

# Preschool Developmental Pathways to Preadolescent Internalizing and Externalizing Problems

Judi Mesman, Ilja L. Bongers, and Hans M. Koot

Erasmus University Rotterdam, The Netherlands

The present study investigated longitudinal pathways from specific early preschool behavioral problems (ages 2–3 years) to internalizing and externalizing problems in preadolescence (ages 10–11 years), and the role of social problems at school entry (ages 4–5 years) in such pathways. Path analyses were performed using both parent and teacher reports in a sample of 251 to 346 children from the general population, depending on the availability of parent and teacher data at each time of assessment. Structural equation modeling revealed homotypic internalizing and externalizing pathways, predictions from early preschool externalizing problems to later internalizing problems, and negative predictive paths from early internalizing problems to externalizing problems in preadolescence. Cross-informant predictions spanning 8 years were found between parent-reported aggression and overactivity at ages 2–3 years and teacher-reported externalizing problems at ages 10–11 years. Further, results showed that boys' pathways were more complex and showed greater predictive validity than pathways for girls, and that social problems at school entry played a significant role in pathways to internalizing problems, but only for boys. The results are discussed from a developmental psychopathology perspective.

*Keywords:* Development, externalizing disorder, internalizing disorder, longitudinal studies, preschool children, sex differences.

*Abbreviations:* CBCL: Child Behavior Checklist; TRF: Teacher's Report Form.

## Introduction

The distinction between internalizing and externalizing problems in children is widely used in developmental psychopathology studies, and there are a number of theories regarding their developmental pathways (e.g., Cicchetti & Toth, 1991; Loeber et al., 1993; Rubin & Mills, 1991). From a developmental perspective, the transition from the early preschool years to school entry and into later childhood is of special interest in the search for pathways to internalizing and externalizing problems. It has been demonstrated that at an early preschool age (ages 2–3 years), psychopathology can be reliably assessed and differentiated (e.g., Achenbach, 1992; Koot, Van den Oord, Verhulst, & Boomsma, 1997). Behavioral and emotional problems at this age may potentially set a child on a course of maladaptation (Campbell, 1995), and more specifically on a pathway to internalizing or externalizing problems. At school entry (ages 4–5 years), preschoolers' behavioral patterns meet with a variety of social demands represented by key developmental tasks such as making friends and learning certain social skills required by the school-setting. Children's (in)ability to successfully adapt to these social demands is often thought to be crucial to their further development, and more specifically the development of internalizing and externalizing expressions of dysfunction in later childhood (Masten & Coatsworth, 1995; Parker, Rubin, Price,

& DeRosier, 1995). The aim of the present study is to investigate pathways from a variety of specific behavior problems at age 2–3 years to internalizing and externalizing problems at age 10–11 years, and the role of social problems and psychopathology at school entry in such pathways.

Externalizing problems have generally received more research attention than internalizing problems. Externalizing problems have been found to show considerable longitudinal stability, even from before the age of 4 (Campbell & Ewing, 1990; Fischer, Rolf, Hasazi, & Cummings, 1984; Lavigne et al., 1998; Rose, Rose, & Feldman, 1989). Theories and studies regarding specific behavioral antecedents of externalizing problems generally focus on oppositional, hyperactive, and aggressive behavior. Loeber and colleagues (Loeber, 1991; Loeber & Stouthamer-Loeber, 1998) proposed an early-onset pathway that starts as early as the preschool years with conduct problems, oppositional behavior, and hyperactivity, leading to conduct problems in middle childhood. In a follow-up study by Campbell and Ewing (1990), 48% of preschoolers with problems including hyperactivity, inattention, and discipline problems met DSM-III criteria for an externalizing disorder at the age of 9 years. Further, McGee, Partridge, Williams, and Silva (1991) found that a considerable proportion of hyperactive preschoolers show disruptive behavior 12 years later. However, in a study by Nagin and Tremblay (1999) no support was found for hyperactivity at the age of 6 years as an independent predictor of delinquency at age 15 years after correcting for early levels of physical aggression or oppositional behavior, but this study did not include data at an early preschool age. Finally, some

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Requests for reprints to: Professor Hans Koot, Sophia Children's Hospital, Department of Child and Adolescent Psychiatry, PO Box 2060, 3000 CB Rotterdam, The Netherlands (E-mail: koot@psys.azr.nl).

authors have reported significant predictive links between early internalizing and later externalizing problems. (Egeland, Pianta, & Ogawa, 1996; Lavigne et al., 1998), but others did not (Fischer et al., 1984; Rose et al., 1989). Early internalizing problems such as inhibition and anxiety have been found to serve as a protective factor in the development of externalizing problems (Kerr, Tremblay, Pagani, & Vitaro, 1997; Schwartz, Snidman, & Kagan, 1996; Tremblay, Pihl, Vitaro, & Dobkin, 1994). Based on the above, we expect preadolescent externalizing problems to be predicted by pathways of early aggression, hyperactivity, and/or oppositional behavior, but also negatively influenced by early internalizing pathways.

Relatively, few studies have investigated early preschool behavioral predictors (before the age of 4 years) of child internalizing problems, and those that did used only broad definitions of internalizing problems at preschool age. Results are inconsistent, with some studies reporting that early preschool internalizing problems can predict later internalizing problems (Lavigne et al., 1998), and others not confirming these findings (Fischer et al., 1984; Rose et al., 1989). Further, studies investigating internalizing problems from a kindergarten age report more substantial homotypic stability into later childhood (Ialongo, Edelsohn, Werthamer-Larsson, Crockett, & Kellam, 1993, 1995; Pianta & Castaldi, 1990). There is very little empirical evidence linking more specific early behaviors to the development of internalizing problems. Theories regarding pathways to internalizing problems have generally focused on early behavioral inhibition (Kagan, 1997; Rubin & Mills, 1991), which is expressed as fearfulness and anxiety during the toddler years, specifically in the form of fear and avoidance of new and unfamiliar people or situations. Studies have shown that behavioral inhibition at the age of 21 months is stable into early childhood and predicts social wariness and withdrawal at the ages of 4 and 7½ years (Kagan, Reznick, Clarke, & Snidman, 1984; Kagan, Reznick, Snidman, Gibbons, & Johnson, 1988; Rubin & Stewart, 1996). Further, there is some empirical evidence linking preschool behavioral inhibition to anxiety at school age (Biederman et al., 1993; Hirshfeld et al., 1992; Kagan, 1997). Finally, there is some evidence that early preschool externalizing problems also predict later internalizing problems (Fischer et al., 1984; Rose et al., 1989). It is unclear whether these latter findings should be attributed to early aggression, hyperactivity, or oppositional behavior. Considering the above, we expect preadolescent internalizing problems to be predicted by early internalizing problems such as anxiety and withdrawal, as well as one or more specific early externalizing problems.

The results from a number of studies suggest that social problems may be involved in the development of both internalizing and externalizing problems in several ways (Cole, Martin, Powers, & Truglio, 1996; Hymel, Rubin, Rowden, & LeMare, 1990; Patterson, Debaryshe, & Ramsey, 1989; Rubin & Mills, 1991; Salzer Burks, Dodge, & Price, 1995). First, social problems may be causes as well as consequences of internalizing problems. For example, failure in social functioning may foster negative self-perceptions that are associated with depression (Cole et al., 1996), and depressive symptoms such as lack of interest and energy may lead to difficulties in social functioning (Cicchetti & Schneider-Rosen, 1986). Second, the link between early externalizing

problems and later internalizing problems is possibly mediated by social problems, in that early aggression may lead to peer rejection, which in turn may lead to diminished self-esteem and associated internalizing problems (Panak & Garber, 1992; Patterson & Stoolmiller, 1991). Third, some authors have suggested a pathway from early aggression to peer rejection and later delinquency (Patterson et al., 1989). In this theory, the disruptive and socially unaccepted nature of early aggressive behavior hampers the formation of positive social relations with other children, which may take the form of peer rejection and a subsequent association with a similarly deviant and aggressive peer group, which in turn predicts externalizing behaviors such as delinquency (Cairns, Cairns, Neckerman, Gest, & Garipey, 1988; Dodge, 1993; Patterson et al., 1989). We therefore hypothesize that potential homotypic internalizing and externalizing pathways, as well as heterotypic externalizing-internalizing pathways, may be mediated by social problems at school entry.

When investigating developmental pathways of psychopathology, potential sex differences are of special interest. Previous research has not only shown sex differences in the prevalence rates of internalizing and externalizing psychopathology (Cohen et al., 1993), but also that these differences vary across developmental stages (Keenan & Shaw, 1997). During the early preschool years boys and girls appear to show similar rates of behavior problems (Keenan & Shaw, 1994; Koot, 1993; Rose et al., 1989), whereas after the age of 4 years boys have significantly higher rates of externalizing disorders than girls but rates of internalizing problems remain similar across sexes (Offord et al., 1987). During adolescence, girls' rates of internalizing disorders exceed that of boys (Angold & Rutter, 1992), while rates of externalizing disorders are still higher for boys than for girls (Offord et al., 1987; Simonoff et al., 1997).

There is little consistent empirical evidence regarding sex differences in developmental pathways of psychopathology from an early age, since most longitudinal studies of early preschool problems did not perform separate analyses for boys and girls (Lavigne et al., 1998; Rose et al., 1989), and most studies regarding externalizing behaviors such as aggression and delinquency included only boys (Campbell, Pierce, Moore, Marakovitz, & Newby, 1996; Loeber et al., 1993; Moffitt, 1990). However, several hypotheses can be formulated based on Keenan and Shaw's (1997) overview of research regarding sex differences across development and the role of social problems in such pathways. First, since patterns of psychopathology from toddlerhood into later childhood tend to be more continuous for boys than for girls, we expect predictive psychopathology pathways from an early age to be more salient for boys than for girls. Second, Keenan and Shaw (1997) posited that disruptive behavior is less accepted for girls than for boys, and thus for girls it may be channeled into internalizing problems as a result of sex-stereotypic socialization processes. We therefore hypothesize that early externalizing problems in girls are especially likely to lead to internalizing problems in later years. Third, boys seem to develop social skills somewhat later than girls, and since deficits in social skills are related to psychopathology, this may explain the greater continuity of early preschool problems in boys. We hypothesize that social problems at school entry play a significant role in pathways of psychopathology for boys (cf. Keenan & Shaw, 1997).

Finally, on a methodological level, the use of multiple informants and a general population sample is of special interest. Pathways may be different depending on the informant and the situation that is represented by the informant, but those that are consistent across situations (e.g., home and school) may be especially salient for theories of developmental psychopathology. Further, in a general population sample, behaviors ranging from normal to severely disordered may be found, as well as a variety of different types of problem behaviors. Clinical samples, on the other hand, will be less diverse, and may be selective regarding factors such as higher incidence of multiple disorders, an overrepresentation of externalizing problems, or low socioeconomic status, which impedes the generalization of results.

In sum, a number of studies have investigated pathways from preschool behavioral and emotional problems to internalizing and externalizing problems in later childhood. Furthermore, the role of social problems and differences between boys and girls as well as differences between informants have been found to be significant aspects in the study of developmental psychopathology. However, most studies in this area investigated only one or a few of these aspects, whereas an integrated approach including all of these aspects is needed to do justice to the complexity of development and its assessment. Therefore, the present study aims to answer the question "which developmental pathways from specific preschool problems to internalizing and externalizing psychopathology in preadolescence can be identified when social problems at school entry, and differences between sexes and informants, are taken into account?" The answer to this question may provide us with a more solid basis to adopt one or more of the pathways derived from theories and research described above because it takes into account several factors that may be crucial to the particular expression of such pathways. Based on previous studies the following hypotheses were formulated: (1) early preschool oppositional behavior, aggression, and overactivity predict later externalizing problems; (2) early preschool withdrawal and anxiety *negatively* predict later externalizing problems; (3) early preschool withdrawal and anxiety predict later internalizing problems; (4) early externalizing problems predict later internalizing problems; (5) social problems at school entry mediate homotypic internalizing and externalizing pathways, as well as heterotypic pathways from early externalizing to later internalizing problems; (6) sex differences in pathways include greater predictive value of early problems for boys than for girls, externalizing-internalizing pathways are especially salient for girls, and social problems at school entry are especially important in pathways of psychopathology for boys.

## Method

### Participants

Subjects were participants in the second follow-up of a longitudinal study of preschoolers from the general population (Koot, 1993; Koot et al., 1997). The target sample consisted of 469 preschool children, drawn randomly and stratified by age and sex from the Rotterdam municipal population register and the inoculation register of the Dutch province of Zuid-Holland. For 420 of these children (215 boys and 205 girls, mean age = 3.03 years,  $SD = 0.58$ ), usable information was obtained at Time 1 (1989). The response rate was 91.5%, corrected for untraceables. Nonresponders were significantly more often

from urban than from nonurban areas (65% vs. 35%). No other differences between responders and nonresponders were found.

In 1991, 2 years after the first time of measurement, the sample was approached again for a follow-up study (Time 2). Usable parent information was obtained for 397 of the 420 children participating at Time 1 (204 boys, 193 girls; mean age = 5.31 years,  $SD = 0.64$ ). At second follow-up (1997: Time 3), usable parent information was obtained from 358 respondents, primarily mothers (85.2% of the original 1989 Time 1 sample). Twenty-six parents refused to participate, two of whom because their children had problems and were already subjected to many tests and questions from other mental health institutes, and two of whom asked to be removed from the sample because the children had Down's syndrome and autism respectively, which made the questionnaires inappropriate for them. Further, 15 parents had unlisted phone numbers and did not respond to subsequent letters asking them to contact us, and 3 respondents could not be located. Finally, 378 parents gave consent to be sent a package of questionnaires and agreed to fill these out and send them back to us, but 18 of them never did. The sample at Time 3 ( $N = 358$ ) consisted of 180 boys and 178 girls with a mean age of 10 years and 11 months ( $SD = 7.2$  months; age range = 9.8–12.5 years).

Teacher information was obtained for 294 of the 358 participants at Time 3 (80.4%). Forty-seven parents did not give their consent to approach teachers, and of the 311 teachers for whom parental consent was obtained, 17 never returned their questionnaires.

Most children were living with both biological parents (86.9%), while 7.8% of children lived in a single-parent home, and 5.3% lived with one biological parent and his or her new partner. The large majority of parents were born in The Netherlands (93.6%). Parents' mean socioeconomic status as measured by the highest occupational level in the family was 5.04, which is the midpoint of the 9-point occupational scale (Netherlands Central Bureau of Statistics, 1993). The families had an average of 2.6 children and the children in the sample were mostly (82.4%) first- or second-born. Finally, 3.6% of the children were reported to have a chronic physical condition, 6.1% had received or were receiving special education, and 4.5% had been or still were referred for mental health services.

### Measures

A large number of measures were obtained at each time of assessment, including demographic and family factors, parental characteristics, child temperament, and physical health problems. For the aim of the present study, however, only measures of emotional and behavioral problems were included.

Time 1 psychopathology was assessed using the Dutch version of the Child Behavior Checklist for ages 2–3 years (CBCL/2–3; Achenbach, 1992; Koot et al., 1997) and psychopathology at Time 2 and 3 was measured using the Dutch translations of the Child Behavior Checklist for ages 4–18 (CBCL/4–18; Achenbach, 1991a), and the Teacher's Report Form (TRF; Achenbach, 1991b). The CBCL/2–3 (100 items) and CBCL/4–18 (120 items) obtain parents' reports of children's problem behaviors. The TRF (120 items) obtains teachers' reports and includes 95 of the same problem items as the CBCL/4–18, while items that are only relevant to the home situation were replaced by items relevant to the school situation. On these instruments, the problem items are scored on a 3-point Likert scale based on the preceding 6 months (CBCL/4–18) or 2 months (CBCL/2–3 and TRF). The psychometric properties of the Dutch versions have been found to be comparable with Achenbach's findings in U.S. samples (De Groot, Koot, & Verhulst, 1994, 1996; Koot et al., 1997). Only the CBCL/2–3 was found to have a somewhat different factor structure in a Dutch population, which was used here (see, for a detailed description, Koot et al., 1997).

Table 1  
*Betas for Pathway to Time 3 Internalizing and Externalizing Problems for Boys in the Parent and Teacher Models*

	Time 2			Time 3	
	SP	INT	EXT	INT	EXT
R <sup>2</sup> Parent Model	0.26	0.20	0.36	0.39	0.43
T1 Oppositional	-0.06	0.20*	0.41***	0.12	0.02
T1 Withdrawn/Depressed	0.39***	0.21**	-0.01	0.04	0.01
T1 Aggressive	0.16*	0.00	0.14*	0.01	0.05
T1 Anxious	0.07	0.12*	-0.02	-0.04	-0.13*
T1 Overactive	0.04	0.00	0.18**	0.11	0.20**
T2 SP	-	-	-	0.19**	0.08
T2 INT	-	-	-	0.46***	0.09
T2 EXT	-	-	-	0.09	0.47***
R <sup>2</sup> Teacher model	0.16	0.05	0.20	0.14	0.29
T1 Oppositional	-0.05	-0.02	0.13	0.02	-0.11
T1 Withdrawn/Depressed	0.28**	0.18*	0.23**	0.10	0.06
T1 Aggressive	0.06	0.09	0.15*	0.08	0.24*
T1 Anxious	-0.11	-0.05	-0.20**	0.10	-0.24**
T1 Overactive	0.20**	0.00	0.13*	-0.07	0.29**
T2 SP	-	-	-	0.19**	0.12*
T2 INT	-	-	-	0.18*	-0.16*
T2 EXT	-	-	-	-0.04	0.02

SP: Social problems; INT: Internalizing problems; EXT: Externalizing problems.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .0005$ .

### Procedure

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), regardless of their participation at Time 2. They were then contacted by telephone to obtain consent to send them a package of questionnaires. The majority of parent information was obtained during September to December 1997. Included in the mailing to the parents was a form asking for permission to send the child's teacher two questionnaires. The majority of teacher information was obtained in the period from November 1997 to January 1998.

### Statistical Analyses

First, a series of  $t$ -tests and  $\chi^2$ -tests were performed to compare the sample used in the present study to the original Time 1 sample. Second, means and standard deviations of the Internalizing and Externalizing syndromes at each time of assessment were computed separately for boys and girls, and  $t$ -tests were performed to examine possible sex differences. Third, path analyses were performed using the CBCL/2-3 syndromes Oppositional, Withdrawn/Depressed, Aggressive, Anxious, and Overactive at Time 1, the CBCL/4-18 and TRF syndromes Internalizing, Externalizing, and Social Problems at Time 2, and the CBCL/4-18 and TRF syndromes Internalizing and Externalizing Problems at Time 3. We calculated variance-covariance matrices of syndrome scores using PRELIS 2.3 (Jöreskog & Sörbom, 1999b). Any missing syndrome was deleted pairwise, thus slightly reducing sample size for each syndrome pair. The multiple regression analyses were performed with the statistical package LISREL 8.3 (Jöreskog & Sörbom, 1999a), using variance-covariance matrices and maximum likelihood as the estimation method. Direct pathways were defined from Time 1 syndromes to Time 3 syndromes, and indirect predictions were defined as pathways from Time 1 syndromes via Time 2 syndromes to Time 3 syndromes.

Path analyses were first performed across informants and sexes, but  $\chi^2$ -tests revealed significant differences in regression coefficients between boys and girls for both parent reports,  $\Delta\chi^2(13) = 61.58$ ,  $p < .05$ , and teacher reports,  $\Delta\chi^2(13) = 92.65$ ,  $p < .05$ . Further, a significant difference in coefficients was found for parent and teacher reports,  $\Delta\chi^2(13) = 89.76$ ,  $p < .05$ .

This led us to compute pathways separately for boys and girls, and parent and teacher reports. Parent models included parent-reported syndromes at all times of assessments, and teacher models included teacher-reported syndromes at Time 2 and Time 3, but parent-reported syndromes at Time 1 (children did not attend school at ages 2-3 years, so teacher-reports were not obtained). Predictor variables were tested for collinearity using a tolerance criterion of 0.10. There was no evidence of multicollinearity among predictor variables.

## Results

### Sample Attrition

Sample sizes in pathway analyses differed according to the times of assessment and informants used for each part of the models. These sample sizes range from 251 for the models using teacher reports at Time 2 and Time 3, to 346 for models using parent reports at all times of assessment.  $T$ -tests and  $\chi^2$ -tests comparing each subsample to their respective dropouts from the original Time 1 sample ( $N = 420$ ) revealed no significant differences between each subsample and the respective dropouts in Time 1 CBCL Internalizing and Externalizing problems, child physical health problems, sex, SES, nonparental care, family mental health service use, or negative life-events.

### Sex Differences across Ages

To describe our sample in terms of age- and sex-specific prevalences of internalizing and externalizing problems, means and standard deviations for these CBCL and TRF syndromes at each time of assessment, and for each available informant, were computed.  $T$ -tests revealed no significant sex differences in prevalence at ages 2-3 years on either syndrome. However, examination of the Time 1 narrow-band syndromes did reveal significantly higher scores for boys on the Aggressive scale,  $t(418) = 4.46$ ,  $p = .000$ , but none of the others. At ages 4-5 years, boys had significantly higher scores on the Externalizing Problems syndromes compared to girls on the CBCL,

Table 2  
*Betas for Pathway to Time 3 Internalizing and Externalizing Problems for Girls in the Parent and Teacher Models*

	Time 2			Time 3	
	SP	INT	EXT	INT	EXT
R <sup>2</sup> Parent Model	0.14	0.24	0.21	0.13	0.25
T1 Oppositional	0.16*	0.33**	0.32**	0.01	0.04
T1 Withdrawn/Depressed	0.15	0.16*	0.00	-0.10	-0.13
T1 Aggressive	0.04	-0.09	0.13	0.07	0.05
T1 Anxious	0.12	0.26**	-0.09	0.08	0.08
T1 Overactive	0.07	-0.05	0.12	0.09	0.01
T2 SP	-	-	-	0.02	0.07
T2 INT	-	-	-	0.19**	-0.09
T2 EXT	-	-	-	0.12	0.45***
R <sup>2</sup> Teacher model	0.02	0.04	0.03	0.08	0.22
T1 Oppositional	0.08	0.12	0.15	0.28**	0.10
T1 Withdrawn/Depressed	-0.05	-0.04	-0.03	-0.02	-0.03
T1 Aggressive	-0.08	-0.05	-0.06	-0.20*	-0.06
T1 Anxious	0.01	0.16*	-0.11	-0.11	0.00
T1 Overactive	0.09	-0.01	0.06	-0.09	-0.03
T2 SP	-	-	-	0.12	0.08
T2 INT	-	-	-	0.12	-0.05
T2 EXT	-	-	-	-0.05	0.46***

SP: Social problems; INT: Internalizing problems; EXT: Externalizing problems.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .0005$ .

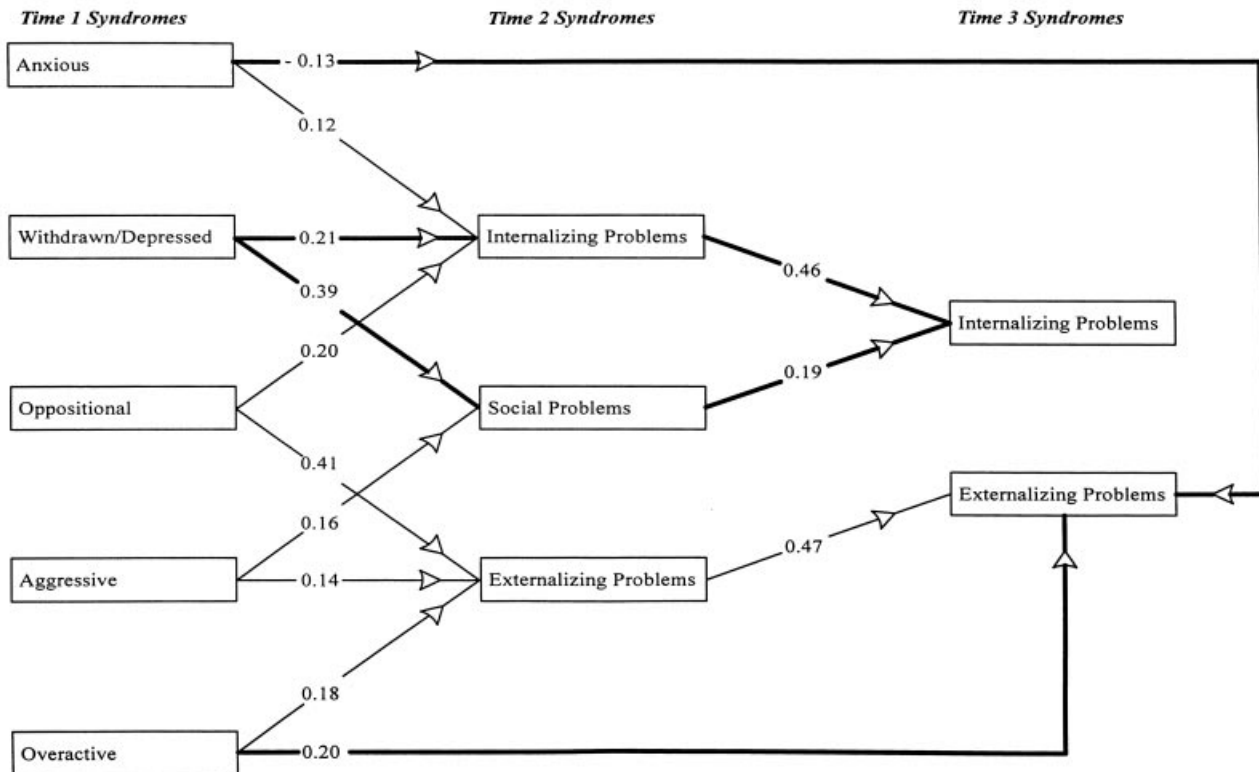


Figure 1. Boys-Parents model.

$t(395) = 5.67, p = .000$ , and the TRF,  $t(340) = 5.33, p = .000$ . The same was true at ages 10–11 years for both the CBCL,  $t(356) = 5.19, p = .000$ , and the TRF,  $t(292) = 5.09, p = .000$ . Boys also had slightly, but significantly, higher Internalizing Problems scores on the CBCL at Time 3 than girls,  $t(356) = 2.43, p = .016$ . Finally, boys had significantly higher scores than girls on the Time 2 TRF Social Problems syndrome,  $t(340) = 3.35, p = .001$ .

*Longitudinal Pathways*

Full results of the pathway analyses for the models for boys and girls are presented in Tables 1 and 2, respectively. Table 1 shows that for boys using parent reports, the proportions of variance in preadolescent internalizing and externalizing problems explained by preschool pathways are considerable (0.39 and 0.43,

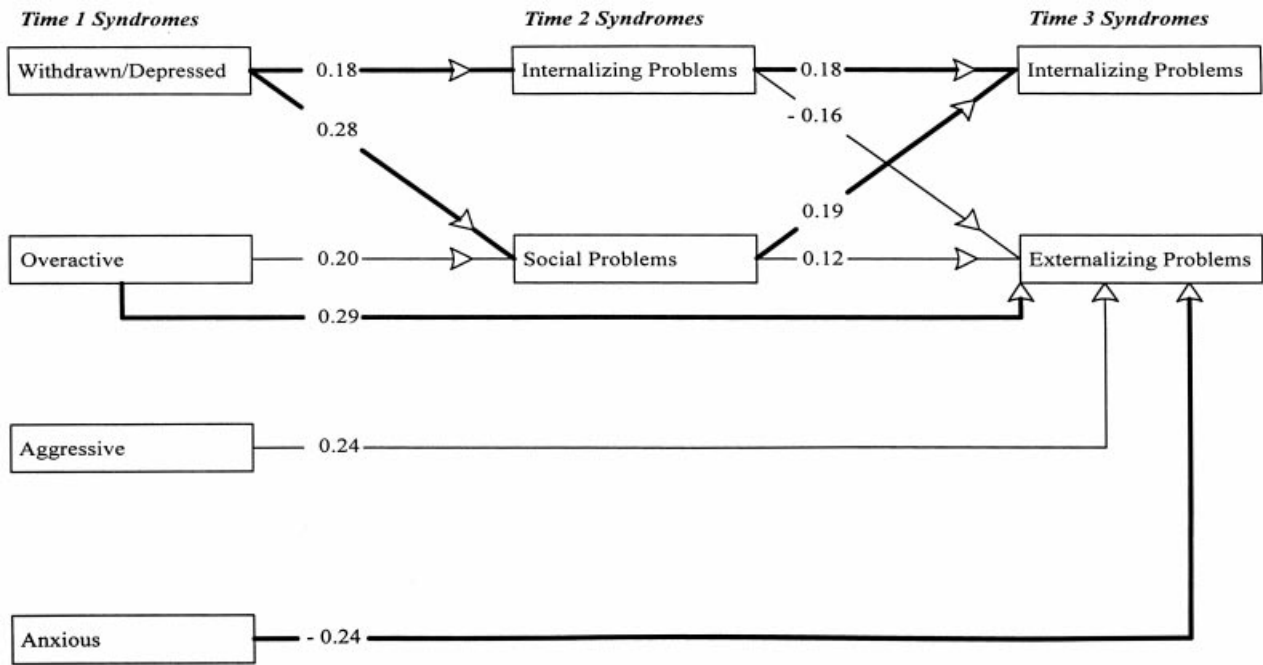


Figure 2. Boys-Teachers model.

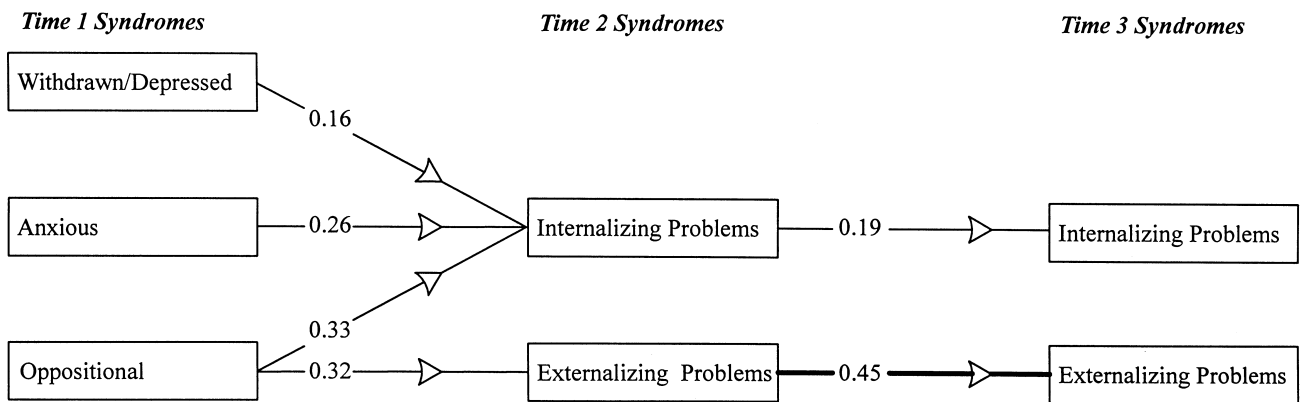


Figure 3. Girls-Parents model.

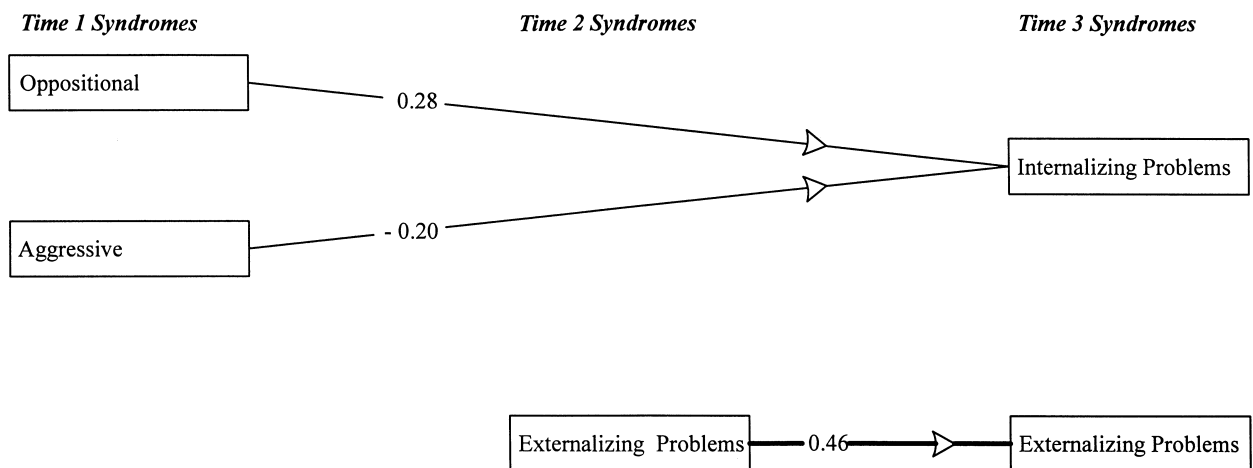


Figure 4. Girls-Teachers model.

respectively). For boys using teacher reports, these figures are lower, and indicate that preadolescent externalizing problems ( $R^2 = 0.29$ ) are better predicted by preschool pathways than internalizing problems ( $R^2 = 0.14$ ). Pathways for girls showed poorer predictive validity than for

boys, as evidenced by consistently lower  $R^2$  values both for parent reports ( $R^2 = 0.13$  for internalizing problems, and  $R^2 = 0.25$  for externalizing problems), and teacher reports ( $R^2 = 0.08$  for internalizing problems, and  $R^2 = 0.22$  for externalizing problems). To gain more insight

into the significant preschool pathways to internalizing and externalizing problems, Figs. 1 to 4 (representing each sex by informant model) present only those results that represent significant pathways to internalizing and externalizing problems at Time 3. Bold arrows represent pathways that were significant across informants for boys or girls.

### *Pathways to Externalizing Problems*

All models, except the boys-teachers model, show homotypic pathways from Time 2 Externalizing Problems to Time 3 Externalizing Problems. In the boys-parents model, indirect pathways from Time 1 Aggressive, Oppositional, and Overactive via Time 2 Externalizing Problems to Time 3 Externalizing Problems were found. For the girls-parents model, an indirect path from Time 1 Oppositional via Time 2 to Time 3 Externalizing Problems was identified. The girls-teachers model shows no significant Time 1 predictors of Time 2 or Time 3 Externalizing Problems. Direct homotypic pathways from Time 1 Aggressive and Overactive to Time 3 Externalizing Problems were found for the boys-teachers model. In this model homotypic Externalizing pathways from Time 1 to Time 2 were also found (see Table 1), but these did not lead to the Time 3 outcomes. In addition, several negative predictive pathways to Time 3 Externalizing Problems were found, including one model with a negative pathway from Time 2 Internalizing (boys-teachers), and two models with direct negative pathways from Time 1 Anxious (both models for boys). Finally, the boys-teachers model showed indirect pathways from Time 1 Withdrawn/Depressed and Overactive via Time 2 Social Problems to Time 3 Externalizing Problems.

### *Pathways to Internalizing Problems*

Three models (boys-parents, boys-teachers, and girls-parents) show homotypic indirect pathways from Time 1 Withdrawn/Depressed via Internalizing Problems at Time 2 to Internalizing Problems at Time 3. The two models derived from parent reports both show that Time 1 Anxious predicts an indirect homotypic pathway via Time 2 Internalizing to Time 3 Internalizing Problems. In the same models, heterotypic indirect paths from Time 1 Oppositional via Time 2 Internalizing Problems to Time 3 Internalizing Problems were also found. The two models for boys both yielded significant pathways to Time 3 Internalizing Problems involving Time 2 Social Problems. In the boys-parents model, indirect paths from Time 1 Withdrawn/Depressed and Time 1 Aggressive via Time 2 Social Problems to Time 3 Internalizing Problems were found, and in the boys-teachers model we found an indirect path from Time 1 Overactive, via Time 2 Social Problems, to Time 3 Internalizing Problems. The girls-teachers model shows a direct pathway from Time 1 Oppositional to Time 3 Internalizing Problems, as well as a negative predictive link between Time 1 Aggressive and Time 3 Internalizing Problems.

## Discussion

Our results mostly confirmed the age and sex differences in prevalence of internalizing and externalizing problems described by Keenan and Shaw

(1997). Boys and girls were not significantly different on broad measures of internalizing and externalizing problems at ages 2–3 years, although boys showed significantly more externalizing problems, but generally not more internalizing problems compared to girls at ages 4–5 years and 10–11 years (Angold & Rutter, 1992; Cohen et al., 1993; Offord et al., 1987). Girls' internalizing scores at ages 10–11 years do not yet exceed those of boys, which fits expectations that such differences do not emerge until adolescence. At a more specific level, boys were found to have significantly higher scores on the Aggressive syndrome than girls at ages 2–3 years, which contradicts results reported by others (Keenan & Shaw, 1994; Rose et al., 1989). This contradiction may be caused by the fact that those studies used relatively small low-income samples, whereas our study used a larger general population sample. On the whole, however, our results do illustrate the importance of testing separate pathways of internalizing and externalizing psychopathology for boys and girls (Keenan & Shaw, 1997). Path analyses across sexes and informants confirmed this observation, since significant differences in regression models between boys and girls (and informants) were found, which indicates a better fit to the data for separate versus combined models for boys and girls. In addition, results illustrated the considerable developmental significance of emotional and behavioral problems during the preschool years and at school entry regarding psychopathology in later childhood. Path analyses showed that large proportions of variance in the internalizing and externalizing outcomes could be explained by Time 1 and Time 2 syndromes, especially in the boys-parents model ( $R^2 = 0.39$  and  $0.43$  respectively).

### *Homotypic Externalizing Pathways*

As expected, preschool pathways to preadolescent externalizing problems were characterized by strong homotypic predictors including early preschool aggression, overactivity, and oppositional behavior. Several strong direct pathways from specific early externalizing problems to preadolescent externalizing problems were identified, as well as consistent indirect preschool externalizing pathways via school entry into preadolescence. Our findings confirm the developmental significance of a variety of externalizing problems from a very early age found by other authors (Campbell & Ewing, 1990; Fischer et al., 1984; Loeber, Green, Lahey, Christ, & Frick, 1992). Comparing the homotypic predictive impact of the three specific early preschool externalizing syndromes, the Oppositional-Externalizing-Externalizing pathways showed the highest betas in both parent-reported models, and the Overactive syndrome was both a direct and indirect predictor of later externalizing problems in parent- as well as teacher-models for boys. The Aggressive syndrome was a modest indirect predictor in the boys-parents model and a direct predictor in the boys-teachers model. The importance of early overactivity and/or aggression as predictors of later externalizing problems in boys is consistent with findings reported by several authors (Campbell & Ewing, 1990; Loeber, 1991; McGee et al., 1991; Nagin & Tremblay, 1999). The significance of early oppositional behavior at home seems to reflect a general vulnerability to psychopathology, since it was predictive of later internalizing problems in both parent-reported models.

### *Negative Internalizing-Externalizing pathways*

Further, as hypothesized, several negative pathways from early internalizing problems to later externalizing problems were found in addition to the homotypic externalizing pathways. Similar to findings by other authors, preschool anxiety and internalizing problems at school entry were found to be protective factors in the development of preadolescent externalizing problems, including aggressive and delinquent behavior (Kerr et al., 1997; Schwartz et al. 1996; Tremblay et al., 1994). It is likely that a subgroup of preschoolers experiencing strong anxiety and shyness will never be able to exhibit uninhibited, and to some extent dangerous, behaviors such as delinquency and aggression. This subgroup may represent children with temperamental behavioral inhibition as described by Schwartz et al. (1996), whose behavioral disposition protects them from externalizing problems in later years. It is especially salient that these negative associations were identified independent of concurrent externalizing problems.

### *Homotypic Internalizing Pathways*

Although not as strong as homotypic pathways to externalizing problems, results regarding early behavioral antecedents of internalizing problems indicated support for early homotypic preschool Internalizing pathways. These included predictions from early preschool anxiety and withdrawn/depressed behavior to internalizing problems at school entry and into preadolescence. Previous studies yielded inconsistent results, with some reporting a longitudinal association between internalizing problems at ages 2–3 years into later childhood (Lavigne et al., 1998), which was not confirmed in other studies (Fischer et al., 1984; Rose et al., 1989). However, these studies used broad definitions of internalizing problems at an early preschool age. One might speculate that the developmental significance of early anxiety in the development of later internalizing problems represents the concept of early inhibition as described by Kagan (1997). The item content of the Anxious syndrome suggests similar behaviors such as “upset by the new,” “shy,” and “afraid to try new things.”

### *Heterotypic Externalizing-Internalizing Pathways*

Similar to findings reported by Fischer et al. (1984), early externalizing problems also played a significant role in pathways to later internalizing problems. Early preschool oppositional behavior was a significant predictor of preadolescent internalizing problems, either through its association with internalizing problems at school entry, or directly. The nature of the Oppositional syndrome is one of general difficult behavior and negativity (items such as “stubborn,” “demanding,” “angry moods,” “sulking”) and it seems to represent a non-specific early preschool precursor of a variety of problems in later childhood, similar to the concept of general difficult temperament (Prior, 1992), rather than being a specific predictor of externalizing problems. Possibly, the CBCL/2–3 Oppositional syndrome represents that part of externalizing problems at an early preschool age that is responsible for at least part of the commonly reported relationship between early externalizing problems and later internalizing problems (Fischer et al., 1984; Rose et al., 1989).

### *The Role of Social Problems*

Social problems at school entry were found to be significant in preschool pathways to preadolescent psychopathology, but only for boys. A path to internalizing problems originates from withdrawn/depressed behavior. This finding may represent those preschool boys who through their behavior (i.e., shows little interest, acts too young, no fun) have difficulties making friends and fitting into a social group at school entry. This failure to successfully associate with peers may then lead to negative self-perceptions and social isolation that in turn are closely linked to the development of further internalizing problems in later childhood (Cole et al., 1996; Rubin, Hymel, Mills, & Rose-Krasnor, 1991). Two other pathways involving social problems seem to refer to a subgroup of boys described by Panak and Garber (1992), who show socially undesirable externalizing behaviors such as aggression or overactivity at an early age, which may result in social problems in the form of peer rejection, and subsequently lead to internalizing problems. No support was found for the Aggressive-Social Problems-Externalizing Problems pathway described by Patterson et al. (1989) when externalizing problems at school entry were corrected for. In the boys-teacher model, this may be due to the association between early preschool overactive behavior and aggression, since overactivity did predict social problems at school entry and subsequent externalizing problems in pre-adolescence.

### *Sex Differences*

Separate regression models for boys and girls revealed that larger proportions of variance in preadolescent internalizing and externalizing psychopathology were explained by preschool pathways for boys compared to girls. As hypothesized, this may represent what Keenan and Shaw (1997) refer to as a more discontinuous pattern of psychopathology for girls than for boys over the course of development. These authors note that girls seem to show a greater decline or lack of increase in rates of behavioral and emotional problems from the preschool years into later childhood than boys. Our hypothesis that girls' early externalizing problems would develop into internalizing problems at a later age through sex-stereotypic socialization processes was only partly confirmed. Early oppositional behavior in girls did predict internalizing problems in later years in both models (but also for boys in one model), but early aggression *negatively* predicted internalizing problems. Early preschool aggression in boys represented a significant developmental precursor of a variety of later problems, but for girls it did not even predict later externalizing problems. This finding may reflect that aggression at an early age is qualitatively different in boys and girls, or at least has a different developmental meaning. Finally, social problems at school entry were significant in models for boys, but not for girls, which is consistent with our hypothesis. This finding may be an illustration of previous findings indicating that girls learn several aspects of social-emotional functioning at an earlier age than boys (Keenan & Shaw, 1997), which makes boys at that age more vulnerable to social problems and associated psychopathological outcomes. Our data indeed show that boys at ages 4–5 years have significantly higher



scores on the TRF Social Problems syndrome than girls (although not on its CBCL counterpart).

### *Parents and Teachers as Informants*

The fact that models for teachers showed less predictive strength than those for parents is not surprising. All predictions in the teacher models from Time 1 were cross-informant, since teacher reports were unavailable at Time 1 and parent reports were used instead. In addition, the teacher information at Time 2 and Time 3 was not provided by the same person, since schoolchildren in the Netherlands hardly ever have the same teacher in first and seventh grades of elementary school. In contrast, the parent reports were obtained from the same person at all times of assessment in the majority cases, namely the mother. However, it must be noted that substantial predictive pathways were identified for preadolescent teacher-reported externalizing problems in boys, including no less than three direct cross-informant paths from Time 1 parent-reported problems to Time 3 teacher-reported externalizing problems. Parent and teacher models did show some convergence in pathways, including for boys the direct predictive association between preschool overactivity and preadolescent externalizing problems, the direct negative pathway from preschool anxiety to externalizing problems in preadolescence, the role of social problems in the development of internalizing problems, and for girls the significance of preschool oppositional problems in pathways to internalizing problems.

### *Recommendations for Future Research*

In sum, several important findings emerged from this study and warrant further research attention. First, early preschool oppositional behavior and anxiety seem to be an important general risk factor for the development of both internalizing and externalizing problems in preadolescence. This syndrome is somewhat similar to the concept of difficult temperament, but is especially interesting because it represents behaviors that are to a certain extent age-appropriate. Future research may award such preschool behaviors a more prominent role in studies of early risk for psychopathology and elaborate on the difference between age-appropriate oppositional behavior and deviancy in this realm.

Second, early anxiety was found to predict later internalizing problems and to negatively predict later externalizing problems. These findings hold an interesting paradox: it may be beneficial to be anxious in that it serves as a protective factor for externalizing psychopathology, but anxiety does pose a risk for the development of later internalizing problems. It is likely that there are qualitative and quantitative differences between anxious children who are protected for externalizing problems and those who will develop internalizing problems. Further research may aim to identify such subgroups to further the understanding of this phenomena.

Third, a number of interesting new findings regarding the development of psychopathology were presented that need replication as well as further study regarding the mechanisms underlying some of these findings. Findings that warrant special attention in this respect include the role of social problems in psychopathology pathways for

boys, the more elusive nature of pathways for girls compared with boys, and the apparently different developmental meaning of early preschool aggression for boys and girls. In addition, the present study included only psychopathology variables, which has left several questions regarding the potential influence of environmental or family variables unanswered. Further research is needed to clarify the role of such variables in preschool pathways of psychopathology.

Finally, the current study focuses only on the continuity of problem behaviors, and was not designed to investigate discontinuity, or factors associated with improvement of functioning. However, there is growing recognition for the fact that in addition to the group of children that follow a rather chronic course of maladaptation, there is also a large group of children who "outgrow" their problems (e.g., Hofstra, Van der Ende, & Verhulst, 2000; Tremblay et al., 1999). To investigate such discontinuity, a categorical approach needs to be adopted and in order to provide a more comprehensive picture of the development of psychopathology, future studies should strive to include factors that may predict continuity as well as improvement.

### Conclusion

This study was the first to integrate several important aspects of developmental pathways to internalizing and externalizing problems from a very early age, including a variety of early preschool problems, the role of social problems, and sex differences. The results of the present study generally confirmed our hypotheses based on previous literature. Several other papers have emerged from this study that elaborate on some of the issues presented in the current paper. In two papers, early and concurrent parent- and teacher-reported specific behavioral predictors of child-reported depression and anxiety were investigated (Mesman & Koot, 2000b, c). The results reported in these papers also illustrate the importance of using different informants and the role of social problems in the development of internalizing problems. Sex differences were not investigated in these papers. In a third paper the specificity of (early) child and family risk factors regarding internalizing versus externalizing problems in preadolescence was examined using two methods (Mesman & Koot, 2000a). Results showed virtually no nonsymptomatic or environmental risk factors to be specific to one or the other expression of dysfunction. In a final paper, early preschool child and family risk factors were examined simultaneously in relation to internalizing and externalizing DSM-IV diagnoses in preadolescence (Mesman & Koot, in press). Results revealed that it was mainly early child characteristics (psychopathology and physical health problems) rather than environmental factors that predicted later disorders.

The findings reported in the present paper illustrate the developmental significance of a number of early preschool emotional and behavioral problems, and the pathways that lead to preadolescent psychopathology. The role of social problems at school entry in the development of psychopathology in boys, and the finding that pathways are different depending on the sex of the child and on the source of information, call for further study.

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