Published in final edited form as:

J Early Adolesc. 2009 April ; 29(2): 258–284. doi:10.1177/0272431608320123.

Developmental Trajectories and Antecedents of Distal Parental Supervision

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Abstract

Groups of adolescents were identified on the basis of developmental trajectories of their families' rules and their parents' knowledge of their activities. Characteristics of the adolescent, peer antisociality, and family context were tested as antecedents. In sum, 404 parent-adolescent dyads provided data for adolescents aged 10–16. Most adolescents were classified into groups characterized by low levels and reductions in family rules over time. However, low socioeconomic status and residence in unsafe neighborhoods increased membership in the group characterized by consistently high levels of family rules. Most adolescents were assigned membership in groups characterized by relatively stable moderate-to-high levels of parental knowledge of their activities. However, greater externalizing problems and peer antisociality, as well as residence in an unsafe neighborhood, increased membership in the group characterized by low and decreasing levels of knowledge. Results suggest that personal and contextual risk antecedes nonnormative decreases in parental knowledge, whereas contextual risk inhibits normative reductions in family rules.

Keywords

monitoring; parenting; adolescence; externalizing behavior problems; peer influence; neighborhood safety; risk factors

Researchers have posited that the nature of the parent-child relationship is transformed during childhood and adolescence, with behavior regulatory responsibilities gradually shifting from parent to child (Maccoby, 1984). Concurrent with this transformation, adolescents spend less time with their families and more time outside of direct adult supervision (Laird, Pettit, Dodge & Bates, 1998; Larson, Richards, Moneta, Holmbeck, & Duckett, 1996; Patterson & Stouthamer-Loeber, 1984). As children's activities change, adept parents shift to distal forms of supervision to guide their children's development.

Components of the distal supervision process that are most relevant during the early adolescent period include parents' having and enforcing rules for the adolescent's behavior inside and outside the home (Dishion, Patterson, Stoolmiller, & Skinner, 1991) and their remaining aware of the adolescent's whereabouts and activities when away from home (often labeled *monitoring* or *monitoring knowledge*; for reviews, see Crouter & Head, 2002; Dishion & McMahon, 1998). Although higher levels of distal supervision are associated with fewer behavior problems and more positive peer relationships (e.g., for reviews, see Crouter & Head, 2002; Ladd & Pettit, 2002), distal supervision levels have been found to decrease over the course of adolescence (Bulcroft, Carmody, & Bulcroft, 1998; Laird, Pettit, Bates, & Dodge, 2003; Patterson & Stouthamer-Loeber, 1984; Pettit, Keiley, Laird, Bates, & Dodge, 2007). It is not yet known whether characteristics of the adolescents, their peers, or the family context influence the developmental course of distal supervision. Therefore, the purpose of this study is twofold: The first is to explore variability in the developmental course of two forms of distal supervision by identifying subsets of families that are experiencing similar developmental trajectories. The second is to determine whether adolescent characteristics, peer relationship characteristics, or family context is associated with membership in the developmental trajectory subsets.

Distal Supervision

Hayes, Hudson, and Matthews (2003) present a model characterizing distal supervision as a multiphase process. The first phase, *pre-free time monitoring*, gives parents an opportunity to establish clear rules and expectations for the adolescents' behavior when unsupervised. The second phase is that of the adolescents' behavior when unsupervised. The third phase, labeled *post-free time monitoring*, provides parents an opportunity to determine how, where, and with whom adolescents spend their free time. The fourth phase, parental response, provides parents an opportunity to respond if their adolescents violate the parents' rules and expectations during their free time, and the fifth phase, adolescent response, considers the adolescents' response to the parents' behavior. Parent and adolescent responses in the fourth and fifth phases are anticipated to influence the next distal supervision cycle.

This study focuses on the first and third phases of the distal supervision process described by Hayes et al. (2003). Specifically, in the first phase, family rules provide guidelines for behavior that is acceptable and not acceptable. Monitoring knowledge can be considered an outcome of the third phase, and it refers to whether parents regularly know where and with whom their adolescents are spending time. Consistent with Crouter, MacDermid, McHale, and Perry-Jenkins's conceptualization (1990), parental knowledge is considered to be the outcome of a long-term relationship-based process that requires parents and adolescents as active participants. In previous studies (e.g., Dishion et al., 1991), measures have combined items assessing family rules with items assessing monitoring knowledge. Furthermore, family rules are recognized as a potential contributor to parents' monitoring knowledge (Kerr & Stattin, 2000; Stattin & Kerr, 2000). However, although monitoring knowledge may inform parents about whether rules are being followed, knowledge of an adolescent's whereabouts does not necessarily imply that parents impose constraints on the adolescent's behavior and activities (i.e., parents may be well aware that their adolescents are engaging in undesirable behavior). Therefore, family rules and monitoring knowledge were treated as separate but related constructs.

Prior research indicates that there is a normative reduction in both components of distal supervision. Studies using longitudinal and cross-sectional designs have identified reductions in parents' monitoring knowledge during the childhood-to-adolescence transition (e.g., Frick, Christian, & Wooten, 1999; Patterson & Stouthamer-Loeber, 1984). Likewise,

prior analyses using the same sample as the current study found reductions from early to late adolescence in not only adolescent reports of monitoring knowledge (Laird, Pettit, Bates, et al., 2003) but also parent reports (Pettit et al., 2007). Similar patterns have been found indicating reductions in family rules (Bulcroft et al., 1998). Although differences in mean levels suggest decreases in distal supervision through adolescence, it is important to recognize that the mean-level differences are often accompanied by substantial variability (Laird, Pettit, Bates, et al., 2003; Pettit et al., 2007; Stoolmiller, 1994). Variability in developmental patterns suggests that families may differ in when and whether there is a reduction in distal supervision. It is unknown, for example, (a) whether the mean-level decrease indicates that all families decrease a modest amount or (b) whether some families are characterized by relatively stable, high or low levels of supervision whereas other families experience substantial declines in supervision that differ in rate and onset. In other words, previous analyses have revealed decreases in mean levels but have not provided information on how common it is for a family to report such decreases.

Growth curve modeling and growth mixture modeling provide two alternatives for modeling variability in developmental patterns. Growth curve modeling summarizes growth as a single mean trajectory, with the trajectories for individual sample members varying around the mean trajectory. Growth mixture modeling differs in that it does not assume that individuals are drawn from a single population and instead allows subclasses of individuals to vary around different mean growth curves (Muthén, 2004). However, growth mixture modeling is exploratory rather than confirmatory in that it relies on variability within the sample to select the number of groups and shapes of the growth trajectories. Growth mixture modeling was used in the current study because it can be used to identify subgroups of families within a sample showing different developmental patterns; thus, it can provide an estimate of the prevalence of different developmental patterns.

Potential Predictors of Distal Supervision Trajectories

Previous research suggests that parents' ability to distally supervise and regulate the behavior of their children is influenced by interactions within the family as well as within the broader ecological context in which the family resides (see Crouter & Head, 2002; Dishion & McMahon, 1998). The developmental course of distal supervision is likely influenced by whether the adolescents' behavior is consistent with the parents' expectations. Externalizing behavior problems, such as aggression and delinquency, may indicate that adolescents are unable or unwilling to regulate their own behavior and conform to their parents' expectations, particularly when their parents are not nearby. Coming from the perspective that parents reduce distal supervision to provide autonomy to deserving adolescents (Steinberg & Silverberg, 1986), it would be reasonable to expect that reductions in distal supervision would be anteceded by the absence of behavior problems as parents relax restrictions in response to well-behaved children and increase restrictions in response to misbehavior. However, prior research suggests that the opposite pattern is more common, with higher levels of antisocial behavior predicting reductions in parents' monitoring knowledge (Dishion, Nelson, & Bullock, 2004; Laird, Pettit, Bates, et al., 2003). One perspective on the reductions in knowledge among parents of antisocial adolescents is that adolescents (a) decrease the amount of information they disclose to their parents during the third phase of the distal supervision process and (b) increase their involvement in antisocial behavior (Kerr & Stattin, 2003; Stattin & Kerr, 2000). Alternatively, some parents may be abdicating their behavior regulation responsibilities when dealing with antisocial or temperamentally difficult adolescents who resist their parents' efforts to remain informed and to enforce rules during the latter phases of the distal supervision process (Kerr & Stattin, 2003; Laird, Pettit, Dodge, et al., 2003; Pettit et al., 2007). Thus, given prior empirical findings, we hypothesize that higher levels of adolescent behavior problems will antecede

membership in distal supervision trajectory groups characterized by lower levels and greater reductions over time in family rules and monitoring knowledge. However, based on theorizing from the autonomy-granting perspective, lower levels of adolescent behavior problems would be expected to antecede membership in distal supervision trajectory groups characterized by greater reductions over time in family rules and monitoring knowledge.

Adolescents' peer relationship experiences may also influence distal supervision. Specifically, friends may endorse behavior norms and expectations that conflict with parental expectations. Granic and Dishion's research (2003) suggests that highly antisocial adolescents influence one another, in part, by discussing and engaging in rule-breaking behavior. These discussions, termed *confluence processes*, serve to articulate a set of shared norms and expectations and so have been shown to reduce monitoring knowledge and positive parenting (Dishion et al., 2004). Adolescents' involvement with antisocial peers is considered an indicator of peer norms most likely to conflict with parental expectations. As with adolescent behavior problems and through similar processes, peer norms that conflict with parental expectations are hypothesized to antecede membership in trajectory groups characterized by lower levels and reductions over time in both forms of distal supervision. Adolescent behavior problems and peer relationship experiences are expected to independently predict distal supervision trajectory group membership.

In addition to adolescent misbehavior, lower socioeconomic status (SES) and greater safety concerns are linked to lower levels of parental knowledge (Pagani, Boulerice, Vitaro, & Tremblay, 1999; Pettit, Bates, Dodge, & Meece, 1999; Pettit, Laird, Dodge, Bates, & Criss, 2001). Thus, it is likely that family contextual factors also influence distal supervision strategies. Lower SES parents and those living in unsafe neighborhoods may have less knowledge of their adolescents' activities because they are more emotionally and economically stressed and therefore unable to fully participate in the distal supervision process. However, when parents believe that their children are relatively safe hanging out with friends in the neighborhood, they may be more likely to permit their children to do so and thus put less effort toward monitoring their activities outside the home. In contrast, when parents believe that hanging out with friends in the neighborhood is potentially dangerous, they may restrict such behavior and more closely monitor their children when they do leave the home. SES and neighborhood safety concerns may distinguish between monitoring knowledge and family rules such that lower SES families and those living in unsafe neighborhoods may have family rules and may maintain or increase them over time, whereas higher SES families and those living in safer neighborhoods may report more monitoring knowledge and may maintain or increase it over time.

Extant evidence indicates that a portion of the variability in distal supervision patterns is due to differences in how parents supervise and regulate the behavior of their sons and daughters. Specifically, there tends to be a lower level of (Dishion & McMahon, 1998) and a greater reduction in (Laird, Pettit, Bates, et al., 2003) parental awareness of daily activities and whereabouts of sons, as compared to daughters, over the course of adolescence. In contrast, family rules have been found to be similar for boys and girls (Bulcroft et al., 1998). Analyses were separately conducted for boys and girls to allow for the possibility that developmental trajectories and antecedent patterns may substantially differ for the two sexes.

The first goal of the current study was to identify subgroups that are experiencing similar trajectories of distal supervision during early and middle adolescence. The second goal was to determine whether divergent trajectory patterns are anteceded by differences in adolescent behavior problems, peer antisocial behavior, and family context. The third goal was to determine whether patterns of distal supervision and antecedents of trajectory patterns

differed for boys and girls. A growth mixture modeling technique was used to conduct analyses to meet the three goals. The current study builds on our prior work (e.g., Laird, Pettit, Bates, et al., 2003; Laird, Pettit, Dodge, et al., 2003; Pettit et al., 2007) in two important ways. First, our prior work focused on normative developmental changes in monitoring knowledge, whereas this study emphasizes variability in developmental change. Second, our prior work focused on monitoring knowledge, but the current study broadens the conceptualization of distal supervision to encompass both monitoring knowledge and family rules as potentially distinct components of the distal supervision process.

Method

Participants

Participating adolescents and their parents were drawn from the ongoing Child Development Project, a multisite longitudinal study of children's and adolescents' adjustment, from kindergarten through early adulthood (see Dodge, Bates, & Pettit, 1990; Pettit et al., 1999). Two successive cohorts totaling 585 families were recruited in Nashville and Knoxville, Tennessee, and Bloomington, Indiana, during kindergarten preregistration in 1987 and 1988. Approximately 75% of the parents who were approached agreed to participate. Data used in the current study were collected over a 7-year period beginning in the 6th year of the study and covering ages 10 through 16. Participating parents and adolescents were contacted each year and asked to participate in an interview session or complete a questionnaire mailed to the home. Adolescents were interviewed at ages 12, 13, and 16, and they completed questionnaires at ages 14 and 15. Parents were interviewed yearly when the adolescents were 10, 11, and 12 years old. One parent (typically the mother) was interviewed in each family.

As in many longitudinal studies, data were missing at different points for different participants. The analysis approach requires complete data for all predictor variables (i.e., behavior problem, peer relationship, and family context variables) but allows missing data among the variables that define the trajectory groups (i.e., monitoring knowledge and family rules). In sum, 404 families provided complete data on the antecedent variables and at least one score for each parenting variable, and 304 of the 404 families provided complete data. Incomplete data among the remaining 100 families are primarily due to the adolescents' choosing not to participate in one or more waves of data collection at ages 13, 14, 15, and 16 ($n = 384, 363, 351, 376$, respectively). Data were missing for 1 of the 12 variables for 25 families, 2 for 43 families, and 3 to 5 for 32 families. The distal supervision variables are moderately to highly correlated across time points. Missing data at one point can be estimated from data at other points; therefore, missing data were treated as missing at random (Schafer & Graham, 2002).

The 404 families in the primary analysis sample were compared with the remaining 181 original Child Development Project participants in terms of age 5 demographic characteristics and behavior problems. Parents of participants in the analysis sample were more educated and held higher-status jobs (Hollingshead, 1979; four-factor index of social status: ($\bar{X} = 40.9$, $SD = 14.2$) than the remaining participants ($\bar{X} = 36.5$, $SD = 13.2$), $t(568) = -3.48$, $p < .001$. Likewise, girls and European American participants were more likely to be included in the primary analysis subsample (Female: 51.9%; European Americans: 85.1%) than to have incomplete data (Female: 39.2%; European Americans: 73.5%), $\chi^2(1) = 8.15$ and 11.31 , $p < .05$. No group differences were found in the proportion of participants living in single-parent homes (28.7% versus 30.3%), $\chi^2(1) = 2.60$, $p = .107$, or in prekindergarten parent-reported externalizing behavior problems ($\bar{X} = 11.44$ and 11.65 , $SD = 6.8$ and 7.5), $t(565) = .33$, $p = .74$.

Measures

Distal supervision—Two forms of distal supervision were assessed using items adapted from Brown, Mounts, Lamborn, and Steinberg (1993) and Dishion et al. (1991). Five items assessed adolescents' perceptions of parental knowledge of their whereabouts and companions (e.g., "How much do your parents know about who your friends really are?" "How much do your parents really know about where you are most afternoons after school?"). At ages 12, 13, and 16, adolescents completed the monitoring knowledge items in an interview format in reference to their parents. At ages 14 and 15, adolescents completed the knowledge items twice, when appropriate—that is, once in reference to their mother and once in reference to their father. Items were scored on a 3-point scale (1 = *don't know*, 3 = *know a lot*). When adolescents responded to both the mother and the father statements, the higher score was used for each item, for two reasons: one, because of the assumption that it is necessary for only one parent to be aware and, two, because of the evidence that indicates that averaging the mother and father reports results in an underestimation when compared to that of the adolescent reports (for more information, see Laird, Pettit, Bates, et al., 2003a). In this manner, monitoring knowledge scores were computed yearly for ages 12 to 16 as the mean of the five items ($\alpha = .42, .65, .72, .78, .75$, respectively). For means, standard deviations, and correlations, see Table 1.

Five items assessed family rules for behavior at home or for that in the neighborhood when parents were not at home (e.g., "Does your family have rules about ...": "Staying in the house when your parents are not at home?" "How far away from home you can play?" "Following an after-school routine?" "Using certain things at home without an adult around?" "Answering the door when your parents are not home?"). The original response scale allowed adolescents to indicate whether a rule existed (0 = *no rule exists*) and how often they followed the rule (1 = *a rule exists but it is not followed*, 3 = *a rule exists that I always follow*). However, because the primary interest focused on whether a rule existed or not, responses were recoded to indicate the presence (coded 1) or absence (coded 0) of each rule. Family rules scores were computed for ages 12, 14, and 15 as the sum of the five items ($\alpha = .58, .72, .73$, respectively).

Behavior problems—Parents' perceptions of behavior problems were obtained using the Child Behavior Checklist (Achenbach, 1991). Externalizing scale scores were used to index behavior problems at ages 11 and 12 ($\alpha = .90$ and $.89$). The checklist's externalizing scales include 33 items from the Aggression and Delinquency subscales. To create a more reliable index, externalizing problems scores for early adolescence were computed as the mean of parent-reported externalizing scores for ages 11 and 12 ($r = .75, p < .001$).

Peer antisociality—At age 12, adolescents described their friends' involvement in antisocial behavior using items adapted from Dishion et al. (1991). Note that the antisocial behavior items were in reference to "your friends or friendship group" and not tied to a specified best friend. A peer antisociality score was computed as the mean of 15 items (e.g., "Do your friends ...": "Steal things?" "Get into fights?" "Drink alcohol?") rated by the adolescents on 5-point scale (1 = *never*, 5 = *very often*; $\alpha = .73$).

Neighborhood safety—Six items adapted from the Self-Care Checklist (Posner & Vandell, 1994) were included in the age 10 parent interviews, and they assessed parents' general appraisal of neighborhood safety (e.g., "How safe is your neighborhood?"), feelings of their own safety in coming home and being home alone, and judgments of how safe it was for their children to play in the neighborhood. Parents responded on a 6-point scale ranging from *very unsafe* to *very safe*. A neighborhood safety score was computed as the mean of the six items ($\alpha = .90$).

SES—Parents' reported their own and their spouses' highest level of education and current job during the age 10, 11, and 12 interviews. This information was coded and combined according to Hollingshead's guidelines (1979) to form a four-factor index of SES. To minimize missing data and to create a more reliable index, scores from ages 10, 11, and 12 were averaged to form a single index of family SES in early adolescence ($\alpha = .95$). Although the sample was predominantly middle class, as indicated by a mean SES score of 39.7 ($SD = 13.2$), a range of SES groups were represented, with 7.2%, 16.6%, 21.5%, 35.9%, and 18.8% of the families being classified into Hollingshead's five classes, from lowest to highest, respectively.

Analysis Strategy

First, means and bivariate correlations were computed. Next, a two-step procedure was used to fit a semiparametric growth mixture model using PROC TRAJ, an SAS procedure (Jones, Nagin, & Roeder, 2001). The procedure handles missing data using a maximum likelihood approach, which allowed us to retain participants who provided parenting data at some but not all time points. The monitoring knowledge and rules variables were not badly skewed (skew = 0.80 to -1.30) or kurtotic (kurtosis = -0.92 to 1.80), but it was possible that families would cluster at the ends of the scales; so, models were fit using a censored normal distribution (Jones et al., 2001). To model developmental change, time was specified as the lag in years between assessments. Default start values specifying groups of equal size and no association between antecedent variables and group probabilities were used because we had no a priori reason to specify different size groups or associations with group probabilities. Exploratory analyses with a range of start values indicated stability in the model solutions.

The first step in the procedure was to identify developmental trajectory clusters for the two forms of distal supervision—monitoring knowledge and family rules. To select appropriate trajectory cluster solutions, Jones et al. (2001) provide criteria for comparing the Bayesian information criteria (BIC) from multiple models reflecting variations in both the number of groups and the shape of the trajectories for each group. According to Jones et al., the difference in the BIC values between two models indexes the degree of evidence favoring one model over another, with $\Delta BIC > 3$ providing “strong” evidence and with $\Delta BIC > 5$ providing “very strong” evidence. Preference is given to parsimonious models with higher BIC values.

For both distal supervision variables, models were fit specifying two-, three-, and four-group linear solutions to identify the appropriate number of groups. Next, trajectory plots were examined to determine which combinations of shapes—that is, stable (intercept only), linear, and quadratic—best represented the trajectory for each group. Individuals were each assigned a score reflecting one's probability of membership in each group. To provide illustrative trajectory plots, individuals were assigned to the group with the highest probability of membership. The trajectory plots show the observed trajectories (i.e., group means at each time point) for the individuals assigned to each group. Initially, trajectory cluster solutions were identified separately for boys and girls. However, the solutions were quite similar, so the analysis was repeated with the full sample so that subsequent analyses would be able to determine whether associations with antecedents were moderated by sex.

The second step in the analysis evaluated the potential antecedents as predictors of supervision trajectory group membership to determine whether these variables predicted patterns of change in distal supervision across early and middle adolescence. Although it is possible to assign individuals to groups on the basis of membership probabilities and then compare the groups using analysis of variance, such an approach does not account for the fact that group assignment is probabilistic and not absolute, which can lead to bias (Clogg, 1995; Roeder, Lynch, & Nagin, 1999). The recommended approach is to add covariates to

the trajectory model; this takes into account the assignment uncertainty (Jones et al., 2001). The trajectory models were refit with five covariates: sex, SES, neighborhood safety, externalizing behavior problems, and peer antisociality. Two sets of models were run. In the first set of models, covariates were tested individually as predictors of trajectory membership probability while controlling for sex. In the second set of models, all five covariates were tested simultaneously as predictors of trajectory membership probabilities. Each Sex $\times$ Covariate interaction was tested individually in both sets of models.

Results

Means and Correlations

As shown in Table 1, the means at the different ages show a substantial decrease in family rules from age 12 to 15 and a limited decrease in monitoring knowledge from age 12 to 16. The correlations within the sets of monitoring knowledge and family rules variables are statistically significant but modest, suggesting variability in developmental trajectories. Correlations also show significant associations between the distal supervision variables and SES, neighborhood safety, externalizing problems, and peer antisociality. Adolescent sex was inconsistently associated with rules and knowledge. Safer neighborhoods, fewer behavior problems, and less peer antisociality were associated with more monitoring knowledge. Lower SES, less safe neighborhoods, and less peer antisociality were associated with more family rules. Higher SES was associated with safer neighborhoods and fewer behavior problems. Safer neighborhoods were also associated with fewer behavior problems and less peer antisociality.

Selecting Trajectory Cluster Solutions

When boys' and girls' monitoring knowledge data were analyzed separately, three-group solutions fit better than two- or four-group solutions for both boys and girls on the basis of parsimony and the small change in BIC values (see Table 2 for BIC values for each model). For boys, there was strong evidence that model fit was improved by specifying trajectory shapes as being linear, intercept only, and quadratic for the three groups, respectively. Statistically significant coefficients (all $p < .008$) for the linear factor for Group 1 and the linear and quadratic factors for Group 3 provide further evidence of improvement in model fit and so indicate that the first group was best characterized by a trajectory modeling a linear decrease over time; the second group, by no change over time in knowledge; and the third group, by a slight linear increase that slowed over time. For girls, there was very strong evidence that fit was improved by specifying trajectory shapes as being quadratic, intercept only, and linear for the three groups, respectively.

Statistically significant coefficients (all $p < .001$) for the linear and quadratic factors for Group 1 and the linear factor for Group 3 provide further evidence of improvement in model fit and so indicate that the first group was characterized best by a trajectory modeling a linear decrease that slowed over time; the second group, by no change over time in knowledge; and the third group, by a slight linear increase over time.

When the boys' and girls' monitoring knowledge data were combined, the three-group monitoring knowledge solution fit better than two- or four-group solutions on basis of parsimony and the small change in BIC values. There was strong evidence that the fit of the three-group solution was improved by specifying the trajectory shapes as being quadratic, intercept only, and linear for the three groups, respectively. Statistically significant coefficients (all $p < .001$) for the linear and quadratic factors for Group 1 and the linear factor for Group 3 provide further evidence of improvement in model fit with the first group best characterized by a trajectory modeling a linear decrease that slowed over time; the

second group, by no change over time in knowledge; and the third group, by a slight linear increase in knowledge over time. To determine whether the three groups represent distinct subpopulations within the sample, 95% confidence intervals (CI) were computed around the intercepts and linear slopes for the full sample. No overlapping CI across the groups show that the three groups differed significantly at age 12 and that subsequent rates of change differ significantly across the three groups, thus indicating that the three groups represent distinct subpopulations.

As shown in Figure 1, the first groups—labeled *low-decreasing* and including 19% of the boys (95% CI = 9%–28%), 12% of the girls (CI = 6–18), and 16% of the full sample (CI = 11–22)—reported low levels of monitoring knowledge at age 12, which declined until age 15 before increasing slightly between ages 15 and 16. The second groups—labeled *moderate-stable* and including 43% of the boys (CI = 30–56), 66% of the girls (CI = 58–74), and 60% of the full sample (CI = 53–68)—reported knowledge levels that fluctuated from year to year within the moderate range. The third groups—labeled *high-stable* and including 38% of the boys (CI = 23–53), 22% of the girls (CI = 15–29), and 23% of the full sample (CI = 16–31)—reported high levels of monitoring knowledge, which increased slightly between ages 12 and 15 before leveling off or decreasing slightly between ages 15 and 16.

For the family rules of the boys, the girls, and the full sample, the three-group solutions fit better than the two- or four-group solutions on the basis of parsimony and the small change in BIC values. Altering the shapes of the trajectories did not improve the fit of the three-group all-linear solutions, thereby indicating that all three groups were best characterized by a trajectory model of linear change over time. As such, 95% CI around the intercepts and linear slopes for the full sample show that the three groups differed significantly at age 12 and that the subsequent rates of change differ significantly across the three groups, thereby indicating that the three groups represent distinct subpopulations. As shown in Figure 2, the first groups (*low-decreasing*) reported few family rules at age 12 and less than one family rule at ages 14 and 15. In sum, 18% of the boys (CI = 12–24), 28% of the girls (CI = 16–40), and 22% of the full sample (CI = 13–31) were classified into these groups. The second groups (*moderate-decreasing*) reported having three to four family rules at age 12, and the families dropped about one rule between ages 12 and 15. In sum, 60% of the boys (CI = 49–71), 61% of the girls (CI = 50–73), and 66% of the full sample (CI = 58–74) were classified into these groups. The third groups (*high*) reported having nearly all the rules at age 12, although there is a potentially interesting difference between the boy and girl trajectories: The boys decreased by about one rule between ages 12 and 15, whereas the girls increased by about one rule over the same period. In sum, 22% of the boys (CI = 12–32), 10% of the girls (CI = 3–17), and 12% of the full sample (CI = 4–19) were classified into the high groups.

Indices of monitoring-knowledge and family-rules group membership obtained from the full-sample analyses were cross-tabulated to assess the consistency of group membership across the two constructs. As such, there was a significant association between monitoring-knowledge group membership and family-rules group membership, $\chi^2(4, n = 404) = 36.32$, $p < .001$. However, only 56.6% of the adolescents were classified into the same group on both constructs. The two most common cross-classifications were as follows: one, for members of the moderate-decreasing rules groups to be assigned to the high-stable knowledge group (14.6%) or, two, for members of the low-decreasing rules groups to be assigned to the moderate-stable knowledge group (13%). The cross-classifications likely reflect discrepancies in distributions of individuals across classes for the two variables, with relatively more individuals assigned (a) to the low-decreasing family rules groups as compared to the low-decreasing monitoring knowledge group and (b) to the high-stable monitoring knowledge group as compared to the high rules group.

Predicting Trajectory Group Membership

The next step in the analysis was to predict trajectory group membership from the potential antecedents. As noted earlier, antecedent tests were conducted by adding covariates to the trajectory models to take into account assignment uncertainty. However, to facilitate interpretation, Tables 3 and 4 provide the means and standard deviations for each antecedent as a function of trajectory group membership. The columns on the right sides of Tables 3 and 4 summarize the results of the covariate analyses, testing whether group probabilities differed within each pair of trajectory groups.

For monitoring knowledge, being female and living in a safer neighborhood was associated with an increased probability of membership in the high-stable versus low-decreasing knowledge group (see Table 3). These group probability differences are reflected in the greater percentage of females and the higher neighborhood safety mean in the high-stable knowledge group as compared to the low-decreasing knowledge group. Externalizing problems and peer antisociality predicted group membership in a linear manner, with more externalizing problems and greater peer antisociality associated with the greatest probability of membership in the low-decreasing group, followed by the moderate-stable group and the high-stable group. Again, the group probability differences are reflected in the means with the greatest externalizing behavior and peer antisociality found in the low-decreasing monitoring knowledge group. When all antecedents were tested simultaneously, externalizing problems no longer differentiated the low-decreasing and moderate-stable groups, thus indicating that the group differences in externalizing problems were explained by differences in peer antisociality. All other group differences remained significant when all predictors were tested simultaneously.

For family rules (see Table 4), living in a safer neighborhood was associated with an increased probability of membership in the low-decreasing rules group compared to the moderate-decreasing and high family-rules groups. The group probability differences are reflected in the higher neighborhood safety mean in the low-decreasing rules group as compared to the moderate-decreasing and high rules groups. The Sex $\times$ SES interaction was significant ($p < .01$) and so indicated that higher SES was associated with an increased probability of membership in the low-decreasing versus moderate-decreasing and high family-rules groups for girls and with an increased probability of membership in the low-decreasing and moderate-decreasing versus high rules group for boys. The group probability differences are illustrated by the SES means, with boys in the high-increasing rules group having the lowest SES and girls in the low-decreasing rules group having the highest SES. When all antecedents were tested simultaneously, SES no longer differentiated among the boys' rules groups, indicating that neighborhood safety accounted for the SES differences among boys' groups. Girls' SES and neighborhood safety group differences remained significant when all predictors were tested simultaneously.

Discussion

The primary goals of this study were to identify groups of individuals who were experiencing similar trajectories of distal supervision across early and middle adolescence and to investigate adolescent behavior, peer relationship experiences, and family context as antecedents of the trajectories. Analyses show that although distal supervision may decrease on average, it does not decrease the same amount or at the same rate in all families. Moreover, whereas most adolescents were classified into the two groups characterized by low levels or reductions in family rules, only a small portion was classified into the one group characterized by low levels and reductions in monitoring knowledge. In terms of antecedents, membership in the group characterized by low levels and reductions in monitoring knowledge was anteceded by higher levels of behavior problems and living in

less safe neighborhoods. In contrast, membership in the group characterized by low levels and reductions in family rules was anteceded by higher SES and living in safer neighborhoods. Although low levels and reductions in monitoring knowledge are more common for boys than girls, interactions with sex were minimal, suggesting that antecedents are similar for boys and girls. Results suggest personal and contextual risk antecedes nonnormative decreases in monitoring knowledge, whereas contextual risk inhibits normative reductions in family rules.

Contrasting developmental trajectories were identified for the two distal supervision strategies. Specifically, reductions in monitoring knowledge were relatively rare, with reductions characterizing only the smallest group (16% of the adolescents). In contrast, reductions in family rules were quite common (88%), with reductions characterizing two of the three groups. Thus, it appears that (a) over the course of early and middle adolescence, many parents come to rely less on rules and prohibitions for what the adolescent can and cannot do when they are not home but that (b) most parents continue to remain aware of the adolescents' whereabouts and activities.

Differences in the behavior and activities governed by the two distal supervision strategies likely underlie the differences in the knowledge and rules trajectories. Specifically, the family rules considered in this study focused primarily on restricting the adolescents' behavior when the parent was not home. Such rules are likely to assist early adolescents who are beginning to spend more time at home unsupervised, and they may protect these adolescents from experiencing problems. However, as adolescents demonstrate self-sufficiency and responsibility, it appears that most parents ease up on the restrictions. To the extent that rules retain an influential role in the distal supervision process, specific rules are likely to change as the adolescents' interests and behaviors change. For example, most children have spent time at home unsupervised by age 10 (Laird et al., 1998) and are likely to have considerable self-care experience by age 14; thus, rules for proper behavior when home alone may lose importance. However, by age 14, adolescents are likely to be spending more time unsupervised away from home, and thus, rules regarding acceptable behavior outside the home may gain importance. Given the developmental changes in activities and experience in self-care, it seems reasonable that these specific rules are abandoned in most families by age 15. However, it is important to note that most of the rules remained in force even by age 15 for a small portion of the sample.

In contrast, monitoring knowledge indicates an awareness of adolescents' behavior and activities when they are unsupervised at home and away from home. Maintaining knowledge of children's whereabouts and activities is a useful and relevant form of distal supervision when children venture out into the neighborhood or into friends' homes in middle childhood, when early adolescents spend the afternoon at the mall with friends, when middle adolescents catch a ride with a friend to a school event, and when late adolescents push for extended curfews. Thus, the maintenance of parental knowledge over early and middle adolescence, as reported by many adolescents, may reflect the ongoing utility and relevance of this form of distal supervision, as well as the adaptability to changing situations and activities. Furthermore, because monitoring knowledge is conceptualized as the outcome of a relationship-based process, the limited change in knowledge may indicate that most parents and adolescents continue to be emotionally engaged and to communicate with one another even when adolescents spend larger amounts of time away from their parents (Larson et al., 1996; Larson & Richards, 1994).

Whereas membership in the group characterized by low levels and reductions in monitoring knowledge was anteceded by adolescent characteristics and living in an unsafe neighborhood, membership in the two groups characterized by low to moderate levels and

reductions in family rules was anteceded by relatively advantageous family contexts. This pattern is particularly informative given the positive associations between the monitoring-knowledge and family-rules variables at individual ages and the relative consistency of group membership across the monitoring-knowledge and family-rules trajectory groups. The greater number of family rules and prohibitions among families living in low SES homes and in less safe neighborhoods is consistent with the findings of other research showing that in high-risk contexts, parents are likely to emphasize obedience rather than independence or autonomy (Bartz & Levine, 1978; Kelly, Sanchez-Hucles, & Walker, 1993). Interestingly, children living in low SES homes also spend more time in self-care (Laird et al., 1998) and thus may have a greater need, at least initially, for clear guidance and distal supervision through family rules. Although maintaining family rules through age 15 may be viewed as being overly restrictive and so potentially limiting the development of autonomy, it appears that parents who maintain rules for acceptable behavior when adolescents are home alone in unsafe neighborhoods are responding to a perceived threat.

Why is lower SES linked to membership in the high-increasing family rules group but not to the low-decreasing monitoring knowledge group? Family rules, more than monitoring knowledge, may reflect the use of harsh and restrictive disciplinary practices more common among low SES parents. It is also possible that low SES parents rely more heavily on family rules than on monitoring knowledge because they lack the motivation, time, or opportunity to engage in the actions, relationship maintenance and monitoring related, necessary to keep them updated on their adolescents' activities. However, low-SES parents impose more family rules than do high-SES parents, and it seems reasonable to believe that parents should have less need to monitor the activities of adolescents who are obeying their parents' rules. Nonetheless, a rule-oriented or more authoritarian emphasis may inadvertently limit adolescents' cooperation with parents' socialization attempts. For example, Darling, Cumsille, Caldwell, and Dowdy (2006) found that adolescents were more likely to lie to their parents about misbehavior when issues were governed by clear rules than when they were not, thereby suggesting that the presence of rules may limit adolescent disclosure that contributes to parental knowledge. Although imposing rules may facilitate distal supervision when the adolescents follow the rule, imposing rules may make it more difficult for parents to accurately monitor the adolescents' behavior by reducing adolescent participation in the monitoring process.

Findings from this study add to our previous attempts to identify and describe antecedents of monitoring knowledge. Specifically, our prior work described developmental change using a latent growth curve model, and it focused on the normative decrease in monitoring knowledge over the course of early and middle adolescence (Laird, Pettit, Bates, et al., 2003; Laird, Pettit, Dodge, et al., 2003). The growth mixture modeling analyses speak to the nature of the variability in the individual growth trajectories and so indicate that the normative decrease identified in the latent growth curve analyses was produced by a substantial decline in knowledge reported by a minority of the sample. Moreover, because initial levels and rates of change are independently modeled in the latent growth curve analyses, the growth mixture modeling analyses provide the clearest evidence that reductions in monitoring appear to be primarily limited to those families who were reporting the lowest initial levels of knowledge. Furthermore, prior analyses provided evidence of transactional associations between behavior problems and knowledge (Laird, Pettit, Dodge, et al., 2003). The current study extends those findings by illustrating that in addition to the short-term associations, behavior problem levels in early adolescence predict the course of monitoring knowledge over early to middle adolescence. Findings from the two approaches are complementary and suggest that behavior problems differentiate the trajectories, in part, because behavior problems elicit parent or adolescent behavior that enhances the trajectories. The transactional associations show that lower levels of knowledge in 1 year predict subsequent

increases in behavior problems by the next year and that high levels of behavior problems in 1 year predict subsequent decreases in knowledge by the next year—a scenario that would link early adolescent behavior problems with subsequent low levels and declines in monitoring knowledge. Finally, not only do behavior problems differentiate the subset that shows low levels and declines in knowledge, but behavior problems also differentiate the groups who maintain consistently moderate versus high levels of knowledge.

Examining two components of the distal supervision process provided the biggest opportunity to build on our previous work. The conceptual model described by Hayes et al. (2003) places (a) family rules as an early step in the distal supervision process and (b) monitoring knowledge as the outcome of a later step. The current study indicates that although the two components may contribute to the distal supervision process on a day-to-day basis, they show different developmental patterns and have distinct antecedents. Findings indicate that the specific rules that parents impose may change more quickly and be more influenced by family context than by the processes that result in parents' knowledge of adolescents' whereabouts and activities. Laursen and Collins (1994) note that changes in the quality or nature of parent-adolescent interactions are expected to occur slowly and to reflect qualities of the relationship present at earlier points in time. The fact that there is a great deal of rank-order stability evident in all the data presented (i.e., the group trajectories are generally parallel) is consistent with Laursen and Collins's perspective and so indicates that parents who provide supervision in early adolescence will continue to do so in late adolescence.

Strengths of the current study include being able to identify subgroups that are experiencing similar developmental trajectories across two forms of distal supervision and being able to compare the groups on possible antecedents. However, it is important to note that growth mixture modeling is exploratory and data dependent; thus, the number and nature of the groups are a function of the particular sample (Muthén, 2004). Other data sets may yield a different number of groups or groups characterized by different trajectories. Nonetheless, analyses provide considerable evidence of variability in developmental trajectories and so indicate that the variability is associated with between-family differences in adolescent behavior, peer relationship experiences, and family context.

The current study is limited by the reliance on a single informant for both indices of distal supervision. It is likely that the monitoring-knowledge and family-rules measures reflect adolescent perception bias. Furthermore, as it turns out, the trajectory profiles confound overall level and rate of change because the trajectory profiles never cross one another. As noted above, the trajectory profiles reflect substantial stability in parenting and therefore reinforce the notion that we are studying the manifestation of an ongoing relationship. Nonetheless, more dynamic trajectory profiles would have facilitated comparisons between groups with similar initial levels of regulation that differed in the timing or rate of change in distal supervision. In a similar vein, this study attempted to disentangle cause-and-effect patterns, but relationship history makes that difficult. Parental supervision strategies—and parent-child interaction patterns in general—have a long history by early adolescence, and changes in those patterns likely occur gradually and thus reflect current and past situations and experiences incorporating parent and child traits and behaviors.

In summary, this study provided evidence of developmental change in two distal supervision strategies, showing (a) low levels and developmental reductions in family rules to be common and (b) low levels and reductions in monitoring knowledge to be uncommon. Individuals assigned to groups characterized by low levels and developmental reductions in family rules were likely to report relatively advantageous family contexts, whereas individuals assigned to groups characterized by low levels and reductions in monitoring

knowledge were likely to report disadvantaged family contexts and high levels of early-adolescent behavior problems.

Acknowledgments

This research was supported by grants from the National Institute of Mental Health (MH 42498, MH 56961, MH 57024, MH 57095), the National Institute of Child Health and Human Development (HD 30572), and the National Institute on Drug Abuse (DA 16903) to Gregory S. Pettit, Kenneth A. Dodge, and John E. Bates, as well as from the Louisiana Board of Regents Support Fund (LEQSF-RD-A-02) and the National Science Foundation (BCS 0517980) to Robert D. Laird. Findings of this study were presented at the 2004 biennial meeting of the Society for Research on Adolescence. Article approved for publication by the director of the Louisiana Agricultural Experiment Station (Manuscript No. 05-36-0292).

References

- Achenbach, TM. Manual for the Child Behavior Checklist and 1991 profile. Burlington: University of Vermont, Department of Psychiatry; 1991.
- Bartz KW, Levine ES. Childrearing by Black parents: A description and comparison to Anglo and Chicano parents. *Journal of Marriage and the Family*. 1978; 40:709–719.
- Brown BB, Mounts N, Lamborn SD, Steinberg L. Parenting practices and peer group affiliation in adolescence. *Child Development*. 1993; 64:467–482. [PubMed: 8477629]
- Bulcroft RA, Carmody DC, Bulcroft KA. Family structure and patterns of independence giving to adolescents: Variations by age, race, and gender of child. *Journal of Family Issues*. 1998; 19:404–435.
- Clogg, CC. Latent class models. In: Arminger, G.; Clogg, CC.; Sobel, ME., editors. *Handbook of statistical modeling for the social and behavioral sciences*. New York: Plenum; 1995. p. 311–360.
- Crouter, AC.; Head, MR. Parental monitoring and knowledge of children. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 3. Being and becoming a parent*. 2. Mahwah, NJ: Lawrence Erlbaum; 2002. p. 461–483.
- Crouter AC, MacDermid SM, McHale SM, Perry-Jenkins M. Parental monitoring and perceptions of children's school performance and conduct in dual- and single-earner families. *Developmental Psychology*. 1990; 26:649–657.
- Darling N, Cumsille P, Caldwell L, Dowdy B. Predictors of adolescents' disclosure to parents and perceived parental knowledge: Between- and within-person differences. *Journal of Youth and Adolescence*. 2006; 35:667–678.
- Dishion TJ, McMahon RJ. Parental monitoring and the prevention of child and adolescent problem behavior: A conceptual and empirical formulation. *Clinical Child and Family Psychology Review*. 1998; 1:61–75. [PubMed: 11324078]
- Dishion TJ, Nelson SE, Bullock BM. Premature adolescent autonomy: Parent disengagement and deviant peer process in the amplification of problem behaviour. *Journal of Adolescence*. 2004; 27:515–530. [PubMed: 15475044]
- Dishion TJ, Patterson GR, Stoolmiller M, Skinner ML. Family, school, and behavioral antecedents to early adolescent involvement with antisocial peers. *Developmental Psychology*. 1991; 27:172–180.
- Dodge KA, Bates JE, Pettit GS. Mechanisms in the cycle of violence. *Science*. 1990; 250(4988):1678–1683. [PubMed: 2270481]
- Frick PJ, Christian RE, Wootton JM. Age trends in association between parenting practices and conduct problems. *Behavior Modification*. 1999; 23:106–128.
- Granic I, Dishion TJ. Deviant talk in adolescent friendships: A step toward measuring a pathogenic attractor process. *Social Development*. 2003; 12:314–334.
- Hayes L, Hudson A, Matthews J. Parental monitoring: A process model of parent-adolescent interaction. *Behavior Change*. 2003; 20:13–24.
- Hollingshead, W. Unpublished paper. Yale University; New Haven CT: 1979. The Hollingshead Four Factor Index of Socioeconomic Status.

- Jones BL, Nagin DS, Roeder K. A SAS procedure based on mixture models for estimating developmental trajectories. *Sociological Methods and Research*. 2001; 29:374–393.
- Kelly ML, Sanchez-Hucles J, Walker R. Correlates of disciplinary practices in working-to low-risk African American mothers. *Merrill-Palmer Quarterly*. 1993; 39:252–264.
- Kerr M, Stattin H. What parents know, how they know it, and several forms of adolescent adjustment: Further support for a reinterpretation of monitoring. *Developmental Psychology*. 2000; 36:366–380. [PubMed: 10830980]
- Kerr, M.; Stattin, H. Straw men, untested assumptions, and bi-directional models: A response to Capaldi and Brody. In: Crouter, AC.; Booth, A., editors. *Children's influence on family dynamics: The neglected side of family relationships*. Mahwah, NJ: Lawrence Erlbaum; 2003. p. 181-187.
- Ladd, GW.; Pettit, GS. Parenting and the development of children's peer relationships. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 5. Practical issues in parenting*. 2. Mahwah, NJ: Lawrence Erlbaum; 2002. p. 269-309.
- Laird RD, Pettit GS, Bates JE, Dodge KA. Parents' monitoring-relevant knowledge and adolescents' delinquent behavior: Evidence of correlated developmental changes and reciprocal influences. *Child Development*. 2003; 74:752–768. [PubMed: 12795388]
- Laird RD, Pettit GS, Dodge KA, Bates JE. The social ecology of school-age child care. *Journal of Applied Developmental Psychology*. 1998; 19:341–360. [PubMed: 20011230]
- Laird RD, Pettit GS, Dodge KA, Bates JE. Change in parents' monitoring knowledge: Links with parenting, relationship quality, adolescent beliefs, and antisocial behavior. *Social Development*. 2003; 12:401–419. [PubMed: 20209033]
- Larson, RW.; Richards, MH. *Divergent realities: The emotional lives of mothers, fathers, and adolescents*. New York: Basic Books; 1994.
- Larson RW, Richards MH, Moneta G, Holmbeck G, Duckett E. Changes in adolescents' daily interactions with their families from ages 10 to 18: Disengagement and transformation. *Developmental Psychology*. 1996; 32:744–754.
- Laursen B, Collins WA. Interpersonal conflict during adolescence. *Psychological Bulletin*. 1994; 115:197–209. [PubMed: 8165270]
- Maccoby, EE. Middle childhood in the context of the family. In: Collins, WA., editor. *Development during middle childhood: The years from six to twelve*. Washington, DC: National Academy Press; 1984. p. 184-239.
- Muthén, B. Latent variable analysis: Growth mixture modeling and related techniques for longitudinal data. In: Kaplan, K., editor. *Handbook of quantitative methodology for the social sciences*. Newbury Park, CA: Sage; 2004. p. 345-368.
- Pagani L, Boulerice B, Vitaro F, Tremblay RE. Effects of poverty on academic failure and delinquency in boys: A change and process model approach. *Journal of Child Psychology and Psychiatry*. 1999; 39:489–499. [PubMed: 9599777]
- Patterson GR, Stouthamer-Loeber M. The correlation of family management practices and delinquency. *Child Development*. 1984; 55:1299–1307. [PubMed: 6488958]
- Pettit GS, Bates JE, Dodge KA, Meece DW. The impact of after-school peer contact on early adolescent externalizing problems is moderated by parental monitoring, perceived neighborhood safety, and prior adjustment. *Child Development*. 1999; 70:768–778. [PubMed: 10368921]
- Pettit GS, Keiley MK, Laird RD, Bates JE, Dodge KA. Predicting the developmental course of mother-reported monitoring across childhood and adolescence from early proactive parenting, child temperament, and parents' worries. *Journal of Family Psychology*. 2007; 21:206–217. [PubMed: 17605543]
- Pettit GS, Laird RD, Dodge KA, Bates JE, Criss MM. Antecedents and behavior-problem outcomes of parental monitoring and psychological control in early adolescence. *Child Development*. 2001; 72:583–598. [PubMed: 11333086]
- Posner JK, Vandell DL. Low-income children's after-school care: Are there beneficial effects of after-school programs? *Child Development*. 1994; 65:440–456. [PubMed: 8013233]
- Roeder K, Lynch KG, Nagin DS. Modeling uncertainty in latent class membership: A case study in criminology. *Journal of the American Statistical Association*. 1999; 94:766–776.

- Schafer JL, Graham JW. Missing data: Our view of the state of the art. *Psychological Methods*. 2002; 7(2):147–177. [PubMed: 12090408]
- Stattin H, Kerr M. Parental monitoring: A reinterpretation. *Child Development*. 2000; 71:1072–1085. [PubMed: 11016567]
- Steinberg L, Silverberg S. The vicissitudes of autonomy in adolescence. *Child Development*. 1986; 57:841–851. [PubMed: 3757604]
- Stoolmiller M. Antisocial behavior, delinquent peer association, and unsupervised wandering for boys: Growth and change from childhood to early adolescence. *Multivariate Behavioral Research*. 1994; 29:263–288.

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Figure 1.
Monitoring Knowledge Groups

Figure 2.
Family Rules Groups

Table 1

Means, Standard Deviations, and Correlations

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Sex ^a														
Monitoring knowledge														
2. Age 12	2.70	0.26	.08											
3. Age 13	2.63	0.35	.06	.39***										
4. Age 14	2.64	0.37	.10*	.36***	.46***									
5. Age 15	2.64	0.40	.02	.27***	.38***	.59***								
6. Age 16	2.63	0.39	.20***	.24***	.32***	.43***	.42***							
Family rules														
7. Age 12	3.42	1.41	.10	.19***	.18***	.19***	.18***	.12*						
8. Age 14	2.33	1.69	.07	.07	.08	.18***	.24***	.16**	.37***					
9. Age 15	1.80	1.65	.07	.08	.13*	.20***	.23***	.23***	.37***	.57***				
10. SES	39.74	13.23	-.06	-.05	-.04	.01	-.03	.02	-.19***	-.18**	-.20***			
11. NGH	4.03	0.84	-.03	.10*	.08	.10*	.10*	.09*	-.14**	-.10	-.20***	.43**		
12. EXT	8.86	6.57	-.09	-.07	-.14**	-.17***	-.21***	-.26***	-.03	.04	-.01	-.23***	-.24***	
13. PEER	1.61	0.32	-.07	-.34***	-.31***	-.24***	-.20***	-.19***	-.13***	-.06	-.05	-.09	-.19***	.16***

Note: $n = 331-404$. SES = socioeconomic status; NGH = neighborhood safety; EXT = externalizing behavior problems; PEER = peer antisociality.^aSex coded: 0 = male, 1 = female. 52% female.* $p < .05$.** $p < .01$.*** $p < .001$. Two-tailed.

Bayesian Information Criterion Values and Comparisons Used to Select the Number of Groups and the Shapes of Trajectories

Table 2

Model	Comparison Model	Boys		Girls		Full Sample	
		BIC	ΔBIC	BIC	ΔBIC	BIC	ΔBIC
Monitoring knowledge							
1. Two groups, both linear ^a		-563.4		-673.1		-1,244.5	
2. Three groups, all linear ^a	1	-557.7	5.7	-645.1	28.0	-1,201.3	43.2
2a. Three groups, linear, intercept only, quadratic ^b	2	-553.6	4.1 ^c	-645.7	-0.6	-1,197.9	3.4
2b. Three groups, quadratic, intercept only, linear ^d	2	-556.5	-1.2	-638.7	6.4 ^c	-1,193.4	7.9 ^c
3. Four groups, all linear ^a	2	-562.8	-9.2	-650.4	-5.3	-1,201.1	0.2
Family rules							
1. Two groups, both linear ^a		-942.3		-1,033.5		-1,968.7	
2. Three groups, all linear ^a	1	-930.9	11.4 ^c	-1,022.2	11.3 ^c	-1,944.3	24.4 ^c
3. Four groups, all linear ^a	2	-932.4	-1.5	-1,027.7	-5.8	-1,942.6	1.7

Note: BIC = Bayesian information criteria.

^aChange is modeled as a linear increase or decrease in all groups.

^bChange is modeled as being linear for Group 1, stable for Group 2, and quadratic for Group 3.

^cFavored model.

^dChange is modeled as being quadratic for Group 1, stable for Group 2, and linear for Group 3.

Table 3

Antecedents of Monitoring Knowledge Trajectory Group Membership

Predictor	<i>M (SD)^a</i>		Group Membership Probability Differences (<i>p</i>)			
	Low-Decreasing (LD)	Moderate-Stable (MS)	High-Stable (HS)	LD vs. MS	LD vs. HS	MS vs. HS
Sex	37% female	52% female	61% female	.079	.002	.120
NGH	1.80 (0.79)	1.98 (0.86)	2.14 (0.79)	.190	.008	.059
SES	40.80 (15.00)	39.50 (12.80)	39.60 (12.20)	.600	.680	.950
EXT	11.73 (7.90)	8.73 (6.50)	7.35 (5.10)	.003	.001	.047
PEER	1.76 (0.41)	1.62 (0.31)	1.50 (0.25)	.001	.001	.015

Note: NGH = neighborhood safety; SES = socioeconomic status; EXT = externalizing behavior problems; PEER = peer antisociality.

^aUnless noted otherwise.

Table 4

Antecedents of Family Rules Trajectory Group Membership

Predictor	<i>M (SD)^a</i>			Group Membership Probability Differences (<i>p</i>)		
	Low-Decreasing (LD)	Moderate-Decreasing (MD)	High (H)	LD vs. MD	LD vs. H	MD vs. H
Sex	47% female	53% female	58% female	.150	.170	.760
NGH	2.17 (1.11)	2.01 (0.81)	1.74 (0.75)	.008	.002	.140
SES: Males	42.70 (13.80)	42.00 (14.10)	35.60 (16.10)	.750	.034	.027
SES: Females	48.40 (11.40)	38.10 (13.70)	38.00 (15.60)	.002	.005	.670
EXT	8.69 (6.80)	8.92 (6.40)	8.85 (7.30)	.980	.680	.570
PEER	1.64 (0.36)	1.62 (0.31)	1.52 (0.29)	.330	.260	.059

Note: NGH = neighborhood safety; SES = socioeconomic status; EXT = externalizing behavior problems; PEER = peer antisociality.

^aUnless noted otherwise.