Published in final edited form as:

Soc Dev. 2003 August 1; 12(3): 401–419. doi:10.1111/1467-9507.00240.

Change in Parents' Monitoring Knowledge: Links with Parenting, Relationship Quality, Adolescent Beliefs, and Antisocial Behavior

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Abstract

A longitudinal prospective design was used to examine antisocial behavior, two aspects of the parent–child relationship, inept parenting, and adolescents' beliefs in the appropriateness of monitoring as predictors of parents' monitoring and change in monitoring during the high school years. 426 adolescents provided reports of their parents' monitoring knowledge during four yearly assessments beginning the summer before entering grade 9. Greater concurrent levels of monitoring knowledge were associated with less antisocial behavior, more parent-reported relationship enjoyment, adolescents and parents spending more time together, and adolescents reporting stronger beliefs in the appropriateness of parental monitoring. Weaker knowledge beliefs predicted increases in monitoring knowledge over time. More antisocial behavior problems were linked to lower levels of knowledge through less enjoyable parent-adolescent relationships, parents and adolescents spending less time together, and adolescents reporting weaker monitoring beliefs. Discussion focuses on processes linking antisocial behavior problems with low levels of monitoring knowledge.

Monitoring has been identified as an important component of effective parenting during childhood and adolescence. Higher levels of monitoring imply parental knowledge of the child's whereabouts, activities, and friends (Hirschi, 1969; Patterson, Reid, & Dishion, 1992). Lower levels of monitoring and knowledge have been found to be associated with involvement in a range of antisocial and delinquent behaviors (Barnes, Reifman, Farrell, & Dintcheff, 2000; Cerkovich & Giordano, 1987; Dishion & McMahon, 1998; Fletcher, Darling, & Steinberg, 1995; Frick, Christian, & Wooton, 1999; Mouts, 2002; Patterson & Stouthamer-Loeber, 1984). However, adolescent involvement in antisocial and delinquent behavior has been linked to *decreases* in monitoring over time (e.g., Jang & Smith, 1997; Paternoster, 1988). Although many studies have focused on adequate monitoring as a protective factor (e.g., Curtner-Smith & McKinnon-Lewis, 1994; Dishion, Capaldi, Spracklen, & Li, 1995), few studies have considered that monitoring activities and parental knowledge may be influenced by child behavior problems. The current study examines potential processes linking adolescents' involvement in antisocial behavior with low levels of, and reductions in, parents' monitoring knowledge.

Monitoring is often framed as a prevention and intervention strategy employed by parents to address the antisocial and delinquent behavior of their children and adolescents. However, recent work has broadened the conceptualization of monitoring to acknowledge both parents' and adolescents' contributions to the monitoring process (Crouter, MacDermid, McHale, & Perry Jenkins, 1990; Kerr & Stattin, 2000; Stattin & Kerr, 2001). Growing evidence suggests that associations between monitoring and delinquent behavior are not unidirectional (Jang & Smith, 1997; Kandel & Wu, 1995; Laird, Pettit, Bates, & Dodge, in press).

In our recent work (Laird et al., in press), cross-domain latent-growth curve analyses were employed to test the correlation between change in antisocial behavior and change in parental monitoring knowledge during the high school years. Increases in antisocial behavior during the high school years were associated with decreases in parental knowledge during the same period. Moreover, the inspection of the cross-lag paths revealed evidence of reciprocal associations between knowledge and antisocial behavior that are consistent with, a transactional process linking reductions in knowledge with increases in antisocial behavior during the same time period. Specifically, higher levels of knowledge were associated with lower levels of antisocial behavior and predicted reductions in antisocial behavior over time. This pattern replicates several studies indicating that parental knowledge may prevent future antisocial and delinquent behavior (for reviews see Dishion & McMahon, 1998; Patterson & Stouthamer-Loeber, 1984). However, the findings did not indicate that parents react to antisocial behavior by successfully increasing their monitoring efforts. In fact, high levels of antisocial behavior predicted reductions in monitoring knowledge over time. Other studies have reported similar findings with delinquent behavior, marijuana use, and conduct problems predicting reductions in monitoring one to six years later (Jang & Smith, 1997; Kandel & Wu, 1995; Paternoster, 1988). These findings directly contrast with what would be expected from a prevention or intervention perspective—that parents would increase monitoring efforts in an effort to curtail escalating delinquent behavior problems. The primary purpose of the present study is to examine potential processes linking adolescent antisocial behavior to low levels and reductions in monitoring knowledge.

A wide range of parent, family, child, and contextual factors may influence parenting quality (Belsky, 1984). Moreover, a wide range of experiences during earlier developmental eras are likely to influence parenting quality during adolescence. In the current study, we limited our focus to difficulties in the parent-adolescent relationship, inept parenting, and adolescents' beliefs in the importance of monitoring as possible mechanisms linking antisocial behavior to low and decreasing levels of monitoring knowledge. Recent empirical findings and speculation have emphasized the contribution of these three factors to the monitoring process (e.g., Dishion & McMahon, 1998; Laird et al., in press; Stattin & Kerr, 2001).

Difficulties within the parent-child relationship may be an important mechanism linking antisocial behavior with reductions in monitoring. Lower levels of parental warmth, responsiveness, and availability have been found to predict lower levels of monitoring knowledge, as well as a greater reluctance on the part of the adolescents to provide information on their whereabouts and activities to their parents (Kerns, Aspelmeier, Gentzler, & Grabill, 2001; Sampson & Laub, 1994). It may be, according to Dishion and McMahon (1998), that adolescent antisocial behavior reduces the quality of the parent-child relationship, and thus, reduces the quality of monitoring. The quality of the parent-child relationship may directly or indirectly influence parents' ability to gather information. Adolescents' antisocial behaviors may make spending time together more difficult and frustrating for parents and adolescents, and therefore parents and adolescents spend less time together and parents are less involved in the adolescents' lives. Less involvement deprives parents of opportunities to learn about the adolescents' interests, activities, and friends. Parents who are uninvolved possess less monitoring knowledge and show more inconsistency in the amount of knowledge they possess

from year to year (Pettit & Laird, 2002). As parents spend less time with their children, they may lose touch with the adolescents' interests and friends.

Antisocial behavior also may forecast reductions in monitoring through inept parenting practices. Specifically, parents may be inconsistent or fail to follow-through in their attempts to control or influence the behavior of their antisocial adolescents. Inconsistent discipline and empty threats have been identified as indicators of poor quality parenting and have been linked to higher levels of child and adolescent behavior problems (e.g., Gorman-Smith, Tolan, Zelli, & Huesmann, 1996; Patterson, DeBaryshe, & Ramsey, 1989). It is likely that parents' frustration in dealing with problem adolescents leads to further inconsistency and failure to follow-through in discipline encounters. The failure to follow-through, in day-to-day encounters may result in reductions in monitoring knowledge because parents give up easily when adolescents refuse to inform their parents about their activities. In nearly all families, parents are likely to encounter some resistance when inquiring about adolescents' whereabouts, activities, and friends; but when adolescents are involved in antisocial behavior, the resistance is likely to be substantially stronger. When parents stop asking questions and pushing for changes in behavior, the resistance from the adolescents and frustration felt by the parents are reduced, and parents are reinforced for abandoning their monitoring efforts.

Adolescents' beliefs in the legitimacy of parental control efforts also may serve as a mechanism linking antisocial behavior to low and decreasing levels of monitoring. Research in this area indicates that parents possess greater monitoring knowledge when adolescents feel that parental control and interest in personal (e.g., how the adolescents spend their money) and friendship (e.g., staying over at a friend's house) issues are legitimate (Smetana & Daddis, 2002). Our own work has linked adolescents' beliefs that parents should possess monitoring-relevant knowledge to greater parental knowledge, greater child disclosure, and to lower levels of antisocial behavior (Pettit, Mize, Bates, & Dodge, 2001). It is possible that the parenting beliefs reflect adolescents' experiences with specific parenting practices (Smetana, 1995). Well-monitored adolescents, for example, may be more likely to believe that parental monitoring efforts are legitimate. Adolescents' beliefs in the legitimacy of parental control have been found to decrease through adolescence, suggesting that adolescents' parenting beliefs may reflect the adolescents' changing needs for autonomy (Fuligini, 1998; Smetana & Asquith, 1994). Adolescents' beliefs also are likely to be influenced by the adolescents' experiences outside the family. Adolescents' involvement in antisocial and delinquent activities is likely to undermine their beliefs that parental knowledge and control is legitimate. Specifically, antisocial adolescents may question whether their parents have a legitimate right, or need, to know how the adolescents spend their time. Over time, antisocial adolescents are likely to be less forthcoming in response to parental solicitations, and thus, parents will become less informed. Moreover, because weaker beliefs in parental authority are linked with more parent-adolescent conflict (Fuligini, 1998; Smetana, 1989), weaker beliefs in the legitimacy of parental monitoring may undermine monitoring efforts by increasing parent-adolescent conflict.

As described above, previous work with portions of this dataset focused exclusively on the relation between monitoring and antisocial behavior problems and found that decreases over time in monitoring were correlated with increases over time in antisocial behavior problems and that high levels of antisocial behavior problems predicted decreases in monitoring knowledge from one year to the next. The current study focused on predictors of grade 9 knowledge and change in knowledge during the high school years. The previous analyses employed Curran and Bollen's (2001) techniques to combine multi-domain latent growth curve modeling with cross-lag correlations. Hierarchical linear modeling and multi-domain latent growth curve modeling are similar and related techniques used to study change over time. Multi-domain latent growth curve modeling is suitable for modeling simultaneous change

across multiple variables measured at multiple time points and for modeling correlations among changes in the variables (Willett & Sayer, 1994; 1996). Hierarchical linear modeling is better suited for predicting change in a single variable from additional variables measured at either a single time point or at multiple time points (Bryk & Raudenbush, 1992; Willett & Sayer, 1994; see Raudenbush, 2001 for a comparison of the two methods). Thus, multi-domain latent growth curve modeling was ideally suited for testing the correlation between change in monitoring and change in antisocial behavior problems across the same time period, as was the issue in Laird et al. (in press). In the current study, hierarchical linear modeling was used to model and predict change in monitoring knowledge from grades 9 through 12 from variables measured at grade 9. Difficulties in the parent–child relationship, inept parenting, and adolescents’ beliefs in the importance of monitoring were tested as predictors of change in knowledge during the high school years. All analyses were conducted controlling for gender, family socioeconomic status (SES), and parents’ marital status, when appropriate, because previous research has identified mean-level differences in monitoring as a function of these demographic factors (e.g., Kerns et al, 2001; Pettit & Laird, 2002; Stattin & Kerr, 2001).

The present study contributes to and extends our understanding of parenting in two ways. First, analyses were conducted to determine whether difficulties in the parent–child relationship, inept parenting, and adolescents’ beliefs in the importance of monitoring are associated with *change* in monitoring over time. Evidence of concurrent links extends previous findings by controlling for demographic characteristics and by providing information on the relative contribution of the three factors as predictors of monitoring. Second, analyses evaluate the extent to which each of the three factors mediates the link between antisocial behavior and monitoring.

Method

Participants

Children of the Child Development Project (CDP) and their families were recruited from two locations in Tennessee and one location in Indiana. During kindergarten pre-registration for the 1987–1988 and 1988–1989 school years, parents were approached and asked to participate in a longitudinal study of child development. Because not all children pre-registered for kindergarten, 15% of the participants were recruited during the first two weeks of the school years. Approximately 75% of the parents approached agreed to participate, resulting in a sample of 585 children and their families. Participants were not recruited to represent a specific ‘at-risk’ population and are generally representative of the geographical areas from which they were recruited. Data used in the current study were collected over a five-year period beginning during the ninth year of the study. At that time, most participating adolescents were in eighth grade (M age = 14 years, SD = 4 months).

As in many longitudinal studies, data were missing at different time points for different participants. Procedures were employed to limit the amount of missing data and to limit the impact of missing data on the analyses. Specifically, only participants with data for at least six of the seven predictor variables (see below) were included in the sample. Furthermore, participants were required to have values for at least two of the four annual monitoring assessments. It was not necessary for participants to have data for every monitoring assessment because growth curve analyses do not require data for each participant at each time point when missing data can be assumed to be missing at random (Bryk & Raudenbush, 1992). These requirements limited the final sample to 426 adolescents and their parents. The 426 adolescents who provided sufficient data were compared to the remaining 159 CDP participants in terms of kindergarten demographic characteristics and behavior problems. In terms of socioeconomic status (SES), those in the final sample came from slightly higher SES homes (M = 40.6, SD = 14.2) than excluded participants (M = 36.6, SD = 13.2, $t(568) = 3.07$, $p < .01$). Participants in

the final sample did not differ from excluded participants in terms of gender (final sample is 50% male), ethnicity (83% European-American, 16% African-American), living with a single parent (23%), or pre-kindergarten parent-reported externalizing behavior problems.

Procedures and Measures

The CDP parents and adolescents were contacted each year and asked to participate in an interview session, or to complete a questionnaire mailed to their homes. Adolescents provided data at five different time points beginning in the winter of grade 8, and extending through the summer before grade 12. Adolescents were interviewed in their homes or schools in the winter of eighth grade, in the following summer (before grade 9), and in the summer before grade 12. In addition, adolescents completed questionnaires through the mail in the summers before grades 10 and 11. All parent data was obtained from parent interviews conducted in their homes in the summer before their adolescents began grade 9. Predictor variables were derived from the adolescent and parent interviews conducted during grade 8 and the summer before grade 9 and outcome variables were derived from adolescent reports collected in the summers before grades 9 through 12.

Monitoring Knowledge—Adolescent perceptions of their parents' monitoring knowledge were obtained on four occasions (summers before grades 9, 10, 11, and 12). On each occasion, adolescents responded to items adapted from Brown, Mounts, Lamborn, and Steinberg (1993) and Dishion, Patterson, Stoolmiller, and Skinner (1991). Often, scores derived from this measure or similar measures are labeled 'monitoring'. However, based on Stattin and Kerr's (2001) recommendation that researchers reserve the term monitoring for measures of parent-driven processes, the label monitoring knowledge will be used in this study. The same five knowledge items (e.g., 'How much do your parents know about who your friends really are?') and the same three-point response scale (1 = 'don't know', 2 = 'know a little', 3 = 'know a lot') were used during all four assessment occasions. On two of the occasions (pre-grade 9 and pre-grade 12), adolescents completed the knowledge items in an interview format in reference to their 'parents'. On the other two occasions (pre-grade 10 and pre-grade 11), adolescents completed the knowledge items twice when appropriate, once in reference to their mother and once in reference to their father. Responses to the mother and father items were positively correlated with one another ($M r = .56$, all $ps < .001$), and with the knowledge scores referencing 'parents' at the other time points ($rs = .36$ to $.49$ for the mother items and $rs = .26$ to $.35$, for the father items all $ps < .001$). Moreover, separate scores derived from the mother and father items showed very similar patterns of associations with the other variables in the study. Based on the assumption that it is necessary for only one parent to be knowledgeable, and that knowledge may be underestimated by averaging across parents, the higher score was used for each item when adolescents responded to the mother and father statements. In this manner, a single *knowledge* score was computed each year by summing across the five items ($\alpha s = .65$ to $.78$). However, because mothers were reported to be more knowledgeable than fathers, the final scores combining responses to mother and father items were correlated more strongly with the mother items than with the father items ($rs = .95$ and $.70$ for pre-grade 10 and $rs = .93$ and $.62$ for pre-grade 12, all $ps < .001$). Means, standard deviations, and intercorrelations are shown in Table 1.

Antisocial Behavior—Assessments of the adolescents' antisocial behavior were completed by the adolescents and their parents. The Youth Self-Report Form (YSR; Achenbach, 1991b) was completed by the adolescents during the grade 8 winter interview. Parents completed the Child Behavior Checklist (CBC; Achenbach, 1991a) several months later during the summer prior to grade 9. Scores from the delinquency sub-scales were used in this study. The YSR delinquency subscale contains 11 items and the CBC delinquency subscale contains 13 items. The items assess both delinquent activities (e.g., stealing) and general antisocial tendencies

(e.g., lying and cheating). Each item is scored on a three-point scale (0 = 'not true', 1 = 'somewhat true', 2 = 'very often true'). Adolescent-reported and parent-reported *antisocial behavior* scores were computed by summing across the items ($\alpha = .69$ & $.65$).

Enjoyment of Parent-Adolescent Relationship—During the pre-grade 9 parent interviews, parents reported the quality of their relationships with their adolescents. Parents responded to six items focusing on the extent to which parents felt spending time with their adolescents was enjoyable (e.g., 'How well do you and your adolescent get along?'; 'How often does your adolescent irritate you in a major way?'). Items were scored using five-point scales with scale-point descriptors modified to be consistent with the wording of the items (e.g., ranging from 'once a month' to 'once a day' for some items and from 'not at all' to 'extremely' for other items). *Relationship enjoyment* scores, computed as the mean of the six items, showed reasonable inter-item reliability ($\alpha = .72$). The relationship enjoyment scores correlated strongly with interviewer ratings of the parents' open-ended descriptions of their relationships with the adolescents ($r = .49, p < .001$), and with parent reports of parent-adolescent conflict ($r = -.32, p < .001$).

Parental Involvement—Adolescents and parents provided reports of the amount of time spent together. During the pre-grade 9 interview, parents estimated the number of hours per week they spend 'sitting around and talking' with their adolescents and the number of hours per week spent with the adolescent doing things he or she enjoys (other than watching TV or eating meals). *Parent-reported involvement* is the mean of the two estimates ($r = .41$). Although parents reported spending, on average, seven and a half hours per week with their adolescents, about five percent of the parents reported spending more than 20 hours per week with their adolescents. To reduce the skew and kurtosis, the parent-reported involvement score was transformed by taking the natural logarithm (Tabachnick & Fidell, 1996).

During the grade 8 interviews, adolescents estimated the number of hours spent with parents on a typical weekday and on a typical weekend day, using items adapted from Cochran and Bo (1989). Adolescents were instructed to include time spent watching TV or engaged in some other joint activity, but were instructed not to include time spent together at home in different rooms. *Adolescent-reported involvement* is the mean of the weekday and weekend estimates ($r = .39$). Although both involvement scores were significantly correlated with parent-reported relationship enjoyment, the parent-reported and adolescent-reported involvement scores were not significantly correlated with one another (see Table 1).

Parental Lack of Follow-through—During the pre-grade 9 interviews, parents also described the extent to which they gave up when their adolescents met their discipline or control efforts with resistance. Parents responded to seven items written for this study (e.g., 'If you ask your adolescent to do something and she does not do it, how often do you give up trying to get her to do it?', 'How often do you change the rules you've set if your adolescent does not agree with them?') using a five-point response scale (1 = 'never', 5 = 'always'). A single *lack of follow-through* score was computed as the mean of the seven items ($\alpha = .74$).

Adolescent Beliefs About Parental Knowledge—During the pre-grade 9 interviews, adolescents reported the extent to which they believed that parents should have knowledge of their children's whereabouts and activities. Specifically, adolescents reported whether they believed that parents should know (a) where their children are during after-school hours, (b) what their children's homework is every night, (c) what movies and music their children see and hear, (d) who their children's friends are, and (e) what things their children do with their friends. Each item was scored using a five-point scale (1 = 'strongly agree'; 5 = 'strongly disagree'). Items were reverse scored so that higher scores indicate a stronger endorsement of

parental knowledge. A single score indexing adolescents' *knowledge beliefs* was computed as the mean of the five items ($\alpha = .79$).

Results

Three sets of analyses will be presented. First, intercorrelations among all measures will be described with an emphasis on the intercorrelations among the knowledge scores and the correlations between knowledge and antisocial behavior, relationship quality, inept parenting, and knowledge beliefs. Second, a series of hierarchical linear models predicting initial levels of knowledge and change in knowledge from demographic factors, antisocial behavior, relationship quality, inept parenting, and knowledge beliefs will be presented. Third, analyses will be presented that tested whether relationship quality and adolescent beliefs mediate the association between antisocial behavior and knowledge.

Means and Intercorrelations

Sample means and intercorrelations among the four knowledge measures are shown in the upper left corner of Table 1. The sample mean for knowledge is very similar across the four time points, with adolescents reporting that their parents have relatively high levels of knowledge. However, the knowledge scores from the four time points are only modestly intercorrelated, suggesting that the similar sample means at the four time points may be comprised of different underlying trajectories. For example, if a portion of the sample is reporting increases in knowledge over time, and another portion reporting decreases in knowledge over time, intercorrelations would be modest, and the overall sample mean could be very similar from year to year. Thus, it is important to recognize that group means and individual level growth curves may have different forms (Bryk & Raudenbush, 1987).

Also shown in Table 1 are the correlations between the predictor variables and the knowledge scores, and the intercorrelations among the predictor variables. Fewer parent-reported and adolescent-reported antisocial behavior problems were associated with, higher knowledge scores at all four time-points. Higher knowledge scores also were associated consistently with parents' reports that they find spending time with their adolescents to be enjoyable, higher levels of parent-adolescent involvement (both parent and adolescent reports), and with stronger knowledge beliefs. Greater knowledge in grades 10 and 12 also was associated with lower lack of follow-through scores. More antisocial behavior was associated with lower levels of relationship enjoyment, greater parental lack of follow-through, less parental involvement, and weaker knowledge beliefs.

Predicting Knowledge at Grade 9 and Change in Knowledge Over Time

Analyses in the next step of data analysis were based on the hierarchical linear modeling framework (HLM; Bryk & Raudenbush, 1992) and were conducted using SAS PROC MIXED as guided by Singer (1998). HLM approaches allow the simultaneous estimation of a within-participant model specifying growth trajectories for each participant and a between-participant model testing participant-level variables as predictors of trajectory components. Consistent with HLM terminology, the individual growth trajectories can be thought of as the level 1 model and the between-participant predictors as the level 2 model. Initially, an unconditional level 1 model was fit specifying linear growth across the four measurement occasions. Time was centered at grade 9 and coded 0, 1, 2, and 3 to represent the number of years since grade 9. The model was specified with random error terms for the intercept and the slope. When specifying the model in this manner, the growth trajectory of knowledge is comprised of two components, an intercept and a slope. Because time was centered at grade 9, the intercept represents the level of knowledge at grade 9 and the slope represents linear change in

knowledge from grade 9 through grade 12. Centering in this manner provides a means to test both concurrent and prospective predictions.

Results obtained from fitting the level 1 model indicated a significant intercept (i.e., grade 9 knowledge values were significantly different from zero) and a non-significant linear effect of time, meaning that there was no sample-wide mean increase or decrease in monitoring from grade 9 through grade 12. Results for the unconditional model generally replicate the findings reported in an earlier study using the same knowledge scores but employing latent growth curve analysis (Laird et al., in press).

Demographic variables

The next step was to specify and test a series of level 2 models. The first set of models tested gender, SES, and living in a single-parent home as predictors of grade 9 parental knowledge (the intercept) and change in knowledge over time (the time slope). As shown in Table 2, living in a single-parent home was associated with lower levels of grade 9 knowledge but not with decreases in knowledge over time. Although boys and girls did not differ in terms of grade 9 knowledge, boys reported greater decreases in parental knowledge over time than did girls. Family SES did not predict knowledge at grade 9 or changes in knowledge over time.

A final combined demographic model was fit with single-parent status predicting grade 9 knowledge and gender predicting both grade 9 knowledge and change in knowledge. Predicted values derived from this model are shown in Figure 1. At grade 9, the primary difference was in terms of single-parent status, with married or cohabitating parents possessing more monitoring knowledge than single parents. By grade 12, married or cohabitating parents of girls possessed the most monitoring knowledge, and single parents of boys possessed the least monitoring knowledge. The single-parent lines consistently fall below their dual-parent counterparts and show the main effect of living in a single parent home. The gender effect on change in knowledge is shown by the decreasing trajectories for the two male groups and the increasing trajectories for the two female groups.

Behavior Problem and Parenting Variables—The antisocial behavior and parenting variables were tested individually as predictors of grade 9 knowledge and change in knowledge while controlling for the single-parent status effect on grade 9 knowledge and the gender effects on grade 9 knowledge and change in knowledge. As shown in Table 2, greater knowledge at grade 9 was associated concurrently with fewer adolescent-reported and parent-reported antisocial behavior problems, with higher levels of relationship enjoyment and involvement, and with stronger beliefs in the appropriateness of parental knowledge. Parental lack of follow-through was not associated with grade 9 knowledge.

Only adolescents' knowledge beliefs predicted change in knowledge over time. However, in contrast to the hypothesis, stronger beliefs that parents should possess monitoring knowledge were associated with decreases in knowledge over time. The model predicting knowledge from adolescent beliefs was re-run without the demographic variables to simplify interpretation. Predicted values derived from this model for prototypical adolescents with stronger (+1SD) and weaker (−1SD) knowledge beliefs are shown in Figure 2. This figure shows that the predicted grade 9 knowledge values were highest and remained highest at all time points when adolescents expressed stronger beliefs in the legitimacy of knowledge. However, the predicted knowledge scores increased more over time when knowledge beliefs prior to grade 9 were weaker. Those adolescents who believed that their parents should not have access to this information reported that their parents have less monitoring knowledge at the beginning of high school, but the gap between those adolescents and the adolescents reporting strong knowledge beliefs narrows by the end of high school. Thus, adolescents who reported that parents should have access to monitoring knowledge also reported that their parents possess

more knowledge concurrently, and that their parents continued to be relatively knowledgeable over time.

An additional analysis was conducted to determine whether knowledge beliefs, relationship enjoyment, and involvement continued to predict the knowledge intercept when the predictions from all variables were tested simultaneously. The analysis was conducted controlling for gender and single parent status. Adolescent-reported involvement (coefficient = .093, $SE = .033$, $p < .01$), relationship enjoyment (coefficient = .277, $SE = .104$, $p < .01$), and knowledge beliefs (coefficient = 1.24, $SE = .106$, $p < .001$) continued to be significant predictors of the knowledge intercept. Parent-reported involvement was not a significant predictor of knowledge after controlling for the other variables (coefficient = .083, $SE = .083$, $p = .32$).

Testing for Mediation of Antisocial Behavior as a Predictor of Grade 9 Knowledge

Additional models were fit to address mediation. Baron and Kenny (1986) note that evidence is consistent with mediation when there is a significant association between the predictor and the mediator, a significant association between the mediator and the outcome, and a reduction in the prediction from the predictor to the outcome when controlling for the mediator. The additional models addressed the mediation of the association between grade 9 knowledge and the two antisocial behavior scores. Relationship enjoyment, involvement, and knowledge beliefs were tested as mediators of the link between antisocial behavior and grade 9 knowledge. Evidence pertaining to Baron and Kenny's first criterion is provided in Table 1. Specifically, parent-reported and adolescent-reported antisocial behavior problems were associated significantly with relationship enjoyment, parent-adolescent involvement, and knowledge beliefs. Evidence pertaining to Baron and Kenny's second criterion is provided in Table 2. Specifically, relationship enjoyment, involvement, and knowledge beliefs were significant predictors of grade 9 knowledge. Note that parental lack of follow-through was not a significant predictor of grade 9 knowledge, and therefore, was not tested as a mediator. To address Baron and Kenny's third criterion, additional models were fit with antisocial behavior, relationship enjoyment, involvement, and knowledge beliefs as predictors of grade 9 knowledge (gender and single parent status remained predictors as described above). In the first set of models, mother-reported antisocial behavior served as the antisocial behavior predictor. Adolescent-reported antisocial behavior was the indicator of antisocial behavior problems in the second set of models. Evidence is consistent with Baron and Kenny's third criterion for mediation if the coefficient for the antisocial behavior variable is reduced when the additional predictors are included in the model.

Results were consistent with partial mediation for both the mother-reported and adolescent-reported antisocial behavior analyses. Specifically, the coefficient for mother-reported antisocial behavior was reduced from $-.182$ to $-.123$ ($SE = .037$, $p < .001$) when the mediators were included in the model. Although mother-reported antisocial behavior remained a significant predictor of grade 9 knowledge ($p < .001$), there was a 32% reduction in the magnitude of the prediction when compared to the coefficient without the mediators [$(.182 - .123)/.182$]. Follow-up analyses tested each mediator separately by computing the statistical significance of the indirect effect associated with each potential mediator using a t -test (i.e., $t = \text{indirect effect}/SE$) as recommended by MacKinnon and Dwyer (1993). The indirect effects of mother-reported antisocial behavior on grade 9 knowledge through relationship enjoyment (indirect effect = .060, $SE = .015$, $p < .001$), adolescent-reported involvement (indirect effect = .056, $SE = .011$, $p < .001$), and knowledge beliefs (indirect effect = .010, $SE = .005$, $p < .05$) were statistically significant. Relationship enjoyment, adolescent-reported involvement, and knowledge beliefs partially mediated the association between mother-reported antisocial behavior and grade 9 knowledge. The indirect path through parent-reported involvement was not significant.

The coefficient for adolescent-reported antisocial behavior was reduced from $-.229$ to $-.114$ ($SE = .028$, $p < .01$) when the set of mediators were added to the analysis, indicating a 50% reduction in the magnitude of the prediction when compared to the coefficient without the mediators. Again, follow-up analyses testing each mediator separately revealed that the indirect effects of adolescent-reported antisocial behavior on grade 9 knowledge through relationship enjoyment (indirect effect = $.016$, $SE = .005$, $p < .01$), adolescent-reported involvement (indirect effect = $.008$, $SE = .004$, $p < .05$), and knowledge beliefs (indirect effect = $.095$, $SE = .012$, $p < .001$) were statistically significant. Relationship enjoyment, adolescent-reported involvement, and adolescents' knowledge beliefs partially mediated the relation between antisocial behavior and concurrent monitoring knowledge.

Discussion

Results from this study shed new light on processes linking adolescent antisocial behavior problems with parents' monitoring knowledge. As expected, fewer antisocial behavior problems, greater relationship enjoyment and involvement, and stronger knowledge beliefs were associated with greater concurrent knowledge. Mediation analyses provide evidence suggesting that antisocial behavior problems reduce the quality of parent-adolescent relationships and weaken adolescents' beliefs that their parents should possess monitoring knowledge. The poorer quality relationships and weaker knowledge beliefs partially account for the reductions in monitoring knowledge associated with greater involvement in antisocial behavior problems.

Although antisocial behavior did predict concurrent assessments of monitoring as expected, antisocial behavior problems did not predict decreases over time in monitoring knowledge. Initially, this pattern appears to be inconsistent with previous studies (Jang & Smith, 1995; Paternoster, 1988), including earlier analyses of these data (Laird et al., in press), which provide evidence of reciprocal links between antisocial behavior and monitoring. However, methodological variations may underlie the seemingly inconsistent results. Specifically, in the cross-lag analyses presented in Laird et al. (in press), greater antisocial behavior problems during grades 9, 10, and 11 were found to predict reductions in monitoring knowledge in the next school year. In the current study, a single assessment of antisocial behavior prior to grade 9 failed to predict reductions in monitoring knowledge over four years from grades 9 through 12.

The prediction of change in monitoring knowledge from grade 9 antisocial behavior can be represented as a predictor X time interaction. Therefore, the lack of a significant effect of antisocial behavior on the knowledge slope does not indicate that antisocial behavior was unrelated to knowledge at grade 12. Rather, the lack of a significant interaction indicates that higher levels of antisocial behavior at grade 9 predicts lower levels of monitoring at grade 12 just as it predicts lower levels of monitoring at grade 9. Although antisocial behavior did not predict decreases in knowledge over time as we expected, more antisocial behavior at grade 9 did predict that parents would maintain relatively low-levels of monitoring knowledge throughout the high school years. These results indicate that greater antisocial behavior continues to be associated with lower levels of monitoring knowledge several years later. Thus, this study does suggest processes that may account for the association between antisocial behavior and monitoring.

The search for processes linking antisocial behavior and monitoring focused on the parent-child relationship, inept parenting, and adolescents' beliefs about monitoring. Dishion and McMahon (1998) suggest that the parent-child relationship plays a key role in linking behavior problems with monitoring efforts. In the current study, parents' enjoyment of interactions with their adolescents partially mediated the concurrent link between antisocial behavior and

knowledge. Greater antisocial behavior predicted less enjoyable parent-adolescent interactions and less parental involvement which, in turn, were linked to low levels of monitoring knowledge. Parental knowledge, the quality of the parent-adolescent relationship, and antisocial behavior may be linked in at least three ways. First, a positive parent-child relationship may make it easier for parents to obtain information from their adolescents and may discourage adolescents from involvement in antisocial behavior. Kerns et al. (2001) found that sixth graders who reported a more secure attachment to their parents reported greater cooperation in monitoring situations and that their parents possessed more knowledge of the sixth graders' whereabouts and activities. Both attachment (e.g., Ainsworth, Blehar, Waters, & Wall, 1978) and social control theories (e.g., Hirschi, 1969) suggest that adolescents will be more positively adjusted and more responsive to parenting efforts in the context of a positive parent-child relationship. Second, in addition to discouraging antisocial behavior, it is possible that the monitoring process itself contributes to the quality of the parent-adolescent relationship. Parental solicitation of information may be interpreted by adolescents as an indicator of parental attention, interest, and concern (Crouter, Helms-Erickson, Updergraff, & McHale, 1999; Dishion & McMahon, 1998). Adolescents, particularly those with little to hide from their parents, may appreciate parental interest in their activities and friends, and parental monitoring efforts may promote, or maintain positive parent-adolescent relationships. Third, parental knowledge and parent-child relationship quality may be linked through mutual trust between parents and adolescents. Trust is likely to increase child disclosure, and parents who consistently know a lot about their adolescents' daily activities are more likely to trust the adolescents to make good decisions (Kerr, Stattin, & Trost, 1999). Moreover, parents are less likely to trust adolescents who regularly misbehave.

Adolescents' beliefs that parents should possess monitoring knowledge also were identified as a partial mediator between antisocial behavior and knowledge. Stronger knowledge beliefs were associated with lower levels of antisocial behavior and with greater parental knowledge. Knowledge beliefs may predict parents' knowledge for several reasons. Stronger knowledge beliefs may reflect a history of being well-monitored (Smetana, 1995). Adolescents who have been well-monitored may accept parental interest as legitimate and continue to facilitate monitoring efforts. More generally, stronger knowledge beliefs may imply a willingness to disclose information to parents. Adolescents who believe parents have a right to know how the adolescents' are spending their time may be more likely to provide parents with the information (Pettit, Mize, et al. 2001; Smetana & Daddis, 2002). Stronger knowledge beliefs may imply that adolescents view their parents as an ally and advocate rather than as someone who interferes in their lives. Stronger knowledge beliefs also may minimize parent-adolescent conflict that has the potential to undermine monitoring efforts (Smetana, 1989).

Adolescents' knowledge beliefs were the only significant predictor of change in knowledge. However, the results were not in the direction that was expected. Strong beliefs that parents should possess monitoring knowledge predicted decreases over time in parental knowledge. It is possible that this pattern is a result of a ceiling effect or regression to the mean. Adolescents who reported strong knowledge beliefs also reported very high levels of parental knowledge. In fact, their grade 9 scores approached the maximum value making it impossible for scores to increase over time. Adolescents reporting weaker beliefs reported lower knowledge scores in grade 9 making it possible for these scores to increase over time. It is also possible that the results were influenced by unmeasured developmental changes in knowledge beliefs. Several studies have found adolescents' beliefs in the legitimacy of parental control to weaken over time (Fuligni, 1998; Smetana & Asquith, 1994). Table 1 shows that the strength of the association between knowledge beliefs at grade 9 and parents' knowledge diminished as the time lag increased. Inspection of the scatterplots indicates that the correlation weakens over time primarily because strong knowledge beliefs become less associated with high levels of knowledge as the time lag increases. The link between weak beliefs and lower levels of

knowledge remains generally consistent as the time lag increases. This pattern suggests that the initially strong knowledge beliefs reported by some adolescents may be weakening over time and that these changes may have influenced the longitudinal associations. Despite the inability to pinpoint exactly how knowledge beliefs are translated into higher levels of parental knowledge, the fact that knowledge beliefs partially mediated the relationship between knowledge and antisocial behavior further underscores the adolescents' role as an active participant in the monitoring process (Stattin & Kerr, 2001).

No evidence was found to support the hypothesis that inept parenting links antisocial behavior to knowledge. Although parents who reported failing to follow-through more often in discipline situations also reported less relationship enjoyment and more antisocial behavior problems, there was no evidence that lack of follow-through was associated with reductions in monitoring knowledge. These results may indicate that parents who fail to follow-through in specific discipline situations are still able to monitor effectively. In fact, some negotiation of the rules may facilitate monitoring efforts by creating a sense of good will and trust between the parents and adolescents. However, the measure of lack of follow-through used in this study is a newly developed measure and more work is needed to understand how this measure converges and diverges with other indices of parenting. It is possible that other components of parenting play a role in linking antisocial behavior problems with parents' lack of monitoring knowledge.

Findings were remarkably consistent across parent and adolescent reports of antisocial behavior. Both predicted lower levels of knowledge, and the prediction from both was partially mediated by relationship enjoyment and knowledge beliefs. Findings were less consistent across parent and adolescent reports of involvement. Although parent-reported and adolescent-reported involvement scores were not correlated with one another, both were correlated with antisocial behavior and knowledge. However, only adolescent-reported involvement served as a partial mediator between antisocial behavior and knowledge. The divergent reports may mean that parents and adolescents differ in their perceptions of parental involvement. However, parents, but not adolescents, were told to exclude time spent watching television together from their estimates of involvement raising the possibility that methodological variations are responsible for the differences of opinion.

Several additional limitations of this study should be acknowledged. Perhaps, the primary limitation of this study is the exclusive reliance on adolescent reports of parental knowledge. The adolescents' perceptions of knowledge may be more closely tied to their own involvement in antisocial behavior, and to their own willingness to disclose information, but parents' perceptions may be more closely tied to the parents' own efforts to obtain information. The findings may be further limited by the combination of in-home interviews and mailed questionnaires and by the method used to combine the knowledge scores when adolescents reported on multiple parents. Predictions of developmental changes in knowledge may have been underestimated by constructing the knowledge scores in this manner. Likewise, predictions of developmental change may have been greatly influenced by the emphasis on monitoring knowledge during the high school years. Analyses focusing on younger ages may be more likely to identify developmental changes in knowledge and to identify predictors of change. Finally, the study is limited because some of the lower SES members of the sample did not provide sufficient data to be included in the analysis.

In summary, previous work with this dataset provided evidence that high levels of antisocial behavior were linked to subsequent reductions in monitoring knowledge. The current study identified several processes that underlie the associations between parental knowledge and adolescent antisocial behavior. Two elements of the parent-child relationship, relationship enjoyment and spending time together, appear to play a role in the processes linking knowledge and antisocial behavior. Moreover, adolescents' beliefs in the importance of parental

knowledge also partially mediated the association between antisocial behavior and knowledge. Antisocial behavior problems appear to disrupt the monitoring process, in part, by negatively influencing the parent-adolescent relationship and by weakening adolescents' beliefs that parents should possess monitoring knowledge.

Acknowledgments

This research was supported by grants from the National Institute of Mental Health (MH 42498, MH 57095) and the National Institute of Child Health and Human Development (HD 30572) to G. S. Pettit, K. A. Dodge, and J. E. Bates. Appreciation is expressed to the Child Development Project families for their continued participation. Approved for publication by the Director of the Louisiana Agricultural Experiment Station as manuscript number 02-36-0793.

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Figure 1.
Predicted values from the combined demographic model.

Figure 2.
Predicted values from the knowledge beliefs model.

Means, Standard Deviations, Reliability, and Correlations for all Variables

Table 1

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Knowledge —g. 9	420	13.15	1.78										
2. Knowledge —g 10	388	13.21	1.88	.43***									
3. Knowledge — g 11	370	13.17	2.07	.38***	.60***								
4. Knowledge — g 12	406	13.12	1.96	.34***	.44***	.44***							
5. Mother- Reported Antisocial Behavior	404	1.73	1.94	-.25***	-.20***	-.19***	-.30***						
6. Adolescent- Reported Antisocial Behavior	378	2.41	2.31	-.34***	-.26***	-.29***	-.22***	.33***					
7. Relationship Enjoyment	426	3.91	.62	.15***	.19***	.16***	.21***	-.39***	-.13**				
8. Parent-Reported Involvement	426	1.74	.77	.15***	.07	.09*	.09*	-.09*	-.02	.27***			
9. Adolescent- Reported Involvement	398	4.27	1.89	.19***	.12*	.17***	.14**	.12**	-.11*	.13**	.06		
10. Lack of Follow- Through	426	1.88	.53	-.07	-.11*	-.08	-.11*	.33***	.06	-.40***	-.07	-.05	
11. Knowledge Beliefs	420	2.16	.67	.54***	.35***	.32***	.29***	-.16**	-.32***	.15**	.05	.09	-.03

Note: pair-wise deletion, *ns* = 335–426.

Table 2
Demographic Characteristics, Antisocial Behavior, and Parenting as Predictors of Knowledge Trajectories

Predictor	Predicting Intercept (grade 9)			Predicting Slope (change over time)		
	Coefficient	SE	P	Coefficient	SE	P
<i>Demographic Characteristics</i>						
Gender	.157	.164	n.s.	.165	.066	.02
Single-Parent Family	-.556	.183	.003	.030	.076	n.s.
SES	-.008	.006	n.s.	.001	.003	n.s.
<i>Behavior Problems and Parenting</i>						
Mother-Reported Antisocial Beh.	-.182	.042	.001	-.026	.017	n.s.
Adolescent-Reported Antisocial Beh.	-.229	.035	.001	.014	.016	n.s.
Relationship Enjoyment	.434	.131	.001	.071	.054	n.s.
Parent-Reported Involvement	.263	.106	.02	-.030	.044	n.s.
Adolescent-Reported Involvement	.142	.044	.002	-.004	.018	n.s.
Lack of Follow-Thorough	-.224	.154	n.s.	-.035	.063	n.s.
Knowledge Beliefs	1.320	.105	.001	-.176	.050	.001

Note: ns = 374–422, intercept degrees of freedom = 370–418, slope degrees of freedom = 1029–1145.