Profiles of Externalizing Behavior Problems for Boys and Girls Across Preschool: The Roles of Emotion Regulation and Inattention

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Abstract:
Although externalizing behavior typically peaks in toddlerhood and decreases by school entry, some children do not show this normative decline. A sample of 383 boys and girls was assessed at ages 2, 4, and 5 for externalizing behavior and at age 2 on measures of emotion regulation and inattention. A longitudinal latent profile analysis was performed and resulted in 4 longitudinal profiles of externalizing behavior for each gender. Poor emotion regulation and inattention were important predictors of membership in the chronic-clinical profile for girls, whereas socioeconomic status and inattention were important predictors of membership in the chronic-clinical profile for boys. Results are discussed with respect to the development of adaptive skills that lead to normative declines in externalizing behavior across childhood.
Keywords: externalizing behavior, emotion regulation, inattention, latent profile analysis, early childhood

Article:
Considerable research has shown that early-onset externalizing behavior problems, characterized by aggressive, destructive, and oppositional behaviors, are risk factors for the development of later, more serious problems, such as conduct disorder, attentiondeficit/hyperactivity disorder (ADHD), and juvenile delinquency (see Campbell, 2002; Campbell, Shaw & Gilliom, 2000, for reviews). Traditionally, researchers have thought that as young children acquire more cognitive, language, and regulatory skills, they are better able to cope with developmental challenges and outgrow externalizing behavior problems (Campbell, 2002; Kopp, 1982). In fact, research has shown a normative developmental pathway of externalizing behavior problems that peaks at age 2 and shows a distinct decline with age (Hartup, 1974; Tremblay, 2000). Although it may be the case that most children acquire adaptive skills that help them manage challenging situations in appropriate and constructive ways (e.g., Coie & Dodge, 1998; Hartup,1996; Tremblay, 2000), for some children, early-onset externalizing problems remain stable and lead to more serious, maladaptive outcomes (Campbell, 2002; Cummings, Ianotti, & Zahn-Waxler, 1989). For this reason, it is important to identify the factors that contribute to different patterns of externalizing problem behavior across early childhood.

Modeling Longitudinal Patterns of Externalizing Behavior Problems

Prior research has attempted to describe and differentiate patterns of externalizing problems to accurately separate the children who display normative declines in problem behavior from those who display persistently high levels. For example, Moffit, Caspi, Dickson, Silva, and Stanton (1996) used cutoff scores to identify subgroups that represented different patterns of aggressive and delinquent behavior over time. However, recent advances in quantitative methods have allowed researchers to further explore heterogeneity in longitudinal patterns of externalizing behavior in a person-centered way. For example, a new group-based, semiparametric technique (B. Muthe´n, 2001; Nagin, 1999) allows researchers to identify distinct subgroups of participants on the basis of shared characteristics in the actual data. This technique assumes that the subgroups are salient, that the members in a subgroup are more similar to each other than to the members of another subgroup, and that membership in a subgroup can be predicted by factors in a meaningful way in accordance with a specific theory (e.g., Bergman & Magnusson, 1997).

Research using these new techniques has shown that distinct subgroups of externalizing problems do seem to exist across multiple samples. Using multiple high-risk samples of older children, Broidy et al. (2003; Nagin & Tremblay, 1999) have distinguished consistently three to four trajectories of aggressive behavior. In addition, three studies have used this technique to examine aggression in younger samples of girls and boys from toddlerhood through age 9 (National Institute of Child Health and Human Development [NICHD] Early Child Care Research Network, 2004; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Tremblay et al., 2004). These studies found similar trajectories in their different samples, including a high and stable problem group, varying types of declining groups, and a low problem group. Thus, recent research using new quantitative techniques lends empirical support to the idea that several patterns of externalizing behavior can be found across early childhood in high- and low-risk samples of boys and girls. However, there is less certainty about the behavioral processes that may distinguish the early, chronic, longitudinal patterns of problem behavior from the other, more normative trajectories.

Predictors of Trajectories of Externalizing Behavior

Prior research using semiparametric techniques to identify both predictors and outcomes of membership in trajectories of externalizing problems has included contextual, parental, and child variables (e.g., Nagin & Tremblay, 1999; NICHD Early Child Care Research Network, 2004; Shaw et al, 2003; Tremblay et al., 2004). For example, when studying patterns of externalizing behavior problems, it is important to examine contextual variables such as socioeconomic status (SES) risk, as factors associated with this risk affect both child and family functioning. Limited economic resources increase family stress and tend to be associated with parenting difficulties (Campbell et al., 2000). In particular, the most common response to increased psychological stress is the use of coercive discipline techniques, which are directly implicated in the development of problem behavior in children (Campbell, 1995; McLoyd, 1990; Patterson, 1980). Because of the association between SES risk and externalizing behavior problems, most of the recent research using semiparametric analytical techniques has been conducted in high-risk, low-income samples (e.g., Nagin & Tremblay, 1999; Shaw et al., 2003; Tremblay et al., 2004). Furthermore, in the low-risk sample of the NICHD Study of Early Child Care, high aggression trajectories were predicted by higher SES risk and less sensitive, less involved parenting (NICHD Early Child Care Research Network, 2004).

In addition to examining SES, it is also important to explore possible gender-related differences in patterns of externalizing behavior. Most studies examining the trajectories of externalizing behavior have focused solely on boys. One exception, an analysis of several samples conducted by Broidy et al. (2003), showed that patterns of physical aggression in girls were remarkably similar to those of boys; however, membership in the high-chronic group predicted later delinquency for boys but not for girls. Although gender differences in externalizing problems are well documented (see Maccoby, 1998), relatively little is known about these behaviors in girls (Hinshaw, 2002). For example, there are lingering questions concerning when gender differences emerge and what factors may account for these differences. Keenan and Shaw (1997, 2003) argued that gender differences in externalizing behavior are not apparent until toddlerhood and become more pronounced in preschool. They also proposed two hypotheses regarding the emergence of these differences. First, girls may be socialized toward overcontrolling (internalizing) rather than undercontrolling (externalizing) behaviors. Second, girls mature faster biologically, cognitively, and socially and thus may acquire more adaptive ways of controlling their behavior at an earlier age than boys. It is clearly important to examine gender differences in trajectories of externalizing behavior during early childhood, a time when these differences are thought to emerge.

Although identifying demographic risk factors and gender differences are important first steps in understanding longitudinal patterns of externalizing problems, research must also explore the behavioral processes hypothesized to be involved in these path ways. These relations may be investigated best in early childhood, when most children are developing social skills with peers (Howes, 1988; Kochanska & Radke-Yarrow, 1992) and when externalizing problems are significant predictors of later outcomes, such as social functioning (Keane & Calkins, 2004). Only a few studies have addressed early behavioral processes or substantive factors that may differentiate normative trajectories of externalizing problems from more stable and chronic trajectories (although see NICHD Early Child Care Research Network, 2004; Shaw et al., 2003). However, a focus on a child's behaviors in addition to their context may lead to a greater understanding of the mechanisms of development related to externalizing behavior problems in early childhood.

There are several factors that may affect the development of externalizing behaviors in toddlerhood, including language skills (Stansbury & Zimmerman, 1999), internalization of social rules (Kochanska, Murray, & Coy, 1997), and empathy (Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). Behavioral processes such as emotion regulation and sustained attention have been theorized to be particularly important in the support of positive social development, and problems with these processes are crucial factors in the etiology of psychopathology (Campbell, 2002; Cole, Michel, & Teti, 1994). Deficits in the ability to reduce distress or to sustain attention are not in themselves sufficient for the manifestation of externalizing behavior problems. However, these factors may be important early predictors because they are implicated in certain behaviors, such as negative emotionality and uncontrolled behavior, that are characteristic externalizing problem behaviors (Campbell, 2002), and they may differentiate normative declines in externalizing behaviors from more chronic and problematic pathways (Calkins, 1994; Calkins & Fox, 2002; Posner & Rothbart, 2000).

The Role of Emotion Regulation and Inattention

Emotion regulation refers to the internal and external processes involved in the modulation, maintenance, and expression of emotion (Kopp, 1989; Thompson, 1994). Emotion regulation may be measured during situations that have putative regulatory demands that elicit specific regulatory behaviors (e.g., distraction, self- soothing, help seeking) that serve to reduce distress. Thus, both degree of distress and specific regulatory behaviors are considered evidence of emotion regulation processes, as the two are often correlated (Buss & Goldsmith, 1998; Calkins & Johnson, 1998; Cole, Martin, & Dennis, 2004).

Problems regulating negative emotion are often considered to be one indicator of externalizing behavior problems (Campbell, 1995; Campbell et al., 2000; Keenan, 2000). However, negative emotionality is not synonymous with externalizing behavior. Emotions, even negative ones, serve a functional purpose (Thompson, 1994). For example, anger expressed by a toddler in the midst of throwing a tantrum may serve the purpose of maintaining persistence toward a goal or an object of desire. In particular, when difficulties in coping with negative emotions persist (e.g., venting, negative emotionality, and failure to use effective regulatory behaviors) and become a characteristic pattern of responding, children who are overwhelmed by distress and aggressively act out toward sources of frustration may have difficulties with later psychological adjustment (Bridges, Denham, & Ganiban, 2004; Calkins & Dedmon, 2000; Keenan, 2000).

There is some research that shows direct links between problematic emotion regulation and externalizing behavior problems. Eisenberg et al. (1996, 2000, 2001) have found consistently among school-aged children that externalizing problems are associated with lower emotion regulation skills, such as attention shifting and focusing. There is also evidence that younger children who have problems acquiring and using adaptive emotion regulation skills early in life are more likely to manifest externalizing behavior problems (Calkins, 2002; Calkins & Dedmon, 2000; Calkins, Gill, Johnson, & Smith, 1999). For example, in one study, toddlers with stable borderline and clinical levels of externalizing behavior problems showed more physical venting and tantrum behaviors and less putative regulatory behaviors than control children across tasks designed to elicit multiple levels of regulation (Calkins & Dedmon, 2000). In another study, it was found that preschoolers who were at extremes in emotion expressiveness (low or high, indicating problems with emotion regulation) and who also showed physiological dysregulation were more likely to show more externalizing symptoms (Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996). These results suggest that there may be negative consequences for toddlers who display early deficits in the regulation of emotions. However, little research has focused on how emotion regulation may have an ameliorative effect on externalizing behavior problems in early childhood.

Another factor implicated in the normative decline of externalizing problems in early childhood is the development of attention processes. During the 2nd year of life, children begin to use attention processes in the control of impulses and behavior (Kochanska, Coy, & Murray, 2001; Ruff & Rothbart, 1996). For example, toddlers with hyperactivity and related behavior problems were rated as high in inattentiveness by both of their parents (Campbell, Szumowski, Ewing, Gluck, & Breux, 1982). Studies with older children and adolescents have shown that inattention, in particular problems with sustaining attention during work tasks, has been linked to problem behavior (Bellanti, Bierman, & the Conduct Problems Prevention Research Group, 2000;

Campbell, Pierce, March, Ewing, & Szumowski, 1994; Olson, Schilling, & Bates, 1999). These results suggest that the ability to use attention skills in everyday situations is important for adaptive development in later childhood. In addition, much of the development of adaptive coping in early childhood is due to the physical development of anterior attention systems in the frontal cortex of the brain (Fox & Calkins, 2003; Posner & Rothbart, 2000). However, less is known about whether individual differences in attention, defined as the ability to sustain attention during everyday activities, is predictive of different patterns of externalizing behavior in early childhood.

Goals and Hypotheses of the Current Study

The primary goal of the current study was to use a semiparametric group-based approach to examine longitudinal profiles of externalizing behavior from age 2 to age 5. We used a structural equation mixture modeling (SEMM) technique that allowed for the description of discrete longitudinal profiles of externalizing behaviors that traditional analysis techniques would be unable to capture (Bauer & Curran, 2004). Using data collected from a sample of 383 boys and girls from ages 2 to 5, we hypothesized that the longitudinal profiles of externalizing behavior would be similar to trajectories found in past research with similarly aged samples (e.g., Shaw et al., 2003; NICHD Early Child Care Research Network, 2004). In particular, we expected to describe a chronic- clinical, a subthreshold, a normative, and a low profile of externalizing problems for both boys and girls.

A second goal was to advance understanding of the factors that might distinguish membership in the externalizing profiles. We expected that low SES would be a risk factor for having a high-chronic profile for both genders. Additionally, we performed separate models for boys and girls to illuminate possible gender differences. We expected that boys and girls would show similar profiles; however, we wanted to explore the possibility that predictors of membership in these profiles might differ for boys and girls.

The final goal was to examine behavioral processes that are important for the development of adaptive behavior during this early period of development and that are potentially responsible for distinguishing normative patterns of behavior problems from chronic patterns. In particular, we hypothesized that emotion regulation difficulties and inattention would distinguish membership in chronic-clinical profiles over the other longitudinal profiles of externalizing behavior, such that boys and girls with higher emotion regulation and lower inattention at age 2 would have lower profiles of externalizing behavior. We also expected these factors to be especially important in differentiating children who showed initially high levels of externalizing problems but showed lower levels of externalizing behavior with age from children who maintained chronically high levels of problem behavior. It may be the case that for children who start out high in externalizing behavior in toddlerhood but do not maintain this high level, these behavioral processes are especially important to acquire.

METHOD

Participants

Participants included 447 two-year-old children (215 male, 232 female) obtained from three cohorts as part of a larger ongoing longitudinal study. Sixty-seven percent were European American, 27% were African American, 4% were biracial, and 2% were Hispanic. At age 2, the

children were primarily from intact families (77%), and families were economically diverse, with Hollingshead (1975) scores ranging from 14 to 66 (M = 39.56).

Recruitment

The goal for recruitment was to obtain a representative community sample of children who were at risk for developing future externalizing behavior problems. Thus, all cohorts were recruited through child day care centers, the County Health Department, and the local Women, Infants, and Children program. Additionally, each gender was screened separately for approximately equal numbers of boys and girls, and recruitment was targeted to all areas of the county to obtain a sample that was representative in terms of race and SES.

Potential participants for Cohorts 1 and 2 (n = 307) were recruited at 2 years of age (Cohort 1: 1994–1996; Cohort 2: 2000–2001) and screened with the Child Behavior Checklist (CBCL 2–3; Achenbach, 1992), completed by the mother. Children with an externalizing T score of 60 or above were selected to be in the *externalizing risk* group (n = 143). Those with both externalizing and internalizing T scores below 60 were selected to be in the *low-risk* group. Cohort 3 was initially recruited when infants were 6 months of age (in 1998), on the basis of their level of frustration, as determined by laboratory observation and parent report (see Calkins, Dedmon, Gill, Lomax, & Johnson, 2002, for more information). This cohort was followed from 6 months of age through the infancy and toddler period, and children whose mother completed the CBCL at 2 years of age were included in the current study (n = 140). On the basis of these criteria, 21 children were placed in the externalizing risk group. Cohort 3 had a significantly lower average 2-year externalizing T score (M = 50.36) compared with Cohorts 1 and 2 (M = 54.49), t(445) = —4.32, p = .00. Of the entire sample (N = 447), 164 children met criteria for the externalizing risk group. There were no significant differences between any cohorts with regard to gender, $X^2(2, N = 447) = 0.63$, p = .73; race, $X^2(2, N = 447) = 1.13$, p = .57; or 2-year SES, F(2, 444) = 0.53, p = .59.

Attrition

Of the 447 participants, 399 participated at 4 years of age. Families lost to attrition included 20 who could not be located, 10 who moved out of the area, 9 who declined participation, and 9 who did not respond to phone and letter requests to participate. There were no significant differences between families who did and did not participate in terms of gender, $X^2(1, N = 447) = 3.27$, p = .07; race, $X^2(1, N = 447) = 0.70$, p = .40; 2-year SES, t(424) = 0.81, p = .42; or 2-year externalizing T score, t(445) = —0.36, p = .72. When children were 5 years of age, 365 families participated, including 4 who did not participate in the 4-year assessment. Families lost to attrition included 12 who could not be located, 10 who moved out of the area, 13 who declined participation, and 3 who did not respond to phone and letter requests to participate. Again, there were no significant differences between families who did and did not participate at 5 years in terms of gender, $X^2(1, N = 447) = 0.76$, p = .38; race, $X^2(1, N = 447) = 0.17$, p = .68; 2-year SES, t(424) = 1.93, p = .06; and 2-year externalizing T score, t(445) = —1.73, p = .09.

Missing Data

All three cohorts were included in the present study. The analysis we describe accounted for missing data longitudinally but did not include cases that were missing predictor or covariate information. Therefore, of the 447 possible participants, only 383 were available because of

missing data at 2 years of age: Thirty mothers did not complete the AD/HD Rating Scale (DuPaul, Power, Anastopoulos, & Reid, 1998), 11 refused to complete socioeconomic information, 10 refused to participate in the laboratory visit but completed questionnaires by mail, 10 could not be contacted by phone to schedule a laboratory visit but completed questionnaires by mail, and 3 had technical difficulties with the video equipment. Thus, the final sample for this study consists of 383 families, 149 (39%) with children who scored above the clinical or borderline range on the 2-year measure of externalizing behavior and 234 (61%) with children who scored below the range on externalizing behavior. These families were not significantly different from those who were missing data by gender, $X2(1, N = 447) = 1.67$, $p = .19$; race, $X2(1, N = 447) = 1.18$, $p = .28$; 2-year SES, $t(445) = 0.98$, $p = .33$; or 2-year externalizing T score, $t(445) = 1.57$, $p = .12$.

Procedures

When the children were 2 years of age, mothers brought their children to the laboratory and were videotaped during several tasks designed to elicit emotion regulation and mother–child interaction. For the purposes of this study, tasks designed to elicit anger or frustration (Laboratory Temperament Assessment Battery: Locomotor Version 2.0; Goldsmith & Rothbart, 1993) were used: a prize in a box task, in which cookies or a desirable toy were placed in a clear box that the child was unable to open for 2 min, and a high chair task, in which the child was placed in a high chair without any toys or snacks for 5 min. For the prize in a box task the mother was asked to limit her interactions with her child; however, during the high chair task she was instructed to respond to her child as she deemed necessary. If the child was highly distressed or cried hard for more than 30 s, the tasks ended. Also while at the laboratory, mothers completed the AD/HD Rating Scale-IV (DuPaul, Power, et al., 1998). When the children were 4 and 5 years of age, the mothers were asked to complete the CBCL 4-18 (Achenbach, 1991) as part of larger laboratory assessments.

Measures

Externalizing behavior problems. The CBCL (Achenbach & Edelbrock, 1983) Externalizing subscale, which includes items measuring aggressive, destructive, and oppositional behaviors, was used as an index of parent reports of externalizing behavior problems at each age. When the children were 2 years of age, mothers completed the CBCL for 2–3-yearolds (Achenbach, 1992). When the children were 4 and 5, mothers completed the CBCL for 4–18-year-olds (Achenbach, 1991). Achenbach (1992; Achenbach, Edelbrock, & Howell, 1987) has found these scales to be a reliable index of externalizing and internalizing behavior problems across childhood. At 2 years of age, the Externalizing subscale consisted of the minor subscales of aggression and destructive behavior, which were composed of 26 items, such as “defiant,” “gets in many fights,” “cruel to animals,” and “screams a lot.” At 4 and 5 years of age, the Externalizing subscale consisted of the minor subscales of aggression and delinquency, which were composed of 33 items, such as “argues a lot,” “destroys his/her own things,” “lying or cheating,” “gets in many fights,” “physically attacks people,” and “steals at home.” The mother indicated how true the statement was of her child by circling 0 if it was not true, 1 if it was sometimes true, or 2 if it was often true.

Although the CBCL does include T scores for each subscale, for the purposes of this study, we used the total scores of the Externalizing subscale to allow for maximum variation across the sample, with a possible range from 0 to 52 for the 2-year-old measure and 0 to 66 for the 4- and

5-year-old measure. In addition, the total scores allowed for examinations of gender effects, given that the 4- and 5-year T scores were already standardized for gender. Note that the range of each scale and the items included in each scale are somewhat different, because they tap externalizing symptoms that would be identifiable and expected in either the 2–3-year-old or the 4–18-year-old age range. As shown in Table 1, however, the range and mean scores for the 4- and 5-year assessments of our sample were each lower than that for the 2-year assessment, so, on average, there was no effect of the increase in number of items on the older version (see Table 1).

Table 1
Descriptive Statistics

Measure	*n*	Min	Max	*M*	*SD*
	2-year measures				
2-year socioeconomic status	383	14.00	66.00	39.74	11.15
2-year Externalizing Behavior raw score	383	1.00	46.00	15.67	8.58
2-year proportion of distress	383	0.00	0.98	0.12	0.18
2-year global negative reactivity	383	0.00	4.00	0.77	0.85
2-year global episode affect	383	−3.00	2.00	−0.10	0.78
2-year distraction use	383	0.50	2.50	1.71	0.35
2-year effectiveness of distraction	383	0.50	3.00	2.77	0.46
2-year global regulation	383	0.00	4.00	3.32	0.84
2-year emotion regulation score	383	−2.89	1.64	0.36	0.79
2-year Inattention subscale	383	0.00	18.00	5.76	3.78
	4-year measures				
4-year Externalizing Behavior raw score	383	0.00	36.00	10.57	6.92
	5-year measures				
5-year Externalizing Behavior raw score	383	0.00	38.00	10.24	7.67

Emotion regulation. Prior research has shown relations between emotion regulation and emotion reactivity measures (Calkins & Johnson, 1998; Stifter & Braungart, 1995); therefore, both types of behaviors were coded from videotapes of the frustration tasks (prize in a box and high chair). Reactivity was indexed by measures of distress or when the child whined, pouted, fussed, cried, screamed, or had a tantrum. It was coded in three ways: (a) proportion of distress—the amount of time (in seconds) the child was distressed divided by the total time of the task, (b) global negative reactivity—coded once for the entire task on a scale from 0 (*no negative response*) to 4 (*task ended with the child in extreme distress*), and (c) global episode affect—coded once for the entire task on a scale from —3 (*highly distressed affect*) to 3 (*highly positive affect*).

Regulation was indexed by measures of global regulation and the frequency and effectiveness of distraction as a strategy for regulating negative affect. All three codes were noted once for each entire task. Global regulation, defined as the use of behavioral skills in an effort to decrease distress during the tasks, was coded on a scale from 0 (*no control of distress across the task*) to 4 (*regulation of distress during most of the task*). One such behavioral skill, distraction, was coded on a scale from 0 (*not used at all*) to 2 (*often used throughout the task*) and was defined as being focused for at least 2 s on an object or event other than the object of distress (i.e., looking at posters on the wall, looking at clothing, looking at mom without trying to engage her). The

effectiveness of distraction was coded to measure whether the child's distress decreased when distraction was used, on a scale from 0 (*never used*) to 4 (*strategy use was always effective in decreasing distress*).

We used these measures because we thought they would best index a child's level of observable reactivity and appropriate regulation skills during tasks that had putatively regulatory demands. Four coders were involved in the reactivity and regulation coding. They trained by working together on 10% of the videotaped sessions and independently scoring another 10% for reliability purposes. Intercoder reliability for the proportion of distress measure was excellent ($r = .99$). Reliability kappas for the ordinal codes ranged from .83 (global regulation) to 1.00 (episode affect and distraction use). Each of the reactivity and regulation codes was correlated and averaged across tasks (mean $r = .25$, $p < .00$). Descriptive statistics for each average code are reported in Table 1.

Inattention. The Inattention subscale of the AD/HD Rating Scale (Du- Paul, Power, et al., 1998) was used as an index of children's difficulty with sustained attention at 2 years of age. This scale was originally created for use with 7–18-year-olds. However, it has also been validated for use with children 5 to 7 years of age (DuPaul, Anastopoulos, et al., 1998) and preschool children (3 to 5 years of age), with an alpha reliability for the Inattention scale of .88 (McGoey, DuPaul, Haley, & Shelton, 2003; Shelton, Woods, & Williford, 2001). The alpha reliability for the Inattention scale in this sample of toddlers was .83, indicating similar internal consistency. It is important to note that, although this scale is typically used to measure diagnostic criteria of ADHD, it was used only as a measure of reported difficulty with sustained attention in the present study. *Sustained attention* in our study was defined as the ability to use sustained attention in everyday situations, such as play activities. Thus, attention in this study does not fall under the rubric of emotion regulation, as it was not measured in an emotion-eliciting situation (Cole et al., 2004).
The Inattention subscale consists of nine items, such as "has difficulty sustaining attention in tasks or play activities," "is easily distracted," and "avoids tasks that require sustained mental effort." The mother was asked to code each item for how often the child exhibited that behavior, ranging from 0 (never) to 3 (always). The nine items were summed to create an inattention summary score (Table 1).

Summary of measures. The emotion regulation measures at 2 years of age; the Inattention subscale of the AD/HD Rating Scale (DuPaul, Power, et al., 1998), collected at 2 years of age; and the CBCL (Achenbach, 1991, 1992) Externalizing Behavior subscales, collected at 2, 4, and 5 years of age, are examined in the present study. As we describe, the analyses allowed for missing data across the repeated measures of externalizing behavior but did not allow missing data across the predictor variables. Overall, 383 children who had complete predictor data at 2 years of age, including demographic (e.g., gender, SES), reactivity, regulation, inattention, and externalizing measures, were used as cases in the analyses.

DATA ANALYSES GOALS AND PLAN

To investigate possible individual differences in longitudinal patterns of externalizing behavior, we used an SEMM. As a semiparametric group- based approach, SEMM allows for estimation of qualitatively different groups when group membership cannot be observed a priori (Bauer &

Curran, 2004). Recent work of Nagin and Tremblay (1999) and B. Muthén (2001) shows how SEMM can be used to test differential patterns of development in psychological phenomena. In the current study, externalizing behavior at age 2 was measured with a different form of the CBCL (age 2–3) than was externalizing behavior at ages 4 and 5 (CBCL 4–18). Thus, we did not estimate linear growth trajectories of externalizing behavior (e.g., Nagin & Tremblay, 1999) because of the possibility of change in measurement; rather, we estimated the mean of externalizing behavior at each age independently within each class (e.g., latent profile analysis [LPA]; Gibson, 1959). For this reason, we refer to classes as longitudinal profiles rather than trajectories throughout the rest of this article. We defined longitudinal profiles as a description of levels of behavior over time, or, in particular, the description of externalizing behavior from the age of 2 to 5.

As a submodel of SEMM, LPA is a multiple-group structural equation model in which the group variable is unobserved. Thus, LPA postulates that observed associations are explained by differences in the means of the continuous measures over latent classes (Bauer & Curran, 2004). There are several benefits to using an SEMM such as LPA, which improves on traditional grouping or clustering techniques. First, LPA performs a maximum likelihood estimation that uses all observations associated with the dependent variable in a data set (Little & Rubin, 1987). This method assumes that the data are missing at random rather than missing completely at random (e.g., listwise deletion) and has been recently recommended by methodologists as an appropriate way to accommodate missing data (Schafer & Graham, 2002).

Second, LPA allows for prediction of the probability of membership in profiles to be estimated in the same model as the estimation of the profiles. This flexibility allows for the possibility that there is uncertainty in class membership and allows one to predict the probability of membership in a group while estimating the classes simultaneously. In other words, unlike in more traditional methods (e.g., cluster analysis), people are not forced into groups, which can result in classification errors. Finally, LPA relies on a formal statistical model rather than an ad hoc algorithm that is based on decision rules (e.g., cluster analysis; Everitt & Hand, 1981).

The function for LPA takes the general form $Y_{(tik)} = \mu_{(tk)} + \epsilon_{(tik),}$ where $\mu_{(tk)}$ is the class-specific mean for the observed variable Y at time t for class k and $\epsilon_{(tik)}$ are within-class individual differences from $\mu_{(tk)}$. $\epsilon_{(tik)}$ is assumed to be normally distributed within class with variance $\sigma_{(tk)}$, allow ing for potential heteroscedasticity across time and classes. In this case, the Yvariables are observed CBCL scores at ages 2, 4, and 5, and the estimated class means $\mu_{(tk)}$ for these variables describe the longitudinal profile for each class.

In the current study, data were analyzed with Version 3.01 of Mplus (L. Muthe´n & Muthe´n, 2004), and models with three through six profiles were estimated. Determination of best model fit was assessed via Bayesian information criteria (BIC), where the smallest number indicates the best fit. This index has been shown to identify the appropriate number of groups in finite mixture models (D'Unger, Land, McCall, & Nagin, 1998; Keribin, 1997) and penalizes the models for number of parameters, thus indicating possible overfitting of the data. Random start values were specified for the model, and specific start values were specified only when models were run to compare different reference groups. In addition, the model was specified to allow means and residual variances of the externalizing scores to be estimated independently within each profile.

When one is fitting models such as these, issues such as convergence are important, especially for more complex models (Hipp & Bauer, 2006). For our case, the model was relatively simple, and random start values resulted in a converged solution.

Longitudinal LPA is a useful tool for describing individual differences; however, it is important not to reify the latent classes, as they do not necessarily represent qualitatively distinct groups in the population (Bauer & Curran, 2003). Given this limitation, it is still valuable to use mixture-modeling techniques, as they may begin to more accurately represent the complexity of developmental theory compared with traditional variable- based approaches and are useful tools for addressing developmental change over time, which is a goal of developmental science (Magnusson & Cairns, 1996).

RESULTS

Following preliminary and descriptive analyses, results are presented in accordance with the data analysis plan. We first discuss model comparisons for the multilevel LPAs and describe the longitudinal profiles of externalizing behavior from 2 to 5 years of age for each gender. Second, we discuss how SES, emotion regulation, and inattention at age 2 predicted membership in latent profiles.

Preliminary Analyses and Data Reduction

Because of the large number of predictors, we performed preliminary analyses to reduce the number of variables to be used in the LPA. In particular, observational measures of regulation and reactivity were reduced to a single summary score (Calkins & Johnson, 1998). There are conceptual and empirical arguments for combining these constructs in a measure of emotion regulation. Conceptually, reactivity is a part of the response to the contextual demands, along with the display of regulatory strategies used to alter that reactivity. Empirically, these measures were significantly intercorrelated at $p < .01$. Positive correlation values ranged from .35 to .77. Negative correlation values ranged from —.35 to —.91. To obtain a single score that represented a high ability to regulate and a low level of distress, we performed a principal-components factor analysis. One factor emerged, accounting for 70% of the variance, with an eigenvalue of 4.2. This factor, labeled Emotion Regulation, loaded positively and highly on global regulation (.91), effectiveness of distraction (.83), distraction (.52), and episode affect (.88). In addition, the Emotion Regulation factor loaded negatively and highly on proportion of distress (—.85) and global negative affect (—.94). Using the factor analysis to inform the creation of a composite variable, we z scored and averaged each variable to create a final variable. We reverse scored proportion of distress and global negative affect. Means and standard deviations for all predictor and outcome variables prior to standardization are presented in Table 1. In addition, intercorrelations among the reactivity and regulation measures are shown in Table 2.

Table 2

Intercorrelations of Reactivity and Regulation Measures at 2 Years of Age

Measure	1	2	3	4	5	6
1. Proportion of distress	—	.77**	−.71**	−.26**	−.59**	−.78**
2. Negative reactivity		—	−.81**	−.35**	−.67**	−.91**
3. Episode affect			—	.30**	.65**	.77**
4. Distraction				—	.43**	.35**
5. Distraction effectiveness					—	.67**
6. Global regulation						—

** $p < .01$.

Simple correlations between SES, measured by the Hollings- head (1975) index, and all outcome variables (externalizing behavior at 2, 4, and 5 years of age) revealed that SES was negatively and significantly related to externalizing behavior problems at 2 years of age (r = —.17, p < .00). Thus, children rated by their parents as having higher externalizing scores at age 2 also had parents with lower SES. A two-way multivariate analysis of variance with race (Caucasian vs. minority) and gender was used to test for group differences on all outcome variables (externalizing behavior at 2, 4, and 5 years of age). This analysis indicated that there were no significant race or gender differences on the outcome variables. Thus, in subsequent analyses, race was not included. In addition, in spite of the lack of gender differences on outcome measures, the analyses were run separately by gender to illuminate possible moderating effects of gender regarding the development of externalizing behavior problems (Keenan & Shaw, 1997).

Latent Profile Mixture Model Comparisons

We fitted models with three, four, five, and six profiles to determine the optimal number of profiles needed to describe externalizing behavior from 2 to 5 years of age for the current sample. For girls, the BIC score was —3,465 for three profiles, —3,461 for four profiles, —3,369 for five profiles, and —3,483 for six profiles. Results were similar for the boys. In particular, the BIC was —3,335 for three profiles, —3,324 for four profiles, —3,329 for five profiles, and —3,349 for six profiles. The four- profile models yielded the smallest numbers (BIC) and thus fit the data best for both boys and girls.

Further examination of the models indicated that the four-profile model yielded unique information and had an acceptable number of members in each profile for both boys and girls. In these analyses, the smallest profiles represented close to 10% of the sample and thus were unlikely to represent a very small group of people clustered together in a spurious way, a problem often associated with model overfit (Hipp & Bauer, 2006). In addition, we calculated the average posterior probability of membership to determine how well each child fit his or her assigned profile. Posterior probabilities were high (M = 91% for girls and 88% for boys) and ranged from 87% to 97% for girls and from 87% to 92% for boys. Thus, on average, children had at least 87% probability of being placed in a profile that best described their individual pattern of externalizing behavior over time and aligned them with individuals with similar patterns. This information, in combination with the BIC, reflects a high degree of confidence in profile assignment and model fit. Post hoc probing of posterior probabilities indicated that there was one outlier. That is, 1 girl had a 69% probability (three standard deviations less than M = 97%) of being correctly assigned to the highest profile. Further investigation indicated that this girl had a slightly higher but not extreme score of externalizing behavior at age 2 and missing data at ages 4 and 5. According to this information, no other profile would be a better fit for this girl.

In addition, we examined the profiles for outliers and nonnormality in a post hoc fashion on the dependent variable, externalizing behavior at ages 2, 4, and 5, for each profile. We saved the profile's membership values and analyzed descriptive statistics on externalizing behavior in each profile. Examinations of histograms and normal quantile plots indicated that all of the profiles fit normality assumptions and that there were no consistent outliers across measurement periods; thus, profiles did not seem to be unduly influenced by a person with an extreme pattern of

behavior. For an illustration of this diagnostic process and representative plots, see Figures 1 and 2. In sum, model fit indexes and post hoc diagnostics revealed that these models fit the data well.

Description of longitudinal profiles of externalizing behavior for girls. The final model for both boys and girls estimated four longitudinal profiles of externalizing behavior (see Figures 3 and 4). For girls, the highest profile accounted for 11% of the sample and displayed high levels of

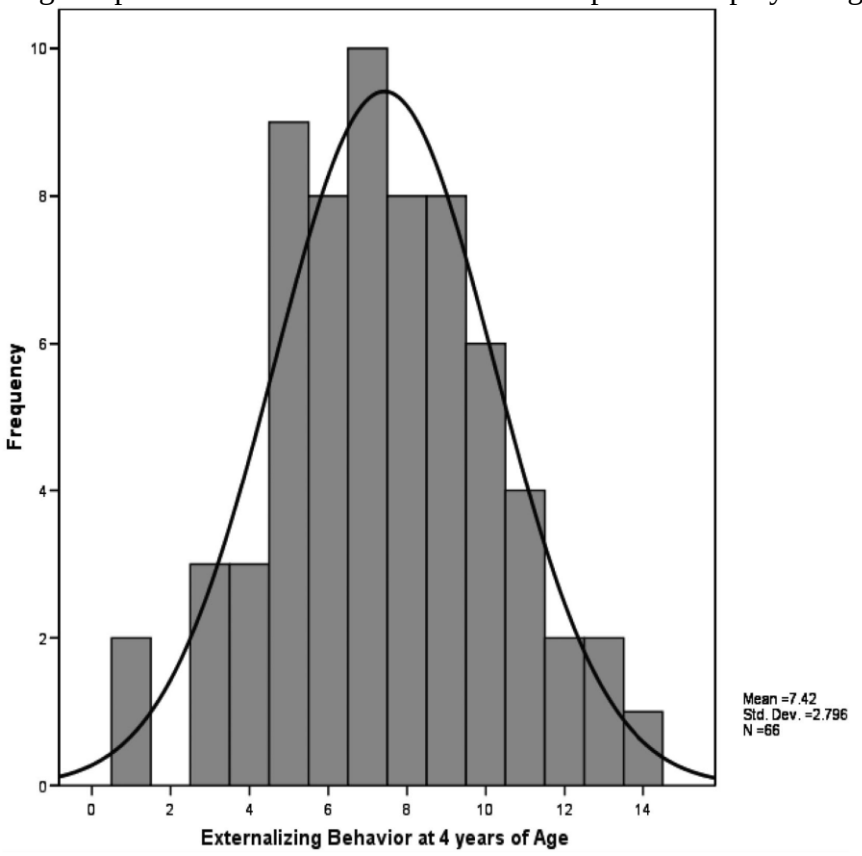

Figure 1. Diagnostic histogram of externalizing behavior at 4 years for the boys' normative profile.

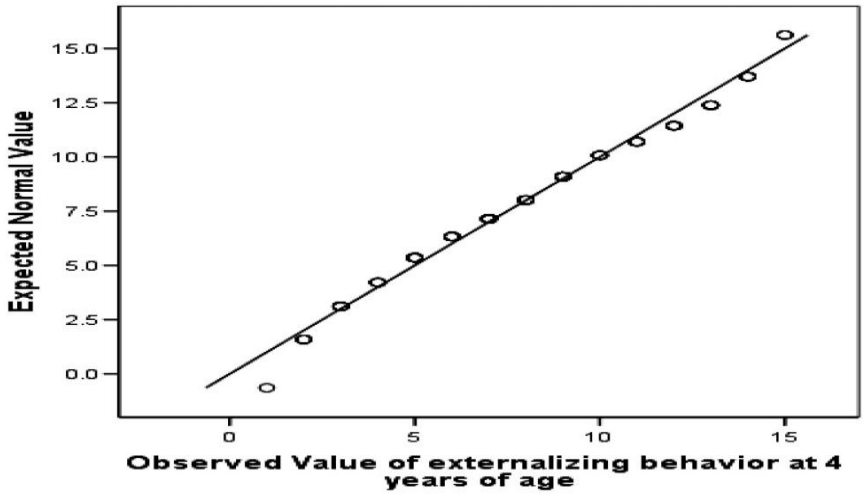

Figure 2. Diagnostic normal quantile plot of externalizing behavior at 4 years for the girls' normative profile.

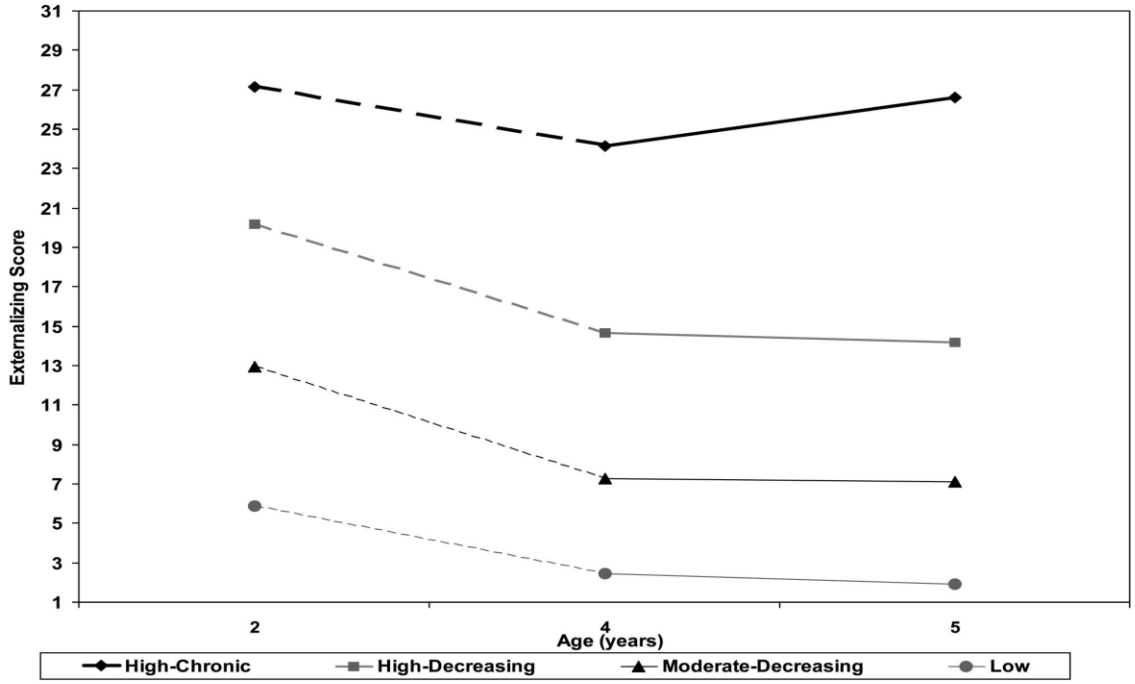

Figure 3. Girls' profiles of externalizing behavior in early childhood.

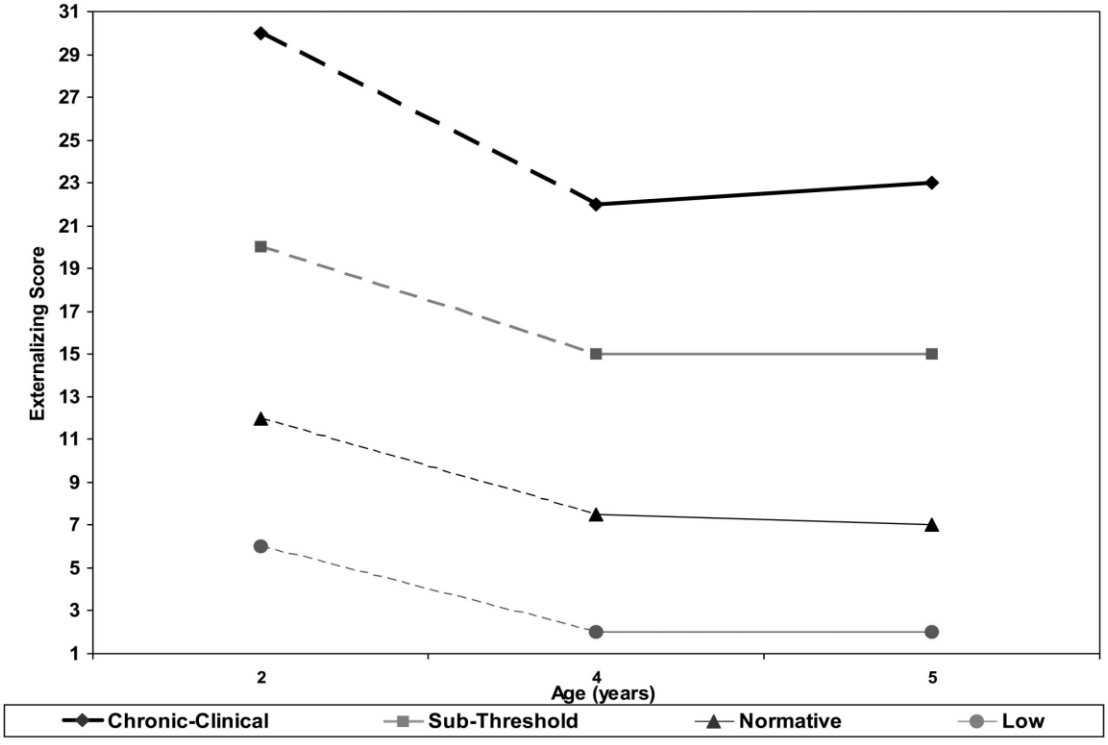

Figure 4. Boys' profiles of externalizing behavior in early childhood.

externalizing behavior (M = 27.00, SE = 1.30, at age 2; M = 23.00, SE = 1.10, at age 4; and M = 27.00, SE = 1.50, at age 5). This profile was within clinical range for externalizing behavior problems at each age and was thus named the *chronic-clinical* profile.

The second highest profile for girls accounted for 22% of the sample and displayed a high initial level of externalizing behavior at age 2 (M = 21.00, SE =1.00) and lower levels of externalizing behavior at age 4 (M = 14.00, SE = 1.00) and age 5 (M = 14.00, SE = 0.64). This profile was within the borderline-clinical range of externalizing behavior at age 2 and was below borderline levels at age 4 and 5. Thus, this profile was named the *subthreshold* profile.

The mid-level profile for girls accounted for 51 % of the sample and displayed modest levels of externalizing behavior at age 2 (M = 13.50, SE = 0.99) and lower levels of externalizing behavior atage 4(M= 8.00, SE= 0.64) and at age 5 (M = 7.50, SE = 0.62). This profile accounted for the largest percentage of the sample and mirrored the normative trend of a higher level at age 2 and a general decline of externalizing behavior, as often described in the literature (e.g., Tremblay et al., 1999), and thus was named the *normative* profile. This profile was well below the borderline and clinical range for externalizing behavior at all ages.

Finally, the lowest profile for girls accounted for 16% of the sample and displayed an extremely low level of externalizing behavior at age 2 (M = 6.00, SE = 1.10) and lower levels of externalizing behavior at age 4 (M = 3.00, SE = 0.66) and at age 5 (M = 2.00, SE = 0.85). This profile was well below borderline and clinical range for externalizing behavior problems at all ages and was named the low profile.

Description of longitudinal profiles of externalizing behavior for boys. There were similarities between the girls and the boys in the descriptions of the profiles. Thus, the names of the profiles were retained for boys as well. For boys, the chronic-clinical profile accounted for 9% of the sample and showed high levels of externalizing behavior (M = 30.00, SE =3.70, at age 2; M = 22.00, SE = 5.80, at age 4; and M = 23.00, SE = 7.50, at age 5). This profile was within the clinical range for externalizing behavior problems at each age.

The subthreshold profile for boys accounted for 39% of the sample and displayed a high initial level of externalizing behavior at age 2 (M = 20.00, SE = 2.70) and lower levels of externalizing behavior at age 4 (M = 15.00, SE = 1.00) and at age 5 (M = 15.00, SE = 0.94). This profile was within the borderline-clinical range for externalizing behavior problems at age 2 and was below clinical levels at ages 4 and 5.

The normative profile for boys accounted for 41% of the sample and displayed modest levels of externalizing behavior at age 2 (M = 12.00, SE = 1.90) and lower levels of externalizing behavior at age 4 (M = 7.50, SE = 0.72) and at age 5 (M = 7.00, SE = 0.78). This profile, as with the normative profile for girls, represented the largest segment of the sample for boys and reflected the normative trend of a high intercept at age 2 and a general decline of externalizing behavior, as often described in the literature (e.g., Tremblay et al., 1999). This profile was well below borderline and clinical range for externalizing behavior at all ages.

Finally, the low profile for boys accounted for 11% of the sample and showed an extremely low level of externalizing behavior at age 2 (M = 6.00, SE = 0.94) and even lower levels at age 4 (M = 2.00, SE = 1.15) and at age 5 (M = 2.00, SE = 0.43). This profile was well below borderline and clinical range for externalizing behavior problems at all ages.

Prediction of Membership in Profiles: SES, Emotion Regulation, and Inattention

We conducted planned comparisons to determine whether SES, emotion regulation, or inattention predicted the probability of membership in the longitudinal profiles of externalizing behavior. Predictor variables were z scored to allow for ease of interpretation. Tables 3 and 4 for girls and Tables 5 and 6 for boys present the results of the planned comparisons in terms of odds ratios and the corresponding significance tests quantified as a t value for each predictor.

Table 3
Odds Ratios for Planned Comparison With the Chronic-Clinical Profile for Girls

Measure	*B*	*SE*	*t*(τ)	Odds ratio
		Subthreshold profile		
Socioeconomic status	−0.07	0.37	−0.19	0.93
Emotion regulation	3.79	1.86	2.04*	44.00
Inattention	−0.59	0.46	−1.28	0.55
		Normative profile		
Socioeconomic status	0.18	0.30	0.59	1.19
Emotion regulation	1.09	0.38	2.90**	2.98
Inattention	−1.51	0.35	−4.39***	0.22 (4.54)
		Low profile		
Socioeconomic status	0.25	0.36	0.69	1.28
Emotion regulation	2.01	0.53	3.81**	7.50
Inattention	−2.88	0.71	−4.08***	0.06 (16.6)

Note. Reciprocal odds ratios in parentheses refer to the odds of membership in the comparison profile.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4
Odds Ratios for Planned Comparison With the Subthreshold Profile for Girls

Measure	*B*	*SE*	*t*(τ)	Odds ratio
		Normative profile		
Socioeconomic status	0.24	0.27	0.91	1.27
Emotion regulation	−2.70	1.95	−1.39	0.07
Inattention	−0.93	0.41	−2.27*	0.40 (2.50)
		Low profile		
Socioeconomic status	0.32	0.29	1.09	1.38
Emotion regulation	−1.78	1.78	−1.00	0.17
Inattention	−2.29	0.67	−3.42***	0.10 (10.00)

Note. Reciprocal odds ratios in parentheses refer to the odds of membership in the comparison profile.
* $p < .05$. *** $p < .001$.

Planned comparison results for girls. The first comparison used the chronic-clinical profile as the reference group in comparison with all other profiles. SES did not predict membership in the chronic-clinical profile in comparison with all other profiles for the girls. However, results indicated that children's emotion regulation and inattention had a strong impact on the probability of being in the subthreshold profile, the normative profile, and the low profile over the chronic-clinical profile.

In particular, for every one standard deviation increase in emotion regulation, the odds of being in the subthreshold profile increased 44-fold, the odds of being in the normative profile increased 3-fold, and the odds of being in the low profile increased 8-fold compared with the chronic-clinical profile. In addition, for every one standard deviation increase in inattention, the odds of being in the chronic-clinical profile increased 18-fold as compared with the low profile and increased 4.5-fold as compared with the normative profile. Inattention did not differentiate between the subthreshold profile and the chronic-clinical profile. Thus, low levels of emotion regulation at age 2 distinguished the chronic-clinical profile from all other profiles, especially the subthreshold profile, and high levels of inattention distinguished membership in the high-chronic profile from membership in the normative and low profiles.

The second planned comparison used the subthreshold profile as the reference group. Again, there were no significant findings for SES. Results indicated that low emotion regulation was a significant predictor of having a chronic-clinical profile versus a subthreshold profile, a finding that was repeated from the first comparison. Emotion regulation did not predict membership in the subthreshold profile when compared with the normative profile or the low profile. Thus, levels of emotion regulation at age 2 were not important for distinguishing these lower profiles. Additional results from this comparison indicated that for every one standard deviation increase in inattention, the odds of being in the subthreshold profile increased 10-fold as compared with the low profile and increased almost 3-fold as compared with the normative profile. Thus, membership in the subthreshold profile was characterized as having more emotion regulation at age 2 when compared with the chronic-clinical profile but more inattention at age 2 than the normative and the low profiles.

Planned comparison results for boys. The first comparison used the chronic-clinical profile as the reference group in comparison with all other profiles. For boys, SES did differentiate the profiles. In particular, for every one standard deviation increase in SES for boys, the odds of being in the subthreshold group increased 4-fold compared with the chronic-clinical profile. Emotion regulation, however, was not a predictor of the profiles for boys. Results did indicate that children's inattention differentiated membership in the low profile from the chronic-clinical profile. That is, for every one standard deviation increase in inattention, the odds of being in the chronic-clinical profile increased 15-fold from being in the low profile. Inattention did not differentiate the normative profile or the subthreshold profile from the chronic-clinical profile. Thus, low SES at age 2 distinguished membership in the chronic- clinical profile from membership in the subthreshold profile, and inattention at age 2 distinguished membership in the chronic- clinical profile from membership in the low profile.

The second planned comparison used the subthreshold profile as the reference group. Again, SES was lower in the chronic-clinical profile than in the subthreshold profile, and emotion

regulation did not differentiate any profile in relation to the subthreshold profile, findings that were repeated from the first comparison. Furthermore, results indicated that higher inattention was a significant predictor of having a subthreshold profile versus the normative and low profiles. That is, for every one standard deviation increase in inattention, the odds of being in the subthreshold profile increased almost ninefold as compared with the low profile and increased twofold as compared with the normative profile. Thus, membership in the subthreshold profile for boys was characterized as having lower SES than the chronic-clinical profile and higher inattention at age 2 than the normative and low profiles.

Table 5
Odds Ratios for Planned Comparison With the Chronic-Clinical Profile for Boys

Measure	*B*	*SE*	*t*(τ)	Odds ratio
		Subthreshold profile		
Socioeconomic status	1.47	0.69	2.13*	4.00
Emotion regulation	0.74	1.32	0.56	2.09
Inattention	−0.55	1.06	−0.52	0.58
		Normative profile		
Socioeconomic status	1.22	0.76	1.61	3.39
Emotion regulation	0.59	1.35	0.44	1.80
Inattention	−1.32	1.07	−1.24	0.27
		Low profile		
Socioeconomic status	1.59	0.87	1.83	4.90
Emotion regulation	1.69	2.10	0.81	5.42
Inattention	−2.72	1.18	−2.30*	0.07 (14.29)

Note. Reciprocal odds ratios in parentheses refer to the odds of membership in the comparison profile.
* $p < .05$.

Table 6
Odds Ratios for Planned Comparison With the Subthreshold Profile for Boys

Measure	*B*	*SE*	*t*(τ)	Odds ratio
		Normative profile		
Socioeconomic status	−0.26	0.66	−0.39	0.77
Emotion regulation	−0.15	0.27	−0.55	0.86
Inattention	−0.76	0.24	−3.16**	0.47 (2.13)
		Low profile		
Socioeconomic status	0.11	0.66	0.17	1.12
Emotion regulation	0.96	1.46	0.66	2.61
Inattention	−2.17	0.46	−4.67***	0.11 (9.09)

Note. Reciprocal odds ratios in parentheses refer to the odds of membership in the comparison profile.
** $p < .01$. *** $p < .001$.

DISCUSSION

The goal of this study was to identify longitudinal profiles of externalizing behavior from age 2 to age 5 for girls and boys and to distinguish these profiles on the basis of SES, emotion regulation, and inattention. The findings contribute important information to the growing body of literature examining the heterogeneity of externalizing problems characterized by aggressive, destructive, and oppositional behavior in children. In addition, for this study we used LPA, which allowed us to longitudinally examine the levels of externalizing behavior over time regardless of the fact that different measures were used at 2 years than at 4 and 5 years of age. This flexibility to describe behavior over time regardless of different measures is highlighted in this study, although linear changes (e.g., increases and decreases) could not be described.

The LPA semiparametric technique used in this study yielded four profiles of externalizing behavior for both boys and girls from ages 2 to 5: a chronic-clinical profile, which for both genders represented high levels of externalizing behavior within the clinical range; a subthreshold profile, which represented an initially borderline-clinical level of externalizing behavior for both genders at age 2 and lower levels of externalizing behavior at ages 4 and 5; a normative profile, which showed moderate amounts of externalizing behavior at age 2 and lower levels at ages 4 and 5 for both genders; and a low profile, which represented low levels of externalizing behavior at each age for both genders. Follow-up diagnostics revealed that the profiles were normally distributed and not driven by outliers. In addition, the sets of profiles were remarkably similar for both genders, although boys started out higher in the chronic-clinical profile and ended up slightly lower at ages 4 and 5 than girls. However, for both genders, this profile was well within clinical range at all ages. We found more extensive gender differences when we examined the behavioral processes that predicted membership in the profiles.

As hypothesized, these descriptions of profiles were similar to past research examining trajectories of externalizing behavior problems. In the current study, 11% of girls and 9% of boys showed chronic-clinical levels of externalizing behavior from ages 2 to 5. These percentages of high chronic problem behavior replicate findings from previous work examining trajectories of externalizing behavior in early childhood. Shaw et al. (2003) reported that 5.6% of boys displayed high persistent patterns of conduct disorder from ages 2 to 8. In addition, Tremblay et al. (2004) reported that 14% of children displayed high and increasing patterns of aggression from 17 months to 3 years of age. Finally, the NICHD Early Child Care Research Network (2004) Study of Early Child Care found that 3% of the sample (including girls) showed a chronically high level of physical aggression from 2 to 9 years of age, which is a lower percentage than in the current study. However, this would be expected given that the Study of Early Child Care was a low-risk sample and the outcome measure was physical aggression, a more specific form of externalizing behavior (NICHD Early Child Care Research Network, 2004). Overall, each of these studies described a high group, a moderate group, and a low group, which is similar to our findings. In addition, although these studies were able to examine change over time (i.e., trajectories), our results are comparable in that the profiles represent similar levels of behavior problems over time. The consistent finding of a chronic-clinical group emphasizes the need to examine factors that differentiate children who display high chronic levels of behavior problems from those who display more normative levels during early childhood.

The second goal of the current study was to identify predictors of membership in the different profiles to increase our understanding of heterogeneity in patterns of externalizing behavior problems across early childhood. Past research has focused mostly on the trajectories of boys' problem behavior (i.e., Moffit et al., 1996; Shaw et al., 2003) and has shown that boys are more likely to have highly stable aggressive behavior in early childhood (Cummings et al., 1989; Olweus, 1979; Shaw, Gilliom, & Giovannelli, 2000). One exception, the NICHD Early Child Care Research Network (2004) Study of Early Child Care, included girls but found that boys had a higher probability of membership in the high-chronic class of physical aggression. In addition, in contrast to a focus on gender differences in level of problem behavior, researchers have postulated that a focus on different predictive models for girls and boys may be of more importance (Martin, 1981; NICHD Early Child Care Research Network, 2004; Renken, Egeland, Marvinney, & Mangelsdorf, 1989). Unfortunately, most recent studies that have used semiparametric methods have not examined girls. Thus, in the current study we examined separate models for boys and girls and found that both boys and girls had high levels of externalizing behavior from ages 2 to 5 but that membership in these profiles was predicted by different factors for girls and boys. Thus, it is clearly important to study patterns of externalizing behavior in both genders during early childhood.

First, we examined SES as a possible predictor of membership in the profiles for boys and girls. Past research has found that socioeconomic constructs such as maternal education and teenage parenthood are risk factors for maintaining high and persistent levels of problem behavior in childhood (e.g., Nagin & Tremblay, 2001). In the current study, SES (e.g., Hollingshead, 1975, index) did not differentiate the profiles for girls. For boys, however, SES was a predictor of membership in the chronic-clinical profile compared with the subthreshold profile. Thus, lower SES at age 2 was a risk factor for boys maintaining clinical levels of externalizing behavior from ages 2 to 5. This finding fits with past research that has shown low SES to be a risk factor for boys' behavior problems (NICHD Early Child Care Research Network, 2004; Shaw, Keenan, & Vondra, 1994; Shaw et al., 1998). Moreover, limited economic resources have been found to exacerbate parenting problems (Campbell et al., 2000). Thus, it could be that increased environmental stressors and lack of support, which are common in low-SES families, make it difficult for mothers to provide the same levels of responsiveness to their children as higher SES mothers can provide. However, the fact that SES was not found to be a predictor for girls is somewhat surprising. Shaw et al. (1998) found that boys were more negatively affected by a lack of maternal responsiveness, suggesting that lower maternal responsiveness affects boys more than girls or affects parents' ratings of boys' behaviors more than girls' behaviors. Clearly, more research is needed to understand the family context of girls who show high levels of problem behavior in early childhood.

We also examined an observed measure of emotion regulation as a possible predictor for membership in the profiles. For girls, emotion regulation at age 2 was an important predictor for differentiating the chronic-clinical profiles from all other profiles. This was especially important for distinguishing the chronic-clinical profile from the subthreshold profile. In particular, girls were 44 times more likely to be in the subthreshold profile compared with the chronic-clinical profile for every one standard deviation increase in emotion regulation at age 2. In other words, better emotion regulation ability at age 2 differentiated girls who started out at borderline-clinical levels of externalizing behavior and then showed lower levels of externalizing behavior at 4 and

5 from girls who displayed chronic and clinical levels of behavior problems across the preschool period.

These results are interesting given that emotion regulation did not distinguish the normative and low profiles from the subthreshold profile. This indicates that it may be especially important for girls who start at borderline-clinical levels of externalizing behavior to have high emotion regulation skills at age 2. In addition, the relation between externalizing behavior and emotion regulation was not necessarily a linear one, such that the level of emotion regulation did not simply decrease as the level of externalizing problems increased across the profiles. In other words, better emotion regulation at age 2 was particularly important for differentiating the two highest profiles of externalizing behavior problems. There is limited research describing precursors for girls' problem behavior. Studies have failed to find predictors for girls' externalizing behavior problems (e.g., Shaw et al., 1994, 1998), and thus this study adds valuable information to the limited knowledge concerning the development of early behavior problems in girls. For boys, emotion regulation was not a predictor. The fact that emotion regulation was important for girls but not for boys lends some support for the hypothesis that girls mature faster than boys and thus acquire more adaptive skills at an earlier age (Keenan & Shaw, 1997, 2003). In fact, in the current sample, boys had significantly less emotion regulation at age 2 than girls did. It could be that emotion regulation becomes an important predictor for boys later in the preschool period; thus, future research should examine emotion regulation longitudinally, especially in relation to externalizing behavior problems.

In addition to emotion regulation and SES, we also examined inattention as a predictor of membership in the profiles. For girls, inattention differentiated the chronic-clinical profile and the subthreshold profile from all other profiles. In particular, higher inattention at age 2 predicted membership in both of the high profiles over the normative and low profiles but did not distinguish the high profiles from each other. The high profiles were only distinguished on levels of emotion regulation. Thus, inattention at age 2 was a risk factor for girls who displayed a profile with initial borderline-clinical levels of externalizing behavior problems and for girls who maintained chronically high levels of externalizing behavior problems over the preschool period.

Similar results for inattention were found for boys. Inattention at age 2 predicted membership in the chronic-clinical profile compared with the low profile and predicted membership in the sub-threshold profile compared with the normative and low profiles. In sum, for boys, the only differentiating factor between the high profiles was SES. However, higher levels of inattention at age 2 increased the likelihood of having higher profiles of externalizing behavior (chronic-clinical or subthreshold) compared with the normative and low profiles. Past research has found that inattention problems are risk factors for externalizing behavior (Bellanti, Bierman, & the Conduct Problems Prevention Research Group, 2000; Campbell et al., 1994; Olson et al., 1999; Winsler & Wallace, 2002). The current results also indicate that inattention is indeed a risk factor for higher levels of externalizing behavior for both genders in early childhood. However, it is less clear what this may mean for later outcomes given that behavior problems and sustained attention problems at early ages is often linked with later more serious problems such as oppositional defiant disorder, conduct disorder, and ADHD (Swaab-Barneveld et al., 2000). Future research should examine whether profiles such as the ones we present for boys and girls predict such outcomes.

In sum, as hypothesized, these results suggest that early deficits in emotion regulation and sustained attention have deleterious implications for the profiles of externalizing behavior problems over the toddler and preschool period. The findings from this study support the idea that early individual differences in the ability to regulate emotion are implicated in psychological adjustment, especially for girls (Calkins & Dedmon, 2000). In particular, emotion regulation may assist high-risk girls in decreasing their behavior problems across early childhood. Inattention, conversely, was a risk factor for having high levels of externalizing behavior over the toddler to preschool period for both genders.

Several limitations of the present study need to be addressed. First, generalizability may be limited, because participants were selected to represent the demographics of the larger community but were overselected for externalizing problems at age 2 to provide sufficient numbers of both boys and girls at risk for these behaviors. The addition of Cohort 3 also may limit the generalizability of this sample to other high-risk samples because the selection procedures were not consistent and Cohort 3 displayed lower levels of externalizing behavior at 2 years of age than Cohorts 1 and 2. Overall, the addition of this group of children somewhat decreased the extreme nature of the sample while providing a larger sample size with which we could model more parameters. It is necessary to replicate and confirm these results with other samples, as future work with randomized samples of boys and girls may lead to different conclusions. However, the selection criteria may also be considered a strength of the study because a higher percentage (11% of girls, 8% of boys) of the sample was included in a chronic-clinical profile of externalizing behavior across early childhood in comparison with previous research in this area (Shaw et al., 2003; Tremblay et al., 2004). This larger high profile also results in more power to predict the consistently high levels of externalizing behaviors over time. Shaw et al. (2003) suggested that using samples that are selected from factors other than socioeconomic risk, such as this one, and including girls in the sample may help clarify the processes involved in the stability of problem behavior (Shaw et al., 2003).

Another concern regarding this study is shared method variance. Although it is not an issue for the associations between emotion regulation and externalizing behavior, method and informant were shared between the measures of inattention and externalizing behavior. Future research should include predictor variables from earlier developmental periods (e.g., infancy) than the profiles or from other reporters to temper the problem of shared variance (e.g., NICHD Early Child Care Research Network, 2004).

Finally, we should discuss the strengths and limitations of longitudinal LPA. First, we emphasize that these profiles were formed on the basis of probabilities, which allows for the possibility that there is uncertainty in which classes people may belong to and allows one to predict the probability of membership in a group while estimating the classes simultaneously. These strengths of LPA improve on past methods used to identify groups, which were prone to classification error or based on ad hoc algorithms rather than formal statistical models.

Other strengths of LPA are the flexibility to describe behavior over time, even when the measurement of behavior changes, and to assume that different populations exist rather than just one population, as is the assumption in variable-based approaches. The findings we present

would not be captured with cross-sectional variable-oriented analyses. For example, better emotion regulation is not simply associated with less externalizing behavior. Rather, more emotion regulation is especially important for girls with initially borderline levels of externalizing behavior. Similarly, nonlinear relations were observed with inattention. Thus, this analysis allows for the description of interesting individual patterns of externalizing behavior during early childhood and offers important empirical evidence for predictors that differentiate clinical levels of behavior from more normative levels.

In sum, LPA is a useful tool for describing individual differences; however, it is important not to reify the latent classes, as they do not necessarily represent qualitatively distinct groups in the population and may not be generalizable to other samples. They may only become more established with repetition and confirmation in other samples. However, given that the profiles presented in this study are consistent with those established in prior studies (e.g., Shaw et al., 2003), this replication has already begun to emerge.

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