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Cumulative Risk and Continuity in Nonparental Care from Infancy to Early Adolescence

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Abstract

Variations in amounts of nonparental care across infancy, preschool, early elementary school, and early adolescence were examined in a longitudinal sample ($N = 438$). Of interest was (a) continuity in use of the different arrangements, (b) whether the arrangements were additively and cumulatively associated with children's externalizing behavior problems, and (c) whether predictive relations were accounted for by social-ecological (socioeconomic status, mothers' employment status, marital status) and social-experiential (parenting quality, exposure to aggressive peers) factors. Correlations among overall amounts of care provided little evidence of cross-time continuity. Consistent with the cumulative risk perspective, Grade 1 self-care and Grade 6 unsupervised peer contact incrementally predicted Grade 6 externalizing problems. Most of the predictive associations were accounted for by family background and social relationship factors.

The impact of nonparental care experiences on children's adjustment and well-being has been, and continues to be, a topic of considerable interest to researchers and policymakers alike (Vandell & Posner, 1999). Much of the empirical work conducted to date has focused on the amount and type of nonparental care within circumscribed developmental periods. Thus, for example, during early childhood, out-of-home care (e.g., day care) has been studied most extensively (e.g., Vandell & Corasaniti, 1990; NICHD Early Child Care Research Network, 1998). In the early elementary school years, a principal topic has been children's after-school self-care (e.g., Vandell, Posner, Shumow, & Kang, 1995). And in the early adolescent years, a major topic of inquiry has been the amount of time spent with peers in unsupervised settings (e.g., Pettit, Bates, Dodge, & Meece, 1999). Some evidence indicates that comparatively high levels of involvement in these differing types of arrangements are predictive of children's behavioral adjustment (e.g., Baydar & Brooks-Gunn, 1991; Galambos & Maggs, 1991;

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Marshall et al., 1997). However, owing to the absence of long-term longitudinal research, there are few descriptive accounts of cross-time continuity in nonparental care usage. Moreover, the nature of the association between children's involvement in nonparental care across multiple developmental periods and children's concurrent and subsequent adjustment has not been well explored.

In a series of studies conducted as part of the longitudinal Child Development Project (Bates et al., 1994; Laird, Pettit, Dodge, & Bates, 1998; Pettit et al., 1999), we sought to identify the amount of children's involvement in typical nonparental care arrangements at each of several developmental periods, including infancy, preschool, early elementary school, and early adolescence. Indexes of children's behavioral adjustment also were collected during these assessments, and information was gathered on the broader social-ecological context characteristic of each developmental period. In the following sections, the main findings from these earlier studies are briefly summarized. Extensive involvement in nonparental care in each period was associated with unfavorable developmental outcomes, but, consistent with emerging literature, these relations were for the most part qualified by family and social-contextual variables.

In our first study to examine the impact of early nonparental care on children's later adjustment (Bates et al., 1994), we used mothers' retrospective reports made during the summer prior to their children entering kindergarten to assess the extent of children's involvement in out-of-home care during the first 5 years of life. Children who spent more time in out-of-home care during infancy, as well as children who spent more time in out-of-home care during the preschool years, evidenced more negative and less positive adjustment (as indexed through teachers' ratings) during kindergarten. These findings are consistent with research demonstrating that extensive out-of-home care during the first years of life may place children at increased risk of negative outcomes late in childhood (Baydar & Brooks-Gunn, 1991; Belsky & Eggebeen, 1991; Vandell & Corasaniti, 1990).

It is important to note that other studies have demonstrated that the impact of time spent in out-of-home care is at least partially mitigated by the quality of care (Howes, Phillips, & Whitebrook, 1992; Lamb, 1998), as well as by family process variables (NICHD Early Child Care Research Network, 1998). Although in the Bates et al. (1994) study there were no direct measures of the quality of out-of-home care, several ecological characteristics known to covary with nonparental care choices were assessed. Associations between amount of out-of-home care during both infancy and preschool and later outcomes remained significant after controlling for the family background factors of socioeconomic status (SES), marital status, and maternal stress. However, Bates et al. (1994) only followed the children into kindergarten, and thus, it is not clear whether the observed effects extend into later grades.

As their children transition into the school-age years, many families must rely on nonparental care arrangements—including self-care—in the after-school hours. In our second study of nonparental care (Pettit, Laird, Bates, & Dodge, 1997), we sought to determine whether self-care during the early elementary school years was associated with poor adjustment outcomes in early adolescence. On the basis of mothers' retrospective descriptions, the amount of time children spent in various care arrangements (e.g., sibling or self-care, sitter or relative care, neighbor care) during Grades 1, 3, and 5 was tabulated. Higher amounts of time spent in self-care during Grade 1 were associated with lower teacher ratings of social competence, lower GPAs, and lower achievement test scores in Grade 6. Moreover, more time spent in self-care during Grade 1 was significantly associated with externalizing behavior problems in Grade 6, even when SES and Grade 1 adjustment were controlled. These findings are consistent with those of other investigators (e.g., Marshall et al., 1997; Steinberg, 1986) who likewise have

found significant associations between amount of self-care and children's behavioral and academic adjustment.

Self-care in the after-school hours becomes more normative in the later elementary school years (Laird et al., 1998; Vandell & Posner, 1999). As children approach adolescence, the concern may be less a matter of whether children are in self-care than it is where children go and who they are with when they are not being supervised by adults. In our third study of nonparental care (Pettit et al., 1999), we examined the association between early adolescents' unsupervised time with peers and their externalizing behavior problems, and whether contextual factors moderated this association. During a telephone interview conducted in the spring of Grade 6, adolescents reported the amount of unsupervised time spent with peers during nonschool waking hours for two weekdays. Indexes of parental monitoring and neighborhood safety were obtained during mother interviews. Young adolescents at greatest risk for later externalizing behavior problems were those who were involved in greater amounts of unsupervised activities with peers, whose parents were lax in providing monitoring, and who lived in comparatively unsafe neighborhoods.

Previously we have presented data indicating considerable continuity in after-school arrangements (Laird et al., 1998). Other research groups have reported continuity of nonparental care (e.g., day care) in the early childhood years (e.g., NICHD Early Child Care Research Network, 1997). However, there is as yet no information concerning continuity of nonparental care across the major developmental transitions from early to middle childhood, and from middle childhood to early adolescence. That is, it is unclear how many (or what proportion of) children in high amounts of out-of-home nonparental care in infancy (or preschool) also are in high amounts of self-care in early elementary school, or in high amounts of unsupervised contact with peers in early adolescence. Likewise, it is unclear whether self-care children are more likely than other children to spend large amounts of unsupervised time with peers in early adolescence. Therefore, a goal of the present study was to examine continuity of children's nonparental care experiences across early childhood (infancy, preschool), early elementary school (Grade 1), and early adolescence (Grade 6).

Our longitudinal database also enabled us to examine the possibility that relatively high amounts of involvement in nonparental care across developmental periods might heighten the risk of later adjustment problems. This perspective suggests that children's risk for later problems cumulates as a function of the overall number of nonparental care arrangements used. It may be, for example, that extensive nonparental care in infancy places some children at increased risk for later behavior problems because such children may be more likely than other children to be in extensive nonparental care in later developmental periods. We tested for cumulative risk by examining whether children in greater numbers of nonparental care arrangements across developmental periods had more adjustment problems than children in fewer arrangements.

Numerous studies have documented the importance of considering family ecological factors and more intermediate social-contextual factors in determining what influences parents' nonparental care choices for their children (e.g., NICHD Early Child Care Research Network, 1997, 1998; Singer, Fuller, Keiley, & Wolf, 1998). Socioeconomic status is a central family ecological factor that functions as a selection factor in family's decisions about nonparental care usage (see NICHD Early Child Care Research Network, 1997) because of the broad influence that economic circumstance has on family life. Mothers' marital status (single-parent vs. two-parent family) and mothers' employment status (full-time vs. less than full-time) also have been linked with nonparental care usage (e.g., NICHD Early Child Care Research Network, 1997). We therefore considered the associations between all three contextual factors

—SES, marital status, extent of mothers' employment—and children's involvement in nonparental care.

The quality of children's relationships with their parents and peers also has been suggested to covary with the types and amounts of non-parental care used. Some evidence indicates that extensive involvement in nonparental care is less likely in families where parenting quality is high (Laird et al., 1998). Moreover, there is evidence that children in extensive nonparental care are more likely to be exposed to aggressive (Sinclair, Pettit, Harrist, Dodge, & Bates, 1994) and deviant (Steinberg, 1986) peers. It therefore would seem important to examine peer experience and parenting quality as indicators of nonparental care participation and to control for parenting quality and peer factors as covariates when examining the association between nonparental care involvement and children's adjustment.

Contextual factors such as those just described also might serve as moderators of the relation between extensiveness of nonparental care and children's adjustment (e.g., Marshall et al., 1997; NICHD Early Child Care Research Network, 1998; Peisner-Feinberg & Burchinal, 1997; Vandell & Posner, 1999). Previously we have documented moderating effects for SES, such that greater risk (i.e., higher levels of behavior problems for those children in extensive amounts of nonparental care) was found for children from lower SES families compared with children from higher SES families (Pettit et al., 1997). Here we consider only those social-contextual moderators that are novel to the current study. Specifically, we evaluated the possible moderating role of parenting quality and exposure to aggressive and deviant peers, as well as mothers' employment and marital status.

The index of adjustment used in this study was teacher-rated externalizing problems in Grade 6. Although the putative risks of nonparental care might extend to other aspects of child adjustment (e.g., anxiety, academic problems), it seemed appropriate at this juncture to focus specifically on a single, widely used indicator of adjustment. Moreover, because mothers and children provided the data on children's nonparental care experiences, to minimize informant-bias problems, we wished to obtain information on children's adjustment from an external source, in this case the children's teachers.

In summary, the goals of the present study were to examine the possibility of continuity of children's participation in nonparental care across four developmental periods (i.e., nonparental care in infancy and pre-school, self-care in Grade 1, and unsupervised peer contact in Grade 6) and to determine whether these forms of nonparental care cumulate in the prediction of adjustment problems. Also of interest was how family ecological factors are associated with children's nonparental care participation and whether the relation between children's participation in non-parental care and children's behavioral adjustment was accounted for—or moderated by—family ecological variables, parenting style, and exposure to aggressive peers.

METHOD

Participants

Families were recruited for participation in the Child Development Project from each of three sites (Nashville and Knoxville, TN, and Bloomington, IN) in the summers of 1987 (Cohort 1) and 1988 (Cohort 2). Schools considered generally representative of each of the three communities were selected in consultation with local school personnel. At the time of kindergarten preregistration (during the spring preceding the September of matriculation), parents were approached by research staff and asked to participate in a longitudinal study of child development. Of the parents approached, about 75% agreed to take part in the study. The sample was quite diverse in terms of child sex (52% male), ethnicity (81% European American,

17% African American, and 2% other ethnic groups), and family composition (at the time of the first interview, 26% of the children were living in single-parent homes). The average family score on the Hollingshead (1975) four-factor index of social status (computed from demographic information provided by the parents) was 39.5, indicating a predominantly middle-class sample. However, a wide range of statuses was represented, with 9%, 17%, 25%, 33%, and 16% of the families being classified into the five possible classes (from lowest to the highest) recommended by Hollingshead (1975).

The initial assessment, conducted prior to kindergarten, was with 585 families. Data for the current study for the first data collection wave were derived from interviews with the mothers of 570 children (278 girls). Follow-up assessments of the children were conducted in kindergarten and every grade thereafter through Grade 6; follow-up family assessments (via questionnaire) were conducted in the summer following kindergarten and in all subsequent summers. Interviews again were conducted with mothers during the summer following the children's completion of fifth grade, and data from this interview were available for 466 children (233 girls). Finally, during the winter and spring of Grade 6, telephone interviews were conducted with 438 children (221 girls). Attrited subjects did not differ from ongoing participants in either initial child or family background characteristics (see Pettit et al., 1999).

Procedure

Developmental history interview—In the summer before children entered kindergarten, or during the first weeks of school, parents were individually given questionnaires and were interviewed at home by a graduate student or postgraduate research assistant (Bates et al., 1994). Items included in the 1.5-hr. developmental history interview were designed to tap caregiving arrangements, family stress and social support, parent discipline practices, child exposure to violence, child conduct, and peer relations. To facilitate detailed accounts, parents were asked about the facets of the child's history in three separate eras: pregnancy to 12 months, age 1–4 years, and age 4–5 years. These eras were chosen to facilitate recall, not to represent equal intervals of time.

Follow-up procedures—Every summer following the initial interview, mothers completed and returned questionnaires relating to children's adjustment and family stresses and concerns. During each subsequent school year, sociometric assessments were conducted within children's elementary-school classrooms. Teachers also completed questionnaires about children's adjustment and academic performance.

After-school care interview—In the summer of the year that most children completed fifth grade, an in-home interview was scheduled with each mother. The goal of the interview was to obtain a detailed history of the child's involvement in differing kinds of after-school care settings throughout the elementary years, as well as information about the family ecological context and parenting in the elementary-school years (see Pettit et al., 1997).

Early adolescent telephone interviews—During the late winter and early spring of Grade 6, telephone interviews focusing on after-school time use were conducted with each child (see Pettit et al., 1999). During the interview, adolescents were asked about their after-school experiences, including where they were, whom they were with, and what they were doing.

Measures

Nonparental care—Information about use of nonparental care during infancy (age 0–1) and the preschool years (age 1–4) was assessed in the initial developmental history interview, with an index created following the procedure described in Bates et al. (1994). Parents were asked

to describe child care arrangements in temporal order. For infancy (birth through age 1), *nonparental infant care* (see Table 1) was coded according to the extensiveness of nonparental care. In a sample of 24 independent cases in which the interviewer and another listener coded this index, the interrater r was .92.

Preschool care during age 1–4 was coded as the level of usage of several out-of-home settings: relative's home, small-group sitter, group day care, and preschool (see Table 1). Following the procedures outlined in Bates et al. (1994), *nonparental preschool care* was calculated as the sum of ratings for each of the types of nonparental care. Rater agreement (computed as with the infancy ratings) was .80. As one index of the validity of the out-of-home care extensiveness indices, mother and father scores (based on separate interviews by the same interviewer) correlated .74 for infancy and .72 for preschool age.

Grade 1 self-care was assessed during the maternal after-school care interview. A guided recall procedure was used in which mothers were first prompted to recall major family events and circumstances (including changes in employment status) and then were asked to identify the general types of out-of-school care arrangements used during each school year from kindergarten through the most recent year (fifth grade; see Pettit et al., 1997 for a detailed description of the procedure). The *Grade 1 self-care* measure used in the current study is the average of the amount of time children spent alone or with siblings in Grade 1 as reported by parents. The accuracy of parents' descriptions of after-school time use was assessed by comparing responses given during the guided recall procedure with those provided for related questionnaire items that were completed following each school year. Average agreement across all types of care for Grade 1 was 78% (range = 69% to 82%), suggesting that mothers' retrospective reports provided fairly valid measures of children's after-school time use.

Early adolescents' unsupervised time with peers was assessed during the adolescent telephone interviews during the spring of Grade 6 (see Pettit et al., 1999). Each adolescent was asked to recall his or her after-school experience for the present day and the preceding day. Children's responses were recorded using a modified version of the Posner and Vandell (1994) Activity Schedule. Because coding of presence or absence of other persons was done essentially by the adolescent interviewee in a forced-choice format, interrater agreement was not assessed. However, the reliability of adolescents' responses was assessed by conducting separate telephone interviews with mothers. Mothers were asked to report the number of minutes per day that their adolescents spent alone during each of the days reported on by the adolescents. Adolescents' and mothers' reports were significantly correlated, $r = .42$, $p < .001$, providing evidence in support of the validity of the adolescent recollections. In the current work, unsupervised self-care with peers was coded as the amount of time (i.e., the number of 15-min intervals) the adolescent reported spending unsupervised time with peers, with no parents or other adults present (siblings over the age of 15 were counted as adults) during any of the interval. In a very few instances, both peers and siblings (but no adults or siblings over age 15) were present; such intervals likewise were coded as *Grade 6 unsupervised peer contact*.

Family ecological variables—Information about family SES at kindergarten, marital status of the mother (unmarried vs. married and living with a partner) at birth and during the preschool years, and maternal employment (coded as none, part-time, and full-time) at birth and during the pre-school years was collected during the developmental history interview.

Data from follow-up demographic and family situation questionnaires were used to determine maternal employment and marital status at Grade 1. Family ecological variables that were collected from parents during the after-school care interview included SES at Grade 6, marital status of the mother (unmarried vs. married or living with a partner) at Grade 6, and maternal employment (coded as none, part-time, and full-time) at Grade 6 (see Table 2).

Peer relations—For three developmental periods—preschool years, Grade 1, and Grade 6—an index of children's exposure to aggressive peers was derived from information obtained from parents and children. During the developmental history interview, mothers responded to questions about how much exposure to aggressive peers their children experienced in various child care settings (e.g., day care, preschool) during the preschool years (see Sinclair et al., 1994). Averages of mothers' ratings of children's exposure to aggressive peers across settings were computed to form a measure of children's *preschool exposure to aggressive peers*.

Exposure to aggressive peers during Grade 1 was assessed using a standard sociometric procedure (Coie, Dodge, & Coppotelli, 1982) conducted in each child's classroom (for details, see Pettit, Clawson, Dodge, & Bates, 1996). Parents of each of the children attending classes in which participants of the study were enrolled were asked to give consent for their children to participate in this procedure. Each child for whom consent was obtained was asked to rate every peer on a 5-point scale with higher ratings indicating higher liking. In addition, each of the children was asked to nominate three peers who displayed aggressive behavior. Children's reciprocal ratings of "5" (i.e., the child rated the peer as a "5" and the child also was rated as a "5" by the peer) were tabulated to index the number of friends, and these friends' average aggressive behavior score, based on number of peer nominations standardized within classroom, were used to form a measure of children's *Grade 1 exposure to aggressive peers*.

To assess the mildly antisocial behavior of best friends in Grade 6, five items taken from Dishion, Patterson, Stoolmiller, and Skinner (1991) were embedded into portions of the early adolescent telephone interview. These five items (i.e., "my friend: (a) gets into trouble at school, (b) gets into fights with other kids, (c) uses bad language, (d) lies to his/her parents and teachers, and (e) likes to do things that make me scared or uncomfortable") were rated by the adolescents on a 3-point scale (not true, somewhat/sometimes true, very/often true; scored 0, 1, 2). A best friend antisocial behavior score was created by taking the mean rating for the five best friend behavior items ($\alpha = .69$, range = 0–2) and was used as the index of *Grade 6 exposure to deviant peers*.

Parenting—Mothers' parenting style during kindergarten was assessed during the developmental history interview and questionnaire responses. Based on a series of questions that mothers answered about how they disciplined their child from ages 1–4 and 4–5, interviewers rated parent's use of harsh, restrictive discipline from 1 (*nonrestrictive, mostly positive guidance*) to 5 (*severe, strict, often physical*). Ratings across the two eras were averaged to yield a score of harsh discipline, $\alpha = .61$, interrater r based on independent rater's checks on 10% of interviews = .80 (see Dodge, Pettit, & Bates, 1994, for additional information). A measure of mothers' positive, proactive parenting (see Pettit et al., 1999) was created from mothers' responses to five hypothetical situations depicting child misbehavior presented to them in an orally administered questionnaire. Mothers were asked how they might have prevented the child from acting this way. Maternal responses were coded as "do nothing," "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." Responses of either of the last two categories received a score of a "1"; responses of either of the other categories received a score of a "0." Scores were summed across the five stories ($\alpha = .70$) to create a measure of positive parenting. A composite of mothers' *preschool parenting quality* was computed by subtracting mothers' positive parenting from their harsh discipline score.

Parenting data were not available for Grade 1. Parenting measures were collected in Grade 6 during the after-school care use interviews. These measures index parents' monitoring and use of harsh discipline. The monitoring score was viewed as a conceptual analog of the earlier proactive parenting measure (see Pettit, Laird, Dodge, Bates, & Criss, in press). Monitoring

scores were computed as the mean of nine monitoring items rated on 5-point scales ($\alpha = .73$). Three additional items in the mother interview pertained to the use of harsh discipline. Mothers rated on a 4-point scale (1 = never, 2 = rarely, 3 = sometimes, 4 = frequently) how often they (a) slapped or hit their adolescent with their hand, (b) spanked their adolescent, and (c) used a belt or paddle on their adolescent when he or she misbehaves. The three items were averaged to form a single composite of Grade 6 harsh discipline ($\alpha = .85$). To simplify analyses, a single composite of *Grade 6 parenting quality* was computed by subtracting standardized Grade 6 monitoring scores from standardized Grade 6 harsh discipline scores.

Behavior problems—Indices of children's externalizing behavior in Grade 6 were computed from teacher responses made during the spring of Grade 6 on the Teacher Report Form (TRF; Achenbach & Edelbrock, 1986), a standard 112-item checklist of child behavior problems. The TRF also includes a series of ratings about school performance. The *externalizing problems* summary score was used here. This was computed using the revised scoring system discussed by Achenbach (1991). The externalizing behavior problems score is based on 35 items for both boys and girls and consists of scales indexing aggression and delinquency. This scale has been shown by its authors to have strong test-retest and inter-rater reliability. The behavior problems scores of interest in the present report were those derived from Grade 6 teacher ratings.

RESULTS

Overview

Three main sets of analyses were conducted. The first focused on assessing continuity in nonparental care through the four developmental periods. Correlations were computed between overall amounts of care used in the differing periods. In addition, patterns of extensive nonparental care usage across periods were examined. This was done by classifying children in terms of single-period versus multiple-period extensive care, and, for the latter, identifying the frequency of occurrence of differing multiple-period combinations. The second set of analyses focused on the contextual factors as selection factors for children's participation in nonparental care. Correlations were computed between each of the social-ecological factors and children's nonparental care.

A third set of analyses was conducted to examine associations between nonparental care usage, and children's externalizing problems in sixth grade. In a series of regression analyses, externalizing behavioral adjustment served as the dependent variable and indexes of nonparental care served as predictors. These analyses were then rerun after controlling for developmentally relevant contextual factors. Supplemental analyses also were conducted to see if contextual factors moderated the relation between nonparental care and later externalizing problems.

Continuity in Nonparental Care Usage

Correlations among amounts of nonparental care across developmental periods—Bivariate correlations were computed among the measures of amounts of nonparental care in each of the four developmental eras. Greater amounts of nonparental care in infancy were associated with greater amounts of nonparental care during the preschool years, $r = .43, p < .01$. Infant care amounts also were very modestly predictive of amounts of Grade 1 self-care, $r = .08, p < .05$. Amount of infant care was not associated with Grade 6 unsupervised peer contact, $r = -.03$. Amount of pre-school nonparental care was not associated with amount of self-care in Grade 1, $r = .05$, n.s., but did predict, albeit modestly, unsupervised peer contact in Grade 6, $r = .12, p < .01$. Grade 1 self-care also was modestly associated with Grade 6 unsupervised peer contact, $r = .07, p < .10$. Thus, in terms of overall amounts of nonparental

care used, there was only limited evidence of continuity, and for the most part, when continuity was found it was only for adjacent developmental periods.

Analysis of patterning of extensive nonparental care across developmental periods—Although there was minimal continuity in overall amounts of nonparental care, it is plausible that only children who experience particularly large amounts of nonparental care in one developmental period are likely to also experience large amounts of nonparental care in other periods. Table 3 shows the breakdown of extensive use of nonparental care, either as occurring “alone” or in combination with nonparental care in other periods. Extensive use was operationalized in the following manner. For both infant and preschool nonparental care, extensive use was defined as the upper quartile of nonparental care participation (20 or more hours of care per week). Extensiveness of self-care and of unsupervised peer contact were indexed following the conventions used in prior publications (i.e., extensive use of self-care refers to 3 or more hours per week; Pettit et al., 1997), and extensive involvement in unsupervised peer contact refers to three or more intervals (45 or more minutes) across a 2-day period (Pettit et al., 1999).

As is readily apparent in the table, these cutoffs resulted in substantially larger numbers of children being classified as having experienced “extensive” infant care, preschool care, and unsupervised peer contact relative to self-care. Partly this reflects the overall lack of involvement of most children in self-care in the early elementary grades (Laird et al., 1998). Although a less stringent criterion might have been adopted (e.g., *any* self-care vs. no self-care), because we sought to stay consistent with our previously published operationalizations, we elected to retain the extensiveness index for self-care.

The number of children either in extensive care in only a single period and the numbers of children in cross-period care combinations were then calculated. The latter included combinations of two care types (e.g., extensive nonparental care in infancy and preschool only), as well as combinations of three types. There were no instances of four-type combinations (i.e., no child was extensively involved in all types of non-parental care). Moreover, many of the two- and three-type combinations were evident only for very small numbers of children. For ease of presentation, Table 3 only shows those groupings that were found for at least five children.

Considerable variation is seen in the extent to which nonparental care in differing periods occurred “alone” (i.e., not in combination with high amounts of earlier or later care) or in combination with high amounts of care in other periods. Proportionally speaking, preschool nonparental care and Grade 1 self-care were most likely to occur in combinations, and infant nonparental care and Grade 6 unsupervised peer contact were least likely to occur in combinations with nonparental care in other periods. This may reflect, at least in part, the fact that the unsupervised peer contact assessment was collected last, and thus only retrospective continuity could be assessed, and that nonparental infant care was assessed first, allowing for prospective continuity only. Nonetheless, in absolute terms, combinations involving infant care with later forms of nonparental care were the most common overall. Preschool care was least likely to occur “alone,” which probably should be expected given that a majority of children in infant care also were subsequently in pre-school care (consistent with the bivariate correlations reported earlier). In general, then, these patterns suggest considerable overlap in extensive usage of nonparental care across developmental periods, with infant care and Grade 6 unsupervised peer contact most likely to be combined, either together or with other care types, and preschool and Grade 1 self-care somewhat less likely to be combined with other care types.

Selection Factors: Correlations Among Contextual Variables and Extensiveness of Nonparental Care

Bivariate correlations were next computed between the contextual factors and participation in nonparental care in each of the four eras. Only concurrent relations are shown in the table because it was judged that co-occurring family and social experiences would be most relevant for understanding the role of possible selection factors in nonparental care. As can be seen in Table 4, children whose mothers were employed full-time during the infant, preschool, and Grade 1 eras spent more time in nonparental care during those eras. Children from single-parent families also were more likely to be in higher amounts of self-care in Grade 1. Children from higher SES families had more preschool nonparental care, but less Grade 1 self-care and Grade 6 unsupervised peer contact, than children from lower SES families. Exposure to aggressive or deviant peers was associated with more nonparental care during preschool and Grade 6.

Examining the Impact of Nonparental Care on Children's Externalizing Problems

Associations between amounts of nonparental care and children's externalizing problems—Bivariate correlations were computed first to provide a context for the testing of cumulative risk. Neither infant or pre-school nonparental care amounts were associated with higher levels of Grade 6 externalizing problems ($r_s = -.02$ and $.04$, respectively) and Grade 1 self-care and Grade 6 unsupervised peer contact were modestly, but significantly, associated with higher levels of Grade 6 externalizing problems ($r_s = .12$ and $.16$, respectively, both $p_s < .01$).

In the first analysis, amount of nonparental infant and preschool care were entered simultaneously as predictors and neither contributed significantly to the prediction of Grade 6 externalizing, $R^2 = .00$, n.s. Thus, amounts of nonparental care in the early childhood years do not appear to forecast higher levels of behavioral problems in the early adolescent years. In the next analysis, Grade 1 self-care was added to the regression equation. The earlier care arrangements were retained in this analysis to ensure that any predictive associations between self-care and Grade 6 externalizing were not attributable to continuity in nonparental care. The overall equation was marginally significant, $R^2 = .01$, $p < .06$, with a significant beta only for self-care ($\beta = .11$, $p < .05$; β s for infant care and preschool care = $-.03$ and $.06$, respectively, both n.s.), indicating that higher amounts of Grade 1 self-care predict later externalizing problems independently of amounts of prior nonparental care. Because infant and pre-school care amounts were unrelated to externalizing problems in either analysis, they were not analyzed further. In the third analysis, self-care and unsupervised peer contact were considered simultaneously in the prediction of Grade 6 externalizing. A significant prediction was found, $R^2 = .04$, $p < .01$, and both betas were significant ($\beta_s = .10$ and $.15$ for self-care and Grade 6 unsupervised peer contact, respectively, both $p_s < .05$). This latter finding is consistent with a model of cumulative risk whereby children with more behavior problems had higher amounts of self-care in Grade 1 and more unsupervised involvement with peers in Grade 6.

We next examined whether these predictive associations held after controlling for the social-ecological and family and peer relationship variables. The background variables used in these analyses were aggregates formed to index cross-developmental measures of family ecology, peer experience, and parenting quality.¹ In the first analysis (summarized in Table 5), the three social-ecological variables (SES, marital status, employment status), the harsh parenting variable, and the exposure to aggressive peers variable were entered first, in a single step. As can be seen in the table, these variables accounted for 15% of the variance in Grade 6 externalizing. Nonparental infant and preschool care were entered simultaneously in the second step. The step was not significant and neither of the betas was significant. A similar pattern was found for the second analysis. The ecological variables accounted for 17% of the variance in Grade 6 externalizing. Adding infant, preschool, and Grade 1 care to the equation on the

second step accounted for an additional 1% of the variance in later externalizing. This step was not significant, and none of the betas were significant. In the final analysis, the contextual variables again were entered in the first step and accounted for 15% of the variance in Grade 6 externalizing. Grade 1 self-care and Grade 6 unsupervised peer contact were entered simultaneously in the second step. Again, owing to their lack of significant relations with later externalizing, infant and preschool care were not included in this analysis. The step was modestly significant, but neither beta was significant. The reduction in R^2 indicates that the background variables accounted for 50% of the effect of the self-care and peer contact variables on Grade 6 externalizing.

Moderators of associations between amounts of nonparental care and children's externalizing problems—In the previous studies upon which the current report builds (Bates et al., 1994; Pettit et al., 1997, 1999), various family-ecological factors were examined as possible moderators of the link between nonparental care and children's behavioral adjustment. We further examined this issue in the present study by considering a somewhat different set of possible moderators and by examining whether moderating effects might be found for longer-term predictions (i.e., behavioral adjustment in Grade 6). Following Aiken and West (1991), moderators and predictors were centered where appropriate prior to computing the multiplicative interaction terms. In a series of regression analyses, amount of nonparental care in infancy and in preschool were entered first, followed by each of the relevant moderator variables (i.e., SES, maternal employment, and marital status for infant care; SES, maternal employment, marital status, exposure to aggressive peers, and parenting quality for preschool care), followed by the interaction between each moderator and the non-parental care measure. None of the interactions were significant.

Because SES already had been found to serve as a moderator of the link between self-care and Grade 6 adjustment in Pettit et al. (1997), SES was not examined here. Instead, we considered the possible moderating role of maternal employment, marital status, and friendship with aggressive peers. The same analysis scheme as described for infant/preschool care was followed. One significant interaction emerged, involving mothers' employment status, $R^2\Delta = .01$. Among children whose mothers were unemployed, those in self-care had significantly ($p < .01$) higher externalizing problems ($M = 11.17$) than those not in self-care ($M = 6.34$). No differences as a function of self-care were found for children whose mothers were employed.

A final set of regressions examined possible moderators of the association between Grade 6 unsupervised peer contact and children's externalizing problems. The contextual factors that were considered were SES, maternal employment, marital status, exposure to deviant peers, and parenting quality. No significant interactions were found between any of these contextual factors and children's unsupervised peer activity in the prediction of Grade 6 externalizing problems.

DISCUSSION

The goals of this research were to examine the degree of continuity in nonparental care across four major developmental periods, and the relations among nonparental care usage and

¹The aggregates across the infant and preschool eras were computed as follows: marital status was represented by the number of years mothers were single; maternal employment was the number of years mothers were unemployed; exposure to aggressive peers, SES, and parenting were single scores collected during only one era. The aggregates across the infant, preschool, and Grade 1 eras for marital status and maternal employment were computed as described for the infant and preschool only eras. Peer risk was computed by averaging the z-scores for aggressive peers in preschool and Grade 1; SES and harsh parenting were single scores collected during only one era. The composites for Grade 1 and Grade 6 were computed as follows: marital status was represented by the number of years mothers were single; maternal employment as the number of years mothers were unemployed; peer risk was computed by averaging the z-scores for aggressive peers in Grade 1 and Grade 6; SES was computed by averaging the z-scores of SES in Grades 1 and 6 and harsh parenting was a single score collected during Grade 6.

children's subsequent behavioral adjustment. Also of interest was the extent to which social-contextual factors might account for predictive relations between non-parental care and children's adjustment, or moderate relations between nonparental care and children's adjustment. Overall, there was little evidence of cross-time continuity in care use, suggesting that the vicissitudes of family life may be stronger determinants of reliance on nonparental care arrangements than pervasive and consistent family-level individual differences in the tendency to use such care arrangements.

Of all the contextual factors considered, SES and maternal employment were most consistently associated with children's nonparental care participation in concurrent eras. Not surprisingly, children whose mothers spent more time at work were more likely to spend time in nonparental care arrangements during infancy, the preschool years, and during Grade 1. It is logical that alternative care arrangements will be needed as mothers spend more time outside of the home (e.g., NICHD Early Child Care Research Network, 1997; Singer et al., 1998). No association was found between maternal employment and children's unsupervised peer contact in Grade 6, perhaps owing to the nature of the care type and the developmental period. Early adolescents are likely to spend more nonschool time with peers, regardless of the need for care that may result from maternal employment. Therefore, maternal employment seems to be a more salient indicator of nonparental care during the early childhood years.

Exposure to aggressive peers and parenting quality also were found to be associated with amounts of nonparental care. These associations probably are best construed in terms of qualities of parenting and peer experience that co-occur both with SES and with nonparental care usage (which, as noted earlier, are associated with each other), rather than as factors that influence parents' child care decisions, at least during the early childhood years. However, the finding that exposure to deviant peers in early adolescence is associated with amount of time spent in unsupervised peer settings may reflect the operation of a selection factor, insofar as teens "hanging out" with antisocial peers may eschew activities and settings where adult supervision is likely to be present. Together, these findings suggest the importance of considering the context within which child care decisions are made.

Infant and preschool nonparental care were not significantly associated with Grade 6 behavioral adjustment. Previously we reported that these forms of care were predictive of kindergarten adjustment (Bates et al., 1994). The current findings suggest that the "effects" of such early care experiences may fade out over time. In contrast, Grade 1 self-care and Grade 6 unsupervised peer contact were incrementally predictive of Grade 6 externalizing problems. This suggests a cumulative risk pattern—at least with respect to Grade 1 self-care and Grade 6 peer contact—whereby involvement in multiple "risky" nonparental care arrangements heightens the likelihood of adjustment problems.

Continuity of Nonparental Care

Although few previous studies have examined continuity in non-parental care types across developmental periods, our findings of limited continuity parallel the findings reported by Hofferth, Brayfield, Deich, and Holcomb (1991). In a cross-sectional sample, Hofferth et al. (1991) found developmental changes in the use of self-care, center-based programs, and activities such as sports or lessons across the primary school years. In the present study, it was found that the types of nonparental care arrangements in which children participate change as children experience developmental transitions. In other words, certain types of nonparental care (e.g., unsupervised time with peers and self-care) that are not as often utilized for younger children become more normative as children enter the early adolescent years. Therefore, the finding that there was some continuity in non-parental care arrangements across only consecutive developmental periods suggests the possibility that decisions about nonparental care usage are influenced more by concurrent developmental circumstances than by previous

nonparental care history. In other words, parents likely make nonparental care decisions to have adequate flexibility to meet the demands and family needs of each developmental period (Vandell & Posner, 1999), rather than basing decisions on previously utilized types of care, or beliefs about the benefits of certain types of care.

Interestingly, a somewhat different pattern of continuity was found when *extensive* nonparental care was examined across developmental periods. Extensive use of nonparental care in a given period, particularly infant care and Grade 6 unsupervised peer contact, was likely to be combined with extensive nonparental care use in other periods, including nonconsecutive periods. It may be that the family context that necessitates extensive nonparental care is relatively stable for children across development. Therefore, once a pattern of extensive care usage begins, it may be likely to continue throughout childhood.

Nonparental Care and Children's Later Adjustment

Clarifying the role of nonparental care in children's behavioral adjustment was of particular interest in the current study. Specifically, we considered whether risk cumulates over time as a function of the number of different care arrangements used. Total amounts of nonparental care in each of the developmental periods were examined. At the outset it should be noted that nonparental care accounted only for very modest portions of variance in children's externalizing behavior problems. Family and social-contextual variables appear to play a far more substantial role than nonparental care in children's social and behavioral adjustment (see NICHD Early Child Care Research Network, 1998).

There was little evidence that total amount of nonparental care in the early childhood years forecasts later behavioral problems. At the bivariate level, neither infant nor preschool nonparental care was associated with Grade 6 externalizing. These findings point to the possible dissipation of the effects of early childhood care that we previously had found to be associated with kindergarten adjustment (Bates et al., 1994). Other studies (e.g., NICHD Early Child Care Research Network, 1998) also have found concurrent, but few long-term effects of early nonparental care on children's adjustment. This may mean that the negative effects of such early care experiences are later compensated by school and family experience, or that later negative effects perhaps would be more likely to be shown in other spheres of the children's lives. It also may mean that as a consequence of their participation in high amounts of nonparental care in the early years, children have greater exposure to peers, and possibly greater opportunities for developing an aggressive behavioral style. Indeed, our selection-factor analyses show that children in extensive amounts of nonparental care in the preschool years are more likely to be exposed to aggressive peers. But as involvement in peer activities—in nonparental care settings and elsewhere—becomes more age-normative, it may be that children not previously in nonparental care “catch up” in terms of their levels of aggressive behavior.

A somewhat different picture emerged when school-age self-care and early adolescent unsupervised peer contact were considered as predictors of Grade 6 externalizing problems. These two forms of care did in fact cumulate in the prediction of externalizing problems. We previously had shown that amount of self-care in the early elementary school years forecasts higher levels of behavior problems in early adolescence (Pettit et al., 1997). The present findings indicate that this predictive link is not accounted for by children's subsequent unsupervised peer involvement. Rather, unsupervised peer involvement contributed an independent risk factor in the prediction of Grade 6 externalizing.

It is possible that the differential links between early and later non-parental care arrangements and children's externalizing stem from the manner in which nonparental care was assessed. Both nonparental infant and preschool care were assessed through mothers' retrospective reports during the summer before children entered kindergarten. Self-care in Grade 1 was

assessed from mothers' reports made during the summer after most children completed fifth grade. Grade 6 unsupervised peer contact, from adolescent reports of unsupervised time with peers in sixth grade, was the only measure assessed that reflects ongoing levels (rather than prior or historical levels) of nonparental care. Therefore, the findings that only Grade 6 unsupervised peer contact predicted Grade 6 externalizing behavior when the other care types were controlled might actually be a reflection of the timing of the assessment (i.e., concurrent vs. retrospective) or the respondent (i.e., adolescent vs. mother).

Social-Ecological Factors and Children's Nonparental Care

Because of the importance of contextual factors in understanding the impact of children's nonparental care (e.g., Lamb, 1998), we also evaluated predictive links between nonparental care and children's behavioral adjustment after controlling for concurrently assessed contextual factors in each era. Collectively, these contextual factors clearly were more predictive of children's adjustment outcomes than were nonparental care arrangements. In fact, in no case did nonparental care uniquely predict outcomes beyond the contextual variables. In contrast, after controlling for nonparental care, significant variance in externalizing behavior was accounted for by variables within each contextual domain. This suggests that social-ecological and social-experiential contexts may be the best indicators of children's concurrent and subsequent behavioral functioning (NICHD Early Child Care Research Network, 1998; Scarr, 1998).

Contextual factors next were examined as possible moderators of the relation between nonparental care and children's later adjustment. Because we did not wish to be redundant with our earlier reports, we did not consider SES as a moderator of self-care (which we previously had found to serve a potent moderator role), but we did consider SES as a moderator of infant/preschool nonparental care and Grade 6 adjustment, and as a moderator of unsupervised peer contact and Grade 6 adjustment. No such moderating effects were found for SES, nor did parenting quality or children's peer experiences serve as a moderator. In fact, the only significant moderating relation was for mothers' employment and children's Grade 1 self-care. Given the SES by self-care interaction previously reported, it was not surprising to find that children who were in self-care and whose mothers were unemployed had more externalizing problems than children in self-care whose mothers were employed. Together, these findings suggest that family and social-ecological factors play a greater role in accounting for the associations between nonparental care and child outcomes than in altering the magnitude of the association between nonparental care and child outcomes.

A strength of the current study is the use of multiple informants across multiple developmental periods. At the same time, such an approach may be problematic since data about infant, preschool, and Grade 1 non-parental care all were reported on retrospectively. Although there are potential problems with retrospectively reported data (e.g., inaccuracy) previous reports have shown maternal retrospective reports to be reliable and valid (see Laird et al., 1998). Another caveat of the present study is that no information about the quality of the care received was available. Many researchers have shown the quality of nonparental care during the infant and preschool years to be a particularly important factor in determining the effect of care on children's outcomes (NICHD Early Child Care Research Network, 1998; Scarr, 1998). Likewise, the self-care experiences of school-age and early adolescent children have been shown to vary (as a function of such factors as parental monitoring, presence of peers) with different outcomes for children in different types of self-care arrangements (Steinberg, 1986; Vandell & Posner, 1999). Although the current study lacks qualitative information about the nonparental care arrangements, the amount of each care type experienced in different developmental periods, particularly when placed within a broader social-ecological context,

did inform our understanding of the impact of non-parental care experiences on children's subsequent adjustment.

In conclusion, the findings reported here have relevance for three general issues in research on children's nonparental care. First, although high amounts of nonparental care in infancy and preschool previously have been linked with children's adjustment problems, our findings suggest that such linkages may weaken as children grow older. On the other hand, self-care in the early elementary grades was associated with later adjustment problems, independently of children's unsupervised involvement with peers in early adolescence. Second, the amount of nonparental care children experienced in any particular developmental period was largely independent of the amount of nonparental care experienced in earlier or later periods. This conclusion necessarily is constrained by the ages of the children and the types of arrangement considered in this report. Still, it would appear that, across development, few children in this sample tend to experience multiple "risky" forms of nonparental care. Third, family background characteristics and family and peer relationship characteristics appear to play a far greater role in children's behavioral adaptation than do children's nonparental care experiences.

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Table 1

Assessment of Nonparental Care in Four Developmental Periods

Developmental period	Coding of extensiveness of care
<i>Nonparental infant care</i>	0 = none 1 = <20 hr per week for 1–7 mo 2 = 20–30 hr per week for 1–7 mo 3 = 30+ hr per week for 1–7 mo 4 = <20 hr per week for 8–12 mo 5 = 20–30 hr per week for 8–12 mo 6 = 30+ hr per week for 8–12 mo
<i>Nonparental preschool care</i>	0 = none 1 = 1–6 mo or less than once a month over entire era 2 = 6–18 mo or less than once a week over entire era 3 = 5–20 hr per week for more than 18 mo or once a week over entire era 4 = more than 20 hr per week for more than 18 mo
<i>Grade 1 self-care</i>	number of hours per week spent in self-care
<i>Grade 6 unsupervised peer contact</i>	number of minutes (divided into twenty-four 15-min intervals) across 2 days that adolescent spent alone

Table 2

Summary of Assessment of Measures

Time period	Assessment method	Construct
Infant	Developmental history interview ^a	SES
		Maternal employment
		Marital status
Preschool	Developmental history interview ^a	Nonparental care
		SES
		Maternal employment
		Marital status
		Exposure to aggressive peers
Grade 1	Maternal questionnaire	Parenting quality
		Nonparental care
		Maternal employment
Grade 6	Classroom sociometrics	Marital status
	After-school care interview	Exposure to aggressive peers
		SES
		Maternal employment
	Early adolescent telephone interview	Marital status
		Parenting quality
		Self-care in Grade 1
		Exposure to deviant peers
		Unsupervised peer contact

^a = The developmental history interview was completed by mothers the summer prior to children's entry into kindergarten, making these reports retrospective.

Table 3**Continuity in Extensive Nonparental Care: Combinations of Nonparental Care Types**

Type of nonparental care	N	%
No extensive nonparental care in any era	324	
Nonparental infant care ^a	165	
This period only ^b	91	55%
Nonparental infant care and nonparental preschool care	42	25%
Nonparental infant care and Grade 6 unsupervised peer contact	18	11%
Nonparental infant care and preschool care and Grade 6 unsupervised peer contact	7	4%
All other combinations ^c	7	4%
Any combination including nonparental infant care ^d	74	45%
Nonparental preschool care ^a	82	
This period only ^b	22	27%
Nonparental infant care and nonparental preschool care	42	52%
Nonparental infant care and preschool care and Grade 6 unsupervised peer contact	7	9%
All other combinations ^c	11	12%
Any combination including nonparental preschool care ^d	60	73%
Grade 1 Self-care ^a	28	
This period only ^b	14	50%
All other combinations ^c	14	50%
Any combination including self-care ^d	14	50%
Grade 6 unsupervised peer contact ^a	105	
This period only ^b	67	64%
Nonparental infant care and Grade 6 unsupervised peer contact	18	17%
Nonparental infant care and preschool care and Grade 6 unsupervised peer contact	7	7%
All other combinations ^c	13	19%
Any combination including unsupervised peer contact ^d	38	36%

Note. Percentages refer to the number of children in each group divided by the total number of children in infant care, preschool care, Grade 1 self-care, or Grade 6 peer contact.

^aThe number of children ever in extensive amounts of each type of care (i.e., infant care, preschool care, Grade 1 self-care, or Grade 6 peer contact).

^bThe number of children in extensive amounts of each type of care to the exclusion of participation in extensive amounts of any other type of care.

^cThe number of children in all combinations of care containing five or fewer children.

^dThe number of children in any combination of care including each type of care (i.e., the sum of the number of children in all care combinations).

Table 4

Correlations Among Family Ecological Variables and Nonparental Care

	Infant care	Preschool care	Grade 1 self-care	Grade 6 unsupervised peer contact
Infant				
SES ^a	.06			
Maternal employment ^b	.54**			
Marital status ^c	.04			
Preschool				
SES ^a		.11**		
Maternal employment ^b		.45**		
Marital status ^c		.04		
Exposure to aggressive peers ^d		.15**		
Parenting quality ^e		.01		
Grade 1				
SES ^a			-.08*	
Maternal employment ^b			.08*	
Marital status ^c			.15**	
Exposure to aggressive peers ^f			.01	
Grade 6				
SES ^a				-.18**
Maternal employment ^b				.05
Marital status ^c				.07
Exposure to deviant peers ^g				.16**
Parenting quality ^h				.17**

Note.

^a = SES for the infant, preschool, and Grade 1 eras was collected during the developmental history interview.

^b = Maternal employment scores are classified as unemployed, part-time, or full-time for the infant, preschool, and Grade 1 eras and coded as employed or unemployed in Grade 6.

^c = Marital status is coded as unmarried versus married and living with a partner.

^d = Exposure to aggressive peers during preschool is an average of mothers' ratings of children's exposure to aggressive peers.

^e = Parenting quality during preschool is a composite formed by subtracting positive parenting from harsh discipline.

^f = Exposure to aggressive peers was formed from children's reciprocal liked most ratings from high aggressive children in Grade 1.

g = Exposure to deviant peers was formed from the mean rating of antisocial behavior of children's best friends in Grade 6.

h = Parenting quality in Grade 6 was formed by subtracting parents' monitoring scores from harsh discipline scores.

* = $p < .05$.

** = $p < .01$.

Table 5

Predicting Grade 6 Externalizing Behavior from Nonparental Care, Controlling for Contextual Factors

<i>DV (externalizing behavior)</i>	<i>Step</i>	<i>Contextual risk variables entered</i>	ΔR^2	β^a
Grade 6	1	SES		-.26**
	1	Marital status ^b		.04
	1	Maternal employment ^b		.00
	1	Exposure to aggressive peers		.12*
	1	Parenting quality	.15**	.16**
	2	Nonparental infant care		.01
	2	Nonparental preschool care	.00	.03
Grade 6	1	SES		-.22**
	1	Marital status ^c		.15*
	1	Maternal employment ^c		.04
	1	Exposure to aggressive peers ^c		.10*
	1	Parenting quality	.17**	.14**
	2	Nonparental infant care		.02
	2	Nonparental preschool care		.07
Grade 6	1	SES ^d		-.20**
	1	Marital status ^d		.00
	1	Maternal employment ^d		.12*
	1	Exposure to aggressive peers ^d		.03
	1	Parenting quality	.15**	.18**
	2	Grade 1 self-care		.10
	2	Grade 6 unsupervised peer contact	.02*	.08

Note.^a = Standardized betas on the final step are reported for each of the analyses.^b = Contextual variables are aggregates across the infant and preschool eras.^c = Contextual variables are aggregates across the infant, preschool, and Grade 1 eras.^d = Contextual variables are aggregates across Grade 1 and Grade 6.* = $p < .05$.** = $p < .01$.