

## Predicting Stability and Change in Toddler Behavior Problems: Contributions of Maternal Behavior and Child Gender

By: Cynthia L. Smith, Susan D. Calkins, Susan P. Keane, Arthur D. Anastopoulos, and Terri L. Shelton

Smith, C., Calkins, S., Keane, S.P., Anastopoulos, A., & Shelton, T., (2004). Predicting stability and change in toddler behavior problems: Contributions of maternal behavior and child gender. *Developmental Psychology*, 40, 29-42

Made available courtesy of American Psychological Association:

<http://www.apa.org/journals/dev/>

**\*\*\*Note: Figures may be missing from this format of the document**

**\*\*\*Note: Footnotes and endnotes indicated with parentheses**

### **Abstract:**

This study examined the stability and continuity of early-identified behavior problems and the factors associated with this stability. Children and their mothers (N = 125) were seen when the children were 2 and 4 years of age. Maternal reports of child externalizing behavior and laboratory observations of child noncompliance were stable from age 2 to age 4. Early externalizing behaviors decreased over time; however, child noncompliance in the laboratory did not. Although few associations were found between maternal positive behavior and child behavior problems, maternal controlling behavior was related to increases in child behavior problems, particularly at high levels of both prior noncompliance and prior maternal control. Child noncompliance was predictive of increases in maternal controlling behavior over time.

### **Article:**

Disruptive behavior problems in early childhood have been the focus of considerable developmental and clinical research. This concentration is due largely to the repeated observation that these problems are highly stable across childhood (Campbell, Pierce, Moore, & Marakovitz, 1996; Cohen & Bromet, 1992; Heller, Baker, Henker, & Hinshaw, 1996), predictive of other more serious kinds of behavioral problems (Campbell, 1991; Loeber, 1982), and implicated in disruptions in other domains such as social competence and academic functioning (Campbell, 2002; Moffitt, 1993). Moreover, different rates of these problems have been observed in girls and boys (Keenan & Shaw, 1997). Less is known about the implications of behavior problems that are observed in toddlerhood, a period when increases in negativity, noncompliance, and aggression are often viewed as normative but may also be important predictors of future adjustment (Belsky, Woodworth, & Crnic, 1996; Campbell, Shaw, & Gilliom, 2000; Rubin, Burgess, Dwyer, & Hastings, 2003). Family correlates of such problems have been investigated extensively in the preschool and childhood period but less so in the toddler period (Campbell et al., 2000). In addition, differential correlates and outcomes for boys and girls have not been examined extensively during this period (Rubin et al., 2003).

Questions regarding the patterns, parenting correlates, and implications of toddler behavior problems may be examined from within a developmental framework with reference to the individual and dyadic processes that are observed during this critical developmental transition and that are theorized to be important for subsequent functioning. During toddlerhood,

significant developments are occurring in child self-regulation that lay the foundation for the autonomous behavior necessary to make the transition to school and that create opportunities for individual differences in child functioning to emerge (Calkins, 1994; Kopp, 1982; Sroufe, 1995). From both a theoretical and an empirical standpoint, failures of self-regulation are core components of early behavior problems (Calkins & Dedmon, 2000; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Keenan, 2000), and caregiving behaviors are clearly influential in providing children with the appropriate support to practice autonomous and self-regulated behavior (Calkins, Smith, Gill, & Johnson, 1998). Both maturational differences and caregiver behavior may be expected to influence emerging self-regulation and to yield differential developmental pathways to problem behavior for boys and girls (Calkins, 2002; Keenan & Shaw, 1994). It is from within such a developmental framework that we examined the patterns and caregiving correlates of early behavior problems, using observational and parent report measures, in a community sample of children selected for both high and low levels of toddler behavior problems.

### CONTINUITY AND STABILITY

Typically, research on behavior problems does not differentiate between the continuity of behavior problems and the stability of behavior problems, although this distinction can influence the interpretation of empirical findings (Tremblay, 2000). Continuous patterns of behavior include instances in which the mean level of the behavior of interest remains the same across the developmental periods assessed, whereas stable patterns of a particular behavior indicate that the rank order of the individuals has been maintained over the particular time periods assessed (Bornstein & Suess, 2000).

Although behavior problems can be highly stable throughout development, increases in language development, cognitive abilities, and self-regulation during toddlerhood should allow children to learn to control early noncompliant, aggressive, and impulsive tendencies, leading to a decline in problem behavior (Campbell, 2002). In fact, the majority of studies on childhood aggression have shown that aggressive behavior decreases across toddlerhood and preschool (e.g., Cummings, Ianotti, & Zahn-Waxler, 1989; Parke & Slaby, 1983; Rubin et al., 2003). Rates of observed physical aggression and aggression with peers show discontinuity over time; however, other measures of disruptive problem behavior may fail to show discontinuity. Hay, Castle, and Davies (2000) found that maternal report of aggression did not change across a 6-month time period, and Rose, Rose, and Feldman (1989) found that maternal report of behavior problems increased over time from age 2 to ages 4 and 5, although the sample sizes in these studies were very small. In contrast, Spieker, Larson, Lewis, Keller, and Gilchrist (1999) found that maternal report of behavior problems decreased from early preschool through early school age, a finding similar to the discontinuity found in observations of aggressive behavior in younger children. More work is needed to address the continuity of multiple measures of problem behavior, including both maternal report and observations of problem behavior (Tremblay, 2000).

The stability of behavior problems has also been studied across several periods of development, although much of this work has focused on boys (Campbell, 1995; Olweus, 1979; Parke & Slaby, 1983). In work including both genders, Hay et al. (2000) found that toddler behaviors such as hitting and pushing and maternal ratings of aggression showed stability across a 6-month period, and Rubin et al. (2003) reported modest stability in problem behavior across the period

from toddlerhood to preschool, using observational measures in toddlerhood to predict parent report in preschool. In both studies, the stability of aggression was stronger for girls than for boys; however, the differences in the stability correlations for boys and girls were not tested statistically. Moreover, Campbell (1997) reported that half of the children with preschool behavior problems, especially boys, continued to have problems at school age, whereas half of them showed improvement. In older children and adolescents, the magnitude of the stability of behavior problems has been compared to the magnitude of the stability of intelligence (Olweus, 1979). Antisocial behavior in adolescent samples is a strong predictor of adult antisocial behavior; however, most antisocial children do not become antisocial adults (cf. Sampson & Laub, 1997). Questions about the degree of stability of early problem behavior remain, and attempts to answer these questions should include a focus on multiple sources of information about the behaviors as well as the gender of the child.

In examining these questions in a community sample of toddlers with both observational and parent-report measures of problem behavior, we derived several hypotheses. First, we hypothesized that overall there would be a decline in behavior problems across the period from toddlerhood to preschool that would largely be a function of normative maturation in self-regulation and impulse control (Kopp, 1982; Sroufe, 1995). Second, we hypothesized that stable individual differences in both maternal reports of externalizing behavior and observations of child noncompliance would be observed; however, maternal reports were expected to be more stable given that they are likely a function of both maternal perceptions and actual child behavior. On the basis of past findings (e.g., Campbell, 1997), we expected that boys would show more stable and continuous patterns of behavior problems than girls.

#### PARENTING CORRELATES AND CHILD GENDER

The stability and continuity of behavior problems are not likely to unfold in isolation from the context of development. The degree to which the young child's behavior changes over time is influenced by numerous environmental factors (Campbell et al., 2000; Cummings, Davies, & Campbell, 2000). The stability of individual differences in child behavior has been linked to multiple dimensions of family influence (Cummings et al., 2000). For example, considerable research demonstrates that preschool children are more likely to display overactive, noncompliant, aggressive, and impulsive behavior if they have parents who display negative control and are uninvolved, rejecting, or harsh (Campbell, 1995; Dumas & LaFreniere, 1993; Hart, DeWolf, Wozniak, & Burts, 1992; Pettit, Bates, & Dodge, 1993). Also, mothers of children displaying behavior problems have been found to be more adult-focused, controlling and dominating activities with their children, rather than being child-focused and encouraging actions initiated by their children (Gardner, 1994; Rubin, Booth, Rose-Krasnor, & Mills, 1995). Negative controlling parenting may undermine toddler attempts at autonomy by punishing or frustrating the child's attempts at behavioral self-control (Calkins et al., 1998).

The amount and quality of negative control used in parenting are associated with children's display of behavior problems across many different developmental periods. However, control is just one dimension of parenting behavior that may play a role in children's adjustment (Cummings et al., 2000). A parenting style that is high in warmth as well as high in setting limits and providing guidance may be especially relevant to helping toddlers and preschoolers manage externalizing behaviors, and a lack of warmth and guidance may be implicated in continued

externalizing problems beyond the toddler period (Baumrind, 1971; Shaw & Bell, 1993). For example, children displaying behavior problems have been found to have less harmonious interactions with their mothers (Gardner, 1987, 1994) and to receive less affection, positive involvement, and warmth from their mothers than children not displaying such problems (Brophy & Dunn, 2002; McFadyen-Ketchum, Bates, Dodge, & Pettit, 1996; Miller, Cowan, Cowan, Hetherington, & Clingempeel, 1993). Although the focus of research is often on the harmful effects of certain types of parenting, positive dimensions of parenting may be important to the developmental process as well by providing young children with a supportive context in which to practice newly acquired, albeit imperfect, self-regulatory skills (Calkins et al., 1998).

Multiple dimensions of parenting are likely to be critical to the development and maintenance of problematic child behavior (Loeber & Dishion, 1983; Rothbaum & Weisz, 1994); however, the few studies that included both positive, supportive behaviors and intrusive, harsh, controlling behaviors yielded inconsistent results. Some studies examining both dimensions of maternal behavior found that maternal warmth was associated with child behavior problems more than maternal control and thus emphasized the importance of the role of positive parenting in child misbehavior (Miller et al., 1993; Pettit & Bates, 1989; Russell & Russell, 1996). Other studies, however, found that harsh and intrusive parental control was associated more with child behavior problems than were aspects of positive parenting when both types of behaviors were considered (Campbell, Breaux, Ewing, Szumowski, & Pierce, 1986; Pettit, Bates, & Dodge, 1997; Shaw et al., 1998).

Given these contradictory results, more consideration needs to be given to how both positive and negative controlling dimensions of maternal caregiving styles are associated with child behavior problems. One hypothesis is that these dimensions interact to provide a supportive context with limited negativity and intrusiveness. Such a parent–child dynamic may lead to declines in difficult behavior often characteristic of toddlerhood and to more harmonious parent—child interactions. In contrast, a pattern of interaction marked by high control and little positive guidance may undermine child attempts at self-control and lead to conflicted coercive interactions that have been linked quite conclusively to behavior problems in older children (Patterson, 1980, 2002).

Empirical evidence also increasingly suggests that differential socialization of boys and girls may play a role in the trajectories of early problem behavior. For example, mothers may be more controlling and harsh with boys than with girls (Miller et al., 1993; Webster-Stratton, 1996). Rothbaum and Weisz (1994) reported that overall there were stronger associations between caregiving styles and externalizing behavior for boys than for girls. Although parenting behavior may be different for problem boys and girls, the boys and girls may also respond differently to parental control. McFadyen-Ketchum et al. (1996) concluded that boys were more likely to respond with aggression to maternal control events. Shaw et al. (1998) also found that boys were more affected by a lack of contingent maternal responsiveness during infancy than were girls. Regardless of the direction of effects, disturbances in the mother-child relationship seem to affect boys more than girls, but there is little understanding of why this is the case. The interactional dynamic between parent and child may differ depending on parental beliefs and attitudes about appropriate gender-typed behavior. Such differential socialization may influence the stability of early problem behavior (Calkins, 2002; Keenan & Shaw, 1997).

Finally, the assumption of directional effects from parent to child must be reexamined in light of transactional models of socialization (Sameroff & Fiese, 2000) that emphasize the dyadic effects of early relationships on child functioning. Patterson and colleagues (Forgatch, Patterson, & Skinner, 1988; Patterson, 1982, 2002; Patterson, DeBaryshe, & Ramsey, 1989) described a pattern of coercive interaction between mothers and children that suggests that both parties participate in the development of antisocial behavior in children. It is especially important to investigate such transactional effects during toddlerhood (Campbell et al., 2000). Although difficult behavior may be normative during the toddler period, if the behavior is considered aversive by parents, then it is possible that they may respond by engaging in more negative and aversive behaviors themselves, which may trigger the coercive cycle that has been implicated in troubled family interaction and behavior problems among younger children (Belsky et al., 1996) and aggression in older children (Patterson, 1980). Important questions not yet addressed are whether the toddler's early problem behavior has effects on subsequent parenting behavior that would serve to further undermine the processes of developing autonomous and self-regulated behavior (Campbell et al., 2000) and whether these effects vary by the gender of the child. On the basis of prior research (Calkins, 2002), we hypothesized that toddler behavior problems would be predictive of increases in maternal control for boys, but not for girls.

In sum, the first aim of this study was to examine the pattern of early behavior problems during the critical transition period from toddlerhood to preschool by examining the relative degree of continuity and stability of such problems. The second aim was to examine concurrent and longitudinal associations between measures of child behavior problems and positive and controlling dimensions of maternal behavior. The third aim was to examine the extent to which stable patterns of child behavior problems would be affected by both positive and controlling dimensions of parenting and whether these relations would vary as a function of the gender of the child. The fourth aim of the study was to examine transactions between parent and child by studying the effects of child behavior problems on maternal behavior and the interaction of maternal behavior and child behavior as a predictor of child behavior problems.

Prior work in this area has been limited by the use of low-risk samples, exclusively male samples, single-time-point assessments, different measures of behavior problems across time, or single dimensions of parenting behavior (Cummings et al., 2000). To increase the likelihood of observing effects on externalizing problems that were significant and likely to impact child functioning, we recruited a racially and socially diverse sample that was over-sampled for early behavior problems. Our investigation used observational measures of child behavior and parenting in the laboratory and parent-report measures of problem behavior, and the same battery was administered at both ages. By using multiple measures of child behavior, multiple dimensions of parenting behavior, and a community sample of boys and girls at higher risk for problem behavior, we hoped to gain a better understanding of the implications of early toddler behavior problems for preschool functioning.

## METHOD

### *Participants*

Participants for this study were recruited as part of an ongoing longitudinal study that began when the children were 2 years old. One hundred fifty-four 2-year-old children and their mothers were initially recruited through child day-care centers, local pediatric offices, and programs at

the County Health Department. Children were recruited from a variety of sources in order to obtain a sample diverse in socioeconomic status (SES) and ethnicity. At the time of initial recruitment, parents completed the Child Behavior Checklist (CBCL; Achenbach, 1992). A total of 474 CBCLs were returned. Sixty-five percent of the families who returned recruitment CBCLs were European American, 30% were African American, and 5% were Asian or Hispanic. Using Hollingshead (1975) scores, we classified 61% of the families as middle class, 25% as lower class, and 14% as upper class.

From the larger sample, we selected children whose CBCL scores comprised three groups: (a) children with Externalizing scores on the CBCL in the clinical or borderline clinical range, with scores of 60 or above ( $n = 44$ ); (b) children with Externalizing and Internalizing scores on the CBCL in the clinical or borderline clinical range ( $n = 27$ ); and (c) children with CBCL scores below 60 on both Internalizing and Externalizing scales ( $n = 83$ ). Although we selected more children with externalizing problems than are usually found in the general population (Achenbach, 1992), the SES and ethnicity within the three groups reflected the demographics of the recruitment area. Therefore, the sample was considered an at-risk community sample. This selected sample of 2-year-olds was racially and economically diverse (65% European American, mean Hollingshead score = 39.2), was primarily from intact families (77%), and consisted of 78 boys and 76 girls.

Two years after the original assessment, the families were asked to participate in a follow-up assessment. Of the original 154 mother-child dyads, 12 families moved from the county of recruitment, 8 families refused to continue in the study, and 9 families could not be located. Within the families that discontinued participation, 10 were from the externalizing- only group, 6 were from the externalizing and internalizing group, and 13 were from the group low on both. One hundred twenty-five families agreed to participate in the follow-up assessment. More boys discontinued participation in the study; however, there were no differences in race, SES, and CBCL Externalizing, Internalizing, or total scores between the subjects who continued participation and those who did not or between the boys who discontinued participation and those who did not. Children retained in the sample were 4 1/2 years old (mean age = 56 months,  $SD = 2.9$  months) at the time of the preschool assessment; 58 were boys and 67 were girls.

Thirty-seven percent of the participants at the age 4 assessment were African American, and 63% were European American. The SES of the participants again ranged from lower to upper-middle class. At age 4, 2% of the mothers had completed some high school, 6% were high school graduates, 37% had some college education, 43% had a college degree, and 11% had an advanced degree. For the level of paternal education, mothers reported that 5% of the children's fathers had completed some high school, 27% were high school graduates, 28% had some college education, 28% had a college degree, and 13% had an advanced degree. Twenty-four percent of the families reported an annual family income of less than \$20,000, 46% reported one between \$20,000 and \$35,000, 24% reported one between \$35,000 and \$50,000, and 7% reported an annual family income of more than \$50,000.

#### *Procedures at the 2-Year Assessment*

The mother-child dyads completed a series of laboratory tasks designed to measure mother-child interaction. Because of video problems, mother-child interaction data are missing for 1

child. The mother–child tasks included a *teaching task*, in which mothers were asked to teach their children how to complete a shape puzzle (4 min); a *free-play session*, in which the mother–child dyads were asked to play with a Sesame Street toy farm set as they normally would at home (4 min); a *compliance task*, in which mothers were asked to have their children clean up the toys from the free-play session (2 min); and a *puzzle task*, in which mothers were asked to let their children work on a series of three puzzles of increasing difficulty and to help if they thought their children needed help (9 min).

In addition to the CBCL completed at the initial recruitment, mothers were given a second CBCL after their laboratory assessment to take home, complete, and mail back in a return envelope provided. The mean time between completion of the recruitment CBCL and the date of the children’s laboratory assessment was 2.36 months ( $SD = 1.92$ ). Only 3 mothers failed to return the second CBCL. Mothers also provided demographic information, which included information on their race, education, and occupations.

#### **Procedures at the 4-Year Assessment**

A follow-up assessment was scheduled when the children were 4½ years old. Mother–child interaction data are missing for 1 child at this age because of video problems. The tasks designed to measure mother–child interaction at age 4 were very similar to the tasks at age 2 and included a *teaching task*, in which mothers were asked to teach their children how to replicate a model made of blocks (4 min); a *free-play session*, in which the mother–child dyads were asked to play with a set of age-appropriate toys as they normally would at home (5 min); a *compliance task*, in which mothers were asked to have their children clean up the toys from the free-play session (2 min); a *puzzle task*, in which mothers were asked to let their children work on a series of two puzzles of increasing difficulty and to help if they thought their children needed help (5 min); and a *second free-play session*, in which the mother–child dyads were asked to play with a toy train set as they normally would at home (6 min).

During the laboratory assessment, mothers were asked to complete the CBCL for 4- to 18-year-olds (Achenbach, 1991). Mothers who did not complete the CBCL took it home and returned the completed form by mail. Five mothers did not return the CBCL. Again, demographic information was also collected.

#### **Measures**

**Child responses.** The children’s behaviors in response to maternal statements during the compliance task were coded according to the compliance (e.g., Crockenberg & Litman, 1990; Kuczynski & Kochanska, 1995) and behavior problem literature (e.g., Campbell et al., 1986; Winslow, Shaw, Bruns, & Kiebler, 1995). Instances of *child noncompliance* included off-task behavior and refusing, ignoring, or defying maternal statements.

**Goal of maternal statements.** The goals or focus of maternal statements in the mother–child interactions were coded according to Rubin et al. (1995). *Adult-oriented statements* included statements in which the mother initiated an activity that changed the direction and/or content of the child’s ongoing activity and statements in which the mother stopped the child’s ongoing activity. *Child-oriented statements* included statements in which the mother attempted to maintain or encourage the child’s ongoing behavior and activities. The frequencies of each of these types of statements in the mother–child interaction tasks were determined.

**Global coding of mother–child interaction.** The global codes were adapted from the Early Parenting Coding System (Winslow et al., 1995). Maternal behavior received codes for *warmth/positive affect* (displaying positive affect and warmth toward the child), *strictness/punitiveness* (being too strict, demanding, or harsh considering the child’s behavior; exerting influence toward completion of the child’s activity; displaying a no-nonsense attitude; constantly guiding the child and creating a structured environment), and *sensitivity/responsiveness* (promptly and appropriately responding to the child’s bids to her). Child behavior was given a global code for *hostility* (displaying emotional expressions of anger toward the mother, with tone of voice, facial expressions, and aggressive behavior as indicators) and *responsiveness* (promptly and appropriately responding to the mother). These were either 4- or 5-point scales ranging from *low* to *high*.

**Reliability for coding of the mother–child interaction tasks.** Two research assistants coded together 10% of the total sample on all tasks. Another 10% were coded separately and used to assess reliability for the data from both assessments, and interrater reliability correlations were .80 or higher on all categories. To assess reliability for the global coding system, two research assistants coded 10% of the tapes together. Another 10% were coded separately and used to calculate reliability. Adjusted kappas were all above .70.

**Calculation of summary scores for the mother–child interaction tasks.** The duration of the tasks could vary for individual children, so the proportion of responding in each of the categories of maternal goals and child behavior was calculated. The frequencies of each type of maternal goal and child behavior were divided by the length of the task for each individual mother–child dyad. The proportions were converted back into standard frequencies by multiplying the proportion scores by the maximum length of time for each task. The adjusted frequencies represent the frequencies for each of the scores if the task had lasted the maximum time.

Next, the maternal measures (child-centered behavior, adult-centered behavior, warmth/positive affect, strictness/punitiveness, and sensitivity/responsiveness) were combined across the four or five tasks at each age. The alpha reliabilities for each measure across tasks were all above .65, so the measures were averaged across tasks. To examine how the five averaged maternal behavior scores were related, we conducted a principal-components factor analysis with varimax rotation. For both the age 2 and age 4 maternal data, two factors emerged. The first factor reflected positive maternal behavior and loaded high on child-centered behavior, warmth/positive affect, and sensitivity/responsiveness. The eigenvalue was 2.53 at age 2 and 2.64 at age 4. The first factor accounted for 51% of the variance at age 2 and 53% at age 4. The second factor reflected controlling maternal behavior and loaded high on strictness/punitiveness and adult-centered behavior. The eigenvalue was 1.59 at age 2 and 1.45 at age 4. This factor accounted for 32% of the variance at age 2 and 29% at age 4. Thus, the two factors accounted for a total of 81% of the variance at both ages.

Because we were interested in comparing changes in maternal behavior from age 2 to age 4, we calculated summary scores that were standardized on the same scale. All of the variables were standardized using the means and standard deviations from age 2 and then summed. The *maternal positive behavior summary score* consisted of warmth/positive affect, sensitivity/responsiveness, and child-centered behavior. The *maternal controlling behavior*



*summary score* consisted of strictness/punitiveness and adult-centered behavior. Table 1 presents the means and standard deviations for the maternal behavior summary scores at both ages.

Table 1  
*Means and Standard Deviations for Child and Maternal Behavior Summary Measures (Presented Separately by Child Gender)*

Measure	Boys		Girls	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
CBCL externalizing				
2 years	16.11	8.15	15.99	7.58
4 years	11.29	7.48	12.20	7.22
Child noncompliance				
2 years	1.02	4.47	-.88	4.78
4 years	-1.16	3.68	-2.44	4.06
Maternal positive behavior				
2 years	-.13	2.73	.14	2.53
4 years	-.30	2.91	-.40	2.31
Maternal controlling behavior				
2 years	.22	1.88	-.19	1.76
4 years	-.18	1.51	-.61	1.55

*Note.* CBCL = Child Behavior Checklist.

**Behavior problems.** Maternal reports of *child externalizing behavior* from the CBCL were used as a measure of behavior problems. Because mothers completed two CBCLs for the 2-year assessment, the mean of the two externalizing raw scores was used when both scores were available. The Externalizing raw scale score (total score for the Aggressive and Destructive subscales) was used instead of *t* scores because we were interested in exploring gender differences. Although raw scores were used for analyses, 44% of the children at age 2 and 29% of the children at age 4 were in the clinical or borderline clinical range on the broadband Externalizing scale of the CBCL (a *t* score of 60 or higher).

Laboratory observations of child noncompliance were obtained from the behaviors coded during the cleanup task at both ages, and a *child noncompliance summary score* was created. The measures of child noncompliance were standardized using the age 2 means and standard deviations and were summed to form the scale. The measures in each scale were significantly correlated (the average correlation was .45), and the alphas for the two scales were both above .70. Table 1 presents the means for the scores of child externalizing and child noncompliance.

## RESULTS

The results from the study are presented in three stages. First we present results addressing the continuity and stability of behavior problems from age 2 to age 4 and the continuity and stability of maternal behaviors. Next we present correlations examining relations between maternal and child behavior concurrently and longitudinally. The last section presents regression analyses predicting (a) increases in behavior problems from maternal behaviors, (b) changes in maternal behavior from child behavior problems, and (c) increases in behavior problems from interactions between maternal and child behaviors.

Preliminary analyses revealed that SES was related to some of the child measures. The family's Hollingshead (1975) score was negatively correlated with age 2 externalizing scores ( $r = -.20$ ,  $p < .02$ ). Because SES was associated with behavior problems, we controlled for it in all Analyses. In additional preliminary analyses, we examined the distribution and skew of all of the variables of interest. Examination of the skew statistics and normal histogram plots for all of the variables of interest indicated that none were substantially skewed. In addition, the median scores did not differ substantially from the mean scores for any of the variables.

### *Continuity of Behavior Problems*

To examine whether there was a change in the mean level of child externalizing behavior from age 2 to age 4, we performed a repeated measures analysis of variance (ANOVA), controlling for SES. In this first ANOVA, child externalizing behavior was the dependent variable, with age as a within-subject variable and gender and race as between-subjects variables. A main effect for age was found,  $F(1, 116) = 8.46$ ,  $p < .01$ . Children's externalizing scores decreased from age 2 to age 4. With SES controlled, the mean child externalizing score at age 2 was 15.9, and at age 4 it was 11.4. There were no significant main effects for gender or race and no significant interactions between age and gender or between age and race.

A second repeated measures ANOVA controlling for SES was conducted to examine the continuity in child noncompliance observed in the laboratory at 2 and 4 years. Child noncompliance in the laboratory was the dependent variable, with age as a within-subject variable and gender and race as between-subjects variables. A main effect for gender,  $F(1, 116) = 5.07$ ,  $p < .03$ , was found. There were no main effects for age or race. Interactions between age, gender, and race were not found. Girls ( $M = -1.55$ ) had lower noncompliance scores than did boys ( $M = -0.17$ ).

### *Stability of Behavior Problems*

Partial correlations, with SES controlled, were calculated to investigate the relation between externalizing scores at age 2 and those at age 4. Table 2 presents these correlations separately by child gender. Externalizing scores at age 2 and those at age 4 were highly related for both boys and girls. Age 2 and age 4 externalizing scores also were positively correlated for both European Americans and African Americans,  $r(73) = .63$ ,  $p < .01$  and  $r(41) = .65$ ,  $p < .01$ , respectively. Children whose mothers rated them high in externalizing behavior at age 2 also were rated high in externalizing behavior at age 4.

Table 2 also presents the partial correlations, with SES controlled, between age 2 and age 4 child noncompliance. Child noncompliance scores were positively correlated from age 2 to age 4 for both boys and girls. Age 2 and age 4 child noncompliance scores also were positively correlated for both European and African Americans,  $r(75) = .31$ ,  $p < .05$  and  $r(42) = .34$ ,  $p < .05$ , respectively. Children who were noncompliant in the laboratory at age 2 also were noncompliant at age 4.

Because no differences were found in the continuity and stability of behavior problems for European American and African American children, race was not considered in further analyses.

**Table 2**  
*Correlations Between Variables of Interest (With SES Controlled), Presented Separately by Gender*

Variable	1	2	3	4	5	6	7
<b>Boys</b>							
1. Child externalizing (age 2)	—						
2. Child noncompliance (age 2)	.19	—					
3. Child externalizing (age 4)	.69**	.28*	—				
4. Child noncompliance (age 4)	-.08	.28*	.05	—			
5. Maternal positive behavior (age 2)	.02	-.15	.28*	.07	—		
6. Maternal controlling behavior (age 2)	-.06	.11	.08	.32*	-.18	—	
7. Maternal positive behavior (age 4)	.24†	-.01	.30*	.04	.63**	-.09	—
8. Maternal controlling behavior (age 4)	-.15	.07	-.12	.31*	-.13	.59**	-.06
<b>Girls</b>							
1. Child externalizing (age 2)	—						
2. Child noncompliance (age 2)	.13	—					
3. Child externalizing (age 4)	.63**	.02	—				
4. Child noncompliance (age 4)	.33*	.34*	.33*	—			
5. Maternal positive behavior (age 2)	-.08	-.11	.05	-.19	—		
6. Maternal controlling behavior (age 2)	.15	.13	.07	.17	-.03	—	
7. Maternal positive behavior (age 4)	-.09	-.12	-.01	-.01	.43**	-.16	—
8. Maternal controlling behavior (age 4)	.27*	.08	.26*	.42**	-.18	.54**	-.24*

*Note.* SES = socioeconomic status.  
 †  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

### **Continuity of Maternal Behavior**

To examine changes in maternal behaviors from age 2 to age 4, we conducted two repeated measures ANOVAs, controlling for SES. In the first ANOVA, maternal positive behavior was the dependent variable, with child age as a within-subject variable and child gender as the between-subjects variable. No main effects for age or gender were found. The interaction between age and gender was not significant. In the second ANOVA, maternal controlling behavior was the dependent variable, with age as a within-subject variable and gender as the between-subjects variable. Again, no main effects for age or gender were found, and the interaction between age and gender was not significant. The levels of maternal positive and controlling behaviors did not change across the time period examined. Also, the levels of maternal positive and controlling behaviors did not differ as a function of the child's gender.

### **Stability of Maternal Behavior**

To examine the stability of maternal behavior over time, we calculated partial correlations, separately by child gender and controlling for SES, and these are presented in Table 2. Both maternal positive behavior and maternal controlling behavior were highly stable over time for boys and girls.

### **Concurrent Relations Between Maternal Behavior and Child Behavior**

To examine concurrent relations between the style of maternal behavior and child behavior problems, we computed partial correlations, controlling for SES, between maternal behavior and child behavior at age 2 and age 4. Table 2 presents these correlations.

There were no concurrent associations between maternal and child behaviors at age 2 for either boys or girls. Examination of the concurrent correlations between maternal positive behavior and

child behavior at age 4 indicated that maternal positive behavior at age 4 was positively associated with boys' externalizing scores at age 4. A Fisher's r-to-z test revealed that the magnitude of the relation between maternal positive behavior at age 4 and child externalizing scores at age 4 was not significantly different for boys and girls ( $z = 1.69$ , ns). Examination of the correlations between maternal controlling behavior and child behavior at age 4 revealed that higher levels of maternal controlling behavior at age 4 were associated with higher externalizing scores for girls at age 4. A Fisher's r-to-z test indicated that the correlations between maternal controlling behavior at age 4 and externalizing scores at age 4 were significantly different for boys and girls ( $z = -2.05$ ,  $p < .05$ ). In addition, maternal controlling behavior at age 4 also was positively associated with child noncompliance in the laboratory at age 4 for both boys and girls.

#### *Longitudinal Relations Between Maternal Behavior and Child Behavior*

To examine longitudinal relations between the style of mother-child interaction and the display of child behavior problems, we computed partial correlations, controlling for SES, between maternal behavior and child behavior across the two time periods. Table 2 presents these correlations separately by gender.

An examination of the relation between maternal positive behavior and child behavior indicated that maternal positive behavior at age 2 was positively associated with child externalizing at age 4 for boys. A Fisher's r-to-z test indicated that the magnitude of this association did not differ significantly for boys and girls ( $z = 1.25$ , ns). For girls, child externalizing at age 2 was positively associated with age 4 maternal controlling behavior, and there was a significant difference between this relation for boys and girls ( $z = -2.32$ ,  $p < .05$ ). In addition, maternal controlling behavior at age 2 was positively associated with child noncompliance at age 4 for boys, although there was not a significant difference in the magnitude of the association between boys and girls ( $z = .86$ , ns).

#### *Predicting Increases in Child Behavior Problems From Maternal Behavior*

To address the question of whether maternal behavior was related to changes in child behavior, we conducted four regression analyses. The outcome of interest was child behavior problems at age 4 according to both parent report and laboratory observation. SES was entered on the first step in the regression analyses to control for SES. Child behavior at age 2 was entered on the next step; therefore, the change in child behavior from 2 to 4 years was being predicted. Interactions between maternal behavior and child gender were computed according to procedures outlined in Aiken and West (1991). All predictor variables were centered, and the interaction terms were created by multiplying child gender by the maternal behavior scores. Child gender was entered on the third step after child behavior at age 2. Maternal behavior at age 2 was entered as a block into the regression on the fourth step. The interaction terms were entered on the last step. In the regression analyses predicting changes in child behavior problems from age 4 maternal behaviors, age 2 maternal behaviors were included on the fourth step to control for age 2 maternal behaviors. Maternal behavior at age 4 was entered on the fifth step, and the interaction terms for maternal behavior at age 4 and child gender were entered on the last step.

***Child externalizing behavior.*** Table 3 presents the results from the regression analyses predicting age 4 child externalizing behavior from maternal behavior. Externalizing behavior at age 2 accounted for a significant amount of the variance in externalizing behavior at age 4. Maternal behavior added significantly to the model. The significant positive beta for maternal

positive behavior indicated that more maternal positive behavior at age 2 was associated with increases in externalizing behavior. The interaction terms between maternal behavior at age 2 and child gender did not add significantly to the model. The next regression analysis predicted

Table 3  
*Regression Analyses Predicting Increases in Child Externalizing From Maternal Behavior*

Variables in the model	$\beta$	$R^2$	$\Delta R^2$	$F$
2-year model				
1. SES	-.04	.01	.01	
2. Externalizing score (age 2)	.66**	.42	.42**	
3. Gender	-.04	.43	.00	
4. Age 2		.46	.04*	
Positive maternal behavior	.20**			
Controlling maternal behavior	.06			
5. Interactions (age 2)		.48	.02	
Positive Behavior $\times$ Gender	.14*			
Controlling Behavior $\times$ Gender	.07			
Model				14.73**
4-year model				
1. SES	-.02	.06	.00	
2. Externalizing score (age 2)	.63**	.42	.42**	
3. Gender	-.05	.43	.00	
4. Age 2		.46	.04*	
Positive maternal behavior	.17*			
Controlling maternal behavior	.04			
5. Age 4		.47	.00	
Positive maternal behavior	.03			
Controlling maternal behavior	.05			
6. Interactions (age 4)		.48	.02	
Positive Behavior $\times$ Gender	.07			
Controlling Behavior $\times$ Gender	-.09			
Model				11.08**

Note. Betas are standardized betas from the final step. SES = socioeconomic status.  
\*  $p < .05$ . \*\*  $p < .01$ .

age 4 child externalizing behavior from maternal behavior at age 4 after controlling for maternal behavior at age 2. Neither age 4 maternal behavior nor the interaction terms between age 4 maternal behavior and child gender added significantly to the prediction of increases in externalizing behavior. Increases in child externalizing behavior were related to more maternal positive behavior at age 2.

**Child noncompliance.** Table 4 presents the results from the regression analyses predicting age 4 child noncompliance from maternal behavior. Child noncompliance at age 2 accounted for a significant proportion of the variance in child noncompliance at age 4. Maternal behavior at age 2 added significantly to the model. The significant positive beta for maternal controlling behavior indicated that more maternal control at age 2 was associated with increases in child noncompliance. The interaction terms between maternal behavior at age 2 and child gender did not contribute to the prediction of increases in child noncompliance. Maternal behavior at age 4, after we controlled for maternal behavior at age 2, also added significantly to the model. The beta for maternal controlling behavior at age 4 was significant. Higher levels of maternal

Table 4  
*Regression Analyses Predicting Increases in Child Noncompliance From Maternal Behavior*

Variables in the model	$\beta$	$R^2$	$\Delta R^2$	$F$
2-year model				
1. SES	-.14	.02	.02†	
2. Child noncompliance (age 2)	.27**	.12	.09**	
3. Gender	.09	.13	.01	
4. Age 2		.17	.04*	
Positive maternal behavior	.00			
Controlling maternal behavior	.23*			
5. Interactions (age 2)		.21	.04†	
Positive Behavior $\times$ Gender	.21†			
Controlling Behavior $\times$ Gender	.05			
Model				4.45**
4-year model				
1. SES	-.09	.02	.02†	
2. Child noncompliance (age 2)	.27**	.12	.09**	
3. Gender	.06	.13	.01	
4. Age 2		.17	.04*	
Positive maternal behavior	-.03			
Controlling maternal behavior	.03			
5. Age 4		.26	.08**	
Positive maternal behavior	.13			
Controlling maternal behavior	.37**			
6. Interactions (age 4)		.27	.02	
Positive Behavior $\times$ Gender	-.00			
Controlling Behavior $\times$ Gender	-.13			
Model				4.69**

Note. Betas are standardized betas from the final step. SES = socioeconomic status.  
 †  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

controlling behavior at age 4 were associated with increases in noncompliance scores. The interaction terms did not add significantly to the model. Increases in child noncompliance were related to more maternal controlling behavior at age 2 and to increases in maternal controlling behavior from age 2 to age 4.

***Predicting increases in child behavior problems from interactions between maternal behaviors.*** Next, regression analyses exploring the impact of interactions between maternal positive and controlling behaviors on age 4 child behavior were conducted. The order of entry was similar to that in the previous regression analyses, with SES on the first step, age 2 child behavior on the second step, child gender on the third step, and maternal positive and controlling behavior on the fourth step. Interaction terms between positive and controlling behaviors were entered on the final step. In the age 4 regression analyses, age 2 maternal behaviors were entered on the step following gender to control for the age 2 maternal behavior variables.

All four regression analyses were significant:  $F(6, 111) = 16.42, p < .001$  for age 2 maternal behaviors and interactions predicting externalizing scores;  $F(6, 116) = 4.06, p < .001$  for age 2 maternal behaviors and interactions predicting child noncompliance;  $F(8, 109) = 12.09, p < .001$  for age 4 maternal behaviors (with age 2 maternal behaviors controlled) and interactions predicting externalizing scores; and  $F(8, 114) = 4.93, p < .001$  for age 4 maternal behaviors (with age 2 maternal behavior controlled) and interactions predicting child noncompliance. Although the overall regression equations were significant, none of the interaction terms added

significantly to the models. Increases in child behavior problems were not associated with interactions between maternal positive and controlling behaviors.

#### *Predicting Increases in Maternal Behavior From Child Behavior Problems*

To further examine the relation between maternal and child behavior, we computed four regression analyses predicting increases in maternal controlling and positive behaviors from child behavior problems. Maternal behavior at age 4 was the outcome of interest. SES was entered on the first step, followed by age 2 maternal behavior on the second step, child gender on the third step, age 2 child behaviors on the fourth step, and interactions between child behavior and gender on the final step. In the regression analyses predicting changes in maternal behavior from age 4 child behaviors, age 2 child behaviors were entered on the fourth step to control for the effects of age 2 child behaviors. Age 4 child behavior was entered on the fifth step, followed by the interaction terms between child behavior and child gender.

**Maternal positive behavior.** In the regression analyses predicting maternal positive behavior from child behavior problems, both regression analyses were significant:  $F(7, 115) = 12.87, p < .001$  for age 2 child behaviors predicting maternal positive behavior, and  $F(9, 108) = 9.77, p < .001$  for age 4 child behaviors (with age 2 child behaviors controlled) predicting maternal positive behavior. In both regression equations, maternal positive behavior at age 2 accounted for a significant proportion of the variance in age 4 maternal positive behavior,  $\Delta R^2 = .23, p < .001$  and  $\Delta R^2 = .22, p < .001$ , respectively. Child behavior problems at age 2, child behavior problems at age 4 (with age 2 behavior problems controlled), and the interactions between child behavior problems and child gender did not add significantly to either of the models. Child behavior problems did not predict changes in maternal positive behavior.

**Maternal controlling behavior.** In the regression analyses predicting maternal controlling behavior from child behavior problems, the regression equation for age 2 child behavior problems predicting increases in maternal controlling behavior was significant,  $F(7, 115) = 12.94, p < .001$ . Maternal controlling behavior at age 2 accounted for a significant proportion of the variance in age 4 maternal controlling behavior,  $\Delta R^2 = .29, p < .001$ ; however, neither age 2 child behavior problems nor the interaction terms between age 2 child behavior problems and gender added significantly to the model. Child behavior problems at age 4, after we controlled for those at age 2, did add significantly to the model predicting increases in maternal controlling behavior. Table 5 presents these results. The significant positive beta for child noncompliance indicated that higher levels of child noncompliance at age 4, after age 2 noncompliance was controlled, were associated with increases in maternal controlling behavior. The interaction terms between child behavior problems and child gender did not add significantly to the model. Increases in maternal controlling behavior were predicted by increases in child noncompliance from age 2 to age 4.

#### *Predicting Increases in Child Behavior Problems From the Interaction of Maternal and Child Behavior at Age 2*

Finally, in order to examine the transactional relation involved in the interaction of early maternal behavior and child behavior problems, we conducted two regression analyses predicting changes in child behavior problems from interactions between age 2 maternal behavior and child behavior problems. The outcome of interest was child behavior problems at age 4. SES was entered on the first step, followed by age 2 child behavior on the second step, child gender on the

**Table 5**  
*Regression Analyses Predicting Increases in Maternal Controlling Behavior From Child Behavior Problems at Age 4*

Variables in the model	$\beta$	$R^2$	$\Delta R^2$	$F$
1. SES	-.12	.14	.14**	
2. Maternal control (age 2)	.51**	.41	.28**	
3. Gender	.06	.42	.01	
4. Age 2		.42	.00	
Child externalizing	.03			
Child noncompliance	-.04			
5. Age 4		.47	.05*	
Child externalizing	-.02			
Child noncompliance	.22**			
6. Interactions (age 4)		.49	.02	
Child Externalizing $\times$ Gender	-.13†			
Child Noncompliance $\times$ Gender	-.07			
Model				11.63**

*Note.* Betas are standardized betas from the final step. SES = socioeconomic status.  
 †  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

third step, age 2 maternal behavior on the fourth step, and the interaction of age 2 maternal behavior and age 2 child behavior on the final step.

The first regression analysis examined whether the interaction between maternal behavior at age 2 and child externalizing behavior at age 2 predicted age 4 child externalizing behavior. The overall regression equation was significant,  $F(7, 110) = 14.76, p < .001$ ; however, the interaction terms between maternal behavior and child externalizing behavior at age 2 did not contribute significantly to the prediction of increases in child externalizing behavior.

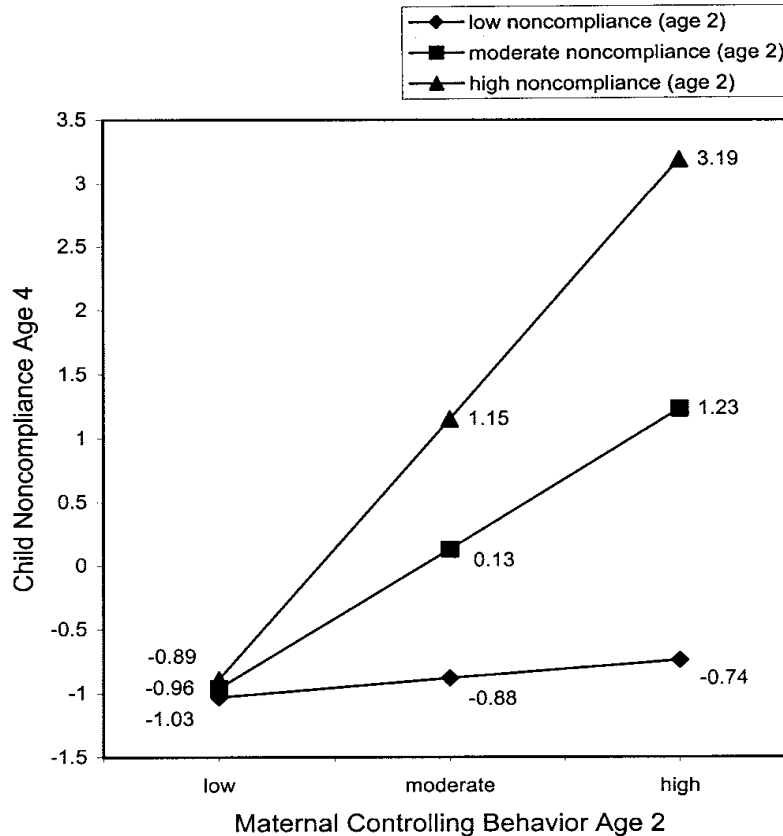
The second regression analysis indicated that the interaction between age 2 maternal behavior and child noncompliance added to the prediction of increases in child noncompliance. The results from this regression analysis are presented in Table 6. The interaction terms were probed according to procedures outlined in Aiken and West (1991). The regression equation was restructured to express the regression of age 4 noncompliance on age 2 maternal behavior at three levels of age 2 noncompliance. The values of child noncompliance at age 2 corresponded

**Table 6**  
*Regression Analyses Predicting Increases in Child Noncompliance From the Interactions Between Maternal Behavior at Age 2 and Child Noncompliance at Age 2*

Variables in the model	$\beta$	$R^2$	$\Delta R^2$	$F$
1. SES	-.12	.02	.02†	
2. Child noncompliance (age 2)	.26**	.12	.09**	
3. Gender	.09	.13	.01	
4. Age 2		.17	.04*	
Positive maternal behavior	.04			
Controlling maternal behavior	.28*			
5. Interactions (age 2)		.23	.05*	
Positive $\times$ Child Noncompliance	.18*			
Controlling $\times$ Child Noncompliance	.23*			
Model				4.78*

*Note.* Betas are standardized betas from the final step. SES = socioeconomic status.  
 †  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .





**Figure 1.** The interaction of maternal controlling behavior at age 2 and child noncompliance at age 2 predicting increases in child noncompliance.

to the mean, one standard deviation above the mean, and one standard deviation below the mean. Although the beta for the interaction between maternal positive behavior at age 2 and child noncompliance at age 2 was significant, none of the slopes for low, moderate, or high child noncompliance were significantly different from zero. The interaction between maternal controlling behavior and child noncompliance at age 2 is plotted in Figure 1. The strongest relation between child noncompliance at age 4 and maternal controlling behavior at age 2 was for the moderate and high child noncompliance groups at age 2. The slopes for moderate and high child noncompliance at age 2 were significantly different from zero; slopes for the moderate and high noncompliance groups were 0.60 and 1.12, respectively,  $t(112) = 3.07$  and  $3.58$ , respectively,  $ps < .01$ . However, the slope for low child noncompliance was not significantly different from zero; the slope for the low noncompliance group was 0.08,  $t(112) = 0.32$ , ns. For children who were moderate and children who were high on child noncompliance at age 2, there was a relation between maternal controlling behavior and increases in child noncompliance, whereas there was no such relation for the children low in child noncompliance at age 2. Increases in child noncompliance were related to age 2 maternal controlling behavior, and this association was stronger for children displaying moderate and high levels of child noncompliance at age 2.

## DISCUSSION

The aim of this investigation was to explore the continuity and stability of early behavior problems and factors associated with these patterns in young children transitioning from toddlerhood to preschool. This period of development appears to play an important role in determining the long-term consequences of early behavior problems, because maladaptive behaviors become more firmly entrenched from the preschool period onward (Campbell et al., 2000). It is assumed that this transition period creates opportunities for behavioral change because, although behavior characterized by aggression, impulsivity, and noncompliance is normative in toddlerhood, anticipated developments in the self-control of behavior and emotion should lead to declines in these problems by the time the child enters school (Kopp, 1982). Thus, understanding the factors that increase the likelihood of stability versus change is clearly important. One such factor that has been linked to both the development of self-control (Calkins, 1994; Thompson, 1998) and to behavior problems is parenting (Campbell, 2002). This study examined multiple dimensions of maternal behavior and their interactions with child gender as factors affecting the stability of early problem behavior.

The first goal of the study was to address the continuity and stability of behavior problems. As expected, children showed discontinuity, or decreases, in behavior problems from toddlerhood to preschool, although only with respect to parent report of such problems, not with respect to observed noncompliance. Although this disparity may appear contradictory, there are at least two explanations for such a finding. First, noncompliance is only one dimension of problematic behavior that may be observed during toddlerhood. The Externalizing scale of the CBCL samples a variety of related problematic behaviors. Different measures of problem behavior may show different developmental patterns. There is reason to believe that mastery of impulsivity, control of aggression, and the development of compliance may develop at differential rates over the preschool period (Bronson, 2000). For example, direct defiance and passive noncompliance have been found to decrease with age, whereas rates of compliance have not (Kuczynski, Kochanska, Radke-Yarrow, & Girnius-Brown, 1987). The different pattern of continuity found in the present study might be a result of our use of a more global measure of noncompliance that also included ratings of the children's responsivity. A second explanation for the apparent disparity is that one measure represents parent perception of problem behavior, whereas the other may reflect dynamics within the parent—child relationship as well as child behavioral tendencies.

Past research on developmental trajectories of problem behavior has also demonstrated that boys are more likely to show more continuous patterns of disruptive behavior than are girls (Campbell, 1997). In this study, boys and girls showed similar rates of decline in externalizing behavior; however, boys were more noncompliant in the laboratory at both ages compared with girls. Again, it is not clear whether the differences were a function of the more narrow measure of problem behavior used in the laboratory, which focused solely on noncompliance occurring within the mother—child dynamic, or of the level of child problem behavior. It is notable that in addition to a few differences between boys and girls in the patterns of behavior problems over time, there were no interactions across time between child gender and maternal behavior. It may be that characteristics of the children contribute more to understanding gender differences in behavior problems early in development (Keenan & Shaw, 1997). Moreover, this sample was overselected for behavior problems at age 2 and included similar numbers of girls and boys with

problem behavior. Such a sample is rare in the behavior problem literature because most samples are either exclusively male or low risk. Given that behavior problems in girls have only recently become a focus of research, it is clearly important to study girls with early onset behavior problems in order to understand the role of gender differences and socialization differences in problematic behavior.

The data also revealed stability in the display of behavior problems from age 2 to age 4 in terms of both parent report of externalizing problems and observations of child noncompliance. Children who were displaying externalizing behaviors as reported by mothers and who were noncompliant in the laboratory at 2 years of age were also higher on these measures at 4 years of age. These results extend developmentally downward previous work on the stability of behavior problems in older children (Cohen & Bromet, 1992; Heller et al., 1996). Moreover, boys and girls were equally likely to retain their relative stability in both types of problems.

The second issue in the current study involved examining factors associated with the stability of behavior problems across the transition from toddlerhood to preschool. The conceptual framework for examining such factors focused on the important role of parenting during this transition, and dimensions of parenting that were hypothesized to be important for emerging self-regulation and autonomy were examined. These included parent-focused, intrusive controlling behavior and child-focused, positive guiding behavior. The first set of analyses examined concurrent relations between problem behavior and maternal positive and controlling behavior. It is interesting that there were no relations between these two sets of measures at age 2. This lack of association may reflect the fact that for some children, these problem behaviors are simply reflections of normative developments, whereas for other children, there are clearer links between environmental factors and problem behaviors. It may be difficult to sort out these different relations using simple correlations between measures. By age 4, however, maternal controlling behavior was related to noncompliance for both boys and girls. These data suggest that by age 4, negative patterns of interaction between parents and children are clearly established. These patterns may be the precursors to the coercive interaction that has been implicated in the emergence of more serious problem behaviors among older children (Patterson, 2002).

The lack of significant concurrent associations between maternal positive behavior and child behavior problems observed in this study was surprising because, on the basis of past work (Brophy & Dunn, 2002; Gardner, 1987, 1994), we expected more maternal positive behavior to be associated with lower levels of behavior problems. However, more maternal positive behavior at age 4 was associated with more externalizing in boys at age 4. There could be several possible reasons for these counterintuitive findings. Previous measures of positive parenting behaviors (e.g. Brophy & Dunn, 2002; Gardner, 1987, 1994) were obtained while observing maternal behavior in the home. Such behavior could differ substantially from our measure of maternal positive behavior observed in a laboratory setting. Moreover, maternal positive behavior may not have a significant influence on behavior problems, especially when other parenting factors such as control and negativity are considered (e.g., Pettit et al., 1997) or when the sample is at greater risk for behavior problems.

The third aim of the study focused largely on predicting changes in child behavior over time as well as interactions between maternal factors and gender as predictors of change over time.

Longitudinal regression analyses indicated that after the variance associated with prior levels of problem behavior was accounted for, maternal positive behavior at age 2 predicted increases in externalizing over time, and maternal control at age 2 and age 4 predicted increases in noncompliance. The fact that maternal positive behavior at age 4 did not predict increases in child externalizing behavior is not surprising given that maternal behavior at age 2 and maternal behavior at age 4 were highly related; thus, age 4 maternal positive behavior may not predict child externalizing behavior above and beyond the level at which age 2 maternal positive behavior predicts such increases because of multicollinearity. It is, however, noteworthy that age 4 maternal controlling behavior added to the prediction of increases in child noncompliance even after we accounted for age 2 maternal controlling behavior, which was highly related to age 4 maternal controlling behavior.

In addition to measurement issues, different developmental processes might account for the longitudinal pattern of findings. Noncompliance is a uniquely dyadic response that may be influenced to a greater degree by the level of the intrusion or control on the part of the parent over time and the anticipation of control on the part of the child. In contrast, parents who perceive their children to be problematic across a range of behaviors in a variety of contexts may be sensitized to providing more positive feedback in a setting in which their behavior is observed. Alternatively, these parents may be accustomed to providing more positive feedback in order to avoid a potential tantrum or outburst. Such behavior may have the short-term effect of placating the child but may not provide appropriate feedback regarding behavioral control that is necessary for the development of self-regulation (Calkins & Johnson, 1998).

No support was found for the hypothesis that maternal positive and controlling behaviors interact to predict changes in the level of child problem behavior. Again, it may be that the controlling behavior had more of an influence on child behavior than did the positive behavior, particularly in a sample that had a larger number of children with behavior problems.

A fourth aim of this study was to examine the transactions between the mother and the child over time. Of interest in these analyses were the role of child behavior problems as a predictor of changes in maternal behavior as well as the interaction between child behavior and maternal behavior. Longitudinal predictions regarding changes in maternal behavior revealed no clear predictors of increases in positive behavior. Ceiling effects in positive behavior may account for such results. Indeed, in this study, these behaviors were both highly stable and continuous over time. However, increases in maternal negative control were predicted by increases in child noncompliance from age 2 to age 4. These results do support bidirectional influences between mothers' behavior and children's behavior.

Further evidence for the role of transactions between maternal and child behavior was provided by the analysis of interactions of these behaviors as predictors of increases in child noncompliance. The association between maternal controlling behavior at age 2 and increases in child noncompliance by age 4 was stronger for children displaying moderate to high levels of noncompliance at age 2 than for children displaying low levels of child noncompliance at age 2. Mothers who were controlling with their children at age 2 were likely to be controlling with their children at age 4; however, the strength of the relation between maternal controlling behavior and increases in child noncompliance depended on the level of noncompliance displayed by the

children. It may be that, over time, parental control increases in cases in which children show higher and more stable levels of noncompliant behavior. Taken together, these findings on maternal control and child behavior problems support Patterson's (2002) model in which parents and children develop aversive and reinforcing patterns of behavior as they react to each other over time within typical daily interactions. The process may start with maternal displays of control early in the children's development, which could undermine the children's emerging self-regulation. Alternatively, the process could start with child noncompliance. Regardless of the direction of effects, if early displays of maternal control become coupled with child noncompliance during toddlerhood, increases in the noncompliance may occur over time.

The present study adds to our understanding of early emerging behavior problems and their developmental implications. These problems are moderately stable over the period from toddlerhood to preschool, and their increase over this time is linked to maternal negative control, at least for some children. These problems are, at least in one form, also associated with increases in negative maternal behavior over time. Thus, there does appear to be evidence for the early emergence of coercive cycles of interaction. As parent and child behavior continue to influence each other over time, the associations between these factors could strengthen and lead to continued negative trajectories for children (Patterson, 2002).

The present study is limited by a relatively small sample size and a narrow measurement of child functioning. Also, the generalizability of the results is limited to community populations oversampled for behavior problems. Nevertheless, clear directions for future work are suggested by our findings. One direction for future research would involve more closely examining the mechanisms through which negative coercive cycles in toddlerhood lead to poorer behavioral functioning over time. Although the hypothesized link has been through deficits in behavioral and emotional self-control, few studies have explicitly tested these processes as mediators of parenting behaviors. A second direction for future work involves attempting to understand whether and how specific dimensions of parenting behavior lead to behavioral improvements over the preschool period. Given the implications of this early developmental transition for later behavioral functioning, understanding the processes and mechanisms that undermine adjustment continues to be a critical avenue of research.

## REFERENCES

- Achenbach, T. M. (1991). Integrative guide for the 1991 CBCL/4-18, YSR, & TRF profiles. Burlington: University of Vermont, Department of Psychiatry.
- Achenbach, T. M. (1992). Manual for the Child Behavior Checklist/2-3 & 1992 profile. Burlington: University of Vermont, Department of Psychiatry.
- Aiken, L. S., & West, S. G. (1991). Multiple regression: Testing and interpreting interactions. Thousand Oaks, CA: Sage.
- Baumrind, D. (1971). Note: Harmonious parents and their preschool children. *Developmental Psychology*, 4, 99-102.
- Belsky, J., Woodworth, S., & Crnic, K. (1996). Troubled family interaction during toddlerhood. *Development and Psychopathology*, 8, 477-495.
- Bornstein, M. H., & Suess, P. E. (2000). Child and mother cardiac vagal tone: Continuity, stability, and concordance across the first 5 years. *Developmental Psychology*, 36, 54-65.

- Bronson, M. B. (2000). *Self-regulation in early childhood: Nature and nurture*. New York: Guilford Press.
- Brophy, M., & Dunn, J. (2002). What did Mummy say? Dyadic interaction between young “hard to manage” children and their mothers. *Journal of Abnormal Child Psychology*, 30, 103–112.
- Calkins, S. D. (1994). Origins and outcomes of individual differences in emotion regulation. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations*. Monographs of the Society for Research in Child Development 59(2–3, Serial No. 240, pp. 53–72).
- Calkins, S. D. (2002). Does aversive behavior during toddlerhood matter? The effects of difficult temperament on maternal perceptions and behavior. *Infant Mental Health Journal*, 23, 381–402.
- Calkins, S. D., & Dedmon, S. E. (2000). Physiological and behavioral regulation in two-year-old children with aggressive/destructive behavior problems. *Journal of Abnormal Child Psychology*, 28, 103–118.
- Calkins, S. D., & Johnson, M. J. (1998). Toddler regulation of distress to frustrating events: Temperamental and maternal correlates. *Infant Behavior and Development*, 21, 379–395.
- Calkins, S. D., Smith, C. L., Gill, K. L., & Johnson, M. C. (1998). Maternal interactive style across contexts: Relations to emotional, behavioral, and physiological regulation during toddlerhood. *Social Development*, 7, 350–369.
- Campbell, S. B. (1991). Longitudinal studies of active and aggressive preschoolers: Individual differences in early behavior and outcome. In Cicchetti & S. L. Toth (Eds.), *Rochester Symposium on Developmental Psychopathology: Vol. 2. Internalizing and externalizing expressions of dysfunction* (pp. 57–89). Hillsdale, NJ: Erlbaum.
- Campbell, S. B. (1995). Behavior problems in preschool children: A review of recent research. *Journal of Child Psychology and Psychiatry*, 36, 113–149.
- Campbell, S. B. (1997). Behavior problems in preschool children: Developmental and family issues. *Advances in Clinical Child Psychology*, 19, 1–26.
- Campbell, S. B. (2002). *Behavior problems in preschool children: Clinical and developmental issues*. New York: Guilford Press.
- Campbell, S. B., Breaux, A. M., Ewing, L. J., Szumowski, E. K., & Pierce, W. (1986). Parent-identified problem preschoolers: Mother–child interaction during play at intake and 1-year follow-up. *Journal of Abnormal Child Psychology*, 14, 425–440.
- Campbell, S. B., Pierce, E. W., Moore, G., & Marakovitz, S. (1996). Boys’ externalizing problems at elementary school age: Pathways from early behavior problems, maternal control, and family stress. *Development and Psychopathology*, 8, 701–719.
- Campbell, S. B., Shaw, D. S., & Gilliom, M. (2000). Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology*, 12, 467–488.
- Cohen, S., & Bromet, E. (1992). Maternal predictors of behavioral disturbance in preschool children: A research note. *Journal of Child Psychology and Psychiatry*, 33, 941–946.
- Crockenberg, S., & Litman, C. (1990). Autonomy as competence in 2-year-olds: Maternal correlates of child defiance, compliance, and self-assertion. *Developmental Psychology*, 26, 961–971.
- Cummings, E. M., Davies, P. T., & Campbell, S. B. (2000). *Developmental psychopathology and family process: Theory, research, and clinical issues*. New York: Guilford Press.

- Cummings, E. M., Ianotti, R. J., & Zahn-Waxler, C. (1989). Aggression between peers in early childhood: Individual continuity and developmental change. *Child Development*, 60, 887–895.
- Dumas, J. E., & LaFreniere, P. J. (1993). Mother–child relationships as sources of support or stress: A comparison of competent, average, aggressive, and anxious dyads. *Child Development*, 64, 1732–1754.
- Forgatch, M. S., Patterson, G. R., & Skinner, M. L. (1988). A mediational model for the effect of divorce on antisocial behavior in boys. In M. E. Hetherington & J. D. Arasteh (Eds.), *Impact of divorce, single parenting, and stepparenting on children* (pp. 135–154). Hillsdale, NJ: Erlbaum.
- Gardner, F. E. (1987). Positive interaction between mothers and conduct- problems children: Is their training for harmony as well as fighting? *Journal of Abnormal Child Psychology*, 15, 283–293.
- Gardner, F. E. M. (1994). The quality of joint activity between mothers and their children with behaviour problems. *Journal of Child Psychology and Psychiatry*, 35, 935–948.
- Gilliom, M., Shaw, D. S., Beck, J. E., Schonberg, M. A., & Lukon, J. L. (2002). Anger regulation in disadvantaged preschool boys: Strategies, antecedents, and the development of self-control. *Developmental Psychology*, 38, 222–235.
- Hart, C. H., DeWolf, D. M., Wozniak, P., & Burts, D. C. (1992). Maternal and paternal disciplinary styles: Relations with preschoolers' playground behavioral orientations and peer status. *Child Development*, 63, 879– 892.
- Hay, D. F., Castle, J., & Davies, L. (2000). Toddlers' use of force against familiar peers: A precursor of serious aggression? *Child Development*, 71, 457–467.
- Heller, T. L., Baker, B. L., Henker, B., & Hinshaw, S. P. (1996). Externalizing behavior and cognitive functioning from preschool to first grade: Stability and predictors. *Journal of Clinical Child Psychology*, 25, 376–387.
- Hollingshead, A. B. (1975). *Four Factor Index of Social Status*. New Haven, CT: Yale University.
- Keenan, K. (2000). Emotion dysregulation as a risk factor for psychopathology. *Clinical Psychology: Science and Practice*, 7, 418–434.
- Keenan, K., & Shaw, D. (1994). The development of aggression in toddlers: A study of low income families. *Journal of Abnormal Child Psychology*, 22, 53–78.
- Keenan, K., & Shaw, D. S. (1997). Developmental and social influences on young girls' early problem behavior. *Psychological Bulletin*, 121, 95– 113.
- Kopp, C. (1982). Antecedents of self-regulation: A developmental perspective. *Developmental Psychology*, 18, 199–214.
- Kuczynski, L., & Kochanska, G. (1995). Function and content of maternal demands: Developmental significance of early demands for competent action. *Child Development*, 66, 616–628.
- Kuczynski, L., Kochanska, G., Radke-Yarrow, M., & Girnius-Brown, O. (1987). A developmental interpretation of young children's noncompliance. *Developmental Psychology*, 23, 799–806.
- Loeber, R. (1982). The stability of antisocial and delinquent child behavior: A review. *Child Development*, 53, 1431–1446.
- Loeber, R., & Dishion, T. (1983). Early predictors of male delinquency: A review. *Psychological Bulletin*, 94, 68–99.

- McFadyen-Ketchum, S. A., Bates, J. E., Dodge, K. A., & Pettit, G. S. (1996). Patterns of change in early childhood aggressive-disruptive behavior: Gender differences in predictions from early coercive and affectionate mother-child interactions. *Child Development*, 67, 2417–2433.
- Miller, N. B., Cowan, P. A., Cowan, C. P., Hetherington, E. M., & Clingempeel, W. G. (1993). Externalizing in preschoolers and early adolescents: A cross-study replication of a family model. *Developmental Psychology*, 29, 3–18.
- Moffitt, T. E. (1993). The neuropsychology of conduct disorder. *Development and Psychopathology*, 5, 135–151.
- Olweus, D. (1979). Stability of aggressive reaction patterns in males: A review. *Psychological Bulletin*, 86, 852–875.
- Parke, R. D., & Slaby, R. G. (1983). The development of aggression. In P. H. Mussen (Ed.), *Handbook of child psychology* (Vol. 4, pp. 547–641). New York: Wiley.
- Patterson, G. R. (1980). Mothers: The unacknowledged victims. *Monographs of the Society for Research in Child Development*, 45(5, Serial No. 186).
- Patterson, G. R. (1982). *Coercive family process*. Eugene, OR: Castalia.
- Patterson, G. R. (2002). The early development of coercive family processes. In J. B. Reid, G. R. Patterson, & J. Snyder (Eds.), *Antisocial behavior in children and adolescents: A developmental analysis and model for intervention* (pp. 25–44). Washington, DC: American Psychological Association.
- Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989). A developmental perspective on antisocial behavior. *American Psychologist*, 44, 329–335.
- Pettit, G. S., & Bates, J. E. (1989). Family interaction patterns and children's behavior problems from infancy to four years. *Developmental Psychology*, 25, 413–420.
- Pettit, G. S., Bates, J. E., & Dodge, K. E. (1993). Family interaction patterns and children's conduct problems at home and school: A longitudinal perspective. *School Psychology Review*, 22, 403–420.
- Pettit, G. S., Bates, J. E., & Dodge, K. E. (1997). Supportive parenting, ecological context, and children's adjustment: A seven-year longitudinal study. *Child Development*, 68, 95–107.
- Rose, S. L., Rose, S. A., & Feldman, J. (1989). Stability of behavior problems in very young children. *Development and Psychopathology*, 1, 5–19.
- Rothbaum, F., & Weisz, J. R. (1994). Parental caregiving and child externalizing behavior in nonclinical samples: A meta-analysis. *Psychological Bulletin*, 116, 55–74.
- Rubin, K. H., Booth, C., Rose-Krasnor, L., & Mills, R. S. L. (1995). Social relationships and social skills: A conceptual and empirical analysis. In S. Shulman (Ed.), *Close relationships and socioemotional development* (pp. 63–94). Norwood, NJ: Ablex.
- Rubin, K. H., Burgess, K. B., Dwyer, K. M., & Hastings, P. D. (2003). Predicting preschoolers' externalizing behaviors from toddler temperament, conflict, and maternal negativity. *Developmental Psychology*, 39, 164–176.
- Russell, G., & Russell, A. (1996). Positive parenting and boys' and girls' misbehaviour during a home observation. *International Journal of Behavioral Development*, 19, 291–307.
- Sameroff, A. J., & Fiese, B. H. (2000). Transactional regulation: The developmental ecology of early intervention. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 135–159). New York: Cambridge University Press.
- Sampson, R. J., & Laub, J. H. (1997). A life course theory of cumulative disadvantage and the stability of delinquency. In T. P. Thornberry (Ed.), *Developmental theories of crime and*



- delinquency. *Advances in criminological theory* (Vol. 7, pp. 133–161). New Brunswick, NJ: Transaction.
- Shaw, D. S., & Bell, R. Q. (1993). Developmental theories of parental contributors to antisocial behavior. *Journal of Abnormal Child Psychology*, 21, 493–518.
- Shaw, D. S., Winslow, E. B., Owens, E. B., Vondra, J. I., Cohn, J. F., & Bell, R. Q. (1998). The development of early externalizing problems among children from low-income families: A transformational perspective. *Journal of Abnormal Child Psychology*, 26, 95–107.
- Spieker, S. J., Larson, N. C., Lewis, S. M., Keller, T. E., & Gilchrist, L. (1999). Developmental trajectories of disruptive behavior problems in preschool children of adolescent mothers. *Child Development*, 70, 443–458.
- Sroufe, L. A. (1995). *Emotional development: The organization of emotional life in the early years*. New York: Cambridge University Press.
- Thompson, R. A. (1998). Emotional competence and the development of self. *Psychological Inquiry*, 9, 308–309.
- Tremblay, R. E. (2000). The development of aggressive behaviour during childhood: What have we learned in the past century? *International Journal of Behavioral Development*, 24, 129–141.
- Webster-Stratton, C. (1996). Early-onset conduct problems: Does gender make a difference? *Journal of Consulting and Clinical Psychology*, 64, 540–551.
- Winslow, E. B., Shaw, D. S., Bruns, H., & Kiebler, K. (1995, March). Parenting as a mediator of child behavior problems and maternal stress, support, and adjustment. Paper presented at the biennial meeting of the Society for Research in Child Development, Indianapolis, IN.