

Early Preschool Predictors of Preadolescent Internalizing and Externalizing *DSM-IV* Diagnoses

JUDI MESMAN, PH.D., AND HANS M. KOOT, PH.D.

ABSTRACT

Objective: To investigate the independent predictive value of parent-reported psychopathology and family risk factors in early preschool in relation to parent-reported internalizing and externalizing psychopathology in preadolescence. **Method:** Subjects were participants in a longitudinal study of 420 two- to three-year-olds from the general population of Zuid-Holland, the Netherlands, which started in 1989. At a second follow-up 8 years later (ages 10–11 years), 358 children participated. For this study, 332 children were included for whom *DSM-IV* diagnoses (derived from the Diagnostic Interview Schedule for Children-Version 4-Parent Version) were obtained at age 10 to 11 years. Preschool risk factors were obtained through the Child Behavior Checklist for ages 2 to 3 years and a parent interview. **Results:** Early preschool internalizing and externalizing problems were predictive of their *DSM-IV* counterparts 8 years later, independent of the influence of early parent-reported family risk factors. Preschool child physical problems were independently predictive of both internalizing and externalizing diagnoses in preadolescence. Of the environmental risk factors, only stressful life events contributed independently to the prediction of later externalizing problems. **Conclusion:** Early adverse family circumstances and parenting characteristics do not contribute to the prediction of later psychopathology once child characteristics are accounted for. *J. Am. Acad. Child Adolesc. Psychiatry*, 2001, 40(9):1029–1036. **Key Words:** preschool risk factors, *DSM-IV* diagnoses, internalizing, externalizing.

One of the main research aims in the field of developmental psychopathology is the early identification of children at risk for different types of psychopathology (Cicchetti and Cohen, 1995; Sroufe, 1989). In longitudinal risk research, a focus on very young children is of special interest. The extensive developmental changes and the significance of family life during the preschool years may potentially set a child on a course of adaptation or maladaptation and, more specifically, a path to one type of psychopathology rather than another (Campbell, 1995). In addition, the internalizing-externalizing distinction is especially useful in the identification of early child and family risk factors for different types of psychopathology, as it represents the most consistently empirically identified

classification of psychopathology across ages, including the early preschool years (Cicchetti and Toth, 1991).

Preschool child and family risk factors can be grouped according to their “proximity” to the child (cf. Bronfenbrenner, 1979). The first category includes child problems, both emotional/behavioral and physical, that logically represent the closest and most integral part of the subject of investigation. The second category includes aspects of the parent–child relationship (e.g., insecure attachment) and parenting strategies (e.g., physical punishment) that represent contextual risk factors directly related to the child. The third category includes general adverse family circumstances such as low socioeconomic status (SES), stressful life events, and family psychopathology that posit a potential negative influence on the child but are not necessarily directly related to or aimed at the child.

A large variety of preschool risk factors from all three categories have been found to significantly predict internalizing and externalizing psychopathology in later childhood (for a review, see Campbell, 1995). However, relatively few longitudinal studies have investigated family risk factors from an early preschool age. Those that did

Accepted April 3, 2001.

From the Department of Child and Adolescent Psychiatry, Erasmus University Rotterdam, the Netherlands.

This study was supported by grant 224 from the Sophia Foundation for Medical Research.

Reprint requests to Dr. Koot, Department of Child and Adolescent Psychiatry, Sophia Children's Hospital, Dr. Molewaterplein 60, 3015 GJ Rotterdam, The Netherlands; e-mail: koot@psys.azr.nl.

0890-8567/01/4009-1029©2001 by the American Academy of Child and Adolescent Psychiatry.

were generally concerned with family factors related to the stability of early problems (Lavigne et al., 1998; Prior et al., 1992). This strategy ignores children who do not yet show significant psychopathology at an early age but who may live under family circumstances that predispose them for psychopathology in later childhood. Furthermore, little is known about the independent predictive value of these risk factors when early psychopathology is accounted for. This is especially relevant considering the commonly found cross-sectional association between child psychopathology, parenting, and adverse family characteristics (Belsky et al., 1996; Sonuga-Barke et al., 1996). To investigate the independent predictive value of preschool risk factors regarding psychopathology in later childhood, the hierarchy of risk factors according to their proximity to the child is especially useful. The question is raised as to whether and how each subsequent category can add to the prediction of psychopathology when the previous category is accounted for.

Both genetic and physiological vulnerability and early emotional/behavioral and physical child problems are potentially important risk factors in the development of psychopathology in later years. Recent research has shown genetic influences on the development of relatively common childhood psychopathology, including affective disorder (both depressive and anxiety disorder), attention-deficit/hyperactivity disorder, and oppositional and conduct disorders (see Rutter et al., 1999). Physiological regulatory processes and neurobiological processes are involved in both internalizing (see Zahn-Waxler et al., 2000) and externalizing problems (Campbell et al., 2000). However, early genetic/biological vulnerability may be considerably moderated by environmental circumstances (Rutter et al., 1997).

Once emerged, problem behavior seems rather stable. There is a growing body of evidence that internalizing and externalizing problems in the preschool and kindergarten years are considerable predictors of similar problems in later childhood (Campbell and Ewing, 1990; Egeland et al., 1996; Fischer et al., 1984; Lavigne et al., 1998; Rose et al., 1989). In addition, there is some evidence that preschool externalizing problems can predict later internalizing problems (Egeland et al., 1996; Fischer et al., 1984; Lavigne et al., 1998; Rose et al., 1989) and, to a lesser extent, vice versa (Egeland et al., 1996; Lavigne et al., 1998). These results reflect a substantial continuity of psychopathology from the preschool years into later childhood and adolescence.

There is also considerable evidence regarding the long-term impact of early physical health problems on the development of psychopathology (Allen et al., 1998; Pless et al., 1993; Wallander and Varni, 1998). However, most of these studies were concerned with chronic physical disorders rather than a wider range of physical problems that may occur more frequently in the general population. To our knowledge, such preschool physical health problems have not been investigated in the context of possible coexisting early problematic behaviors in a general population sample. This is especially important considering that a variety of somatic and psychosocial/behavioral problems have been found to occur in clusters, suggesting a complex interaction between various forms of dysfunction (Starfield et al., 1984).

The parent-child relationship and parenting characteristics are an integral part of theories regarding the development of psychopathology (Carlson and Sroufe, 1995; Richter, 1994). Theories of internalizing problems tend to focus on the role of insecure attachment as a result of negative maternal attitudes toward the child, characterized by hostility, little warmth, and inconsistent availability (e.g., Cicchetti and Toth, 1995; Hammen and Rudolph, 1996). A negative parent-child relationship is thought to lead to a negative internal "working model" that either anticipates rejection by withdrawal or expects unavailability by helplessness and dependence (Cicchetti and Toth, 1995); this may evoke internalizing problems in already biologically vulnerable children. The development of externalizing problems, especially oppositional problems, has often been linked to early harsh discipline and physical punishment (Strassberg et al., 1994; Weiss et al., 1992). Several studies have shown that physical discipline ranging from spanking (Strassberg et al., 1994) to more severe and harsh physical punishment (Weiss et al., 1992) is prospectively related to externalizing problems. Although less widespread and consistent, there is also evidence that harsh discipline is related to internalizing problems (Weiss et al., 1992). It should be noted that the relationship between parenting and child problem behavior may indicate bidirectional and interactive effects. Attention-deficit/hyperactivity problems are not likely caused by parenting at all, and oppositional and conduct problems may include major contributions from the child's characteristics. Physiologically based infant characteristics such as hyperactivity and irritability may elicit coercive parenting strategies that, according to the coercive cycle model proposed by Patterson et al. (1992), may potentiate the onset of more

serious conduct problems, which ultimately escalate into parental power assertion and increased levels of hostility toward the child.

A number of adverse family circumstances have been found to be related to psychopathology in children (Emery and Kitzmann, 1995), including family psychopathology, maternal absence, stressful life events, and low SES. Family psychopathology is a potential risk factor for psychopathology in children through genetic or parenting mechanisms (Downey and Coyne, 1990; Rutter et al., 1999). Parental psychopathology may be the cause of ineffective and harmful parenting strategies, which may cause psychopathology in children (Cummings and Davies, 1994). Frequent maternal absence has also been found to predict psychopathology in children (e.g., National Institute of Child Health and Human Development, 1999). Stressful life events and adverse experiences may have a significant impact on the development of psychopathology, most notably of anxiety and affective disorders (e.g., Pynoos et al., 1999). This association can be seen as a simple stress-reaction process, but it is likely to be more complex than that through the effects of coping, the availability (or unavailability) of social support, and the possibility of a reciprocal association (DuBois et al., 1992). Finally, low SES has been well documented as a small but significant risk factor for psychopathology in children (Verhulst, 1995). This is generally hypothesized to be due to the effects of factors thought to be related to low SES such as ineffective parenting and reduced access to a variety of resources (McLoyd, 1998).

The aim of this study is to investigate the independent predictive value of parent-reported early preschool (ages 2–3 years) child psychopathology (internalizing and externalizing problems); physical health problems; adverse parenting characteristics (negative maternal attitude, harsh discipline); and adverse family circumstances (family psychopathology, frequent maternal absence, stressful life events, low SES) regarding internalizing and externalizing psychopathology in preadolescence (10–11 years) as assessed by a structured parent interview, the Diagnostic Interview Schedule for Children-Version 4-Parent Version (DISC-IV-P).

METHOD

Sample and Procedure

A more detailed description of the sample and procedure can be found elsewhere (Mesman and Koot, 2000a,b). The procedures for

all three times of assessment were approved by the medical-ethical committee of the Erasmus University Rotterdam/University Hospital Dijkzigt.

Subjects were participants in the second follow-up of a longitudinal study of preschool children from the general population (Koot et al., 1997; Koot and Verhulst, 1991). The original time 1 sample of preschool children was drawn randomly and stratified by age and sex from the inoculation register of the Dutch province of Zuid-Holland, which included all 2- to 3-year-olds in the province (excluding Rotterdam), and from the Rotterdam municipal population register. At time 1 (1989) the sample consisted of 420 children aged 2 to 3 years (mean age 2.6; SD = 0.8; 215 boys and 205 girls; response: 91% of target sample). In August 1997, all 420 respondents who participated at time 1 received a letter asking them to participate in a second follow-up (time 3). Usable written parent information was obtained for 358 children, the respondents being primarily the mothers (85.2% of the original time 1 sample; 180 boys, 178 girls; mean age 10.9 years; SD = 7.2 months; age range 9.8–12.5 years). After obtaining written information, we telephoned parents again in February 1998 to make an appointment for the DISC-IV-P home interview. Of the 358 parents who sent us written information, 332 (92.7%) gave permission for a home visit and were interviewed by 1 of 11 trained lay interviewers (10 female, 1 male), who had just finished or were in the final year of a study in the social or medical sciences.

Measures of Time 1 Predictors

Time 1 psychopathology was assessed with the Child Behavior Checklist for ages 2 to 3 years (CBCL/2–3) (Achenbach, 1992). In a study involving exploratory and confirmatory factor analyses in community, clinical, and twin samples of Dutch preschool children by Koot et al. (1997), the CBCL/2–3 was found to have a somewhat different factor structure than the U.S. version (Achenbach, 1992). For the present study, only the Dutch broadband Internalizing and Externalizing syndromes were used (for a description, see Koot et al., 1997). Because no nationally representative Dutch normative data are available for the CBCL/2–3, deviancy was defined as having scores above the 82nd percentile, on the basis of frequency tables within our own sample and congruent with the borderline cutoff commonly used for the CBCL/4–18 (Achenbach, 1991).

In an interview with the parent, information on a variety of child, parenting, and family characteristics was obtained. These were dichotomized and grouped into meaningful variables, which in turn were grouped into the categories described in the introduction. The variable “child physical health problems” (one or more physical problems rated as “serious” by the parent, such as ear infections, rashes, or allergies ever) was included in the child physical health problems category. The variables “negative maternal attitude” (mother irritated by child every day, wanting to hurt the child sometimes or often, or exhausted from raising child most of the time) and “harsh parenting” (mother hitting child several times a week or more, or ever hitting child and leaving physical traces) were included in the parenting category. The variables “family psychopathology” (poor self-perceived maternal mental health or family mental health service use ever), “maternal absence” (mother away from home or nonparental care more than 20 hours a week), “stressful life events” (two or more that occurred between birth and time 1), and “low SES” (Netherlands Central Bureau of Statistics, 1993) were included in the adverse family circumstances category.

Measures of Psychopathology at Time 3

The DISC-IV-P (Shaffer et al., 1998) was translated into Dutch (Ferdinand and Van der Ende, 1998) and used to obtain *DSM-IV* diag-

noses. The DISC-IV-P is a structured interview that generates the 1-year prevalence of *DSM-IV* diagnoses in six modules: (A) anxiety disorders, (B) psychosomatic disorders, (C) affective disorders, (D) schizophrenic disorders, (E) disruptive disorders, and (F) substance abuse disorders. For practical purposes, and considering the average age of our sample, only the modules representing anxiety disorders (A), mood disorders (C), and disruptive behavior disorders (E) were used. The scoring logic for deriving *DSM-IV* diagnoses from the interview was obtained from the authors (Shaffer et al., 1998). For the present article, diagnoses were grouped into an internalizing category (one or more diagnoses from module A or C) and an externalizing category (one or more diagnoses from module E).

Statistical Analyses

First, odds ratios (ORs) were used to investigate the cross-sectional relationship between all time 1 predictors. Second, univariate ORs between each of the separate time 1 predictors (CBCL/2–3 syndromes, child health problems, and family characteristics) and the time 3 internalizing and externalizing psychopathology outcomes were computed. Third, multivariate ORs were derived from logistic regression analyses theoretically organized in subsequent blocks (method enter), with child characteristics in the first block (sex, internalizing and externalizing problems, and physical health problems), parenting characteristics directly related to the child in the second block (harsh parenting and negative maternal attitude), and more general negative family circumstances in the third block (family psychopathology, maternal absence, negative life events, low SES).

Sample Attrition

For the present article, only those subjects were included for whom complete time 3 DISC-IV-P data were available ($N = 332$). To ensure that this subsample did not suffer from selective attrition, a series of χ^2 tests were performed that compared the current sample to dropouts ($N = 88$) on all time 1 predictors used in this study. With $p < .05$ as a threshold for significance, results revealed no differences on sex, internalizing problems, externalizing problems, physical health problems, harsh parenting, negative maternal attitude, family psychopathology, maternal absence, or stressful life events. A close to significant trend of selective attrition was found for low SES ($\chi^2 = 3.81, p = .05$), with dropouts having a lower socioeconomic status than remainers. However, when correcting for multiple comparisons, this effect would not be considered significant.

RESULTS

Psychopathology at Time 3

As shown in Table 1, at time 3, 22.3% of the sample met criteria for one or more parent-reported *DSM-IV* diagnoses ($N = 74$). Prevalence rates for any internalizing and externalizing diagnosis were similar (13.3% and 12.0% respectively). The most prevalent diagnoses were specific phobia (9.0%), attention-deficit/hyperactivity disorder-inattentive type (6.0%), and oppositional defiant disorder (4.8%). Furthermore, 27 boys and 29 girls received a single diagnosis, 8 boys and 6 girls had two diagnoses, and 4 boys had three or more diagnoses (max-

TABLE 1

DSM-IV Diagnoses at Time 3 for Boys ($n = 166$) and Girls ($n = 166$)

Diagnosis	Boys		Girls		Total	
	%	(<i>n</i>)	%	(<i>n</i>)	%	(<i>n</i>)
Social phobia	2.4	(4)	0.6	(1)	1.5	(5)
Separation anxiety	1.8	(3)	3.0	(5)	2.4	(8)
Specific phobia	7.2	(12)	10.8	(18)	9.0	(30)
Agoraphobia	1.2	(2)	0.0	(0)	0.6	(2)
Generalized anxiety disorder	0.6	(1)	0.6	(1)	0.6	(2)
Selective mutism	0.6	(1)	0.0	(0)	0.3	(1)
Obsessive-compulsive disorder	1.8	(3)	0.6	(1)	1.2	(4)
Major depressive episode	0.6	(1)	0.0	(0)	0.3	(1)
ADHD-inattentive type	6.0	(10)	3.6	(6)	4.8	(16)
ADHD-hyperactive type	3.6	(6)	0.6	(1)	2.1	(7)
ADHD-combined type	1.8	(3)	0.0	(0)	0.9	(3)
Oppositional defiant disorder	7.2	(12)	4.8	(8)	6.0	(20)
Any internalizing disorder	12.7	(21)	13.9	(23)	13.3	(44)
Any externalizing disorder	15.1	(25)	9.0	(15)	12.0	(40)
Any disorder	23.5	(39)	21.1	(35)	22.3	(74)

Note: ADHD = attention-deficit/hyperactivity disorder. Diagnoses that did not occur in our sample are not shown in the table: panic disorder, post-traumatic stress disorder, dysthymic disorder, manic episode, hypomanic episode, conduct disorder.

imum five disorders). No significant sex differences in rates of diagnoses were found.

Associations Between Preschool Predictors

To gain insight into the cross-sectional association between time 1 predictors, ORs were computed with a 95% confidence interval (95% CI). Time 1 internalizing problems were significantly associated with externalizing problems (OR = 2.4, 95% CI = 1.3–4.7), negative maternal attitude (OR = 2.1, 95% CI = 1.2–3.8), and low SES (OR = 2.1, 95% CI = 1.2–3.8). Externalizing problems were significantly related to harsh parenting (OR = 2.8, 95% CI = 1.5–5.0), negative maternal attitude (OR = 2.9, 95% CI = 1.6–5.2), family psychopathology (OR = 2.5, 95% CI = 1.4–4.7), and low SES (OR = 2.8, 95% CI = 1.5–5.1). In addition, harsh parenting was related to negative maternal attitude (OR = 2.7, 95% CI = 1.7–4.5) and family psychopathology (OR = 2.2, 95% CI = 1.3–3.8), and the latter two were also related to each other (OR = 4.2, 95% CI = 2.5–7.2). Child physical health problems was only related to low SES (OR = 3.3, 95% CI = 1.7–6.6).

Longitudinal Predictions

Table 2 shows that in the univariate analyses, three of the time 1 predictors were significantly related to parent-reported preadolescent *DSM-IV* internalizing diagnoses, including time 1 internalizing problems, child physical

TABLE 2Univariate Odds Ratios for Time 1 Predictors and Time 3 *DSM-IV* Internalizing and Externalizing Diagnoses (*N* = 332)

Time 1 Predictors	(n Deviant)	Internalizing		Externalizing	
		OR	(95% CI)	OR	(95% CI)
Sex (male)	(166)	—	—	—	—
CBCL Internalizing Problems	(59)	2.87	(1.42–5.78)	—	—
CBCL Externalizing Problems	(56)	—	—	4.80	(2.35–9.77)
Physical health problems	(38)	3.22	(1.46–7.09)	2.63	(1.14–6.07)
Harsh parenting	(96)	—	—	2.53	(1.29–4.95)
Negative maternal attitude	(114)	2.13	(1.12–4.04)	2.11	(1.08–4.10)
Family psychopathology	(78)	—	—	—	—
Maternal absence	(42)	—	—	—	—
Stressful life events	(52)	—	—	2.70	(1.27–5.74)
Low SES	(87)	—	—	—	—

Note: Table entries represent odds ratios (OR) and 95% confidence intervals (95% CI). Only significant odds ratios are shown. CBCL = Child Behavior Checklist; SES = socioeconomic status.

health problems, and negative maternal attitude. Five time 1 predictors were significantly related to parent-reported preadolescent *DSM-IV* externalizing diagnoses, including time 1 externalizing problems, physical health problems, harsh parenting, negative maternal attitude, and stressful life events. Time 1 low SES, maternal absence, and family

psychopathology were not significantly related to either of the psychopathology outcomes.

The results of the multiple logistic regression analyses are presented in Table 3. Results showed that both time 3 internalizing and externalizing psychopathology outcomes were significantly and independently predicted

TABLE 3Multivariate Odds Ratios for Time 1 Predictors and Time 3 *DSM-IV* Internalizing and Externalizing Diagnoses

Time 1 Predictors	Internalizing		Externalizing	
	OR	(95% CI)	OR	(95% CI)
Block 1				
Sex (male)	—	—	—	—
CBCL Internalizing	2.82	(1.36–5.83)	—	—
CBCL Externalizing	—	—	5.12	(2.44–10.76)
Physical health problems	3.22	(1.44–7.21)	2.79	(1.15–6.74)
Block 2				
<i>Sex (male)</i>	—	—	—	—
<i>CBCL Internalizing</i>	2.70	(1.29–5.65)	—	—
<i>CBCL Externalizing</i>	—	—	4.22	(1.95–9.13)
<i>Physical health problems</i>	3.22	(1.42–7.30)	2.79	(1.15–6.79)
Harsh parenting	—	—	—	—
Negative maternal attitude	—	—	—	—
Block 3				
<i>Sex (male)</i>	—	—	—	—
<i>CBCL Internalizing</i>	2.84	(1.33–6.04)	—	—
<i>CBCL Externalizing</i>	—	—	4.46	(1.99–10.02)
<i>Physical health problems</i>	3.36	(1.41–8.03)	2.64	(1.02–6.83)
<i>Harsh parenting</i>	—	—	—	—
<i>Negative maternal attitude</i>	—	—	—	—
Family psychotherapy	—	—	—	—
Maternal absence	—	—	—	—
Stressful life events	—	—	2.55	(1.11–5.84)
Low SES	—	—	—	—

Note: Table entries represent odds ratios (OR) and 95% confidence intervals (95% CI). Only significant odds ratios are shown. In blocks 2 and 3, variables that were entered in previous blocks are printed in italics. CBCL = Child Behavior Checklist; SES = socioeconomic status.

by their time 1 CBCL counterparts and child physical health problems. In addition, time 1 stressful life events added significantly to the prediction of time 3 externalizing psychopathology after all other predictors were entered. Although time 1 harsh parenting and negative maternal attitude were significantly related to psychopathology outcomes in the univariate analyses, this relation did not remain significant when child psychopathology was controlled for.

DISCUSSION

This study reported the independent predictive value of early preschool child and family risk factors regarding internalizing and externalizing *DSM-IV* diagnoses in preadolescence obtained from parent report. The 1-year prevalence of *DSM-IV* diagnoses found in our study (22.3%) is slightly higher than in other studies, which report overall prevalences of diagnoses ranging from 17.6% to 21.4% in preadolescent samples (Anderson et al., 1987; Kashani et al., 1989; Velez et al., 1989). These studies used *DSM-III* or *DSM-III-R* criteria, whereas the prevalence of diagnoses in our study was based on *DSM-IV* criteria. Consistent with results reported in other studies (Belsky et al., 1996; Sonuga-Barke et al., 1996), the cross-sectional results of this study showed that almost all preschool predictors were related to one or more other predictors, except for sex.

Univariate ORs revealed evidence for considerable homotypic stability of internalizing and externalizing psychopathology, in that both preschool syndromes only predicted their *DSM-IV* counterparts in preadolescence. Preschoolers with internalizing problems had an almost 3-fold increased risk for later similar problems, whereas children exhibiting externalizing problems at ages 2 to 3 years showed an almost 5 times higher risk for later similar problems. These results confirm the considerable developmental stability of such problems even from a very young age, as well as the somewhat stronger stability for externalizing problems compared with internalizing problems found by other authors (Fischer et al., 1984; Lavigne et al., 1998). Furthermore, preschool child physical health problems proved to be a strong predictor of both internalizing and externalizing psychopathology. This is especially interesting considering that preschool health problems were not cross-sectionally related to internalizing and externalizing problems. Thus, the association between parent-reported early physical problems and later psycho-

pathology may reflect a true association between early ill health and later psychopathology, or the report of these problems may be a marker for some other causal factor. As far as the association between chronic illness and psychological development is concerned, theoretical models include functional dependence, psychosocial stress, and coping as potential mediators in this association (for a review, see Wallander and Varni, 1998). Of the preschool family variables, negative maternal attitude was associated with both internalizing and externalizing psychopathology 8 years later. However, this association may be reflective of an influence of child characteristics on maternal attitude rather than vice versa, as suggested by subsequent multivariate analyses.

Our multivariate analyses were aimed at identifying independent preschool predictors of preadolescent internalizing and externalizing psychopathology. For the sake of clarity, it must be noted that statistically independent predictors are not necessarily conceptually independent of each other as risk factors. They may still be related in a number of ways, but they each contribute uniquely to the prediction of psychopathology regardless of this association. Results from these analyses showed that when preschool child characteristics (i.e., internalizing and externalizing problems and physical health problems) are accounted for, most environmental factors (i.e., harsh parenting, negative maternal attitude, family psychopathology, maternal absence, low SES) do not independently contribute to the prediction of preadolescent psychopathology, suggesting that these latter risk factors are only related to later psychopathology through their association with concurrent child physical and/or emotional/behavioral problems. Only stressful life events remained an independent significant predictor of later externalizing problems after accounting for the influence of child psychopathology and parenting variables. Post hoc examination of the specific preschool life events that constitute the cumulative variable revealed that "parental burnout" and "increase in maternal absence" were strong longitudinal predictors of later externalizing diagnoses. Life events related to parental availability during the period between child birth and the early preschool years apparently increase the risk for externalizing problems at a later age.

These findings may have several explanations. First, it is possible that risk factors within the child are indeed mostly responsible for the development of psychopathology in childhood. This can occur either directly (e.g., a genetic/

biological vulnerability) or in interaction with environmental variables (e.g., a difficult child evokes ineffective parenting, which in turn leads to difficult behavior). Second, it is possible that parenting and family risk factors influence the development of the child mainly during infancy, that is, before the preschool years. It may be that once psychopathology develops during the preschool years as a result of ineffective parenting and/or adverse circumstances, it is this problematic behavior that mainly dictates the future development of psychopathology.

Clinical Implications

Our results showed that early parenting and general family risk factors did not significantly add to the prediction of later psychopathology when early physical and behavioral problems were accounted for. These results suggest that early detection and prevention efforts regarding child psychopathology may be most cost effective if they are primarily aimed at early child physical problems and psychopathology rather than environmental circumstances. Furthermore, clinicians should be aware of the potential impact of early preschool physical health problems on the development of psychopathology in later childhood. This finding may be especially relevant for prevention purposes, as physical health problems were not cross-sectionally, but only longitudinally, related to psychopathology. General practitioners in particular are in a position to identify physical health problems in children and, if necessary, to refer them to appropriate services.

Limitations

Some limitations of this study can be noted. First, only parent reports were used. Teacher reports could not be obtained at time 1 because children did not yet attend school and were too young to complete self-reports. The use of a single informant (parents) may have led to an overestimation of the longitudinal associations between time 1 predictors and time 3 outcomes as a result of the effects of informant bias. It may also be responsible for the low rate of mood diagnoses in that parent reports often underestimate anxiety and mood disorders (Herjanic and Reich, 1997; Mesman and Koot, 2000a). This in turn may have led to an underestimation of associations between certain risk factors (those known to be especially related to depression, such as negative maternal attitude and parental psychopathology) and the internalizing outcome. Furthermore, this means that the results regarding the internalizing outcome should be interpreted as pertaining

to anxiety disorders, especially specific phobia, which is the most prevalent internalizing type of psychopathology. However, whether or not parent reports represent absolute reality, parents' perceptions are clearly important and do appear to predict later child characteristics.

Second, time 1 family risk factors and child health were not obtained through standardized measures. This means that the reliability and validity of these variables is uncertain and that the results regarding these risk factors are difficult to compare to findings obtained by other studies.

Third, we found a nonsignificant trend suggesting that children from low-SES families may have been underrepresented in the follow-up sample. Because low SES is generally found to be related to an increased prevalence of child psychopathology and is likely to be a fairly stable family characteristic (McLoyd, 1998), this selection may have caused, if anything, an underestimation of the strength of association between preschool and preadolescent psychopathology.

Finally, interactions between preschool child characteristics and family risk factors were not included because of too-small cell sizes. Therefore, the potential contribution of some family risk factors may have been underestimated.

In conclusion, future studies are needed to replicate our results with multiple informants, standardized preschool family risk factors, and a larger (and possibly younger) sample. Considering the strong independent predictive value of child physical health problems and stressful life events, these factors deserve special attention in future longitudinal risk studies.

REFERENCES

- Achenbach TM (1991), *Manual for the Child Behavior Checklist/4-18 and 1991 Profile*. Burlington: University of Vermont Department of Psychiatry
- Achenbach TM (1992), *Manual for the Child Behavior Checklist/2-3 and 1992 Profile*. Burlington: University of Vermont Department of Psychiatry
- Allen NB, Lewinsohn PM, Seeley JR (1998), Prenatal and perinatal influences on risk for psychopathology in childhood and adolescence. *Dev Psychopathol* 10:513-529
- Anderson JC, Williams S, McGee R, Silva PA (1987), *DSM-III disorders in preadolescent children*. *Arch Gen Psychiatry* 44:69-76
- Belsky J, Woodworth S, Crnic K (1996), Trouble in the second year: three questions about family interaction. *Child Dev* 67:556-578
- Bronfenbrenner K (1979), *The Ecology of Human Development*. Cambridge, MA: Harvard University Press
- Campbell SB (1995), Behavior problems in preschool children: a review of recent research. *J Child Psychol Psychiatry* 36:113-149
- Campbell SB, Ewing LJ (1990), Follow-up of hard-to-manage preschoolers: adjustment at age 9 and predictors of continuing symptoms. *J Child Psychol Psychiatry* 31:871-889
- Campbell SB, Shaw DS, Gilliom M (2000), Early externalizing behavior problems: toddlers and preschoolers at risk for later maladjustment. *Dev Psychopathol* 12:467-488

- Carlson EA, Sroufe LA (1995), Contribution of attachment theory to developmental psychopathology. In: *Developmental Psychopathology*, Vol 1: *Theory and Methods*, Cicchetti D, Cohen DJ, eds. New York: Wiley, pp 581–617
- Cicchetti D, Cohen DJ (1995), Perspectives on developmental psychopathology. In: *Developmental Psychopathology*, Vol 1: *Theory and Methods*, Cicchetti D, Cohen DJ, eds. New York: Wiley, pp 3–20
- Cicchetti D, Toth SL (1991), A developmental perspective on internalizing and externalizing disorders. In: *Rochester Symposium on Developmental Psychopathology*, Vol 16: *Internalizing and Externalizing Expressions of Dysfunction*, Cicchetti D, Toth SL, eds. Hillsdale, NJ: Erlbaum, pp 1–19
- Cicchetti D, Toth SL (1995), Developmental psychopathology and disorders of affect. In: *Developmental Psychopathology*, Vol 2: *Risk, Disorder, and Adaptation*, Cicchetti D, Cohen DJ, eds. New York: Wiley, pp 369–420
- Cummings EM, Davies PT (1994), Maternal depression and child development. *J Child Psychol Psychiatry* 35:73–112
- Downey G, Coyne JC (1990), Children of depressed parents: an integrative review. *Psychol Bull* 108:50–76
- DuBois DL, Felner RD, Brand S, Adan AM, Evans EG (1992), A prospective study of life stress, social support, and adaptation in early adolescence. *Child Dev* 63:542–557
- Egeland B, Pianta R, Ogawa J (1996), Early behavior problems: pathways to mental disorders in adolescence. *Dev Psychopathol* 8:735–749
- Emery RE, Kitzmann RE (1995), The child in the family: disruptions in family functions. In: *Developmental Psychopathology*, Vol 2: *Risk, Disorder, and Adaptation*, Cicchetti D, Cohen DJ, eds. New York: Wiley, pp 3–31
- Ferdinand RF, Van der Ende J (1998), *Diagnostic Interview Schedule for Children IV Parent-Version*. Rotterdam: Erasmus University Rotterdam, Department of Child and Adolescent Psychiatry
- Fischer M, Rolf JE, Hasazi JE, Cummings L (1984), Follow-up of a preschool epidemiological sample: cross-age continuities and predictions of later adjustment with internalizing and externalizing dimensions of behavior. *Child Dev* 55:137–150
- Hammen C, Rudolph KD (1996), Childhood depression. In: *Child Psychopathology*, Mash EJ, Barkley RA, eds. New York: Guilford, pp 153–195
- Herjanic B, Reich W (1997), Development of a structured psychiatric interview for children: agreement between child and parent on individual symptoms. *J Abnorm Child Psychol* 25:21–31
- Kashani JH, Orvaschel H, Rosenberg TK, Reid JC (1989), Psychopathology in a community sample of children and adolescents: a developmental perspective. *J Am Acad Child Adolesc Psychiatry* 28:701–706
- Koot HM, Van den Oord EJCG, Verhulst FC, Boomsma DI (1997), Behavioral and emotional problems in young preschoolers: cross-cultural testing of the validity of the Child Behavior Checklist/2–3. *J Abnorm Child Psychol* 25:183–196
- Koot HM, Verhulst FC (1991), Prevalence of problem behavior in Dutch children aged 2–3. *Acta Psychiatr Scand* 83(suppl. 367):1–37
- Lavigne JV, Arend R, Rosenbaum D, Binns HJ, Kaufman-Cristoffel K, Gibbons RD (1998), Psychiatric disorders with onset in the preschool years, I: stability of diagnoses. *J Am Acad Child Adolesc Psychiatry* 37:1246–1254
- McLoyd VC (1998), Socioeconomic disadvantage and child development. *Am Psychol* 53:185–204
- Mesman J, Koot HM (2000a), Child-reported depression and anxiety in preadolescence, I: associations with parent- and teacher-reported problems. *J Am Acad Child Adolesc Psychiatry* 39:1371–1378
- Mesman J, Koot HM (2000b), Common and specific correlates of preadolescent internalizing and externalizing psychopathology. *J Abnorm Psychol* 109:428–437
- Netherlands Central Bureau of Statistics (1993), *Standard Occupational Classification*. The Hague: SDU
- NICHD Early Child Care Research Network (1999), Child care and mother-child interaction: the first 3 years of life. *Dev Psychol* 35:1399–1413
- Patterson GR, Reid JB, Dishion TJ (1992), *Antisocial Boys*. Eugene, OR: Castalia
- Pless IB, Power C, Peckham CS (1993), Long-term psychosocial sequelae of chronic physical disorders in childhood. *Pediatrics* 91:1131–1136
- Prior M, Smart D, Sanson A, Pedlow R, Oberklaid F (1992), Transient versus stable behavior problems in a normative sample: infancy to school age. *J Ped Psychol* 17:423–443
- Pynoos RS, Steinberg AM, Piacentini JC (1999), A developmental psychopathology model of childhood traumatic stress and intersection with anxiety disorders. *Biol Psychiatry* 46:1542–1554
- Richter J (1994), Parental rearing and aspects of psychopathology with special reference to depression. In: *Parenting and Psychopathology*, Perris C, Arrindell WA, Eisemann M, eds. New York: Wiley, pp 235–251
- Rose SL, Rose SA, Feldman JF (1989), Stability of behavior problems in very young children. *Dev Psychopathol* 1:5–19
- Rutter M, Dunn J, Plomin R et al. (1997), Integrating nature and nurture: implications of person-environment correlations and interactions for developmental psychology. *Dev Psychopathol* 9:335–364
- Rutter M, Silberg J, O'Connor T, Simonoff E (1999), Genetics and child psychiatry: empirical research findings. *J Child Psychol Psychiatry* 40:19–55
- Shaffer D, Fisher P, Lucas C (1998), *NIMH DISC-IV Diagnostic Interview Schedule for Children, Parent-Informant*. New York: Columbia University
- Sonuga-Barke E, Stevenson J, Thompson MJJ (1996), Mental health of preschool children and their mothers in a mixed urban/rural population, II: family and maternal factors and child behaviour. *Br J Psychiatry* 168:21–25
- Sroufe LA (1989), Pathways to adaptation and maladaptation: psychopathology as developmental deviation. In: *Rochester Symposium on Developmental Psychopathology*, Vol 1: *Developmental Psychopathology: An Emerging Discipline*, Cicchetti D, Toth SL, eds. Hillsdale, NJ: Erlbaum, pp 13–40
- Starfield B, Katz H, Gabriel A et al. (1984), Morbidity in childhood: a longitudinal view. *N Eng J Med* 310:824–829
- Strassberg Z, Dodge KA, Pettit GS, Bates JE (1994), Spanking in the home and children's subsequent aggression toward kindergarten peers. *Dev Psychopathol* 6:445–461
- Veletz CN, Johnson J, Cohen P (1989), A longitudinal analysis of selected risk factors for childhood psychopathology. *J Am Acad Child Adolesc Psychiatry* 28:861–864
- Verhulst FC (1995), A review of community studies. In: *The Epidemiology of Child and Adolescent Psychopathology*, Verhulst FC, Koot HM, eds. London: Oxford University Press, pp 146–177
- Wallander JL, Varni JW (1998), Effects of pediatric chronic physical disorders on child and family adjustment. *J Child Psychol Psychiatry* 39:29–46
- Weiss B, Dodge KA, Bates JE, Pettit GS (1992), Some consequences of early harsh discipline: child aggression and a maladaptive social information processing style. *Child Dev* 63:1321–1335
- Zahn-Waxler C, Klimes-Dougan B, Slattery MJ (2000), Internalizing problems of childhood and adolescence: prospects, pitfalls, and progress in understanding the development of anxiety and depression. *Dev Psychopathol* 12:443–466