

The Longitudinal Interplay of Maternal Warmth and Adolescents' Self-Disclosure in Predicting Maternal Knowledge

Elizabeth H. Blodgett Salafia, Dawn M. Gondoli, and
Amber M. Grundy

University of Notre Dame

This study examined the longitudinal associations among maternal warmth, adolescents' self-disclosure, and maternal knowledge during the transition to adolescence. Three years of self-report data were collected from 131 married mothers and their adolescents. Results from longitudinal analysis using adolescent reports indicated that greater maternal warmth in sixth grade predicted higher levels of adolescents' self-disclosure in seventh grade, which in turn led to higher levels of maternal knowledge in eighth grade. Thus, adolescents' self-disclosure served as an indirect link between higher maternal warmth and greater knowledge over time. An alternative model with prior self-disclosure predicting subsequent maternal warmth and knowledge was not supported. Overall, this study demonstrated a time-ordered process by which maternal warmth and adolescents' self-disclosure predict maternal knowledge. Understanding such processes that affect parental knowledge may be beneficial for future prevention and intervention efforts during the transition to adolescence.

Although children are typically granted more freedom from direct parental supervision during the transition to adolescence, parental knowledge of adolescents' daily experiences remains necessary for healthy adolescent adjustment (Collins, Madsen, & Susman-Stillman, 2002; Holmbeck, Paikoff, & Brooks-Gunn, 1995; Steinberg, 2001). A substantial body of research indicates that parental knowledge is associated with positive adjustment among adolescents, including fewer behavioral problems and greater school achievement (for reviews, see Crouter & Head, 2002; Holmbeck et al., 1995; see also Fletcher, Steinberg, & Williams-Wheeler, 2004; Laird, Pettit, Bates, & Dodge, 2003; Soenens, Vansteenkiste, Luyckx, & Goossens, 2006). Given the importance of parental knowledge to adolescent adjustment, it is essential to

Requests for reprints should be sent to Elizabeth H. Blodgett Salafia, Department of Child Development and Family Science, North Dakota State University, 283H EML Hall, Fargo, North Dakota 58105. E-mail: elizabeth.salafia@ndsu.edu

Elizabeth H. Blodgett Salafia is now at the Department of Child Development and Family Science, North Dakota State University.

examine factors that may promote knowledge, particularly during the adolescent transition.

Although parental knowledge is likely to be multiply determined, parental warmth has emerged as a particularly relevant correlate (Crouter & Head, 2002; Kerr & Stattin, 2003). Findings from several large-scale cross-sectional studies have shown that maternal warmth and knowledge are positively related among samples of younger and older adolescents (Bumpus, Crouter, & McHale, 2006; Fletcher et al., 2004; Soenens et al., 2006). Whereas some scholars have argued that parental knowledge is mainly a result of the child's contribution (e.g., Kerr & Stattin, 2000; Stattin & Kerr, 2000), the aforementioned studies suggest that parents may drive the process leading to children's self-disclosure by first creating a warm context and positive parent-child relations. In particular, scholars have noted that warmth may promote the adolescent's day-to-day cooperation and openness to parental socialization. More specifically, warmth may promote the adolescent's spontaneous self-disclosure about activities, whereabouts, and acquaintances (Crouter & Head, 2002; Dishion & McMahon, 1998; Kerr & Stattin, 2000, 2003; Soenens et al., 2006). Thus, it is possible that the connection between warmth and knowledge is indirect, and perhaps mediated by adolescent self-disclosure.

In order for adolescent self-disclosure to serve as an indirect link between warmth and knowledge, it should be associated with indicators of both constructs. Turning to the first association, cross-sectional research findings confirm that warmth and self-disclosure are indeed related. For instance, eighth-graders who perceived high levels of maternal warmth also reported that they were more likely to spontaneously disclose personal information with their parents (Kerr & Stattin, 2000; Kerr, Stattin, & Trost, 1999). Similarly, among high-school-aged adolescents, maternal and paternal warmth were positively associated with adolescents' self-disclosure to parents about daily activities and acquaintances, according to mothers, fathers, and adolescents (Soenens et al., 2006).

Turning to the second path in this particular model, scholars suggest that if adolescents are willing to communicate and share information about themselves and their experiences, then parents will generally be more knowledgeable about their adolescents (e.g., Crouter, MacDermid, McHale, & Perry-Jenkins, 1990). Empirical findings from cross-sectional studies show that parents who reported that they learned about their high-school-aged adolescents' experiences through adolescent self-disclosure also reported high levels of concomitant knowledge (Crouter, Bumpus, Davis, & McHale, 2005; Soenens et al., 2006); these results were also found when considering adolescent reports (Soenens et al., 2006). Further, eighth-graders' voluntary self-disclosure was more strongly associated with maternal knowledge of adolescent daily experiences than any other means of actively monitoring and supervising, according to both parents and adolescents (Kerr & Stattin, 2000).

To summarize to this point, separate empirical studies support the positive associations between maternal warmth, adolescent self-disclosure, and maternal knowledge. More recently, Soenens et al. (2006) simultaneously investigated the links between these three constructs by examining a particular indirect effects model. Results from this effort revealed that maternal and paternal responsiveness (indicated by items assessing warmth and nurturance) were positively associated with 15–21-year-old adolescents' voluntary self-disclosure to parents. Adolescent self-disclosure, in turn, was positively associated with parental knowledge. This study was limited, however, by its use of cross-sectional data. Models using cross-sectional data represent but do not explicitly test relations over time. Prior levels of variables cannot be included in such models, thereby resulting in biased estimates. In addition, alternative models with different time orderings of the variables cannot be examined with cross-sectional data.

In the present study, we expanded the available research by using longitudinal data to examine our hypothesized indirect effects model. In this model, we hypothesized that maternal warmth in sixth grade would lead to adolescents' self-disclosure in seventh grade, which in turn would predict maternal knowledge in eighth grade. Following recommendations by Cole and Maxwell (2003), we included all variables at all time points as well as all autoregressive paths for the variables in our hypothesized model. Applying typical cross-sectional mediation procedures to longitudinal data without including autoregressive paths implies that prior levels of the variables are completely unrelated to subsequent levels, which is unlikely for most parenting and family relations data. Furthermore, failure to include these relevant paths in a longitudinal model is likely to yield biased estimates for the causal indirect paths that are specified (Cole & Maxwell, 2003; Maxwell & Cole, 2007). We minimized these errors by incorporating all variables at all time points.

Measuring the variables at all time points also permitted us to test an alternative model with a different time ordering of the variables, thus meeting the call to test competing models rather than simply compare a single hypothesized model to a null model (Fincham, Grych, & Osborne, 1994; Rutter, 1994). Because interactions between parents and children are ongoing and multidirectional in nature (e.g., Cox & Paley, 1997; Kerr & Stattin, 2003), we test one particular alternative model such that adolescents' self-disclosure predicts maternal warmth and knowledge. Parenting not only involves action but also reaction to children; often parenting is considered something that parents actively do to their children, neglecting the important role that children can play in the parenting process (Kerr & Stattin, 2003). Therefore, the present study tests a model that allows adolescents to drive the parenting process with their self-disclosure promoting subsequent warmth and knowledge among mothers.

Our study also examines these patterns of relations for both adolescents and their mothers. In prior studies on the links between parental warmth, adolescent self-disclosure, and parental knowledge, scholars have often used only a single reporter, whether parents (e.g., Bumpus et al., 2006) or adolescents themselves (e.g., Fletcher et al., 2004; Stattin & Kerr, 2000). In one exception, Soenens et al. (2006) included measures assessed from adolescents as well as both mothers and fathers. These researchers found slightly more robust path coefficients linking parental warmth, adolescent self-disclosure, and parental knowledge for adolescents when compared with either parent. Research has suggested that children's reports of parenting behaviors are more closely related to observations of parenting behaviors than parental reports (Sessa, Avenevoli, Steinberg, & Morris, 2001). Further, scholars argue that adolescent reports on constructs associated with parental knowledge may be more accurate than parental reports because adolescents are a primary source of their parents' knowledge (e.g., Laird et al., 2003; Stattin & Kerr, 2000) and are less susceptible to social desirability tendencies regarding parenting behaviors (Schwarz, Barton-Henry, & Pruzinsky, 1985). Thus, in our study, we hypothesize that we will find stronger relations between maternal warmth, adolescent self-disclosure, and maternal knowledge when considering adolescent reports as opposed to those from mothers.

METHOD

Participants and Procedure

The data were collected as part of a longitudinal project examining parenting during the transition to adolescence. During the first year of the study, initial contact letters were distributed by primary schools in a medium-sized, Midwestern city. The letters briefly described the study and instructed mothers of fourth-graders to contact the research office if interested in participating. To ensure that families had the same degree of experience with the adolescent transition, mother-child dyads were eligible if the fourth-grader was the oldest child in the family (i.e., all families were making this transition for the first time in their ontogeny). In addition, dyads were eligible if the mother was currently married to the fourth-grader's father and had never been divorced. Our aim was not to compare families in different marital contexts, nor did we intend to examine parenting following marital transition. Therefore, we focused on dyads in which mothers remained married during the study period. One hundred and eighty-two dyads met our two criteria and were invited to participate. Of these dyads, 13 (7%) declined participation after hearing more about the study, and 4 (2%) repeatedly canceled their laboratory appointments and were unresponsive to contact by the researchers. Thus, 165 dyads (91%) participated in the first year of data collection. However, due to attrition over the course of the study (e.g., relocation

or refusal to continue participation) as well as our exclusion of data following marital separation or divorce, a total of 131 dyads' data were available for analysis in the present study.

Once annually, the dyads visited a university research laboratory for approximately 2 hr. During each visit, mothers and their adolescents separately completed self-report questionnaires. In compensation for their participation, the dyads were paid US\$30 for their participation in the first year of the study, and this rate increased by US\$10 each year such that in the fifth year of the study (e.g., when the adolescent was in eighth grade), each dyad received US\$70.

The data of interest to the present study were collected from mothers and their adolescents while they progressed through sixth, seventh, and eighth grades because the self-disclosure measure was only administered during these years. The sample consisted of 73 girls and 58 boys who were between the ages of 11 and 13 years at the sixth-grade assessment ($M = 11.65$, $SD = 0.51$). The age range of the mothers was 29–53 years, with an average age of 39.70 years ($SD = 4.11$). Most of the sample identified themselves as European American (95%). At the sixth-grade assessment, mothers had been married an average of 15.5 years ($SD = 3.74$), and there was an average of 2.5 children in the families ($SD = 0.96$). The families tended to be well-educated and middle-class: mothers had completed, on average, 3 years of education after receiving their high school diplomas, 80% worked full- or part-time outside the home, and the annual household income per family ranged from US\$20,400 to US\$450,000 with a mean annual income of US\$93,614 ($SD = 68,491$). According to analysis of variance and chi square procedures, the 131 mother–adolescent dyads included in the present analyses did not differ significantly on any of the demographic variables from the 34 dyads that discontinued participation or whose data were excluded from analysis (all $ps > .05$). Overall, based on demographic data provided by the schools, the sample appeared generally representative of the schools that had yielded the majority of our participants.

Measures

All of the measures used in this study were taken from questionnaires administered in identical forms when the adolescents were in the sixth, seventh, and eighth grades.

Maternal warmth. Maternal warmth was measured with a 13-item scale that assessed warm affect, affection, and nurturance (Bonds, Gondoli, Sturge-Apple, & Salem, 2002). This warmth scale was closely based on the 10-item Acceptance versus Rejection subscale of the revised short form of the Child Report of Parental Behavior Inventory (Schaefer, 1965; Schludermann & Schludermann, 1970). Adolescent and maternal perceptions of maternal warmth were measured with parallel items. Sample items included “My mom makes me feel like I am really important to her” and “I smile at my

child." Participants responded on a 5-point scale, with higher scores indicating higher levels of warmth. Across the 3 years of data collection, internal reliability (Cronbach's α) ranged from .92 to .93 for adolescent reports and was .90 for maternal reports.

Adolescent self-disclosure. Adolescents' self-disclosure was measured with a 5-item scale that assessed child spontaneous communication with parents about daily activities and acquaintances (Kerr & Stattin, 2000; Stattin & Kerr, 2000). Adolescent and maternal perceptions of adolescent self-disclosure were measured with parallel items. Sample items included "Do you keep a lot of secrets from your mother about what you do during your free time?" and "Does your child spontaneously tell you about his/her friends?" Participants responded on a 5-point scale, with items scored such that higher scores indicated greater self-disclosure. Across the 3 years of data collection, internal reliability (Cronbach's α) ranged from .70 to .78 for adolescent reports and from .74 to .80 for maternal reports.

Maternal knowledge. Maternal knowledge was measured with a 9-item scale that assessed the degree to which the mother was knowledgeable about her adolescent's activities, whereabouts, and acquaintances (Grundy, Gondoli, & Blodgett Salafia, 2007; Sturge-Apple, Gondoli, Bonds, & Salem, 2003). This knowledge scale has been widely used to assess parental "monitoring" in prior studies (e.g., Brown, Mounts, Lamborn, & Steinberg, 1993; Jacobson & Crockett, 2000; Kerr & Stattin, 2000; Stattin & Kerr, 2000), a construct now referred to as "knowledge" when such items are administered. Adolescent and maternal perceptions of maternal knowledge were measured with parallel items. 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?" Participants responded on a 5-point scale, with higher scores indicating greater knowledge. Across the 3 years of data collection, internal reliability (Cronbach's α) ranged from .82 to .84 for adolescent reports and from .78 to .83 for maternal reports.

RESULTS

Descriptive Statistics

Means, standard deviations, and intercorrelations for the study variables were calculated and are reported in Table 1. As depicted, when considering adolescent reports, correlations between the model variables were strong, statistically significant, and in the expected directions. However, when considering maternal reports, intercorrelations were often low to moderate. Specifically, mother-reported knowledge at time 1 was not significantly cor-

related with warmth or adolescents' self-disclosure at any time point. These results suggested that there may be potential model differences when considering adolescent reports versus maternal reports, which led us to examine separate models for adolescents and mothers.

Model Testing

The process of model testing included examination of a particular indirect effects model such that maternal warmth in sixth grade led to adolescents' self-disclosure in seventh grade, which in turn predicted maternal knowledge in eighth grade. Following the guidelines for testing longitudinal mediation set forth by Cole and Maxwell (2003), we measured all variables at all

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

<i>Variable</i>	1	2	3	4	5	6	7	8	9
1. Maternal warmth in sixth grade	<i>0.47*</i>	<i>0.73*</i>	<i>0.62*</i>	<i>0.50*</i>	<i>0.40*</i>	<i>0.37*</i>	<i>0.55*</i>	<i>0.40*</i>	<i>0.34*</i>
2. Maternal warmth in seventh grade	<i>0.75*</i>	<i>0.52*</i>	<i>0.66*</i>	<i>0.47*</i>	<i>0.57*</i>	<i>0.42*</i>	<i>0.43*</i>	<i>0.55*</i>	<i>0.42*</i>
3. Maternal warmth in eighth grade	<i>0.70*</i>	<i>0.70*</i>	<i>0.43*</i>	<i>0.35*</i>	<i>0.42*</i>	<i>0.47*</i>	<i>0.46*</i>	<i>0.44*</i>	<i>0.49*</i>
4. Adolescents self-disclosure in sixth grade	<i>0.37*</i>	<i>0.33*</i>	<i>0.22*</i>	<i>0.28*</i>	<i>0.58*</i>	<i>0.50*</i>	<i>0.49*</i>	<i>0.47*</i>	<i>0.37*</i>
5. Adolescents self-disclosure in seventh grade	<i>0.35*</i>	<i>0.42*</i>	<i>0.26*</i>	<i>0.68*</i>	<i>0.36*</i>	<i>0.59*</i>	<i>0.36*</i>	<i>0.53*</i>	<i>0.51*</i>
6. Adolescents self-disclosure in eighth grade	<i>0.18*</i>	<i>0.29*</i>	<i>0.33*</i>	<i>0.59*</i>	<i>0.58*</i>	<i>0.27*</i>	<i>0.37*</i>	<i>0.39*</i>	<i>0.51*</i>
7. Maternal knowledge in sixth grade	<i>0.22*</i>	0.12	0.16	0.15	0.14	0.16	<i>0.063</i>	<i>0.56*</i>	<i>0.43*</i>
8. Maternal knowledge in seventh grade	<i>0.18*</i>	<i>0.21*</i>	<i>0.26*</i>	0.16	<i>0.25*</i>	<i>0.20*</i>	<i>0.66*</i>	<i>0.36*</i>	<i>0.64*</i>
9. Maternal knowledge in eighth grade	0.14	<i>0.23*</i>	<i>0.29*</i>	<i>0.25*</i>	<i>0.18*</i>	<i>0.27*</i>	<i>0.47*</i>	<i>0.61*</i>	<i>0.30*</i>
Adolescents									
<i>M</i>	44.47	42.69	42.43	20.42	19.78	19.18	31.90	30.94	30.19
<i>SD</i>	6.91	7.94	7.43	3.17	3.73	3.35	3.96	4.20	4.44
Mothers									
<i>M</i>	41.73	41.50	40.92	20.92	20.57	20.03	33.27	32.37	31.91
<i>SD</i>	5.18	5.49	5.46	2.59	2.76	3.03	2.62	3.00	3.34

Notes. Correlations using adolescents' reports appear above the diagonal. Correlations using maternal reports appear below the diagonal. Correlations between adolescents' and maternal reports of the same construct appear in italics directly on the diagonal.

**p* < .05.

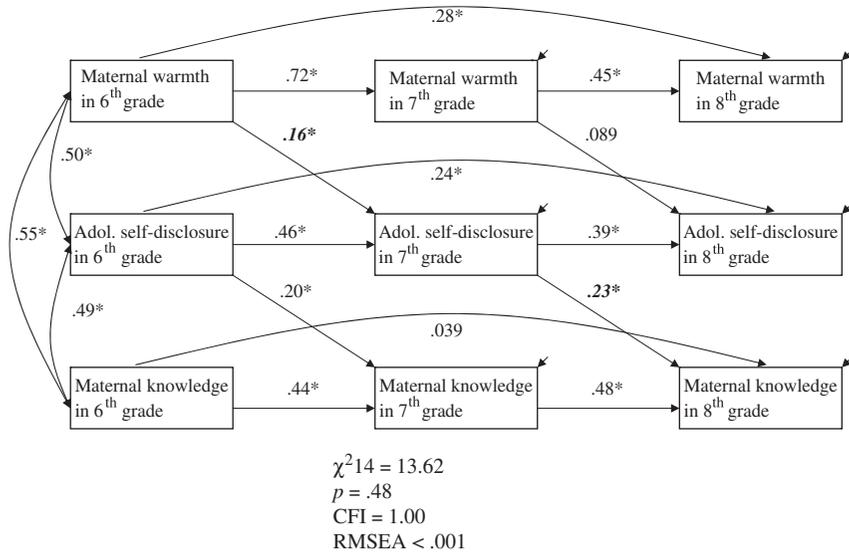
time points. Separate models were conducted using adolescent and maternal reports. In addition, we tested one alternative model with a different time ordering of the variables. Finally, multigroup analyses were performed for all models in order to test the potential moderating effects of adolescent gender.

The Mplus 4.0 program was used to estimate relations among the study variables and derive model fit (Muthén & Muthén, 2006). The significance of the standardized path coefficients was determined by comparing the t -ratio to a critical $t_{(.05)}$ of 1.96. Model fit 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). Models that provided a good fit to the data had nonsignificant ($p > .05$) χ^2 values, CFIs > 0.95 , and RMSEAs $< .06$ (Hu & Bentler, 1999). Lastly, the PRODCLIN method in R (MacKinnon, Fritz, Williams, & Lockwood, 2007) was used to examine the significance of the indirect effect between maternal warmth, adolescent self-disclosure, and maternal knowledge. This method calculates the confidence intervals for the indirect effect, and a confidence interval that does not contain zero indicates that the indirect effect is significant (Fritz & MacKinnon, 2007). We note that this is a recent and particularly powerful way of testing the significance of an indirect effect (see Fritz & MacKinnon, 2007; MacKinnon et al., 2007).

Hypothesized Indirect Effects Model

Adolescent reports. We first examined our hypothesized model using adolescent reports (see Figure 1). Results indicated that model fit was good, $\chi^2(14) = 13.62, p = .48$; CFI = 1.00; RMSEA $< .001$, and all path coefficients for the indirect effects were significant and in the expected directions. Results also indicated that the value of the indirect effect between warmth in sixth grade, adolescents' self-disclosure in seventh grade, and maternal knowledge in eighth grade was significant ($.0016 \leq \alpha\beta \leq .053$). This suggested that higher levels of maternal warmth in sixth grade led to greater adolescent self-disclosure in seventh grade, which in turn predicted higher levels of subsequent maternal knowledge in eighth grade.

Because several cross-sectional studies have shown that maternal warmth and knowledge are directly related (e.g., Bumpus et al., 2006; Fletcher et al., 2004; Soenens et al., 2006), we next examined a direct effects model using our longitudinal data. In this model, we found that maternal warmth in sixth grade did not significantly predict subsequent knowledge in eighth grade ($\tau = .10$). This lack of a direct effect suggested that the relation between maternal warmth and knowledge was not mediated by adolescents' self-disclosure (see Baron & Kenny, 1986). Instead, the pattern of relations between the variables can be best described as indirect in nature.



Notes: * $p < .05$.

Error variances at concurrent time points are correlated but not depicted for ease of presentation.

FIGURE 1 Hypothesized indirect effects model using adolescent reports, with adolescents’ self-disclosure in seventh grade serving as an indirect link between maternal warmth in sixth grade and maternal knowledge in eighth grade.

Maternal reports. When maternal reports were used for all constructs, we did not find a significant pattern of indirect relations. That is, maternal warmth in sixth grade was not significantly associated with adolescents’ self-disclosure in seventh grade ($\alpha = .12$). In addition, adolescents’ self-disclosure in seventh grade did not significantly predict maternal knowledge in eighth grade ($\beta = .053$).

Alternative Model

An alternative model was next examined to determine whether adolescents’ self-disclosure was driving the parenting process by predicting subsequent maternal warmth and knowledge. Models were again examined separately for adolescent reports and maternal reports. Results were consistent across raters in that adolescents’ self-disclosure in sixth grade was not significantly related to maternal warmth in seventh grade ($\alpha = .096$ for adolescent reports, and $\alpha = .061$ for maternal reports). Additionally, warmth in seventh grade was not significantly associated with maternal knowledge in eighth grade ($\beta = .080$ for adolescent reports, and $\beta = .12$ for maternal reports). Thus, we conclude that our hypothesized indirect effects model most accurately

represented the pattern of relations between maternal warmth, adolescents' self-disclosure, and maternal knowledge during sixth through eighth grades when adolescent reports were considered.

Multigroup Analyses

We next examined the potential moderating effects of adolescent gender in the relations among constructs in all models using multigroup analysis. Gender as a moderator was tested in multigroup analysis by comparing fully constrained models to free-to-vary models and examining model fit (Maruyama, 1998). In each fully constrained model, values of the path coefficients were set to be equal between boys and girls whereas the free-to-vary model allowed the paths to vary between genders. Gender differences existed if the model fit of the free-to-vary model was significantly better than that of the fully constrained model. For our hypothesized indirect effects model and the alternative model, we discovered no significant differences in model fit between the fully constrained models and the free-to-vary models ($ps > .05$). Thus, there was no evidence that adolescent gender served as a moderator.

DISCUSSION

The present study examined whether adolescents' self-disclosure in seventh grade would serve as an indirect connection between maternal warmth in sixth grade and maternal knowledge in eighth grade. When using adolescent reports, we found support for our hypothesized indirect effects model. This longitudinal analysis is consistent with conceptual work (e.g., Crouter & Head, 2002; Kerr & Stattin, 2003) and prior cross-sectional studies of the individual links between constructs (e.g., Crouter et al., 2005; Kerr & Stattin, 2000; Kerr et al., 1999; Soenens et al., 2006; Stattin & Kerr, 2000). To our knowledge, our study is the first to examine the associations between these constructs longitudinally.

First, we found that higher levels of maternal warmth in sixth grade led to higher levels of adolescents' self-disclosure in seventh grade. Maternal warmth appears to motivate children and adolescents to freely share with their parents (e.g., Crouter & Head, 2002; Dishion & McMahon, 1998; Kerr & Stattin, 2003). Our findings support this claim and suggest that adolescents who perceive that their mothers are warm are in turn more likely to tell their mothers about daily activities and acquaintances. Second, we found that self-disclosure in seventh grade predicted higher levels of maternal knowledge in eighth grade. If adolescents are willing to self-disclose information, then mothers are able to effectively gain knowledge (e.g., Crouter et al., 1990). Our results also support this claim and suggest that adolescents' voluntary self-disclosure is strongly predictive of their mothers' knowledge about them, at least when adolescents' perceptions are considered.

The findings of our study highlight the importance of parents in the process leading to parental knowledge of adolescents' activities, whereabouts, and acquaintances. In their work, Kerr and Stattin (2000); Stattin & Kerr, (2000) focus on adolescent self-disclosure as the crucial component in predicting knowledge; however, this view often neglects the important role parents may play in the process. We argue that parents actively create a context for such self-disclosure by being warm parents.

We did not find support for our hypothesized indirect effects model when using maternal reports. In particular, the connection between mother-reported adolescent self-disclosure and knowledge was weak. In their work, Soenens et al. (2006) found that path coefficients linking these constructs were generally stronger for adolescent reports compared with maternal reports. In the present study, however, when looking at mean values, mothers reported relatively high levels of knowledge about their children. This may be due to socially desirable tendencies of mothers to appear to be good parents who are knowledgeable about their adolescents (Schwarz et al., 1985). Additionally, it is possible that mothers believe they are obtaining their knowledge through different means other than their adolescents' self-disclosure. For example, in a study by Crouter et al. (2005), mothers were clustered into groups depending on how they obtained knowledge about their adolescents. These researchers found that mothers who did not learn about their children via the child's self-disclosure reported either high levels of solicitation or that they relied on other sources for information about their children, such as spouses, the child's siblings, teachers, or peers. It may be the case that mothers in our study relied on similar means of obtaining knowledge.

We also did not find support for the alternative model investigated in the present study when using either adolescent or maternal reports. Clearly, parenting involves contribution from both the parent and the child, with maternal warmth and adolescents' self-disclosure working together to predict maternal knowledge. Therefore, we examined whether it was the mother driving the process toward knowledge or if it was the adolescent. We found that adolescents' self-disclosure did not significantly predict subsequent maternal warmth and knowledge. Although adolescents' self-disclosure appears to be an essential component in predicting maternal knowledge, the best-fitting model in our study was one with perceptions of maternal warmth driving the parenting process.

Some limitations of our data should be noted. First, our sample consisted of primarily European American, middle-class mother-adolescent dyads that were from maritally intact families. A more diverse sample in regard to ethnicity and socioeconomic status would allow broader generalizations of our findings. In addition, assessments of parenting may differ among maritally intact versus divorced or remarried families. However, in studies with large samples that have included diverse family structures, marital status was not investigated as a potential moderating variable (e.g., Soenens et al.,

2006; Stattin & Kerr, 2000). Thus, future studies should be designed to examine the complexity of parenting dimensions arising from differences in family structure. A second limitation of the present study is that we did not have father reports. Whereas our results would certainly be more generalizable if we had father data, we note that previous studies have revealed few, if any, differences between mothers and fathers in the relations among parental warmth, adolescent self-disclosure, and knowledge (e.g., Soenens et al., 2006). Third, our study included only firstborn adolescents in order to ensure mothers were experiencing parenting during the transition to adolescence for the first time. However, it is possible that inexperience in raising an adolescent can affect perceived or actual levels of maternal knowledge. Because the parenting process may be different for later-born children, our findings do not necessarily generalize to younger siblings in the family.

Despite these limitations, the present study makes several contributions. First, we obtained both maternal and adolescent reports of all study constructs. This is in contrast to prior research that has often focused solely on one type of reporter, whether parents (e.g., Bumpus et al., 2006) or adolescents themselves (e.g., Fletcher et al., 2004; Stattin & Kerr, 2000). Thus, we were able to create separate models for mothers and adolescents, in turn allowing us to detect reporter differences in the structural models. Additionally, some widely cited studies in this area have been inconsistent in the measurement of parenting variables. In work by Kerr and Stattin (2000), for example, it is unclear which parent completed measures, as sometimes it was the mother, sometimes the father, and sometimes both parents worked together; furthermore, these measurement differences were not taken into account in their analyses. Similarly, in work by Fletcher et al. (2004), adolescents were asked to complete measures of *parental* warmth and knowledge rather than separate assessments for mothers and fathers. This practice of combining mothers and fathers into one overall "parent" composite may obscure patterns of relations that may be specific to one parent. In contrast, our separate analysis of mothers permits us to know that our findings are about mothers and not an empirically derived "parent" composite.

A second contribution is that we focus on the relatively understudied period of the transition to adolescence. Studies of parenting practices and their outcomes during this particular period are somewhat rare. In fact, when examining predictors of parental knowledge, researchers often focus specifically on older adolescents (e.g., Crouter et al., 2005; Fletcher et al., 2004; Kerr & Stattin, 2000; Soenens et al., 2006; Stattin & Kerr, 2000). Typically during the transition from childhood to adolescence, however, children are given more freedom from direct parental supervision as they begin to spend more time outside of the home with their peers (Steinberg & Morris, 2001). At the same time, parental knowledge of adolescents' daily experiences and friendships remains crucial for later healthy adjustment (Collins et al., 2002;

Holmbeck et al., 1995; Steinberg, 2001). Because the transition to adolescence sets the stage for subsequent adjustment in later adolescence, researchers should devote more attention to how warmth, self-disclosure, and knowledge might be associated during this epoch.

Third, we used a stringent method for assessing our indirect effects model with longitudinal data. By controlling for prior levels of maternal warmth, adolescent self-disclosure, and maternal knowledge, we were able to examine *change* in these variables over time. In doing so, we reduced the likelihood that our model would yield biased estimates for our specified indirect paths (Cole & Maxwell, 2003; Maxwell & Cole, 2007). We were also able to test an alternative model with a different time ordering of the variables. Whereas much conceptual work has suggested testing alternative, child-driven models (e.g., Cox & Paley, 1997; Kerr & Stattin, 2003; Rutter, 1994), relatively little work to date has done so.

In our study, adolescents' self-disclosure served as an indirect link between maternal warmth and knowledge. Generally speaking, the results from this study highlight the importance of the relational side of parenting. In particular, a warm and nurturing parenting style encourages a positive family climate where adolescents are likely to openly communicate and parents are therefore likely to be knowledgeable of their adolescents' activities, whereabouts, and acquaintances. Uncovering this particular process may ultimately be beneficial for future prevention and intervention efforts, especially during the transition to adolescence when parental knowledge is a particularly salient predictor of adolescent adjustment.

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