

Coexisting problem behaviour in severe dyslexia

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A small group of children and young adolescent with dyslexia has severely impaired reading skills despite prolonged special education. These are the students in focus. In dyslexia, problem behaviour, internalised as well as externalised, has previously been reported, so also for the participants with dyslexia in this study. The aim of the present study was to obtain more in-depth knowledge of the behaviour problems from various informants, representing different settings. This kind of information is imperative for identifying problem behaviour, and for planning and implementing remedial programmes. A clinical group of 70 students with severe dyslexia, due to phonological problems, and a control group of 70 without reading problems participated. The two groups were pair-wise matched on age, gender, cognitive level and whether they lived in rural or urban areas. Mean age was 150 months, and mean IQ was approximately 100 in both groups. Parents, teachers and participants provided information on behaviour through the Achenbach questionnaires Child Behavior Checklist, Teacher's Report Form and Youth Self Report. Behaviour is, in these questionnaires, divided into eight syndrome areas called Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior and Aggressive Behavior. The three informant groups reported significantly more problems in the dyslexia group than in the controls in all the syndrome areas. Parents reported more children with dyslexia to be anxious and depressed, and have social problems and attention problems than teachers. They also reported suicidal ideations in nine participants with dyslexia. In addition, parents rated more internalising and total problems in the dyslexia group than teachers.

Introduction

The aim of the present study was to obtain more in-depth knowledge of behavioural problems in children with severe dyslexia. Dyslexia is a developmental disorder characterised by deficits in the sub-skills of reading, word identification and phonological decoding (Vellutino and Fletcher, 2005). Children with dyslexia also have impaired spelling (Romani, Olson and Di Betta, 2005; Vellutino and Fletcher, 2005) and problems with rapid automatised naming (RAN) (Will-

burger, Fussenegger and Moll et al., 2008; Wolf and Bowers, 1999; 2000). Some children and young adolescents do not benefit from prolonged special education (Niemi, Poskiparta and Vauras, 2001; Torgesen, 2005; Torgesen, Alexander and Wagner et al., 2001). The term severe dyslexia is used to illustrate their severely impaired reading skills.

As will be described, internalised, externalised and also other problem behaviours have previously been reported in dyslexia, so also for participants in this study (Knivsberg and Andreassen, 2008), a clinical sample of 70 students with severe dyslexia. They were included in the study because of their severe phonological problems. They had all received remedial training for several years. Still, their reading skills, related to both accuracy and speed, were more than 2 standard deviations (SDs) below average. In-depth knowledge on behaviour in severe dyslexia is imperative to identify problem behaviour and vital for planning and implementing remedial programmes. Remediation has to be directed towards each of the problem areas to ensure the best possible results (Maughan and Langton, 2008). Behaviour may vary in different settings, which may also be important for remediation. Parents, teachers and the participants themselves provided the information on behaviour, and we could therefore also examine if the informants reported the same kind and strength of behaviour problems.

The term internalising refers to different behaviour like withdrawal from social activities, sadness and loneliness. It also includes fear, anxiety, suicidal ideation, depression and somatic complaints like headaches and stomach pain (Achenbach and Rescorla, 2001). Externalising behaviour is characterised by aggression and rule-breaking behaviour like destroying other persons' things, lying, stealing, cheating and threatening people. Pupils with externalising behaviour may also have bad temper, lack of the feeling of guilt after doing something wrong or abuse of alcohol, tobacco or drugs.

Studies on severe dyslexia are rare. The theory presented below is therefore collected from research of behaviour problems in more heterogeneous groups of dyslexia.

Significantly more withdrawal behaviour was reported in children with reading disabilities than in controls in a twin study by Willcutt and Pennington (2000b). This study was the first to describe more parent-reported somatic complaints in children with reading disabilities than normal

readers. More somatic complaints in adolescents with poor single-word reading than in adolescents with normal word reading ability were also reported from both parents and participants themselves in a study by Arnold, Goldston and Walsh et al. (2005).

Boetsch, Green and Pennington (1996) found more internalising behaviour, more depressive symptoms and, not least, suicidal ideation, self-blame and low energy in children and adolescents with poor reading disabilities than in a control group. More depressed mood was also reported in the Pittsburgh Youth Study in 7–10-year-old boys with marked reading disabilities than in boys without reading problems (Maughan, Rowe and Loeber et al., 2003). In line with this, Arnold et al. (2005) found more self-reported depression and anxiety in adolescents with poor single-word reading ability than in adolescents with normal reading ability, and higher rates of anxiety disorders were also reported for children with poor reading skills by Goldston, Walsh and Arnold et al. (2007). The British Child Mental Health Survey carried out by the UK Office for National Statistics (ONS) in 1999 revealed increased risk for developing anxiety, but not depression, in both males and females with reading disabilities (Carroll, Maughan and Goodman et al., 2005). An association between literacy difficulties and self-reported depressed mood was, however, found in 11–15-year-old boys in the latter study. Willcutt and Pennington (2000b) reported more depressive traits in females than males with reading disabilities, although both genders displayed more depressive problems than controls. In contrast to these studies, Miller, Hynd and Miller (2005) did not find more internalising behaviour in children with dyslexia than in controls.

Externalising problems are frequently reported to coexist with dyslexia. Carroll et al. (2005) found a close relationship between literacy disabilities and conduct disorders in both genders. More hostile–aggressive and anxious–fearful behaviour was reported from parents and teachers in a group with dyslexia than in controls in a longitudinal Australian study (Smart, Sanson and Prior, 1996), and Arnold et al. (2005) found that parents reported more delinquent behaviour among adolescents with poor single-word reading abilities. Willcutt and Pennington (2000b) revealed associations between reading disabilities and externalising problem behaviour for both genders.

Social problems, thought problems and attention problems are terms used in addition to internalising and externalising behaviour to describe problem behaviour (Achenbach and Rescorla, 2007). Children with social problems have problems with peers and behave like they are younger than their age. Thought problems may refer to seeing and hearing things that do not exist. Pupils with these problems might also have strange ideations and compulsive behaviour. Attention problems may not only be displayed as impulsivity, but also as daydreaming and confusion.

Several research groups have focused on attention problems in dyslexia or the coexistence of reading problems and

attention deficit hyperactivity disorders (ADHD) (Arnold et al., 2005; Carroll et al., 2005; Dykman and Ackerman, 1991; Heiervang, Stevenson and Lund et al., 2001; Pennington, 1991; 1999; Willcutt, Betjemann and Wadsworth et al., 2007; Willcutt and Pennington, 2000a; Willcutt, Pennington and DeFries, 2000). More attention problems were reported in children with dyslexia in all these studies, or that the criteria for ADHD were met more frequently than in groups with normal reading ability.

The aim of the present study was to gain more in-depth knowledge about problem behaviour in children and adolescents with severe dyslexia. This knowledge is of importance for teachers and must be taken into account when planning, implementing and developing remedial training for pupils with severe dyslexia. Different training will be needed for children who are depressed and children with aggressive behaviour. It was, however, difficult to formulate hypotheses regarding specific problem areas assumed to be more problematic than others based on the review of previous research. Because of the fact that one study reported increased suicidal ideation (Boetsch et al., 1996), this problem was also explored in our study. We furthermore examined if parents, teachers and participants reported the same kind and strength of problem behaviour. This is also of importance for remedial training.

Method

Participants

A group of 70 children and adolescents (59 males and 11 females) with severe dyslexia and a control group of 70 children without reading problems participated. The participants were pair-wise matched on age, gender, cognitive level and whether they lived in rural or urban areas. Mean age was 150.49 months (SD = 20.56), range 100–196, in the dyslexia group. The control group's mean age was 150.00 months (SD = 20.71), range 108–195. The cognitive level of the participants was measured with the Wechsler's Intelligence Scale for Children-Revised (WISC-R). Mean cognitive level for the participants with dyslexia was 96.86 (SD = 13.76), range 70–130, and for the control group, it was 101.31 (SD = 15.04), range 66–132; only one child had an IQ below 70. In each group, 26 lived in urban and 44 in rural areas.

The reading skills of the participants with dyslexia had been assessed at the National Centre for Reading Education and Research (NCRER) at the University of Stavanger, Norway. A detailed description of the reading skill level of children and adolescents assessed at NCRER has recently been presented by Andreassen, Knivsberg and Niemi (2006). Inclusion criterion in the present study was the diagnosis of dyslexia based on phonological problems.

In Norway, local schools and School Psychology Services (SPS) in the municipalities are responsible for diagnosing reading problems and implementing remediation programmes. By decree, the NCRER has been given a nationwide responsibility to assist the municipality SPS in severe cases of reading impairment. Limited progress in reading,

in spite of extensive special education, is characteristic for children and adolescents assessed at NCRER. This is illustrated by the fact that the majority of the participants had received more than 4 years of remedial reading training.

Nine of the children with dyslexia, eight males and one female, were diagnosed with ADHD, and one of them was also diagnosed with Tourette's syndrome prior to the assessment at the NCRER.

Materials

Information about behaviour was obtained from parents, teachers and participants with the Achenbach questionnaires Child Behavior Checklist (CBCL), Teacher's Report Form (TRF) and Youth Self Report (YSR) (Achenbach, 1991a, b, c). These forms are standardised and have been widely used in research in more than 80 countries (Achenbach and Rescorla, 2007). The questionnaires yield separate scales for males and females, and the CBCL and TRF also yield for age groups below and above 12 years. Each item can be rated on a scale from 0 to 2 (0 = 'not true', 1 = 'somewhat or sometimes true' and 2 = 'very true' or 'often true'). Behaviour is classified into eight problem areas/syndrome scales called withdrawn, somatic complaints, anxious/depressed, social problems, thought problems, attention problems, delinquent behaviour and aggressive behaviour. The three first mentioned syndrome scales are referred to as internalising behaviour; the two last scales are referred to as externalising behaviour. There are composite scores for the internalising and for the externalising behaviour. In addition, there is a composite score, called total problems, based on the sums from all the eight syndrome scales. All the forms are translated to Norwegian, but Norwegian norms do not exist. Therefore, American norms for cut-off points were used.

The CBCL has 118 problem items and two open-ended items, and is standardised for the age range 4–18 years. The TRF is standardised for the band 5–18 years and is filled in by the teachers. Number of problem items, open-ended items, rating scales and syndrome scales correspond to the CBCL. The YSR is standardised for children and adolescents between 11 years and 18 years. The questionnaire has 119 items, one of them open-ended, and the classification of behaviour and the syndrome scales are the same as in the CBCL and the TRF.

The CBCL and YSR can be filled in by the parents and the participants themselves or be administered orally as structured interviews. The latter is preferred if the informant has or might have reading difficulties.

The manuals for CBCL, TRF and YSR (Achenbach, 1991a, b, c) contain information about data obtained from both referred and non-referred samples, divided into gender and age groups below and above 12 years. In addition, a separate manual is published with data from children and adolescents in different countries (Achenbach and Rescorla, 2007). This manual also includes data from a Norwegian sample for the CBCL and the YSR, but not for the TRF.

Procedure

The study was recommended by the Norwegian Social Science Data Services. Participation was based on the

parents' informed and written consent, and they could withdraw their children or adolescents from the project whenever they wanted.

A total of 15–20 students with dyslexia are assessed at the NCRER annually, and only those with severe reading problems are accepted for assessment and counselling. In accordance with ordinary procedures, the SPS provided information on the participants with dyslexia prior to the assessment at the NCRER. This information was results from psychological/pedagogical tests and individual education plans obtained at their home schools or by SPS, in addition to medical information. The teachers at the local schools filled in the TRF before the assessment took place. Five teachers did not know the students with dyslexia well enough to fill in this form.

One or both parents accompanied the students in the dyslexia group on the 2-day assessment at the NCRER. The CBCL was carried out as a structured interview with the parents during the assessment. The YSR was administered orally as structured interviews and was not carried out for the 14 participants who were younger than 11 years.

The controls were recruited from schools in rural and urban areas in the county where the NCRER is located. The schools received written information about the project and a list of gender, age and approximate cognitive level for each child we wanted to participate in the control group. This was done to enable the pair-wise matching of controls and students with dyslexia. The teachers identified the controls among children and adolescents without reading problems, forwarded written information letters to the parents and obtained written consent. The CBCL was then sent to the parents along with a letter informing them on how to fill in the questionnaire. As for the parents of the dyslexia group, it was emphasised that the questionnaire has been developed for a large age band, and that parents might find some of the questions relevant and some rather strange, and that they should rate the items according to the child's behaviour as they knew it in their daily life. The letter also contained information about the date when the researcher from the NCRER would visit the child's or adolescent's school to interview and test their child. The parents were contacted by phone and the same information was given orally, and they were invited to contact the researcher if they had any questions or comments. Parents returned the CBCL to the NCRER. The control students were thereafter tested with the WISC-R in their local schools, and the YSR was administered as structured interviews. The teachers filled in the TRF for the control students.

Statistics

Independent samples *t*-tests were applied to compare results from the different groups. The data were also analysed using non-parametric statistics (Mann–Whitney *U*-tests) because of skewed distributions of data on behavioural traits. Analyses yielded nearly the same results regarding significance levels and effect sizes regardless of different statistical methods. Therefore, only results from the para-

Table 1: T score means and standard deviations (SDs) on problem behaviour reported by parents (N = 70), teachers (N = 65) and students (N = 56)

	Groups		<i>P</i> -value*	Effect size Cohen's <i>d</i>
	Dyslexia group Mean (SD)	Control group Mean (SD)		
CBCL				
Withdrawn	57.09 (8.14)	51.41 (3.85)	0.000	0.9
Somatic Complaints	58.04 (7.76)	53.84 (5.30)	0.007	0.6
Anxious/Depressed	59.74 (9.56)	51.40 (3.83)	0.000	1.2
Social Problems	57.71 (8.76)	50.94 (3.22)	0.000	1.0
Thought Problems	53.31 (6.00)	50.66 (2.61)	0.001	0.6
Attention Problems	60.47 (6.47)	51.13 (3.04)	0.000	1.9
Delinquent Behavior	54.87 (6.47)	50.91 (2.53)	0.000	0.8
Aggressive Behavior	54.47 (7.28)	50.63 (1.80)	0.000	0.7
TRF				
Withdrawn	54.69 (5.47)	50.89 (1.82)	0.000	0.9
Somatic Complaints	55.40 (7.38)	51.60 (4.16)	0.000	0.6
Anxious/Depressed	56.82 (6.46)	51.31 (2.93)	0.000	1.1
Social Problems	58.02 (6.77)	51.23 (2.69)	0.000	1.3
Thought Problems	53.20 (6.35)	50.34 (1.63)	0.000	0.6
Attention Problems	56.68 (6.15)	51.10 (2.94)	0.000	1.2
Delinquent Behavior	53.63 (5.29)	51.34 (3.32)	0.001	0.5
Aggressive Behavior	55.42 (7.67)	52.00 (3.77)	0.000	0.6
YSR				
Withdrawn	52.89 (4.39)	50.50 (2.48)	0.000	0.7
Somatic Complaints	55.70 (6.67)	52.91 (3.80)	0.000	0.5
Anxious/Depressed	53.70 (6.95)	50.96 (2.71)	0.000	0.5
Social Problems	52.96 (4.99)	50.11 (0.56)	0.000	0.8
Thought Problems	52.32 (3.86)	50.00 (0.00)	0.000	0.9
Attention Problems	55.59 (8.53)	51.59 (3.27)	0.000	0.6
Delinquent Behavior	51.91 (4.65)	50.38 (1.38)	0.000	0.5
Aggressive Behavior	53.27 (6.64)	50.89 (2.54)	0.000	0.5

*Independent samples *t*-test.

Differences between the groups are expressed as *P*-values and effect sizes.

CBCL, Child Behavior Checklist; TRF, Teacher's Report Form; YSR, Youth Self Report.

metric analyses are reported. Effect sizes (Cohen's *d*) were calculated with criteria for effect sizes 0.2 = small effect, 0.5 = medium effect and 0.8 = large effect (Cohen, 1988; Pallant, 2007).

Results

The dyslexia group and the control group did not differ on age or cognitive level. The first aim was to get more detailed information about problem behaviour in participants with severe dyslexia. We examined all the syndrome areas of the Achenbach questionnaires and the items that reported suicidal ideations in particular.

There was correlation between gender and behavioural problems, and between age and behavioural problems on some variables. To compensate for this, raw scores were transformed into the standardised T scores. Additionally, the use of T scores facilitates comparing of results from the

different syndrome scales and between questionnaires. The area with T scores between 67 and 70 (94th and 98th percentiles) is called the borderline area, and the area with T scores above 70 is called the clinical area (American norms).

Table 1 presents T score means and SDs on the eight syndrome scales reported by parents, teachers and participants for children and adolescents with and without dyslexia. Group differences are measured with independent samples *t*-tests, presented as *P*-values and effect sizes (Cohen's *d*).

The three informant groups reported participants with dyslexia to display significantly more problem behaviour than controls, on all eight syndrome scales. Larger SDs were also detected in the group with dyslexia, which indicated larger variation in results. Effect sizes ranged from medium to large effects (Cohen's *d* = 0.5–1.9).

Table 2: Number of students with dyslexia (D) and controls (C) scoring in the borderline area or above on the eight syndrome scales, as rated by parents, teachers and students

	CBCL		TRF		YSR	
	D (N = 70)	C (N = 70)	D (N = 65)	C (N = 70)	D (N = 56)	C (N = 56)
Withdrawn	12	1	1	0	1	1
Somatic Complaints	12	1	5	0	5	0
Anxious/Depressed	16	1	5	0	5	0
Social Problems	11	1	8	0	1	0
Thought Problems	4	1	6	0	0	0
Attention Problems	19	1	5	0	6	1
Delinquent Behavior	6	0	3	1	1	0
Aggressive Behavior	8	0	3	0	4	0

CBCL, Child Behavior Checklist; TRF, Teacher's Report Form; YSR, Youth Self Report.

The results were compared with the means for the non-referred samples from the Achenbach manuals (Achenbach, 1991a, b, c), because the dyslexia group in this study were referred to the NCRER because of reading problems, not behavioural problems. For interpretation of the results, it should be noted that Norway is characterised as a 'low scoring' country on behavioural problems (Achenbach and Rescorla, 2007). Norwegian parents have rated their children displaying problem behaviour more than 1 SD below an 'omnicultural mean', that is, a mean based on results from available normative samples from different countries (Achenbach and Rescorla, 2007).

As shown in Table 1, parents reported that most problems related to the scale Attention Problems. Other areas with high scores were Anxious/Depressed, Somatic Complaints, Withdrawn and Social Problems. The results correspond to problem behavior $\frac{1}{2}$ –1 SD above the means for the non-referred samples in the 1991 Achenbach manual. In addition, parents reported nine of the participants with dyslexia to have suicidal ideations sometimes or often, and one child had tried to commit suicide. The controls showed problem behaviour at the same level or below the means for the non-referred samples on these syndrome scales, according to parents. Parents reported the dyslexia group to have externalising behaviour and thought problems at the same level as the non-referred samples, whereas controls' behaviour was reported to be $\frac{1}{2}$ SD below these means. None of the control participants was reported to have suicidal ideations.

Table 1 shows that teachers reported lower mean values of problem behaviour for participants with dyslexia than parents did, except on the Syndrome Scales Social Problems and Aggressive Behavior. The dyslexia group showed most problems on Somatic Complaints, Anxious/Depressed, Social Problems and Attention Problems according to ratings from teachers, and the problem behaviour was ranked $\frac{1}{2}$ SD above the means for the non-referred samples. Only one teacher identified one of the participants with suicidal ideations, and it was not the child who had

tried to commit suicide. It should be noted that for the five participants in the dyslexia group for whom TRF had not been filled in, their parents did not report suicidal ideations. On the other syndrome scales, teacher-reported problem behaviour was at the same level or slightly above the means for the non-referred samples. The controls displayed problem behaviour about $\frac{1}{2}$ SD below the means for the non-referred samples on all eight syndrome scales, according to reports from teachers.

The group with dyslexia reported their own problem behaviour around or somewhat below the means for the non-referred samples in all areas. Three of the participants reported that they had suicidal thoughts now and again. All the participants with dyslexia, for whom parents had reported suicidal ideations, had filled in the YSR. The controls rated their problem behaviour about $\frac{1}{2}$ SD below the means of the non-referred samples in all areas.

Pearson correlations revealed that parents reported significantly more internalising problems ($P < 0.05$) and total problems ($P < 0.000$) than teachers. There was also a tendency that parents reported more externalising problems than the teachers ($P = 0.059$).

The next question raised was if parents, teachers and participants reported the same kind and strength of problem behaviour. Table 2 presents how the different informant groups rated problem behaviour in or above the borderline area on the eight syndrome scales for the dyslexia group and controls.

Table 2 shows that problem behaviour primarily characterised the dyslexia group. Parents of students with dyslexia rated twice as many or more students as displaying problem behaviour in nearly all the syndrome areas compared with the two other informant groups. They also rated the problem behaviour to be in the clinical areas for most of these participants. Parents reported significantly more students with dyslexia to be anxious/depressed ($P < 0.05$) and have social problems ($P < 0.001$) than teachers. Parents did not report

problem behaviour above the borderline levels in any syndrome area for the five participants for whom TRF had not been filled in.

Table 2 also illustrates that attention was the area in which most participants with dyslexia had problems. Parents rated 19 (17 boys and 2 girls) to have attention problems above the borderline level, nearly four times as many as teachers did, and the difference was significant ($P < 0.001$).

Between 17% and 24% of the boys with dyslexia were registered as anxious/depressed, with withdrawn behaviour or somatic problems in the borderline and clinical areas, whereas only 10% of the boys were reported with delinquent and aggressive behaviour according to the parents. Results for girls are not presented because of the low number of female participants. The gender differences in the groups with problem behaviour above the borderline levels were, however, in accordance with those in the total sample.

As can be seen in Table 2, the teachers and the participants also reported a higher number of students with than without dyslexia in the borderline areas, and all were boys. The teachers, however, identified the highest number of participants displaying social problems, three in the borderline and five in the clinical area. Results on the YSR deviated from teachers' results on the scales Social Problems, Thought Problems and Delinquent Behavior. Results on these scales showed that almost none of the participants identified themselves as displaying problems.

Discussion

The present study examined coexisting behaviour problems in a clinical sample of students with severe dyslexia and a pair-wise matched control group without reading problems. Participants with dyslexia were more withdrawn, more anxious and depressed, and had more somatic complaints, social problems and attention problems than controls. They were also rated with more delinquent and aggressive behaviour, but these problems were less severe. Teachers, parents and participants generally reported problem behaviour in the same direction on all the eight syndrome scales of the Achenbach questionnaires. However, parents reported more severe problems than the other groups and suicidal ideations in nine of the participants with dyslexia.

According to the Diagnostic and Statistical Manual of Mental Disorders-IV-Text Revision (American Psychiatric Association, 2000), 60–80% of individuals diagnosed with reading disorder are males. Most of the participants in the present study registered by parents as withdrawn, anxious/depressed and with somatic complaints above the borderline levels were also boys. The study by Willcutt and Pennington (2000b) was the first to demonstrate a significant relationship between reading disabilities and all measures of internalising problems on the CBCL syndrome scales. They found, however, a stronger association among females than males on the subscales withdrawn and anxious/depressed, but identified no gender differences

related to the subscale somatic complaints. Few girls were included in the present study, and the results on gender differences have to be treated with caution.

Compared with the results for non-referred samples (Achenbach, 1991a, b), parents and teachers reported internalising problems for participants with dyslexia to be nearly 1 SD above the results in the control group. The severity of this was seen by the fact that parents rated 9 out of 70 in the dyslexia group to have suicidal thoughts, and one of them had tried to commit suicide. Suicidal ideation was self-reported from three of the participants, but only one was identified by his teacher. In a Norwegian study, adults diagnosed with dyslexia as 10 year olds reported that they struggled in school, with little support and help from teachers. It was also difficult for them to maintain a positive self-concept. Their teachers did not believe that they had dyslexia because their general achievement was too good (Undheim, 2003). Overholser, Adams and Lehnert et al. (1995) have indicated a close relationship among feelings of depression, hopelessness and suicidal tendencies in adults with low self-esteem. Results from the present study underline how important it is that teachers are able to identify different kinds of internalising problems. To do so, they need solid knowledge about how depressive traits might be expressed to be able to refer those children to further assessment. Intervention is often more problematic in children with more than one developmental disorder (Willcutt and Gaffney-Brown, 2004). What is effective treatment in one area does not necessarily improve the other, so remediation has to be directed to each of the problem areas (Maughan and Langton, 2008).

Fewer participants with dyslexia were, in the present study, rated with externalising than internalising problems. The results correspond with results from previous studies on associations between reading disabilities and externalising behaviour problems (Carroll et al., 2005; Hinshaw, 1992; Willcutt and Pennington, 2000a, b). Five out of the six participants with delinquent behaviour, and seven out of the eight with aggressive behaviour above the borderline levels were boys. Although Willcutt and Pennington (2000b) showed more externalising behaviour in participants with reading disabilities of both genders, the association in aggressive behaviour was stronger for males. Their study showed, however, no gender differences in delinquent behaviour in participants with reading disabilities.

According to Achenbach and Rescorla (2007), Norwegian, Swedish and Icelandic parents reported problem behaviour more than 1 SD below parents in the USA for children and adolescents. Lower parent ratings in Scandinavia than in the USA and Australia have also been found in a study on ADHD and pre-reading skills (Willcutt et al., 2007), and in a study on behaviour in 10-year-old children with dyslexia (A. E. Dahle and A. M. Knivsberg, unpublished data). The results from the present study correspond with this.

It has also been reported from the USA that teachers and parents only agree partly in their reporting of ADHD symp-

toms and that teachers in general report more problems than parents (Hartmann, Rhee and Willcutt et al., 2007). This is contrasted in the present study where teachers described significantly lower frequency and less severity of Problem Behavior for children with severe dyslexia than parents on several Syndrome Scales and on Internalising Problems and total Problems. The phenomenon with lower ratings from teachers than from parents has also been reported from the Netherlands (Grietens, Onghena and Prinzie et al., 2004). Reasons for the lower teacher ratings are unknown, and we wonder if this may be a Nordic or North European phenomenon.

The differences in parents' and teachers' ratings are important, and it would be of interest to investigate if the lower teacher ratings reflect the Norwegian school culture more than a real difference in the children's and adolescents' behaviour at school and at home. Inclusion has been the official school policy for years, and pupils do not receive marks for behaviour. Norwegian teachers are careful when describing pupils' behaviour, aware of the fact that they may contribute to labelling a youth's behaviour in a negative way. The teachers' ratings may, in other words, be somewhat biased. Consequently, questionnaires filled in by parents in Norway might be more reliable in describing problem behaviour, than questionnaires filled in by teachers. Further research is needed to shed light on these rating differences. Another aspect for reflection is that Norwegian teachers may under-report problem behaviour compared with reports from teachers in other countries. If this is correct, it may lead to under-diagnosing and lack of special education for children with problem behaviour. For participants with severe dyslexia, it is imperative that their behavioural problems are dealt with in addition to dyslexia.

Pair-wise matching (age, gender, cognitive level and whether they lived in rural or urban areas) between every child in the dyslexia and the control group was used. The strength in this design is that the groups differ in reading abilities but are as homogenous as possible in other areas of importance. A consequence of the selected design is, however, that the teachers had to identify the control group. This might have led to a 'super-normal' control group, not only in reading skills but also in behaviour, because more behaviour problems might have been expected in the control group. The fact that Norway is reported to be a low-scoring country of problem behaviour on parents' and youths' ratings (Achenbach and Rescorla, 2007) can also influence how behaviour in the control group is rated.

It would have strengthened the design if our sample had been randomly selected. This was, however, impossible, because children and adolescents with severe dyslexia belong to a small group of the population. Control children selected from the same schools as the children with dyslexia would also have been preferable. For practical and economical reasons, this could not be done, but the pair-wise matching of children in the two groups was meant to compensate for this.

Several studies have shown problem behaviour in more heterogeneous groups with dyslexia. This study is, as far as

we know, the first to present a detailed picture of behaviour problems in a sample where all participants have a diagnosis of severe dyslexia. Further research is needed to examine if development for participants with severe dyslexia is more hampered by internalising problems than what is the case in more heterogeneous groups of participants with dyslexia. Special focus should be on depressive traits and suicidal ideations.

Another question to reflect on is the difference in problems reported by parents and teachers. Behaviour and emotional problems can be displayed differently in different settings, and it might be difficult for teachers to identify and be aware of internalising problems in the classroom setting. If the parents observe more problem behaviour than the teachers, it might be imperative to involve parents in planning and implementing remedial programmes. Further research may clarify if Norwegian teachers under-report behavioural and emotional problems in children with severe dyslexia.

Another point to consider is the gender differences found in this study. It is well documented that more boys than girls are diagnosed with dyslexia. The present study is in accordance with earlier research at this point as more than 80% of the children with dyslexia were boys. In addition, we found the same gender differences among children with behaviour problems above the clinical levels. Further studies on gender differences in participants with severe dyslexia are needed.

To summarise, the study clearly indicates the need for solid knowledge to identify pupils with dyslexia and coexisting problems as early as possible. It also indicates that it may be vital for remediation programmes to collect information from parents and pupils themselves as well as teachers. For some of the children and young adolescents, the problems are complex. Remediation should be directed at both the impaired reading skills and their coexisting behavioural problems. Guidelines for best practice are definitely needed, which also underline the need for longitudinal intervention studies to be carried out.

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