

Predicting the Developmental Course of Mother-Reported Monitoring Across Childhood and Adolescence From Early Proactive Parenting, Child Temperament, and Parents' Worries

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Change in mothers' reported monitoring and awareness of their children's activities and companions across Grades 5, 6, 8, and 11 were examined with the use of latent factor growth modeling. Proactive parenting and resistant-to-control (RTC) child temperament assessed prior to kindergarten, as well as parents' worries about their children's behavior in Grades 5 and 8, were tested as factors associated with change in monitoring over time. Higher proactive parenting, lower RTC temperament, and the mounting of a successful campaign to change their children's behavior were associated with higher monitoring scores overall. Monitoring levels decreased across time, but the rate of decline was steeper among mothers with high RTC children and slower among mothers who mounted a campaign and judged it to be effective. These findings shed light on factors contributing to continuity and change across development in a key domain of parenting.

Keywords: monitoring, parenting, temperament, longitudinal, growth modeling

Literature on continuity and change of parenting behavior across major developmental periods is remarkably sparse (Conger, Lorenz, & Wickrama, 2004), and the literature on parental monitoring is no exception. This is unfortunate given the central role that monitoring has been hypothesized to play in childhood socialization. Monitoring may be conceptualized in terms of supervisory and behavioral regulation strategies that parents use to keep track of their children's out-of-home activities (Barber, 1996) and in terms of the knowledge parents glean from multiple sources that inform them about their children's whereabouts and companions (Stattin & Kerr, 2000). Low levels of parental monitoring have been found to be associated with poorer behavior-adjustment outcomes, both concurrently and longitudinally (see review by Crouter & Head, 2002). This

relation most likely reflects bidirectional processes in which more antisocial youth both have more to hide from parents and do a better job of hiding it, compared with better adjusted youth, and in which distracted and/or disengaged parents are less diligent in seeking out information that might help them establish guidelines and rules that could rein in a wayward child (Pettit, 2004; Stattin & Kerr, 2000). In general, research findings show normative decreases in monitoring knowledge as children get older, which would be expected owing to the increased opportunities for out-of-home discretionary activity and because of gradual changes and negotiations in the parent-child relationship that favor increasing behavioral and psychological autonomy for youth (Laird, Pettit, Bates, & Dodge, 2003). Still, there is evidence of a fairly broad range in the relative degree of change over time in monitoring (Laird, Criss, & Pettit, 2004). Understanding the factors that contribute to continuity or change in monitoring is important and is the focus of the present study.

Laird et al. (2003) documented that monitoring knowledge, as reported by teens, is moderately highly stable across successive years of high school (i.e., Grades 9 through 12), with a significant negative slope indicating overall reductions in monitoring across grades. It is not clear whether similar levels of stability and a similar pattern of decline in knowledge would be found across longer periods of time or across major developmental transitions, such as the transition from elementary to middle school and from middle school to high school, nor is it clear whether mother reports would show patterns comparable to youth reports.

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Development across these transitions is characterized by major shifts in cognitive (and social-cognitive) processing, in physical and pubertal growth, and in the centrality of the peer group. These changes likely impinge on the parent-child relationship in ways that make monitoring-relevant knowledge more difficult to come by (e.g., by fueling the desire for autonomy; Collins, 1995). In the current study, latent factor growth modeling was used to examine variation within and between persons in overall levels of monitoring knowledge across these time points. Growth modeling with latent factors provided estimates of levels (intercept) and rates of change (slope) in monitoring over time for each respondent and of the mean and variability of these levels and rates across all respondents.

We also sought to identify child and parent factors that might predict monitoring across time. Two such factors—child temperament and proactive parenting—were assessed in early childhood and were construed as potential antecedents of subsequent variations in monitoring. We focused on child resistant-to-control (RTC) temperament, which is characterized by low behavioral self-regulation and unmanageability. Children with lower self-regulation are more susceptible to developing behavior problems, especially externalizing problems, when exposed to negative parenting and an absence of positive parenting (Bates & Pettit, 2007). Resistant, unmanageable children likely pose a child-rearing challenge for their parents. Mothers viewing their child as highly RTC might experience less enjoyment in their interactions with the child, and through transactional processes the child's RTC temperament may be a harbinger of later antisocial tendencies (Lengua & Kovacs, 2005). Mothers who rate their children as high in RTC temperament consequently may be less motivated to acquire and maintain the kinds of monitoring-relevant knowledge that could inform and guide their childrearing practices. We therefore expected that overall levels of monitoring would be negatively associated with mothers' perceptions of their children's RTC temperament. Because RTC temperament also reflects a tendency on the part of the child to respond negatively to parental control attempts (Bates, Pettit, Dodge, & Ridge, 1998), and because there tends to be an upsurge in parent-child conflict during major developmental transitions (Collins, 1995), we speculated that parents of high RTC children would report substantial decreases in their levels of monitoring over time.

Proactive parenting also was examined as a factor predicting the developmental course of monitoring. Children whose parents provide a family environment characterized by anticipatory guidance and structure and whose parents proactively teach conflict resolution skills have fewer behavior problems and better social skills compared with children whose parents more often use reactive, after-the-fact means of instructing and disciplining their children (Gardner, Sonuga-Barke, & Sayal, 1999; Holden, 1985; Mize & Pettit, 1997). Earlier work (Pettit, Laird, Bates, Dodge, & Criss, 2001) examining antecedents of monitoring found that mothers endorsing a proactive, preventive approach to dealing with child misbehavior in early childhood tended to have higher monitoring knowledge scores in

early adolescence, as reported by both mothers and teens. Pettit and Laird (2002) also found that proactive parenting interacts with early mother reports of child problem behavior in the prediction of subsequent monitoring, with proactive parenting showing stronger links with monitoring knowledge among those mothers who rated their children as having more externalizing behavior problems. In the current analyses, proactive parenting was examined as a predictor of overall levels of monitoring across childhood and adolescence, with the expectation that higher levels of proactive parenting would be associated with higher levels of subsequent monitoring. We speculated that, insofar as Pettit et al.'s (2001) index of proactive parenting captured an enduring childrearing philosophy of the mothers, it may be linked with slower rates of decline in monitoring over time. We also considered the interaction between proactive parenting and RTC temperament as a predictor of level and change in levels of monitoring knowledge. In light of the previously reported interaction between proactive parenting and mother-reported child behavior problems, we thought it possible that a slower rate of decline in monitoring would be most pronounced when high proactive parenting co-occurred with high RTC temperament. We speculated that parents whose monitoring stems from a more anticipatory, proactive childrearing philosophy, and who have a child they perceive to be in need of such guidance, may be more likely to maintain a (relatively) high level of monitoring over time, compared with parents of children who are easy to manage and therefore less in need of anticipatory guidance.

A second set of predictors was selected to represent a potentially important aspect of parents' motivations for monitoring their children. Recent conceptualizations of monitoring (and, by association, monitoring knowledge) have highlighted its dynamic interplay with child behavioral adjustment, with low levels of monitoring both preceding and following from high levels of antisocial behavior (Laird et al., 2003). It remains unclear, however, why incipient behavior problems do not trigger an *increase* in parental monitoring. Instead, parents' assessments of their children's adjustment problems appear to more reliably be associated with subsequent declines in monitoring. Explanations for this empirical relationship, alluded to earlier, are that youths become better at hiding information about their activities, and parents become less conscientious in seeking out information. We wondered, however, whether recognition by parents that their child's behavior posed a serious problem that needed to be modified—in effect, parents' worries about their youth's behavior—could spur the parents to make changes in their parenting and perhaps to seek out help or support that would enable them to become more knowledgeable about their child's whereabouts and activities. Such a linkage has in fact been reported by Kerr and Stattin (2003), who found, among other things, that parents' "gut-level" reactions (parent-reported worries and lack of trust) to their teens' problem behavior at home was concurrently related to parents' reports of their active monitoring strategies. Because of their cross-sectional nature, the Kerr and Stattin findings do not reveal whether parents actually

change their behavior. Simply desiring a change may be insufficient to overcome established interaction patterns. It may be that only when parents feel their worries led to a successful outcome for the child—a change in the child's behavior—do they report a change in their own parenting behavior. These possibilities were considered in the present study by examining overall levels of monitoring and change in monitoring in relation to mounting a campaign (Grade 5) and to mounting a campaign that was successful (Grade 8).

To summarize, the goals of this study were to chart the developmental course of mother-reported monitoring across Grades 5, 6, 8, and 11, using multiple-indicator latent factor growth modeling. Antecedent predictors (temperamental RTC and proactive parenting) were assessed the summer prior to kindergarten. Mothers' reports of their concerns about the child and their efforts to mount a child-behavior-change "campaign" were collected in Grade 5, and mothers' reports of the success of a campaign were collected in Grade 8. Of particular interest was the extent to which the antecedent and campaign variables predicted developmental growth patterns in parental monitoring.

To address these goals, we used a statistical technique that enables the modeling of constructs represented in successive data collection waves in which observed indicators overlap but are nonidentical. Monitoring is a multifaceted construct, reflecting both an end product (what parents know) and the process through which said knowledge is acquired. Disentangling process and outcome has occupied the interest of some researchers (e.g., Fletcher, Steinberg, & Williams-Wheeler, 2004; Stattin & Kerr, 2000), but monitoring, broadly construed, is a remarkably robust construct, and varied indicators of it have been found to be associated in consistent and replicable ways with youth antisocial behavior (Crouter & Head, 2002; Dishion & McMahon, 1998). The items tapping monitoring in the current study encapsulate awareness, tracking, and beliefs about the child's likelihood of engaging in antisocial behavior, or being in situations (e.g., in which appropriate supervision is lacking) in which such activities may be more likely to occur. Through the use of an unconditional multiple-indicator latent factor growth model (Garber, Keiley, & Martin, 2002; Muthén & Muthén, 1998), four comparable cross-year monitoring factors were generated from the observed monitoring items and examined with respect to developmental change and links with the child and parent antecedent factors and parents' behavior-change efforts. This is one of the first applications of the latent factor growth modeling technique, and our use of it extends prior analytic approaches of studying growth that required that the same measures be available across all time periods.

Method

Participants and Overview

Data were drawn from the ongoing Child Development Project (CDP), a prospective study of youth and family development (see Dodge, Bates, & Pettit, 1990; Pettit et al., 2001). The CDP is a multisite, dual cohort study that com-

menced in 1987 (Cohort 1) and 1988 (Cohort 2), when 585 families were recruited during kindergarten preregistration or early in the kindergarten school year from Knoxville and Nashville, Tennessee, and from Bloomington, Indiana. Of the parents asked to participate, 75% chose to do so. Extensive in-home assessments were conducted in the 1st year of data collection, with subsequent annual follow-ups, either by mailed questionnaire, telephone interview, or face-to-face interview. Data for the current project were collected via face-to-face interviews with mothers during the summers following Grades 5, 6, 8, and 11.

Socioeconomic status (SES) was measured with the Hollingshead (1979) four-factor index of social status, computed from parent education and occupation levels when the child was in kindergarten. According to Hollingshead criteria, 26% of the families were from low SES backgrounds. Ethnicity was self-reported and scored as European American (80%), African American (18%), or other (1.9%). The ethnicity variable used is a dichotomous variable, with 0 denoting European American families and 1 denoting African American families. Child gender was scored as 0 = boys (49%) and 1 = girls (51%).

Local institutional review boards approved all research measures and procedures. Before participating in the study, all parents signed statements of informed consent, and child participants signed statements of assent. Research assistants described to parents and children their rights as research participants and answered any questions.

Measures

Monitoring. Monitoring items were embedded in mother interviews conducted in the summers following Grades 5, 6, 8, and 11, with sample sizes of 237, 466, 438, and 469, respectively. (Because Grade 5 was a funding transition year for the CDP, interviews were conducted only with the second cohort of participants.¹ For the latent factor growth modeling, participants were included if data were available for 1 or more years ($n = 522$).

The items comprising the monitoring scale in each grade are listed in Table 1. Some items were adapted from those commonly used in the monitoring literature (Brown, Mounts, Lamborn, & Steinberg, 1993; Dishion, Patterson, Stoolmiller, & Skinner, 1991); others were developed specifically for this project (see Pettit, Bates, Dodge, & Meece, 1999). Items tapped mothers' reported knowledge of their children's companions and whereabouts, difficulty in tracking the child's activities, likelihood that the child will go to

¹ Mplus and maximum-likelihood estimation provide a powerful means of dealing with missing data. Standard errors for the parameter estimates are computed using the observed rather than the expected information matrix, which produces robust estimates, standard errors, and chi-square statistics. Muthén and Muthén (1998) recommended that the amount of missing data be no more than 90% (i.e., that one have at least 10% coverage in the observed information matrix). In the current study, for every variable there is at least 40% coverage; for most variables, there is over 80% coverage.

Table 1
Monitoring Items for Each Grade

Item	Grade available	GMM factor
I know where my child is.	5, 6	1
I know whom my child is with.	5, 6	1
I know when my child is returning.	5, 6	1
I know the first and last names of my child's friends.	5, 6	1
I have difficulty keeping track of my child.	6, 8, 11	2
My child goes to places he/she is forbidden to go.	6, 8, 11	2
My child is supervised at his/her friend's house.	6, 8, 11	2
My child and I talk about school.	6, 8, 11	2
I know if my child's peers are in trouble.	6, 8	3
My child tells me when he/she is going somewhere.	6, 8	3
My child and I talk about activities with peers.	6, 8	3
My child is not without supervision.	8	4
My child goes wandering.	8	4

Note. All items rated on 5-point scales, with anchors tailored to individual items. GMM = growth mixture modeling.

forbidden places, and communication about the child's peers, schoolwork, and out-of-school activities. Four items were available in Grade 5, 11 in Grade 6, 9 in Grade 8, and 4 in Grade 11. The number and content of items across grades varied owing to both developmental (i.e., degree to which an item was judged to be useful for a particular age group) and practical (i.e., limits on length of assessment protocol) considerations. Grade 5 items mainly reflected mothers' general knowledge of their child's whereabouts. Grade 6 items also indexed general knowledge, as well as the child's exposure to possible risky peers and contexts and the challenges of keeping track of the child. Grade 8 items also tapped exposure to risky peers and contexts and the difficulty in keeping track of the child as well as overall extent of supervision. A subset of Grade 8 items was used in Grade 11 to index difficulty in tracking and degree of supervision of the youth.

Four monitoring indicators were created for use in growth mixture modeling (see Table 1). The Monitor 1 indicator was computed as the mean of four items and was available for Grades 5 and 6 (α s = .64 and .73). The Monitor 2 indicator also was computed as the mean of four items and was available for Grades 6, 8, and 11 (α s = .58, .72, and .84). The Monitor 3 indicator was computed as the mean of three items in Grades 6 and 8 (α s = .30 and .41), and the Monitor 4 indicator was the mean of two items in Grade 8 (α = .84).

The unconditional multiple-indicator latent factor growth model for mother-reported monitoring is shown in Figure 1. Paths and error variances with the same letters were constrained to be equal to ensure measurement invariance and equality across time. Although not depicted in the figure, the means of the observed monitoring variables were also constrained to be equal. As is the custom in growth modeling, the paths from the monitoring intercept to the observed monitoring items were constrained to be 1, and the paths from the monitoring slope to the observed monitoring items were constrained to the metric we chose for time. Time was centered at Grade 8; thus the paths were constrained to be -3, -2, 0, and 3 to correspond to Grade 5 (0[Grade 8

intercept] - 3 years), Grade 6 (0[Grade 8 intercept] - 2 years), Grade 8 (0[Grade 8 intercept]), and Grade 11 (0[Grade 8 intercept] + 3 years).²

An advantage of using observed variables to denote the monitoring factors is that the reliability of the monitoring factor at each time point is greater than the reliability for the separate observed variables. The resulting alpha internal consistencies for each of the monitoring factors were .67, .93, .89, and .84 for Grades 5, 6, 8, and 11, respectively (Raykov, 2004). The internal consistency reliabilities were obtained from multiple correlation squared statistics provided for each of the single- (Grades 5 and 11) and multiple- (Grades 6 and 8) indicator latent monitoring factors that comprise the fitted unconditional baseline model described in the Results section. These multiple correlation squared statistics are the result of the loading of the Monitoring latent factors on the Growth Parameter latent factors (Intercept and Slope; see Figure 1).

RTC temperament. RTC refers to early unmanageability, with higher scores indicating that children display socially unresponsive, dominating, or impulsive behavior (Bates et al., 1998). During assessments conducted the summer before kindergarten, mothers completed the Retrospective Infant Characteristics Questionnaire, in which mothers are asked to rate their child's traits as an infant. Items are rated on 7-point scales, with descriptive anchor points at low, medium, and high levels. The RTC score consists of three items (α = .83; sample item: "If you moved your baby [child] away from something he or she should not be getting into, how often did your baby [child] get upset?"). Retrospective reports on the Retrospective Infant Characteristics Questionnaire have been shown to be

² We centered the intercept at Grade 8 for two reasons: (a) We were interested in changes in monitoring that might be evident as the child moved into middle and high school from elementary school, and (b) we wanted to include as a predictor of both intercept and slope the variable that described whether a campaign to change the child's behavior was seen as helpful in Grade 8.

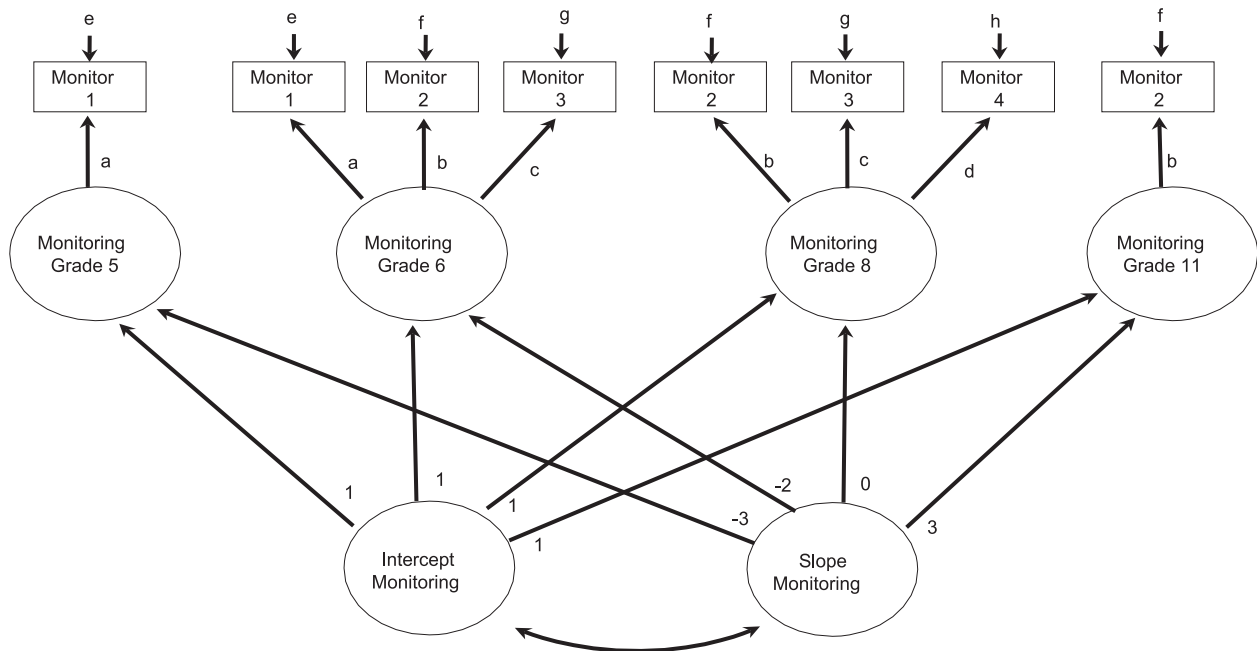


Figure 1. Unconditional multiple-indicator growth model for mother-reported monitoring. Paths and error variances with the same letters have been constrained to be equal to ensure measurement invariance and equality across time.

moderately, but significantly, related to prospectively collected (during infancy) reports on the same scales (Bates et al., 1998), providing evidence in support of the validity of the RTC measure used in the present study.

Proactive parenting. The summer before kindergarten, interviewers rated mothers' responses to the Concerns and Constraints Questionnaire, in which mothers are presented with five hypothetical stories depicting a child misbehaving with peers. Mothers were asked a series of questions about what they would do if their child behaved in such a manner and what they might have done to prevent their child from misbehaving. Mothers' responses were scored as *do nothing (unpreventable)*, *after-the-fact punishment*, *after-the-fact guidance and reasoning*, *before-the-fact*, *preventive but general*, and *before-the-fact preventive and situation and method specific*. Parents who used either of the latter two categories received a score of 1; parents using any other category received a score of 0. Scores were summed across the five stories ($\alpha = .70$, interrater $r = .56$) to create a measure of proactive parenting. Analyses supporting the validity of this measure as an index of positive parenting have been reported in a number of investigations (e.g., Pettit, Bates, & Dodge, 1997; Pettit et al., 2001).

Behavior-change campaigns. As part of the interviews conducted during the summers following Grades 5 and 8, mothers were asked a number of questions about disciplinary issues, including the ways in which they dealt with child misbehavior and whether they believed their efforts were successful. A subset of the questions, designed specifically for this project, was concerned with parents' worries about

and actions in response to their child's behavior. This section of the interview began in the following manner:

"Parents usually deal with children's misbehaviors, such as stubbornness and defiance, and other problems, such as being inactive, through everyday discipline and motivational practices. However, it's also fairly common (as we have learned from parents in this project in past years) that a parent decides that they will start a *campaign*—an extended effort—to change the child. Have you made such a decision in the past year?"

This item was scored as *no* (0) or *yes* (1) and constituted the behavior-change campaign measure in Grade 5. Follow-up questions asked about specific behaviors or attitudes of the child that the parent tried to change, the strategies parents used to try to effect change, and whether the parent believed the child's behavior had improved. Although the campaign score is based on a single item, we believe it is a face-valid indicator of when parents' worries and concerns trigger a decision to try to change the child's behavior. The types of change efforts ranged from seeking professional intervention (e.g., a psychologist or counselor) to consulting with friends and relatives, to modifying daily routines and activities (e.g., by imposing more structure). The Grade 5 behavior-change measure can be construed as an antecedent predictor of changes in parental monitoring. Of the 212 mothers who completed this measure in Grade 5, 69 reported having mounted a campaign.

As part of a follow-up home visit interview in Grade 8, parents were again administered the behavior-change battery. As before, parents were asked if they had mounted a

campaign, the behaviors they wished to change, and the strategies used to try to effect that change. Of the 427 mothers who completed this measure, 156 indicated that they had mounted a campaign. Parents also were queried about the effectiveness of their efforts. Specifically, parents were asked: "Do you feel that your efforts helped the change in some way?" This item was scored on a 3-point scale, in which 0 = *not at all*, 1 = *some*, and 2 = *quite a bit*. This item served as the campaign-effectiveness measure in Grade 8. We elected to use the effectiveness measure at this latter age rather than the yes/no mounting-a-campaign measure because we wished to determine if effectiveness held special significance as a factor co-occurring with (rather than preceding) changes in parental monitoring. There were 64 mothers who completed both the mounting-a-campaign measure in Grade 5 and the was-it-helpful measure in Grade 8.

Background and demographic information. Because of evidence that level of parental monitoring and related parenting indexes vary as a function of ethnicity and SES, these variables were controlled in the principal analyses. SES was measured with the Hollingshead (1979) four-factor index of social status, computed from parent education and occupation levels when the child was in kindergarten. Ethnicity was self-reported and scored as *European American*, *African American*, or *other*. Only a very small number of participants self-reported "other" (1.9%); consequently, a dichotomous ethnicity control variable was used to contrast African American ($n = 97$) and European American ($n = 477$) families.

Results

Descriptive Statistics and Intercorrelations Among Measures

Descriptive statistics (means, standard deviations, and ranges) for all observed variables are shown in Table 2. In

general, mothers rated themselves as high in monitoring, with average reported levels decreasing and variability increasing across grades. The means for RTC temperament and proactive teaching were in the midrange for these variables. The Grade 5 and Grade 8 campaign scores were significantly correlated ($r = .20, p = .006$). Of those mounting a campaign in Grade 8, about half (53%) reported that it helped "quite a bit"; another 41.7% reported that it helped "some."

Correlations among observed variables are shown in Table 2. Monitoring was fairly stable across years, with larger stability coefficients across temporally adjacent periods. The developmental periods most distant from one another (e.g., Grade 5 to Grade 11) showed lower, but still significant, rank-order stability. Gender was unrelated to any of the predictors; ethnicity and SES were, as expected, negatively correlated, indicating that European American families had more favorable socioeconomic backgrounds than did African American families. Higher SES families also had higher proactive parenting scores and were more likely to report mounting a campaign in Grade 5. African American families had lower proactive parenting scores.

At the bivariate level, higher SES predicted more monitoring in every grade. African American ethnicity was associated with less monitoring in Grades 6 and 8, as well as lower overall levels of monitoring. Correlations with gender indicated that the mothers of girls had higher monitoring scores in Grades 5, 6, and 8 than did mothers of boys. Proactive parenting predicted higher monitoring in Grades 6 and 8 (and overall), and resistant temperament predicted lower monitoring in every grade. Mounting a behavior-change campaign in Grade 5 was associated with less monitoring in Grades 5 and 6; mounting a campaign that was effective in Grade 8 was associated with more monitoring in Grade 11.

Growth Analyses

A multiple-indicator latent factor growth analysis (Garber et al., 2002; Keiley, Bates, Dodge, & Pettit, 2000; Muthén

Table 2
Descriptive Statistics and Intercorrelations Among Observed Measures

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	2	3	4	5	6	7	8	9	10	11
Monitoring													
1. Grade 5	237	4.82	0.35	.41**	.36**	.24**	.18**	-.08	.17**	.11	-.14*	-.14*	-.01
2. Grade 6	466	4.60	0.36		.54**	.39**	.27**	-.29**	.11*	.15**	-.20**	-.19**	.12
3. Grade 8	438	4.29	0.44			.45**	.19**	-.14**	.13**	.16**	-.24**	-.08	.07
4. Grade 11	469	4.17	0.63				.10*	-.04	.05	.06	-.17**	-.07	.23**
Family background													
5. SES	577	39.53	14.01					-.39**	-.08	.19**	-.06	-.17*	-.08
6. Ethnicity ^a	585	0.17	0.37						.30	-.12**	-.01	.03	.05
7. Gender ^b	585	0.48	0.50							.01	-.08	-.10	-.09
Antecedent													
8. Proactive parenting	578	0.45	0.33								-.01	.11	-.15
9. Resistant temperament	556	3.58	1.12									.10	-.11
Campaign													
10. Mounted (Grade 5)	212	0.67	0.47										-.02
11. Effective (Grade 8)	154	1.47	0.60										

Note. $ns = 407-585$, except for Grade 5 ($ns = 200-237$). SES = socioeconomic status.

^a Ethnicity coded as 0 = *European American*, 1 = *African American*. ^b Gender coded as 0 = *male*, 1 = *female*.
* $p < .05$. ** $p < .01$.

& Muthén, 1998; Singer & Willett, 2003) was used to investigate change in mother-reported monitoring and to test whether growth in monitoring was related to the temperament and parenting measures as well as to the parent-worries-campaign measures. All models were fit with Mplus, which allows for the inclusion of respondents with missing data by using full information maximum-likelihood estimation (Muthén & Muthén, 1998), drawing on the theory in Little and Rubin's (1987) study. In full information maximum-likelihood estimation with missing data, observations are sorted into missing data patterns, and each parameter is estimated using all available data for that particular parameter. Mplus estimates a covariance matrix from raw data and a coverage matrix that describes the extent of missing data. The percentage of missing data in mother-reported monitoring in the sample ranged from none to 40%. The percentage of missing data for the predictors ranged from none to 30%. No differences were found on any demographic, predictor, or outcome study variables between respondents who were missing data and those who were not.

Only recently has research begun to accumulate on the linear growth of constructs that are represented by latent factors (e.g., for an empirical demonstration, see Garber et al., 2002; for a review and synthesis of the measurement invariance literature, see Vandenberg & Lance, 2000). The latent factors that have been constructed in previous articles (e.g., Garber et al., 2002) have used the same measures across all of the time points. In the current study, we extended this approach by using different measures that have only partial overlap across the different time points. Our research is one of the first applications of this approach, given that the standard has been to use the same measure across all time points. In both approaches, however, Muthén and Muthén (2003) have specified that as a first step, measurement invariance must be established across the latent factors; that is, factor loadings, intercepts, and error variances must be invariant across each time point prior to fitting the growth model. We conducted the relevant test of invariance of factor loadings and intercepts for each of the four latent monitoring factors (at Grades 5, 6, 8, and 11) before proceeding to tests of model fit. The delta chi-square test indicated that our factors were indeed invariant across the time points, $\chi^2(6, N = 522) = 11.97$, critical $\chi^2(6, N = 522) = 12.59$; $\alpha = .05$. We can reject the null hypothesis that the constrained parameters are not invariant. Once we established measurement invariance, we fit our growth model to determine the change in these four factors across Grades 5, 6, 8, and 11.

Unconditional baseline model. A baseline unconditional multiple-indicator latent factor growth model of mothers' monitoring was fit from the monitoring indicators available at each time point. As noted earlier (and as shown in Table 1), at Grade 5 the construct of monitoring was measured with Monitor 1; at Grade 6 monitoring was measured with Monitors 1, 2, and 3; at Grade 8 monitoring was measured with Monitors 2, 3, and 4; and at Grade 11 monitoring was measured with Monitor 2. In addition, in order not to assume that the measures at Grades 5 and 11

were measured without error, we constrained the error variances of those measures to be consistent with the alpha reliabilities that we estimated in our bivariate analyses.

Linear and quadratic growth models were fit, and the delta chi-square test indicated that adding a quadratic term did not improve the fit of the model; development of mother-reported monitoring was linear. Thus, the Level 1 multiple-indicator latent factor growth model contained two individual growth parameters: (a) an intercept parameter with time centered at Grade 8 representing monitoring at Grade 8 and (b) a slope parameter representing the rate of change over time. The intercept and slope growth factors were allowed to covary. The baseline multiple-indicator latent factor growth model for mother-reported monitoring, before adding predictors, fit the data well: $\chi^2(23, N = 522) = 60.908$, comparative fit index (CFI) = .95, Tucker Lewis index (TLI) = .94, root-mean-square error of approximation (RMSEA) = .06. Significant variance, which could then be predicted, existed in both intercept ($\sigma^2 = .097, p = .001$) and slope ($\sigma^2 = .003, p = .001$) factors. The average intercept (4.656, $p = .001$) and average slope ($-.053, p = .001$) were significantly different from zero, indicating that mother-reported monitoring significantly decreased over time.

Next, two conditional latent factor growth models were fit to test whether the between-persons variation in the growth parameters in this unconditional baseline model was related to variation in the two sets of predictors. As predictors were added to the unconditional model, the significance of the variance accounted for by the predictor, or set of predictors, was tested by fitting a reduced model in which the predictors' effects on the growth parameters were constrained to be zero and conducting the appropriate delta chi-square test. Because Grade 5 data were available for only one cohort, we conducted additional follow-up analyses in which cohort was examined both as a main effect and as a moderator of the association between the predictor variables and the intercept and slope of monitoring. No significant cohort effects were found.

Temperament and parenting predictors. Proactive parenting and RTC temperament were then added to the unconditional growth model. Together, they were a significant addition to the model, accounting for 11.7% of the variance in the level of monitoring at Grade 8 and 3.5% of the variance in the monitoring slope. This model fit the data well, $\chi^2(35, N = 522) = 67.052$ (CFI = .96, TLI = .95, RMSEA = .04), and adding the interaction between proactive parenting and temperament did not improve the fit of the model. The fitted equation for this model is

$$\hat{Y}_{\text{monitoring}} = (4.866 + .161 \times \text{Proactive} - .079 \times \text{RTC}) + (4.866 + .161 \times \text{Proactive} - .079 \times \text{RTC}) \times \text{Time}.$$

Both proactive parenting (.161, $p = .001$) and RTC temperament ($-.079, p = .001$) were associated with the intercept of monitoring at Grade 8; proactive parenting was positively related, and RTC was negatively related. Mothers who were more proactive reported more monitoring knowl-

edge in Grade 8, whereas mothers with highly RTC or overly persistent children reported less monitoring knowledge in Grade 8.

RTC temperament was associated negatively ($-.009$, $p = .01$) with the slope of monitoring. That is, mothers reported a nonsignificant decrease in their monitoring over time for children who were low in RTC temperament, whereas mothers with high RTC temperament children reported a significant decrease in their monitoring over the same time period. Using the fitted equation for this model and entering substantively interesting values of the predictors (i.e., 1.5 standard deviations above and below the mean for a continuous variable or 0,1 for a dichotomous variable), we calculated the fitted trajectories shown in Figure 2. These are trajectories of true growth in monitoring for prototypical mothers. As shown in the figure, on average, there were Grade 8 (intercept) differences for both proactive parenting and RTC temperament: Monitoring was higher among high-proactive mothers and lower among mothers of high RTC children. The effects of the two predictors on the intercept level can be seen in the first part of the fitted equation above ($4.866 + .161 \times \text{Proactive} - .079 \times \text{RTC}$). These are merely differences in the initial levels of monitoring for different prototypes of mothers. In the second part of the same equation are the effects of the predictors on the slope. Multiplying out the second part of this equation illustrates that the effects of the predictors are actually interactions with time ($4.866 \times \text{Time} + .161 \times \text{Proactive} \times \text{Time} - .079 \times \text{RTC} \times \text{Time}$). These interactions of the predictors with time are the reason the trajectories of different prototypical mothers have different shapes. The effects of the predictors vary over time. Thus, the decrease in monitoring over time was greater for the mothers of highly RTC children than for the mothers of less RTC children,

controlling for changes in proactive parenting. In other words, the prototypical mother with a typically lower RTC child has a different trajectory shape over time than does the typical mother with a highly RTC child.

Parent campaign predictors. Finally, whether the parent began a campaign to change the child's behavior in Grade 5 was added to the unconditional growth model, along with whether mothers judged that mounting a campaign was successful or not in reducing troubling behavior in Grade 8. Together, the two campaign predictors were a significant addition to the model, accounting for 6.2% of the variance in the level of monitoring at Grade 8 and 11.9% of the variance in the monitoring slope. We tested the interaction between these variables, but it did not improve the fit of the model. The model, without the interaction, fit the data well, $\chi^2(35, N = 522) = 69.684$, $p = .57$ (CFI = .95, TLI = .94, RMSEA = .04). The fitted equation for this model is

$$\hat{Y}_{\text{monitoring}} = (4.55 - .111 \times \text{Campaign}_5 + .097 \times \text{Help}_8) + (-.103 + .004 \times \text{Campaign}_5 + .033 \times \text{Help}_8) \times \text{Time}.$$

The effect of starting a campaign to change child behavior in Grade 5 was a significant predictor of the level of monitoring in Grade 8 ($-.111$, $p = .05$). If a parent began a campaign in Grade 5, the level of monitoring in Grade 8 was significantly lower than if a campaign was not started. The success of the campaign by Grade 8 also predicted monitoring levels in Grade 8 ($.097$, $p = .05$); mothers who felt the campaign had been helpful had higher monitoring scores in Grade 8 than did those who had not begun a campaign or felt the campaign had not been successful. Starting the campaign in Grade 5 had no effect on the change in monitoring over time, but the success of the

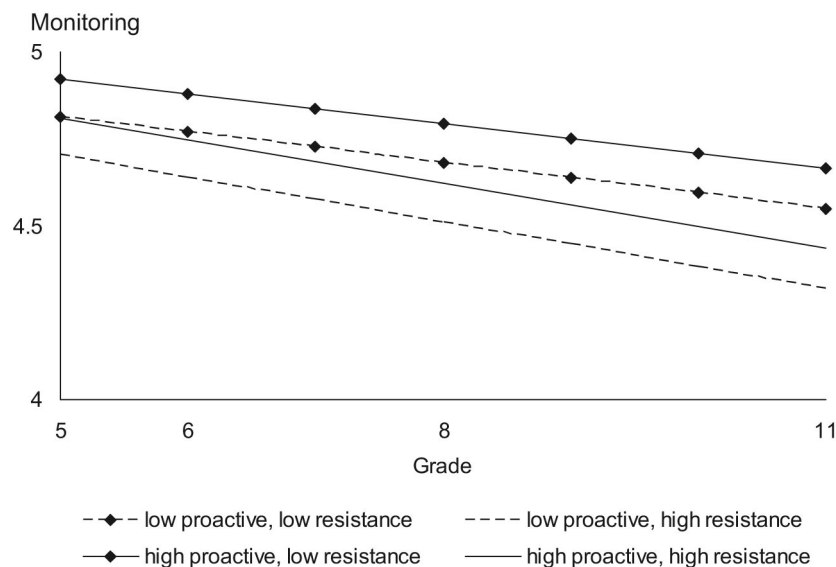


Figure 2. Fitted conditional multiple-indicator growth model trajectories for mother-reported monitoring (time centered at Grade 8) predicted by proactive parenting and temperamental resistance ($n = 522$).

campaign as reported by mothers did have an effect on the change in monitoring over time (.033, $p = .01$). As shown in Figure 3, on average, typical mothers who judged their campaign to be helpful in Grade 8 had trajectories that decreased less over time than did those of mothers who felt their campaigns were not helpful.

Discussion

How and why parenting practices change over time is a topic of increasing interest to family psychologists. In this study we sought to describe changes in mother-reported monitoring across middle childhood and adolescence using latent factor growth modeling. On the basis of developmental theory (e.g., Collins, 1995) and our own (Laird et al., 2003) and others' (Forehand & Jones, 2002; Loeber et al., 2000) empirical evidence, we expected declines in monitoring over time. But differences across families in rates of decline also were expected. Our efforts at understanding the bases for such individual-level cross-time differences in monitoring levels shed light on both the predominant developmental pattern in the sample and on how and why particular families deviate from that pattern.

Developmental Changes in Monitoring

We should note at the outset that whereas we found overall levels of monitoring to decline across time, the level of decline was quite modest. This is consistent with prior studies of monitoring that likewise have relied on mother reports. Barber, Maughan, and Olsen (2005), for example, reported mean-level declines in mother-reported monitoring knowledge across early to middle adolescence of 2.84, 2.81,

NA, and 2.73 (on a 3-point scale, with no data available in the 3rd year). In contrast, in an earlier multi-informant study, Patterson and Stouthamer-Loeber (1984) found a more substantial decline in monitoring (whole-sample standardized scores of .89, .50, and -1.24 for Grades 4, 7, and 10, respectively). It may be, then, that developmental declines in monitoring are more pronounced when observed monitoring scores, indexed by multiple informants and multiple methods, are used than when a latent construct, indicated solely by mother reports (as is the case in the current study), is used.

An abundant literature has linked parental monitoring with youth behavioral adjustment (Crouter & Head, 2002; Dishion & McMahon, 1998). Until recently, standard explanations for this association typically emphasized a parent-driven "top-down" process in which monitoring served as a deterrent for antisocial behavioral development (Barber, 1996). In the past few years, there has been increasing recognition that youth actively contribute to their parents' monitoring and that monitoring itself is multidimensional, reflecting both a set of strategies for acquiring information about youth activities and whereabouts and a knowledge and awareness that flow from that information. These dimensions or aspects of monitoring tend to overlap empirically (e.g., Dorius, Bahr, Hoffmann, & Harmon, 2004; Fletcher et al., 2004; Gorman-Smith & Loeber, 2005), and this was the case in the present study. Disentangling the constituents of monitoring and clarifying what is meant by the term (e.g., as distinct from "knowledge" or from the means through which knowledge is acquired) has been and will continue to be a worthwhile endeavor. However, we believe it also is useful to study monitoring in a more

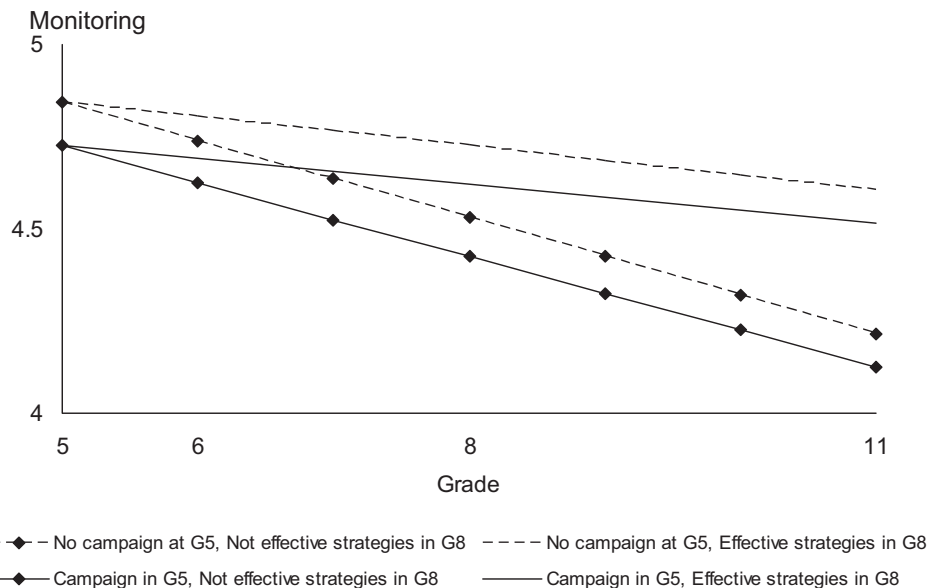


Figure 3. Fitted conditional multiple-indicator growth model trajectories for mother-reported monitoring (time centered at Grade 8) predicted by beginning a campaign to change child's behavior at Grade 5 and the helpfulness of beginning a campaign in Grade 8 ($n = 522$). G = grade.

broadband sense, as a general marker of family process and parenting competence.

Contemporary socialization perspectives incorporate a reciprocal relations, or transactional, framework to describe how parenting qualities and child behavioral adjustment mutually influence one another over the course of childhood and adolescence (Dodge & Pettit, 2003). A transactional-developmental perspective is useful in interpreting the current study's findings. As a family process, monitoring is most salient during the late-middle childhood and early-to-middle adolescent years, when parents begin to have less direct control over their children, when distal forms of supervision become more important, and when youth generally begin to make more of their own decisions. But the groundwork for variations in monitoring likely is laid much earlier. We reasoned that two antecedent factors that would impinge on subsequent monitoring knowledge and effectiveness were parent perceptions of their children's temperament—especially their children's response to parents' control attempts—and parents' endorsement of a preventive, proactive childrearing philosophy. Both factors were found to be associated with stability and change in monitoring across development.

Latent factor growth modeling showed that proactive parenting predicted higher overall levels of monitoring, and having a child with a resistant, unmanageable temperament predicted lower overall levels of monitoring, consistent with our earlier reports (Pettit & Laird, 2002; Pettit et al., 2001). It also showed changes in monitoring over time, with monitoring decreasing more in families with less proactive parents and more resistant children than in families with more proactive parents and less resistant children. It thus appears that some basic aspects of the parent-child relationship, aspects that are apparent early in the child's development, are instrumental in both the formation of a family-management style and in the stabilization of that style over time. In previous research, Pettit and Laird (2002) speculated that parents whose monitoring stems from a more anticipatory, proactive childrearing philosophy, and who have a child that they perceive to be in need of such guidance, may be more likely to maintain a (relatively) high level of monitoring over time, compared with parents of children who are easy to manage and therefore less in need of anticipatory guidance.

Whether the mother is proactive and whether the child is temperamentally unmanageable therefore appear to contribute to divergent developmental pathways in parenting. What might account for the increasing divergence between these mothers and other mothers with respect to monitoring? We speculate that three factors commonly associated with monitoring in general and with knowledge acquisition in particular (Crouter & Head, 2002)—parents' skill in soliciting information, whether from the child or from other sources; the child's proclivities to freely disclose about his or her activities; and qualities of the parent-child relationship (especially trust and communication)—may all come into play in families low in proactive teaching and high in child temperamental resistance. To the extent that a proactive parenting orientation in early childhood sets the stage for

subsequent parental vigilance, we would expect those low in proactive parenting to be either unmotivated or unskilled in effectively tracking and monitoring their children's whereabouts and companions. And to the extent that an unmanageable child may be temperamentally predisposed to anti-social behavior, we would expect that children perceived in such ways by their mothers would be reluctant to "come clean" about what they are doing and with whom when they are away from their parents. These same child characteristics, in concert with a lack of proactive parenting, may fuel the development of a family relationship system that is lacking in trust and in the kinds of support that foster open and honest communication between child and parent. In any of these cases, parents who have young children who appear resistant to control may need access to professional help to learn more effective and proactive parenting and monitoring strategies for helping their children to respond to requests for behavior change so as to forestall the development of even more difficult behaviors later in adolescence.

Family background factors likewise predicted overall levels of monitoring in ways consistent with past literature, with mothers of daughters and mothers living in higher SES homes reporting more monitoring. That girls were monitored more closely than boys likely reflects greater parental concerns about girls' exposure to and involvement with antisocial and risk-taking peers and/or unsupervised interactions with boys (Gorman-Smith & Loeber, 2005). That children from lower SES families were monitored less closely, as were African American children, may reflect the stresses and economic challenges that have an adverse impact on parenting and on family well-being in these groups (Forehand & Jones, 2002).

Parents' worries, as manifested in parents' decisions to take action (mount a campaign) to change their children's behavior, exhibited a coherent and compelling pattern of associations with monitoring change. As noted earlier, previous research has shown that monitoring tends to decline, rather than increase, in the presence of behavior problems. Monitoring was lower among mothers mounting a campaign in Grade 5 than among mothers who did not, and mothers whose monitoring declined less over time were those mothers who mounted a campaign that they judged to be effective in Grade 8. Given that the indexes of monitoring used in this study were based on mothers' reports, it seems reasonable to conclude that mothers who mount a campaign do so in part because they are worried that their tracking and surveillance efforts are inadequate and that, consequently, they are less knowledgeable about their children's activities and companions than they wish (and need) to be. This would account for the negative relation between mounting a campaign and overall monitoring in Grades 5 and 6. But only a subset of parents believed they were effective in their campaigning, and it is for this subset that we saw reported improvements in monitoring over time, relative to other mothers. The mounting of an effective campaign therefore can be construed as a parental intervention that uncouples trajectories of monitoring (decreases) from trajectories of youth problem behavior (increases). Parents whose behavior-change interventions bear fruit ap-

pear to succeed, at least in part, because they are able to sustain (or at least they so believe) their monitoring efforts over time.

Methodological Considerations

Interpretations of bivariate relations and rank-order stability of monitoring is complicated by the fact that the composite monitoring variables differed somewhat in their item content. This limitation was overcome by using latent scores created with the latent factor growth modeling approach. This approach may be especially useful in longitudinal research in which items are added or eliminated in successive data collection waves, where investigators are making an effort to better capture salient phenomena of each developmental period. This is because latent factors can be indicated from different items in different measurement waves, as long as there is at least some overlap (across two or more waves) in item content. This advantage gives latent factor growth modeling the potential to address a major stumbling block in longitudinal family research, namely, the changing expression of an underlying construct across data collection periods. In the current data set there was sufficient overlap in mother-reported monitoring scores to enable the creation of latent factors that maintained measurement equivalence over the four time periods. The individual within-grade indicators had reliabilities that ranged from good to poor, but the latent factor reliabilities were acceptable, albeit still on the low side for Grade 11 monitoring. Ideally one would want a larger and more comprehensive—and more directly comparable—set of items at each time period. Although the method used in this report is based on quantitative methods already developed, it extends those methods in novel ways by using somewhat different measures at different time points. In addition, we note that the assumptions and limits of this extension have yet to be thoroughly explored with methods such as Monte Carlo analysis. For example, we do not know as yet exactly how much overlap is required for adequate specification of growth using such an approach.

The data used in the current report all derive from mothers' reports. Multimethod, multi-informant approaches are needed to build more psychometrically robust constructs. Alternatively, if different informants' perspectives do not converge (as has been found in some research on parents' and teens' reports on parents' monitoring and behavior-regulation strategies; see Barber, 1996; Pettit et al., 2001), then comparisons are needed of growth trajectories based on different informants' reports.

It also is important to acknowledge that this is our first use of the parent-worries ("mounting-a-campaign") measure. Follow-up work is needed to validate this index and to demonstrate that it actually captures concerns that parents may have about their children's incipient behavior problems and parents' efforts to change the behavior. This might be done by cross-referencing parents' reports about the campaigns' effectiveness with subsequent reports by the parent (and other informants, including the child) of youth problem behavior.

Conclusion

Interest in factors contributing to continuity and change in parenting over time is a topic of emerging interest to family psychologists. Supervision of the child and knowledge of the child's whereabouts and companions are key aspects of parenting that figure prominently in theoretical models of child behavioral adjustment and that have been hypothesized to undergo considerable transformation over the course of childhood and adolescence. Although rank-order stability in mother-reported monitoring across Grades 5, 6, 8, and 11 was moderately high, such estimates say nothing about within-family change. The cross-domain growth analyses, however, documented such changes and their links with child and family factors. Proactive parenting, nonresistant child temperament, and parents' successful efforts at changing their children's behavior were associated with a slower rate of decline in monitoring over time.

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