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ORIGINAL ARTICLE

Prognosis and Continuity of Child Mental Health Problems from Preschool to Primary School: Results of a Four-Year Longitudinal Study

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Abstract In a four-year longitudinal study, changes in and continuity of behavioral and emotional problems were examined in 814 subjects from kindergarten to primary school. Mental health problems were assessed by means of the Child Behavior Checklist (CBCL). The distribution of the CBCL broadband groups revealed a high level of continuity of internalizing symptoms over the four-year period and a shift from externalizing symptoms at baseline towards a combination of internalizing and externalizing symptoms at follow-up. The presence of mental health problems at follow-up was correlated with gender (higher amongst boys), pre-existing mental health problems at baseline, and separation or divorce of the parents, but not with single-family status or the age and educational level of the mother. The increasing number of children with a combination of internalizing and externalizing symptoms demonstrates the increasing complexity of child mental health problems in the developmental span from preschool age to school age.

Keywords Child mental health · Externalizing problems · Internalizing problems · Longitudinal studies · Preschool children

Introduction

In the last decade, several large longitudinal studies on the epidemiology of child mental health and child psychopathology have been conducted [1–3]. However, prospective research on the psychopathology of preschool children has been lacking due to the late age of enrollment (mostly after school entry or even later in early adolescence) for most longitudinal studies on child mental health problems.

Dimensional studies of child psychopathology often focus on the dimensions of internalizing and externalizing problem behavior. Externalizing problems show considerable longitudinal stability, even from before the age of 4 years [4]. The assumption of a

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developmental sequence that starts in the preschool years with oppositional, hyperactive, and aggressive behavior, leading to conduct problems in later childhood [5] stands in contrast to findings that children with high degrees of externalizing problems are also vulnerable to internalizing symptoms of anxiety or depression [6]. Also, externalizing or disruptive behavior may be channeled into internalizing symptoms as a result of age-dependent and sex-stereotyped socialization in school [7]. In adolescents, anger and frustration have been found to be positively related to externalizing problem behavior [8], but also to psychosomatic disorders and depression [3], both of which constitute internalizing disorders. Such co-occurrence is a commonly described phenomenon [9, 10].

Studies of population-based preschool samples focusing on internalizing and externalizing symptoms show inconsistent results with regard to sex differences. In a population-based sample of children between the ages of 4 and 18 years [11], no differences were reported for internalizing problems between boys and girls in early childhood, and externalizing problems declined with age. Across all age groups, boys showed more externalizing problems than girls, and in adolescence, more internalizing symptoms were reported for girls than for boys [12, 13]. However, results from other studies have not provided any indications of sex differences at preschool age, neither for internalizing nor for externalizing problems [14, 15].

In addition to the particular risk of child mental health problems manifesting in boys, there are further risk factors for the onset of child mental health problems associated with the child's family [16, 17]. Existing findings demonstrate that both structural factors, such as socioeconomic status and educational level [18], and changes in family relationships, such as separation or divorce, are associated with childhood psychopathology [19].

In summary, mental health studies on children spanning the transition from preschool to primary school are rare, and it is still not clear whether sex differences already exist at preschool age and what the significant factors in the development of childhood psychopathology are. The present study focused on the continuity of child mental health problems in the transition from preschool to primary school. In a four-year longitudinal design, a representative nonclinical community sample was examined at preschool age and 4 years later in primary school. The continuity of symptoms and the degree of internalizing and externalizing problems at both time points were examined. In order to control for the co-occurrence of the two broadband groups, a combined group evidencing both internalizing and externalizing problems was defined.

Methods

Sample and Procedure

This study was designed to prospectively explore the prevalence and changing patterns of mental health problems in subjects drawn from the general population of preschool children in a northern German city of 260,000 residents. Participation in both surveys was voluntary, and written consent was obtained from the parents of all children in the study.

The baseline survey was conducted 6 months prior to primary school entry in the context of a statutory pediatric health examination [20]. Four years later, the population of the baseline survey was re-examined in the fourth grade of primary school. The response rate of the 1,481 children from the baseline sample who were asked to take part in the second survey was 68.3%; of these children, 814 were adequately assessed to be included in the second wave of the longitudinal study.

Table 1 Demographic features of the sample and the local population

	Sample	Population[a] (%)
Sex	$N = 814$	
Boys	46.3% (± 3.4)	51.7
Girls	53.7% (± 3.4)	48.3
Housing situation	$N = 798$	
Child lives with both parents	86.4% (± 2.4)	81
With mother	12.5% (± 2.4)	16
With father	0.6% (± 0.5)	3
Other relatives, foster care	0.4% (± 0.5)	n.n.
Number of children in the family	$N = 814$	
One child	17.7% (± 2.6)	16.8
Two	54.4% (± 3.4)	49.5
Three	20.5% (± 2.7)	24.3
Four or more	7.5% (± 1.8)	9.4
Educational level, mother	$N = 726$	[b]
Secondary school	16.4% (± 2.7)	19.3
Secondary-modern school	30.6% (± 3.3)	26.8
Grammar school	53.0% (± 3.6)	51.6
Educational level, father	$N = 649$	[b]
Secondary school	22.5% (± 3.2)	20.4
Secondary-modern school	19.9% (± 3.1)	16.2
Grammar school	57.4% (± 3.8)	60.7
Vocational situation, mother	$N = 782$	[b]
Full-time job	8.7% (± 2.0)	12.7
Part-time job	45.4% (± 3.5)	38.9
Primary homemaker	41.9% (± 3.5)	(other: 48.4)
Unemployed/students	3.9% (± 1.4)	
Vocational situation, father	$N = 720$	[b]
Full-time job	90.7% (± 2.1)	83.0
Part-time job	3.8% (± 1.4)	3.7
Primary homemaker	1.8% (± 1.0)	(other: 13.3)
Unemployed/students	3.8% (± 1.4)	

95% CI for percentage is in ()

[a] *Source*: local authorities for education, public health service, and statistics

[b] All subjects with at least one child under 18 are included

For both surveys, the adult caregiver was asked to complete some questionnaires. Mothers were the primary respondents at both baseline (88 vs. 11% for fathers) and follow-up (90 vs. 9% for fathers). Four children lived in foster care (see Table 1). The sample was comprised of 377 boys (46.3%) and 437 girls, aged between 5 and 6 years, with a mean age of 5.9 years at baseline.

Drop-Out-Analysis

The participants did not differ significantly in age, gender, number of siblings, or parents' education level and vocational situation relative to the eligible sample (see Table 1), although slightly fewer non-German children (3.6% vs. 7.4%) participated in the study.

Measures

The German version of the Child Behavior Checklist 4–18 (CBCL) [21] was completed by the parents or the primary caregiver. The CBCL 4–18 is a well-established screening instrument for childhood psychopathology [22]. The CBCL consists of 118 problem items that are scored from '0' to '2', based on the occurrence of the behavior during the preceding 6 months: '0' if the item is not true, '1' if it is somewhat or sometimes true, and '2' if it is very true or often true. By summing the scores, eight syndrome scales, two broadband scales (Internalizing and Externalizing), and a Total score were computed. The good reliability and validity of the CBCL were confirmed for the German version of the measure [23]. Cronbach's alpha for Total, Internalizing, and Externalizing scales ranged from 0.94 to 0.81. The test–retest reliability over a period of 5 weeks was 0.81. Four items concerning school, drugs, and sexual problems (items 73, 96, 101, and 105) were not considered applicable to preschool children and were excluded from the CBCL. This approach is in accordance with other studies of preschool children [6, 24].

Case Definition

The case definition is based on sex-specific *T*-scores according to the CBCL manual [23] and the national norms [25]. The cut-off point for the prevalence of child mental health problems was defined as a *T*-score of 64 or more on the Total score or on one of the broadband scales. For those children who met the criteria of child mental health problems, four subtypes of problem behavior were defined. Children who had a *T*-score of 64 or more on just one of the two broadband scales of internalizing or externalizing behavior were allocated either to the high internalizing (INT) or to the high externalizing (EXT) group. Those children who had a *T*-score of 64 or more on both broadband scales were considered to be in the combined group (COM) of high internalizing and externalizing behavior. Finally, children who met the criteria on the Total score, but not on any of the broadband scales, were allocated to the "other" category.

The grouping of COM and "other" were added to the already existing definition of INT and EXT [23]. The additional categories are necessary for a clear and unambiguous allocation of all possible patterns of psychopathology of those children meeting the case definition.

Statistical Procedures

The data analysis was performed using the Statistical Package for Social Sciences (SPSS for Windows, version 17). Differences in problem behavior between baseline and follow-up and between boys and girls were examined with a two-factor repeated-measures analysis by means of the general linear model procedure. Effect sizes for the ANOVA were computed in terms of partial eta-squared (η^2). A conservative interpretation of η^2 is given by Cohen [26], with $\eta^2 = 0.02$ considered a small effect size, $\eta^2 = 0.15$ a medium effect size, and $\eta^2 = 0.35$ a large effect size.

The categorical distribution of broadband groups and the continuity over time were examined by means of cross-tabulation and Chi-square test. The risk of child mental health problems was calculated by means of a logistic regression analysis, with presence or absence of psychopathology at T2 as the dichotomous dependent variable. The odds ratios of each independent variable are reported as indicators of risk.

Results

CBCL Scores at Baseline (T1) and Follow-Up (T2)

The means of the CBCL scores at T1 and T2 and the post hoc statistics are listed in Table 2. In a repeated-measures analysis, the within-subjects effect of time of measurement on CBCL scores was significant, F (11, 802) = 9.70, $p < .001$. Also, the between-subjects effect of sex was significant, F (11, 802) = 5.05, $p < .001$. In terms of effect sizes, η^2 was .117 for the effect of time and .065 for the effect of sex, both representing small to medium effects. There was no significant interaction of time and sex, F (11, 802) = 0.99, $p = 0.46$.

Effect of Time

The within-subjects effect of time on CBCL broadband scales and syndrome is reported in Table 2. Post hoc analyses revealed a significant increase of symptoms over time for the syndrome scales *Somatic Complaints*, *Anxious/Depressed*, *Social Problems*, and *Attention Problems*. With regard to the broadband scales, we found a significant increase in *Internalizing* symptoms and a minor decrease in *Externalizing* symptoms. There was no significant difference between T1 and T2 in *Total Score.*

Boys Versus Girls

The differences between boys and girls were significant on the broadband scale of internalizing symptoms and on two of the three internalizing syndrome scales, but not on externalizing scales. For all significant differences, boys had higher scores than girls: *Withdrawn*, 55.3 versus 54.3 ($F = 7.13$, $p = 0.008$, $\eta^2 = 0.009$); *Anxious/Depressed*, 56.2 versus 55.0 ($F = 8.52$, $p = .004$, $\eta^2 = 0.01$); *Social Problems,* 54.1 versus 53.2 ($F = 7.46$, $p = .006$, $\eta^2 = 0.009$) *Attention Problems,* 54.4 versus 53.0 ($F = 16.56$,

Table 2 *T*-Scores of CBCL subscales at baseline (T1) and follow-up (T2)

	Means (SD)		Univariate tests		
CBCL Scale	T1	T2	*F*	*p*	η^2
Withdrawn	54.70 (5.8)	54.85 (6.4)	0.58**	.45	<0.01
Somatic complaints	54.08 (5.8)	55.98 (7.3)	48.63**	<.001	0.06
Anxious/depressed	55.19 (6.1)	55.90 (7.3)	8.22**	.004	0.01
Social problems	53.13 (4.8)	54.02 (6.4)	16.31**	<.001	0.02
Thought problems	52.19 (5.0)	52.53 (5.6)	2.43**	.12	<0.01
Attention problems	53.11 (4.8)	54.23 (6.3)	30.61**	<.001	0.04
Delinquent behavior	54.12 (5.1)	54.00 (5.6)	0.18**	.67	<0.01
Aggressive behavior	54.22 (5.5)	54.02 (6.1)	1.03	.31	<0.01
Internalizing behavior	52.77 (8.6)	53.77 (9.4)	10.20**	.001	0.01
Externalizing behavior	51.38 (8.2)	50.76 (9.1)	4.34	.04	<0.01
Total score	51.54 (8.2)	51.80 (9.3)	1.02**	.31	<0.01

** $p < .01$

$p < .001$, $\eta^2 = 0.02$); and *Internalizing Behavior*, 54.2 versus 52.5 ($F = 9.70$, $p = .002$, $\eta^2 = 0.012$).

Broadband Groups INT and EXT and the Need for Combined Group COM

At T1, 129 of 814 (15.8%) children had mental health problems. Of the 129 children with mental health problems, there were 98 children with pronounced internalizing problems and 43 with pronounced externalizing problems, including 13 children with both internalizing and externalizing problems. To differentiate between children with problems of a single broadband group and children with problems characteristic of both broadband groups, independent grouping into three categories was necessary. Of the total number of 129 children (100%) with mental health problems at baseline, 85 (66%) children belonged to the INT group of children with only high internalizing scores, 30 (23%) belonged to the EXT group of children with only high externalizing scores, and 13 (10%) children fulfilled the criteria for the COM group of children with both high internalizing and high externalizing scores. The symptoms of 1 (1%) child were assigned to the "other" group. There was no significant difference between boys and girls in the distribution of INT, EXT, and COM at T1 (X^2 (2, $N = 128$) = 1.49, $p = .47$). However, overall, significantly more boys (n = 73; 19.4%) than girls (n = 56; 12.8%) had mental health problems, X^2 (1, $N = 814$) = 6.51, $p = .012$.

At T2, 165 of 814 (20.3%) children showed mental health problems. Of those 165 (100%) children, 90 (55%) were classified as INT, 27 (16%) as EXT, 42 (26%) as COM, and 6 (4%) were identified as belonging to the "other" category. At T2, the distribution of INT, EXT, and COM between boys and girls was not significantly different (X^2 (2, $N = 159$) = 0.04, $p = .98$). However, as at T1, child mental health problems were significantly more common in boys (n = 93; 24.7%) than in girls (n = 72; 16.5%), X^2 (1, $N = 814$) = 8.41, $p = .004$. The number of children in each broadband group and the combined group, as well as the changes between T1 and T2, are shown in Table 3.

Continuity of Behavioral and Emotional Symptoms

The overall concordance of child mental health problems between T1 and T2 was 81%. Out of a total of 129 children with mental health problems at T1, 71 (55%) children still had problems at T2. The continuity of having no mental health problem at T1 and T2 was at a high level: 86%.

Table 3 Frequencies of Int, Ext, and Com at baseline (T1) and at follow-up (T2): continuity within specific broadband groups and within any broadband group

	T1	T2	T1 and T2[a]	Any problem group[b]
Pathology[c]	129	165	71 (55%)	71 (55%)
Int	85	90	32 (38%)	45 (53%)
Ext	30	27	4 (13%)	16 (53%)
Com	13	42	4 (31%)	10 (77%)
No pathology	685	649	591 (86%)	591 (86%)

[a] Number of children in the specified broadband group both at T1 and at T2 (percentage of T1)

[b] Number of children in any broadband group both at T1 and at T2 (percentage of T1)

[c] Including all children with any pathology of Int, Ext, Com, and other

Table 4 Logistic regression predicting child psychopathology at follow-up

Predictor	B	SE	*p*	OR	95% CI
Pathology at T1	1.99	0.21	<.001	7.28	(4.8–11.0)
Divorce	0.62	0.37	.09	1.86	(0.9–3.9)
Boys versus girls	0.44	0.19	.02	1.55	(1.1–2.3)
Single-parent family	−0.27	0.34	.44	0.77	(0.4–1.5)
Mother education	−0.14	0.14	.17	0.88	(0.6–1.3)

$R^2 = 0.12$ (Cox and Snell), 0.19 (Nagelkerke). Model χ^2 (6) = 105.73

CI confidence interval for odds ratio (OR)

The continuity of symptoms between T1 and T2 within the same problem group was 32 out of 85 (38%) children for INT, 4 out of 30 (13%) children for EXT, and 4 out of 13 (31%) children for COM. The continuity rates for INT (38%) and EXT (13%) were significantly different (X^2 (1, $N = 115$) = 6.1, $p = .02$). There was only a slight crossover move from INT to EXT (2%), a moderate move from INT to COM (12%) and from EXT to INT (13%), but a substantial move from EXT to COM (23%).

Predictors of Child Psychopathology at T2

The risk of child mental health problems at T2 was calculated by means of a logistic regression, with the following independent variables: child's sex, the presence of child mental health problems at T1, educational level of the mother, family status (two-parent versus single-parent), and divorce or separation (see Table 4).

Pre-existing child mental health problems at T1 (OR = 7.3; Wald = 87.85, $df = 1$, $p < .001$) had a significant effect on child mental health problems at T2. Also, parents' separation or divorce (OR = 1.9, Wald = 2.80, $df = 1$, $p = .09$) and boys, as opposed to girls (OR = 1.6; Wald = 5.31, $df = 1$, $p = .02$), were associated with a higher risk of child mental health problems. However, no significant effect on the risk of mental health problems at T2 was found for the educational level of the mother (Wald = 3.56, $df = 2$, $p = .17$), nor for two-, as opposed to single-, parent families (Wald = 0.60, $df = 1$, $p = .44$).

Discussion

The results show significant effects of time and sex on CBCL scores. There was also considerable continuity of mental health problems in children with combined internalizing and externalizing problems as well as considerable continuity of children without any mental health problems. Children with pre-existing mental health problems at preschool age, children whose parents were separated or divorced, and boys had a significantly higher risk for child mental health problems at the four-year follow-up.

CBCL Scores at Baseline and Follow-Up

Over the period of four years, which included the important transition from preschool status to primary school, there was no significant change in the degree of child mental health problems on the global level of total scores, though there were changes in terms of

the internalizing and externalizing subscales. In particular, significantly higher scores on *Somatic Complaints* and *Anxious/Depressed* represented the significant increase of internalizing symptoms, which is in accordance with some previous findings [11, 15]. Also, the shift from externalizing to internalizing symptoms over time has been reported elsewhere [11, 27].

The significantly higher scores for *Social Problems* and *Attention Deficit Problems* at follow-up were for neither internalizing nor externalizing symptoms and may have been related to the new demands on the children attending school at T2, especially in terms of social behavior, cognitive performance, focusing, and attention.

Grouping of Children with Mental Health Problems

By defining a combined group, COM, of co-occurring internalizing and externalizing symptoms, a new category was introduced as an addition to the two discrete broadband groups, INT and EXT. The definition of the COM group implied a high overall symptom load. The importance of co-occurring INT and EXT symptoms has been confirmed in several recent studies [28–30]. Already at T1, and even more prominently at T2, externalizing symptoms were seldom present on their own but were often combined with internalizing symptoms. This combination was represented in the COM group. A shift in psychopathology over time from externalizing symptoms to a broader scope of symptoms was also found elsewhere [11]. Therefore, the newly defined category COM has proven to be essential for a comprehensive classification of child mental health symptoms.

Continuity and Prognosis

The most impressive continuity from baseline to follow-up was found for the children in the COM group (70%) and for those children without any psychiatric problems (86%). Furthermore, the amount of continuity in the INT group (37%) was nearly twice as high as in the EXT group (19%), and the substantial crossover moves from EXT to INT (15%) and from EXT to COM (18%) demonstrate the shift from externalizing to internalizing symptoms. The crossover move from EXT to INT over time is in accordance with the results from the present study on the level of CBCL syndrome scales as described above. Similar results have been found in other studies [11, 27]. The higher risk of mental health problems for school children with pre-existing mental health problems at preschool age is an important finding—one that supports the assumption of continuity, aggravation, and chronic manifestation of mental health problems already evident in early childhood.

The effect of family background variables is controversial in the existing literature. Some studies have shown that children living in families with both biological parents had significantly lower frequencies of disturbance than almost any other family constellation [31, 32]. In the present study, we found no significant effect of single- versus two-parent families on child mental health, which is in accordance with Ford et al.'s findings [16]. However, there was a significant effect on child mental health problems in children who had experienced parental separation or divorce in the last 4 years. This closer link between parental separation or divorce and mental health problems has also been reported in other studies [24, 30, 33]. Separation or divorce and single-parent status are correlated, but only in a specific temporal sequence. The more recent state variable of separation or divorce explained a significantly higher amount of variance than the more enduring family background variables. However, further studies are needed to determine which effects of

family variables are important for possible developmental pathways of child mental health problems.

Limitations of the Study and Conclusions

These results must be considered within the context of their limitations. The population-based sample was drawn from a city where university and public service employees are overrepresented. Consequently, generalization of the findings to national samples may be limited. Given the large sample size, a symptoms checklist was used to identify child psychopathology. A structured interview might have provided more specificity. Finally, the age of the children at baseline was between 5 and 6 years, which is at the upper limit of the usual definition of preschool. Nevertheless, all children met the preschool status due to the higher school entry age in Germany, which is comparable to Scandinavian countries and the Netherlands.

In conclusion, the results of the present longitudinal study have important research and clinical implications. In terms of research, further systematic investigation is needed on general development and on sex-specific aspects of mental health problems in early childhood. Our results, which show a significant increase of internalizing psychopathology in boys in conjunction with high degrees of general mental health problems during the 4 years of the follow-up period, require further prospective research on sex-specific early child mental health.

In clinical terms, the continuity of early child mental health problems from preschool age to the fourth year of primary school points to the important aspects of aggravation and chronic manifestation of mental health problems already present in early childhood. CBCL scores represent dimensional measures of symptoms and are not identical to statements of categorical diagnosis in our population sample. However, it has been shown that dimensional CBCL scores correlate significantly with categorical data of psychiatric diagnoses from structured interviews [34]. The increasing number of children with both internalizing and externalizing symptoms suggests a higher complexity in the development of child mental health problems with age. This study points to the need for early intervention at preschool age to prevent aggravation and chronic manifestation of psychopathology in later childhood. Specifically, the vulnerability for internalizing psychopathology in boys requires the particular attention of child mental health workers, not only at primary school age, but prior to school entry in preschool settings and in early childhood.

Summary

A sizeable number of studies have examined the development of mental health problems in older children, adolescents, and young adults, but only a few longitudinal studies have examined child mental health problems at preschool age. In the present follow-up study, changes in and continuity of behavioral and emotional problems were examined over a period of 4 years, from preschool age to the fourth grade of primary school. A total sample of 814 children was studied in kindergarten, 6 months prior to primary school enrollment, and at a follow-up 4 years later. Child mental health problems were assessed by means of the Child Behavior Checklist (CBCL). In addition to the CBCL broadband groups exhibiting either internalizing or externalizing symptoms, a third group of combined symptoms was defined.

There was a high degree of continuity of internalizing symptoms over the 4 years from baseline to follow-up. Also, there was a shift from externalizing symptoms in kindergarten towards a combination of internalizing and externalizing symptoms in primary school. The presence of mental health problems at follow-up was correlated to sex (higher among boys than girls), pre-existing mental health problems at baseline, and separation or divorce of parents.

The increased number of children with combined symptoms demonstrates the increasing complexity of child mental health problems in the developmental span from preschool to school age. The high level of continuity of early child mental health problems points to the need for intensive research on early child mental health disturbances and to the need for the provision of psychiatric services for young children.

References

1. Costello EJ, Mustillo S, Erkanli A, Keeler G, Angold A (2003) Prevalence and development of psychiatric disorders in childhood and adolescence. Arch Gen Psychiatry 60:837–844
2. Ford T, Goodman R, Meltzer H (2003) The British child and adolescent mental health survey 1999: the prevalence of DSM-IV disorders. J Am Acad Child Adolesc Psychiatry 42:1203–1211
3. Kim-Cohen J, Caspi A, Moffitt TE, Harrington HL, Milne BJ, Poulton R (2003) Prior juvenile diagnoses in adults with mental disorder: developmental follow-back of a prospective-longitudinal cohort. Arch Gen Psychiatry 60:709–717
4. Lavigne JV, Arend R, Rosenbaum D, Binns HJ, Christoffel KK, Gibbons RD (1998) Psychiatric disorders with onset in the preschool years: I. stability of diagnoses. J Am Acad Child Adolesc Psychiatry 37:1246–1254
5. Loeber R, Stouthamer-Loeber M (1998) Development of juvenile aggression and violence. Some common misconceptions and controversies. Am Psychol 53:242–259
6. Eisenberg N, Cumberland A, Spinrad TL (2001) The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. Child Dev 72:1112–1134
7. Keenan K, Shaw DS (1997) Developmental influences on young girls' behavioral and emotional problems. Psychol Bull 121:95–113
8. Colder CR, Stice E (1998) A longitudinal study of the interactive effect of impulsivity and anger on adolescent problem behaviour. J Youth Adolesc 27:255–274
9. Angold A, Costello J, Erkanli A (1999) Comorbidity. J Child Psychol Psychiatry 40:57–87
10. Lahey BB, Rathouz PJ, van Hulle C, Urbano RC, Krueger RF, Applegate B et al (2008) Testing structural models of DSM-IV symptoms of common forms of child and adolescent psychopathology. J Abnorm Child Psychol 36:187–206
11. Bongers I, Koot H, van der Ende J, Verhulst FC (2003) The normative development of child and adolescent problem behavior. J Abnorm Psychol 112:179–192
12. Verhulst FC, van der Ende J (1997) Factors associated with child mental health service use in the community. J Am Acad Child Adolesc Psychiatry 36:901–909
13. 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
14. Campbell SB (1995) Behaviour problems in preschool children: a review of recent research. J Child Psychol Psychiatry 36:113–149
15. Keiley MK, Bates JE, Dodge KA, Pettit GS (2000) A cross-domain growth analysis: externalizing and internalizing behaviors during 8 years of childhood. J Abnorm Child Psychol 28:161–179
16. Ford T, Goodman R, Meltzer H (2004) The relative importance of child, family, school and neighbourhood correlates of childhood psychiatric disorder. Soc Psychiatry Psychiatr Epidemiol 39:487–496
17. Furniss T, Beyer T, Muller JM (2009) Impact of life events on child mental health before school entry at age six. Eur Child Adolesc Psychiatry 18:717–724
18. Caughty MO, O'Campo PJ, Muntaner C (2003) When being alone might be better: neighbourhood poverty, social capital and child mental health. Soc Sci Med 57:227–237
19. Dunn J (2001) Children's development and adjustment in different family settings. In: Association of Child Psychology and Psychiatry Occasional Papers, Child Mental Health in Europe, vol 17. ACPP, London, pp 19–37

20. Furniss T, Beyer T, Guggenmos J (2006) Prevalence of behavioural and emotional problems among six-years-old preschool children: baseline results of a prospective longitudinal study. Soc Psychiatry Psychiatr Epidemiol 41:394–399
21. Achenbach TM (1991) Manual for the Child Behavior Checklist/4–18 and 1991 profile. Department of Psychiatry, University of Vermont, Burlington
22. Verhulst FC, Achenbach TM (1995) Empirically based assessment and taxonomy of psychopathology: cross-cultural applications. A review. Eur Child Adolesc Psychiatry 4:61–76
23. Doepfner M, Schmeck K, Berner W, Lehmkuhl G, Poustka F (1994) Zur Reliabilitaet und faktoriellen Validitaet der Child Behavior Checklist: eine Analyse in einer klinischen und einer Feldstichprobe. Z Kinder Jugendpsychiatr 22:189–205
24. Haffner J, Esther C, Muench H, Parzer P, Raue B, Steen R et al (2002) Verhaltens-auffaelligkeiten im Einschulungsalter aus elterlicher Perspektive: Ergebnisse zu Praevalenz und Risikofaktoren in einer epidemiologischen Studie. Prax Kinderpsychol Kinderpsychiatr 51:675–696
25. Arbeitsgruppe Deutsche Child Behavior Checklist (1998) German version of the Child Behavior Checklist cbcl/4–18, 2nd edn. KJFD, Cologne
26. Cohen J (1988) Statistical power analysis for the behavioral sciences, 2nd edn. Erlbaum, Hillsdale, NJ
27. Tremblay RE (2000) The development of aggressive behaviour during childhood: what have we learned in the past century? Int J Behav Dev 24:129–141
28. Ashford J, van Pier PA, Timmermans M, Cuipers P, Koot HM (2008) Prenatal smoking and internalizing and externalizing problems in children studied from childhood to late adolescence. J Am Acad Child Adolesc Psychiatry 47:779–787
29. Fite PJ, Stoppelbein L, Greening L, Dhossche D (2008) Child internalizing and externalizing behavior as predictors of age at first admission and risk for repeat admission to a child inpatient facility. Am J Orthopsychiatry 78:63–69
30. Oland AA, Shaw DS (2005) Pure versus co-occurring externalizing and internalizing symptoms in children: the potential role of socio-developmental milestones. Clin Child Fam Psychol Rev 8:247–270
31. Harland P, Reijneveld SA, Brugman E, Verloove-Vanhorick SP, Verhulst FC (2002) Family factors and life events as risk factors for behavioural and emotional problems in children. Eur Child Adolesc Psychiatry 11:176–184
32. Kroes M, Kalff AC, Steyaert J, Kessels AG, Feron FJ, Hendriksen JG et al (2002) A longitudinal community study: do psychosocial risk factors and Child Behavior Checklist scores at 5 years of age predict psychiatric diagnoses at a later age? J Am Acad Child Adolesc Psychiatry 41:955–963
33. Mesman J, Koot HM (2001) Early preschool predictors of preadolescent internalizing and externalizing DSM-IV diagnoses. J Am Acad Child Adolesc Psychiatry 40:1029–1036
34. Edelbrock C, Costello AJ (1988) Convergence between statistically derived behaviour problem syndromes and child psychiatric diagnosis. J Abnorm Child Psychol 16:219–231