample r of .76 did not come from a population where the expected relation between parallel measures was .91, and we thus concluded that preadolescent reports of warmth and cohesion at T3 were not parallel measures in our sample. We

reached the same conclusions for all time points and for both preadolescent and mother reports. That is, in no case was the correlation between warmth and cohesion equal to the estimated relation between parallel forms of the measures.

Plan of Model Testing Procedures

The process of model testing included examination of relevant direct-effect, full, and mediation models, as is typically done in the Baron and Kenny (1986) approach. Following recommendations by Cole and Maxwell (2003), we included all variables at all time points and included all adjacent autoregressive paths for the variables. Not including adjacent autoregressive paths assumes that prior levels of the variables are not related to subsequent levels of the variables, which is an unlikely proposition for parenting-related variables. Furthermore, failure to include relevant paths is likely to result in biased estimates for the paths that are specified, including the hypothesized mediating pathways (Cole & Maxwell, 2003). We minimized these serious errors by including all variables measured at all time points. Our approach also allowed us to test alternative models with different time orderings of the variables, thus meeting the call to test competing models, rather than simply compare a single hypothesized model to a null model (see Fincham, Grych, & Osborne, 1994; Rutter, 1994). All models were estimated twice: once using preadolescent reports for all variables and again using maternal reports for all variables.

The EQS 6.1 program was used to estimate relations among the variables, assess model fit, and compare models (Bentler & Wu, 1995). The fit of the models was assessed with the chi-square statistic, the Comparative Fit Index (CFI; Bentler, 1990), and the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990). According to Hu and Bentler (1999), models that yield acceptable fit to the observed data have nonsignificant ($p > .05$) chi-square values, CFIs greater than .95, and RMSEAs less than .06.¹

Model Testing with Preadolescent Reports

To begin, the direct-effect model assessed the association between mother-preadolescent relational cohesion at T1 and maternal knowledge

¹ The CFI is always generated and reported in the output as a number ranging from zero to 1.00. If the CFI is less than zero, it is set to zero. If the CFI is greater than 1.00, then it is set to 1.00. If χ^2 is less than the degrees of freedom, then the RMSEA is set to zero.

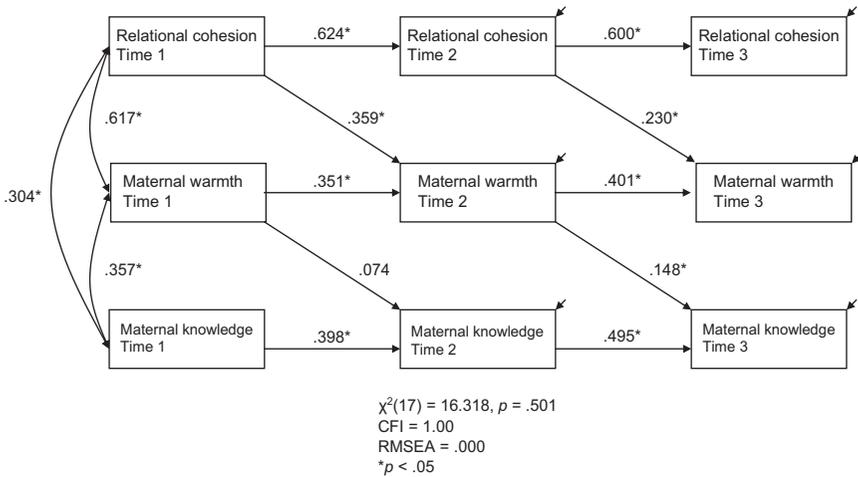


FIGURE 1
 Complete mediation model with preadolescent reports on all variables.
 Error variances at concurrent time points are correlated but not depicted
 for ease of presentation.

at T3, while including all adjacent autoregressive paths for both variables. The fit of the model was good, $\chi^2(7) = 12.194, p = .094$; CFI = .983, RMSEA = .071, and the association between relational cohesion at T1 and change in maternal knowledge at T3 was positive and significant ($\gamma = .138, p < .05$).

We next examined a full model that included relational cohesion, warmth, and knowledge measured at all three time points. The model included all adjacent autoregressive paths for the variables. In addition, the direct path between relational cohesion and knowledge was included, as were the indirect paths between relational cohesion, warmth, and knowledge. Results indicated that when the indirect paths were included, the direct path between T1 relational cohesion and T3 knowledge was reduced from .138 to .092, and was no longer statistically significant. The model also had a good fit to the data, $\chi^2(16) = 14.817, p = .538$; CFI = 1.00, RMSEA = .000.

Next, we tested a complete mediation model in which the direct path between T1 relational cohesion and change in T3 knowledge was eliminated (see Figure 1). The model had a good fit to the data, $\chi^2(17) = 16.318, p = .501$; CFI = 1.00, RMSEA = .000, and the indirect paths between relational cohesion, warmth, and knowledge were positive and statistically significant. Because the mediation and full models both fit well, we compared them by conducting a chi-square difference test. The difference in chi-square between the mediation and the full model was not significant,

$\chi^2(1, N = 148) = 1.50, p > .05$, indicating that the more parsimonious mediation model represented the underlying data structure as well as the full model.

Subsequently, we tested several alternative models, again utilizing preadolescent reports for all variables. The first alternative model involved switching the time-ordering of the independent variable and the mediator. Thus, we hypothesized that T1 warmth led to Time 2 (T2) relational cohesion, which in turn led to T3 knowledge. Results indicated that the direct effect between T1 warmth and change in T3 knowledge was significant ($\gamma = .191$) and that the model fit was good, $\chi^2(7) = 5.350, p = .617$; CFI = 1.00, RMSEA = .000. Examination of the full model, however, indicated that the direct relation between T1 warmth and T3 knowledge remained significant ($\gamma = .160$) when T2 relational cohesion was added to the model, suggesting that the association between warmth and knowledge was not mediated by relational cohesion. In addition, the full model had a poor fit to the data, $\chi^2(16) = 34.336, p = .005$; CFI = .973, RMSEA = .088. Given these results, it was not surprising that the subsequent complete mediation model did not represent the data well either, $\chi^2(17) = 39.973, p = .001$; CFI = .966, RMSEA = .096. Furthermore, while the path between T1 warmth and T2 relational cohesion was statistically significant ($\gamma = .158$), the path between T2 relational cohesion and T3 knowledge was not statistically significant ($\gamma = .113$).

Finally, we tested two additional alternative models, again using preadolescent reports for all variables. In these alternatives, knowledge at T1 was the independent variable. We began with tests of the direct effect between T1 knowledge and change in either cohesion or warmth at T3, while including all adjacent autoregressive paths. Results indicated that there were no direct effects between T1 knowledge and change in either T3 relational cohesion ($\gamma = .059$) or T3 warmth ($\gamma = .002$). Given the lack of significant direct effects, we did not explore mediation in either case. To summarize the results using preadolescent reports, our original hypothesized mediating model with relational cohesion leading to warmth, and warmth leading to change in knowledge, was the best-fitting and most parsimonious representation of our data.

Model Testing with Mother Reports

Our next series of analyses utilized mother reports for all variables. Consistent with our hypothesized model linking prior relational cohesion to subsequent warmth and knowledge, we began by examining the direct effect between relational cohesion at T1 and change in maternal knowledge at T3. The direct effect was not significant ($\gamma = .008$), and the model fit was

poor, $\chi^2(7) = 46.098$, $p < .001$; CFI = .903, RMSEA = .195. Given the absence of a significant direct effect, we did not examine possible mediation.

Next, we specified several alternative models, beginning by switching the time-order of the independent variable and the mediator. Thus, this model hypothesized that T1 warmth led to T2 relational cohesion, which in turn led to T3 knowledge. Results indicated that the direct effect between T1 warmth and T3 knowledge was not significant ($\gamma = .108$), and the model fit was poor, $\chi^2(7) = 31.699$, $p < .001$; CFI = .944, RMSEA = .155. Given the absence of a significant direct effect, we did not address potential mediation.

Finally, we examined two additional alternative models in which knowledge was the independent variable. We began with tests of the direct effect between T1 knowledge and change in either relational cohesion or warmth at T3, while including all adjacent autoregressive paths for the variables. Results indicated that there were no direct effects between T1 knowledge and change in either T3 relational cohesion ($\gamma = .036$) or T3 warmth ($\gamma = -.024$). Given the absence of direct effects, we did not explore mediation in either case.

DISCUSSION

Our hypothesized mediating model fit the data well, at least when preadolescent reports were considered. Our analyses indicated that relational cohesion was positively associated with change in knowledge. Furthermore, the association between relational cohesion and knowledge was mediated by maternal warmth. Our results are consistent with and extend the findings of separate studies indicating positive associations among indicators of relational quality, warmth, and knowledge (e.g., Allen & Hauser, 1996; Becker-Stoll & Fremmer-Bombik, 1997; Bumpus et al., 2006; Fletcher et al., 2004; Kerr & Stattin, 2000; Pettit & Laird, 2002; Soenens et al., 2006; Yau & Smetana, 1996). To our knowledge, our study is the first to examine these associations within a longitudinal mediating perspective.

The indirect pattern of relations in our model indicated that relational cohesion was associated with warmth, and that warmth was associated with knowledge. The positive path between relational cohesion and warmth suggests that an emotionally close and cohesive parent-child relationship may predict greater parental warmth during adolescence. Researchers may be inclined to believe that parenting is the driving force in determining relationship quality between parents and children as well as knowledge, and may be somewhat surprised by the finding that the

child's prior perceptions of the relationship influenced perceptions of warmth and knowledge over time. Our results perhaps indicate the active role of the child in the parenting process, suggesting that dyadic relationship quality affects parenting, at least from the child's perspective. We also note that within an alternate model, warm parenting at T1 was associated with greater cohesion at T2. However, within this alternate model, cohesion did not mediate the relation between prior warmth and subsequent knowledge. Rather, the best representation of our data was a model in which warmth mediated the effect of cohesion on knowledge, suggesting that warmth is a particularly strong predictor of change in knowledge over time.

Maternal warmth may facilitate knowledge in a number of specific ways. For instance, preadolescents who perceive that their mothers are emotionally warm, kindly, and nurturing in their day-to-day interactions may be more likely to self-disclose information that facilitates maternal knowledge (Blodgett Salafia et al., *in press*; Crouter & Head, 2002; Kerr & Stattin, 2000; Stattin & Kerr, 2000). Preadolescents who feel positive affect from their mothers during parenting situations may also remain relatively cooperative with ongoing maternal supervision, again facilitating maternal knowledge (see Bogenschnieder, Small, & Tsay, 1997). Such preadolescents may also be willing to spend more time in the company of their mothers. Time spent together creates opportunities for a mother to follow a preadolescent's daily life in a more integrated and continuous fashion, adding depth and breadth to her knowledge of her youngster's experiences outside the home.

When mothers' reports were utilized, we found that, although maternal perceptions of relational cohesion at T1 were positively correlated with maternal knowledge at T3, prior relational cohesion was not significantly associated with change in knowledge at T3. One reason why prior cohesion did not account for change in knowledge may stem from the considerable stability within mothers' reports of the study variables over time. This stability made it difficult to link changes in one variable to changes in another.

Perhaps the mothers in our generally high-functioning, middle-class sample believe that high parental knowledge reflects appropriate parenting during pre- to early adolescence. Thus, they may tend to perceive themselves as relatively high and stable on knowledge regardless of other, more affective aspects of parenting and the mother-child relationship (for further discussion, see Crouter & Head, 2002; Bumpus et al., 2006). Indeed, a qualitative study of middle-class parents at the transition to adolescence found that parents tended to believe they were just as aware about their youngsters' behaviors as before the adolescent transition

began (Spring et al., 2002). Parents maintained optimistic perceptions of knowledge, even though they also perceived that their affective relationships with their early adolescents were becoming more challenging and that their youngsters were seeking and were being granted greater behavioral autonomy (Spring et al., 2002). To the extent that mothers believe high knowledge is an essential component of their role they may show less change in knowledge over time. Furthermore, when mothers' perceptions of knowledge change markedly over time, these changes may be somewhat idiosyncratic and the result of concomitant changes in nonnormative influences, such as alterations in life stress or marital functioning (Crouter & Head, 2002). Future studies could systematically investigate how normative as well as nonnormative factors influence mothers' perceptions of knowledge over time.

In contrast, preadolescent reports demonstrated less over-time stability than did maternal reports. Lower stability in the preadolescent reports permitted us to link change in one variable to change in another. Movement among preadolescents' reports may be an early indicator of the changes that become more evident as children move through adolescence, such as the desire for greater autonomy or increases in parent-adolescent normative conflict. Future studies could link stability and change in the variables we measured to these and other aspects of the adolescent experience.

None of our alternative models fit as well as our hypothesized model among preadolescents or mothers. For instance, although we found that prior warmth was related to subsequent cohesion, cohesion did not mediate the effect of warmth on knowledge. In addition, knowledge did not account for change in relational cohesion or warmth. Kerr and Stattin (2003) have discussed the possibility of transactional relations between features of the parent-adolescent relationship and knowledge. It is possible that such transactions would be more apparent in a sample which included older adolescents. High school-aged adolescents typically have greater behavioral autonomy than do pre- and early adolescents and so may have more opportunity to do things which they need to hide from their parents, or at least have more opportunity to vary on how much they reveal to parents.

A number of methodological limitations in the present research should be noted. First, our sample consisted of dyads from maritally intact families who were also predominantly European American and middle-class. Replication of our study with a more heterogeneous sample in regard to ethnicity, socioeconomic status, and family structure would allow for generalization of our findings to a broader population. In regard to family structure specifically, it is important to note that the knowledge

construct may have somewhat different correlates in maritally intact versus divorced or remarried families (see Fauber et al., 1990). Thus, studies would need to be designed that could examine the complexity arising from differences in family structure.

Second, we did not have the resources to include fathers in our sample. Although previous efforts have revealed few differences between mothers and fathers in regard to the predictors of knowledge (e.g., Soenens et al., 2006), our findings would have been more generalizable had fathers been included. We also note that the limitation of not collecting father reports is balanced by our collection of separate mother and preadolescent reports. Other investigators have presented data from adolescents (Fletcher et al., 2004; Laird et al., 2003) or parents (Crouter et al., 2005; Pettit et al., 2007) but not both (for an exception, see Soenens et al., 2006). In addition, some of the more widely cited work in this area has been inconsistent in the measurement of knowledge and other aspects of parenting. Stattin and Kerr (2000; Kerr & Stattin, 2000), for instance, measured their constructs with both separate and combined mother and father reports. That is, sometimes knowledge was measured with mother report, sometimes with father report, and sometimes with a combined parental report, and these measurement differences were not taken into account in their analyses. Similarly, Fletcher et al. (2002) collected adolescent reports of "parental" knowledge rather than assessing adolescents' separate reports of mothers' and fathers' knowledge. Although we do not include fathers, at least we include straightforward assessment of separate mother and preadolescent reports.

Third, our measure of knowledge assessed global perceptions of how much a mother typically knows about a child's daily experiences. It is possible that both mothers and preadolescents may under- or overestimate maternal knowledge with this method of assessment. For instance, mothers in normative samples may be prone to overestimation of knowledge during early adolescence, because it may be psychologically threatening to believe that one is not aware (Crouter & Head, 2002; Spring et al., 2002). In addition, pre- and early adolescents are certainly capable of omitting, distorting, and generally editing information about their experiences away from home, behaviors that may also result in maternal overestimation of knowledge. Child reports of parental knowledge may also be vulnerable to distortion and error. For example, during early adolescence youngsters may underestimate maternal knowledge as part of deidealization (i.e., "my mother doesn't know anything"), a need to feel more autonomous, or a simple lack of recognition that their mothers do know about certain things. Thus, different "generational stakes" and simple calculation errors may be operating and may influence responding

when participants are asked to complete global assessments of parental knowledge (Crouter & Head, 2002). Alternative methods for assessing knowledge include diary and daily interview techniques (e.g., Crouter et al., 1999). As more attention is directed to the concept of parental knowledge, it may be increasingly important for researchers to focus on measurement issues. It may also become important to compare how results may differ, depending on how knowledge is assessed and who (parent versus child) is doing the reporting.

Collection of multiple measures of relational cohesion and warmth in future efforts may be important, not only for reduction in measurement error, but to understand more about the overlap between constructs such as dyadic cohesion and parental warmth. In our study the cohesion and warmth measures were substantially correlated. Although a combination of correlation and internal consistency analyses indicated that cohesion and warmth did not appear to be identical measures, they did overlap. Given the simultaneous and interrelated nature of much of family life, this is perhaps not unexpected. However, conceptual models containing both dyadic and parenting behaviors also suppose some degree of distinctiveness between constructs (e.g., Kerr & Stattin, 2003; see also Crouter & Head, 2002). Our subsequent mediation analyses revealed that the model coefficients linking cohesion and warmth were considerably more moderate than the bivariate relations between these variables. In addition, models with different time orderings of cohesion and warmth did not fit identically, suggesting these variables were reasonably empirically distinct. It is likely that future efforts testing similar models will also need to grapple with issues of overlap and distinctiveness. Longitudinal multitrait-multimethod approaches with latent variable modeling could help to develop measures that overlap, yet may also indicate distinct constructs. In turn, results of such efforts can further inform specification and refinement of conceptual models.

Despite limitations, this study makes a number of important contributions. Studies of parenting practices and their outcomes from late middle childhood through early adolescence are somewhat rare. We believe that because early adolescence is an important period in its own right and sets the stage for subsequent adjustment in later adolescence, researchers should focus more often on the start of the adolescent epoch. We also used a very stringent method for assessing mediation with longitudinal data and examined relevant alternative models—something which is typically missing from the field.

There has been renewed interest in the concept of parental knowledge and its correlates and predictors. As part of this direction, scholars have

begun to articulate process-oriented models. Our analyses reveal one possible process by which relational cohesion affects knowledge during late middle childhood to early adolescence. Future efforts might also benefit by testing such models and their logical alternatives with longitudinal data. In regard to practice, our results add to the growing consensus that while structure and limits are doubtless important for parental knowledge, dyadic cohesion and warm parenting also help to create a context in which parental knowledge is fostered.

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