Paper I

Behaviour and skills in 6-year-old children in a "high risk" programme.

Ann-Mari Knivsberg, MA, PhD, Professor, National Centre for Reading Education and Research, University of Stavanger, Norway.

Synnøve Iversen, MSc, PT, Research fellow, Section of Physiotherapy Science, Department of Public Health and Primary Health Care, University of Bergen, Norway.

Magne Nødland, MA, Speech therapist, Madlavoll School, Stavanger, Norway.

Karl-L. Reichelt, MD, PhD, Senior researcher, Pediatric Research Institute, University of Oslo, Norway.

Abstract

Problem behaviour hampers learning and normal development of skills and abilities. The children in focus in this study are 6-year-olds with persistent problem behaviour. Early identification of these children is imperative in order to implement structured educational intervention, and knowledge about their behaviour and skills is therefore important. The aim of the study was to assess the participants' behaviour as well as cognitive, linguistic and motor skills and correlate behaviour and skills. Thirty-one children enrolled in a high-risk programme for children with problem behaviour participated. Standardized material was used to obtain information on behaviour and skills; TRF, WISC-R, ITPA and Movement ABC. The most severe problems were registered in social interaction and attention. Scores lower than normative mean were detected on WISC-R, ITPA, and severe motor problems were observed for more than half of the group. Significant correlations were found between behavioural traits, between attention problems and cognitive skills, and between motor skills and problem behaviour.

Introduction

Problem behaviour is common in young children (Campbell, 1995), and may reflect stress related to developmental changes or age-related conflicts (Campbell, 1990). For the majority it is transient (Campbell, 1995), but not for the children in focus in this study. Their emotional and behavioural problems are severe and persistent, and can be observed both in kindergarten and at home. This behaviour may affect development of skills and abilities negatively (Campbell, 1995; Ogden, 2002), and it is imperative to identify affected children as early as possible in order to plan and implement proper intervention (Campbell, 1990; DuPaul and Stoner, 1994; van Lier, Verhulst, van der Ende and Crijnen, 2003). Knowledge about behavioural characteristics, possible correlations between these, and between skills and behaviour, consequently is important.

Children with emotional and behavioural problems are described in terms like: "children at risk", "high risk children", "children with problem behavior" (Campbell, 1990), "hard to manage preschool children" (Pierce, Ewing, and Campbell, 1999), and children with "early problem behavior" (Keenan, Shaw, Dilliquadri, Giovannelli, and Walsh, 1998). These terms are not medical diagnoses, which reflects that it is difficult to classify and diagnose deviant behaviour in young children. The children may display problems in only one area (Goodman and Scott, 1997), or they may have a variety of traits that fit different developmental disorders or syndromes (Campbell, 1995).

Neither 'problem behaviour', nor any of the other terms, define or depict the specific nature of the children's problems. Deviant behaviour is often described in terms of internalizing or externalizing problems at school start (Keenan et al., 1998). Internalizing behaviour is marked by withdrawal, anxiety, depression and somatic complaints (Achenbach, 1991), and also by passivity, fear, and lack of curiosity (Campbell, 1995). Externalizing behaviour is characterised by delinquency and aggressive behaviour (Achenbach, 1991). It is not uncommon to link attention problems and hyperactivity to externalizing behaviour (e.g. Campbell, 1995; Keenan et al., 1998). These problems may, however, also coexist with internalized behaviour (Achenbach, 1991). Some children show mainly internalized behaviour, others externalized, and a third group a combination of both (Achenbach, 1991).

As problem behaviour is no medical term, research groups may apply the term differently, which again may be reflected in reported prevalence. In young children problem behaviour is reported to be 7 to 11% (Hellgren, Gillberg, Bågenholm, and Gillberg, 1994, Newth and Corbett, 1993; Richman, Stevenson, and Graham, 1982), and approximately half of the children may be severely affected (Ogden, 2002). It is also reported that early behavioural problems are moderately stable into school years (Caspi, Henry, McGee, Mofitt, and Silva; 1995; Deator-Deckard, Dodge, Bates, and Pettit, 1998; Pierce et al., 1999). Emotional and behavioural problems may, in other words, decrease for some, but may persist for a considerable number of children. Severe problem behaviour often indicates a risk for future behavioural and academic problems for the individual child (Goodman and Scott, 1997; Ogden, 2002).

While only a minority of the affected preschoolers has well recognised syndromes, many of the children are later diagnosed with conduct disorders, emotional disorder, or hyperactivity disorders (Goodman and Scott, 1997). Internalized behaviour is, according to Campbell (1995), especially difficult to diagnose during the preschool period, but also the symptoms of for example Attention Deficit/Hyperactivity Disorder (AD/HD) are reported to emerge more clearly during the age band from six to nine in children earlier "diagnosed" as hard-to-manage (Marakovitz and Campbell, 1998). Linguistic delay, which may underlie problems with social

interaction, is often a first sign of later psychopathology, especially in girls (Gillberg, 1995). Early problems with attention and motor coordination may be the childhood expressions of vulnerability to schizophrenia (Roff and Fultz, 2003). Furthermore, academic problems and motor problems are reported for children with AD/HD, and for children with for example Tourette syndrome (DuPaul and Stoner, 1994; Robertson, 1994). Cognitive, linguistic, and motor problems are also common in autistic syndromes (Gillberg and Coleman, 2000).

The aim of the current study was to assess and correlate behaviour and cognitive, linguistic, and motor skills in six year old children with severe and persistent problem behaviour and with no medical diagnoses that could account for their behavioural and emotional problems. The assumption was that the cognitive, linguistic and motor skills would be below the normative mean. The participants were enrolled in a "high-risk" programme due to their problem behaviour. It was therefore hypothesized that a variety of behavioural problems would characterize the participants, and focus would also be on detecting the most characteristic or severe. The study was conducted over a period of four years as only 8 children out of approximately 1200 six-years-old in the community were included in the programme per year.

Method

Participants

The 31 participants were children in need of extra support and training in order to maximise their opportunities to learn and thrive. The school psychology service had recommended the participants to be enrolled in a "high-risk programme" for children with problem behaviour because of the severity and persistence of their problems. The full-time special education programme aimed at preparing the children for inclusion in ordinary classes after one year. The programme consisted of intensive daily training of cognitive, social and motor skills.

The participants, 27 boys and 4 girls, were between 69 and 85 months at the start of the programme, with a mean age of 75.94 (SD 4.54).

They had all attended ordinary kindergartens, and had received some special training. No medical diagnoses had been made for their behavioural abnormalities.

Materials

The Norwegian version of Teacher's Report Form, TRF, (Achenbach, 1991) was administered to obtain information about the children's behavioural patterns. The report is constructed to assess social competence and behavioural or emotional problems in children. Report forms developed for parents, teachers, and children themselves have been translated into 60 languages, and they are reported in more than 5000 publications worldwide (Achenbach, 2004). They are frequently used in clinical work in Norway (Øgrim and Gjærum, 2002). TRF (Achenbach, 1991) is standardised for boys and girls between 5 and 18 years of age. The 120 items, covering various forms of deviant behaviour/emotional problems, are rated on a scale from 0 to 2 (0 = "not true", 1 = "somewhat or sometimes true", 2 = "very true or often true"). The behaviour is divided into eight problem areas/syndrome scales called Withdrawn, Somatic complaints, Anxious/Depressed, Social problems, Thought problems, Attention problems, Delinquent behavior, and Aggressive behavior. The first three subscales are used to form a composite measure of internalized behaviour, and the last two subscales are used as composite measure of externalized behaviour.

The Wechsler's Intelligence Scale for Children – Revised, WISC-R, (Wechsler, 1974) was used to assess the cognitive abilities of the children. The Norwegian version (Undheim, 1978) is standardized for the age band 6½ years to 15½ years, and is the most commonly used cognitive test in Norway. It consists of 12 subtests, six for verbal and six for non-verbal skills.

The Norwegian version of Illinois Test of Psycholinguistic Abilities (ITPA) (Gjessing et al., 1975) was administered to test linguistic skill. The test is standardised for Norwegian children between 4 and 10 years of age. It consists of ten subtests assessing various aspects of the language such as receptive processes, associative processes, and expressive processes. The material consists of pictures, orally presented questions or sentences, and toys and bricks to be handled.

Motor skills were assessed with Movement Assessment Battery for Children (Movement ABC) (Henderson and Sugden, 1992). This assessment battery consists of a checklist and a test, and only the latter was used in this study. The test has been standardised in the United States for children between 4 and 12 years of age. It is divided into four age bands with an increase in task difficulty to compensate for maturation. The motor competence registered with the test is manual dexterity, ball skills, and static and dynamic balance. A composite score of motor skills is derived by adding the scores from the three subtests.

Procedure

All the children, recommended by the school psychology service to participate in the "high-risk programme" during the period of study, were included. No exclusion criteria were set.

Participation was based on parents' informed consent to let their children take part in the study, and 31 out of 32 possible permissions were obtained.

The cognitive, linguistic and motor abilities tests were administered at the beginning of the first school term by well trained and experienced specialists in special education and physiotherapy. The tests were carried out in the first half of the school day in a quiet room. For anxious children one of the teachers was asked to be present.

When the test results from WISC-R (Undheim, 1974) are in the normal area, test results from children up to half a year younger than six may be used (Ellertsen, personal communication, December 2004). Six children were younger than six years, and the results from one child omitted due to low cognitive score. For one child the intelligence testing could not be carried out, and one subscore is missing for another child. The testing of linguistic abilities had to be abandoned for one child. Also test results from Movement ABC (Henderson and Sugden, 1992) were omitted for two of the children due to low cognitive scores.

The information on behaviour is based on two months of observation, and was obtained after this period. TRF (Achenbach, 1991) was used as structured interviews, and the two, most experienced teachers in charge of the programme were interviewed separately. The teachers were thoroughly informed about the TRF, why it was to be used, and why the teachers' observations were important. For a few of the items the teachers reported differently. Only the lowest score was used in the analyses.

Statistical methods

Statistical analyses were carried out with SPSS, version 11. Kolmogorow-Smirnow test of normality had $p < .05$ for subscales/subtests on the observation scheme as well as the tests performed, indicating that the results were not normally distributed. The non-parametric Spearman rank correlation coefficient was

consequently used to analyse relationship between variables. As only four girls were included into the "high risk programme" over the period of four years, these analyses have been done without splitting the group by gender.

Results

Behavioural traits

The raw scores from the 120 items on Teacher's Report Form's (Achenbach, 1991) can be transformed to T-scores on the basis of norms. The T-scores on the eight subscales are truncated, but are helpful in comparing subscales. The T-scores for the externalizing, internalizing and total problems are not truncated. It should be noted for interpretation that the norms are American, because Norwegian norms are not yet available.

For the Total problems T-score, the Internalizing T- score and the Externalizing T-score 60 points are regarded as a clinical cut-off point, corresponding to the 82nd percentile. T-scores in the range from 60 through 63 are clearly indicative of problems, but as false positive may emerge in this area, it is called the borderline area. Registrations above T-score 63 reflect clinical deviance. A T-score of 70 points is equivalent to the 97.7 percentile. When a child's T-score is in the clinical area, and there is a difference of ten points between the Internalizing and Externalizing T-scores, the behaviour is called internalizing or externalizing. Information on the Total problems, the Internalizing and Externalizing T-scores are given in Table 1.

Table 1. Teacher's Report Form results for Total problems T-scores, Internalizing T-scores and Externalizing T-scores (n=31). Mean, standard deviation, lowest and highest scores and the number and percentage of children with scores in either the borderline or the clinical area. Borderline area = 60–63, clinical area from 64 and upwards.

	Mean (SD)	Range	Number in borderline area	Number in clinical area
Total problems T-score				
Boys (n=27)	69.22 (8.13)	54 - 83	4 (15%)	21 (78%)
Girls (n=4)	67.75 (5.18)	63 - 74	1 (25%)	3 (75%)
Internalizing T-score				
Boys (n=27)	67.77 (9.25)	54 - 87	6 (22%)	16 (59%)
Girls (n=4)	63.50 (8.22)	53 - 73	1 (25%)	2 (50%)
Externalizing T-score				
Boys (n=27)	63.19 (11,30)	39 - 88	2 (7%)	14 (52%)
Girls (n=4)	59.75 (12.58)	49 - 77	1 (25%)	1 (25%)

Mean Total problems T- score and mean Internalizing T-score were, as can be seen from the table, in the clinical area, while mean for the Externalizing T-score was in the borderline area. The range of problem behaviour varied substantially. The overall problems were significant for 24 of the children, while five others were in the borderline area. For two children the scores were in the normal area. For 18 children the Internalizing T-score was in the clinical area, and 15 children had Externalizing T-scores in the clinical area. Mainly internalizing behaviour was found in 12 children, mainly externalizing behaviour in 7, and a mixed behavioural pattern in 12 of the children.

For the eight syndrome scales or problem areas the clinical cut-off point is set at 67, corresponding to the 95th percentile. The area from 67 through 70 is the borderline area. Significant deviance is found from 71 points, the 98th percentile and upward. Information on mean raw scores, for the boys and girls respectively, and for the syndrome scores is given in Table 2.

Table 2. Teacher's Report Form results for the sub scales (syndrome scales). Raw scores and syndrome scales' T-scores (n=31). Mean, standard deviation, highest and lowest T-scores. Borderline area = 67-70, clinical area from 71 and upwards.

	Mean raw scores (SD)	Mean T-scores (SD)	T-scores range
Withdrawn		63. 84 (10.77)	50 - 87
Boys (n=27)	5.96 (4.42)		
Girls (n=4)	4.25 (4.03)		
Somatic complaints		57.03 (8.59)	50 - 76
Boys (n=27)	1.52 (1.92)		
Girls (n=4)	0.00 (0.00)		
Anxious/ Depressed		66.87 (8.97)	53 - 89
Boys (n=27)	11.67 (6.50)		
Girls (n=4)	11.50 (7.05)		
Social problems		73.71 (7.22)	61 - 89
Boys (n=27)	11.70 (4.45)		
Girls (n=4)	11.00 (2.58)		
Thought problems		64.19 (9.86)	50 - 80
Boys (n=27)	2.70 (2.67)		
Girls (n=4)	2.50 (1.00)		
Attention problems		68.87 (11.24)	50 - 93
Boys (n=27)	24.59 (7.85)		
Girls (n=4)	22.00 (13.54)		
Delinquent behaviour		60.74 (10.62)	50 - 92
Boys (n=27)	3.96 (3.80)		
Girls (n=4)	0.75 (1.50)		
Aggressive behaviour		63.77 (12.43)	50 - 96
Boys (n=27)	18.56 (13.88)		
Girls (n=4)	11.75 (14.86)		

The mean for the subscale reflecting social problems was in the clinical area. All the individual scores were above one SD over normal mean, and 24 children had scores above the 95th percentile. Within or nearly within the borderline area were the means for Attentions problems and Anxious/Depression. In these two areas 16 children scored above the 95th percentile. Figure 1 shows the number of children whose subscale scores were above the clinical cut-off point, the 95th percentile.
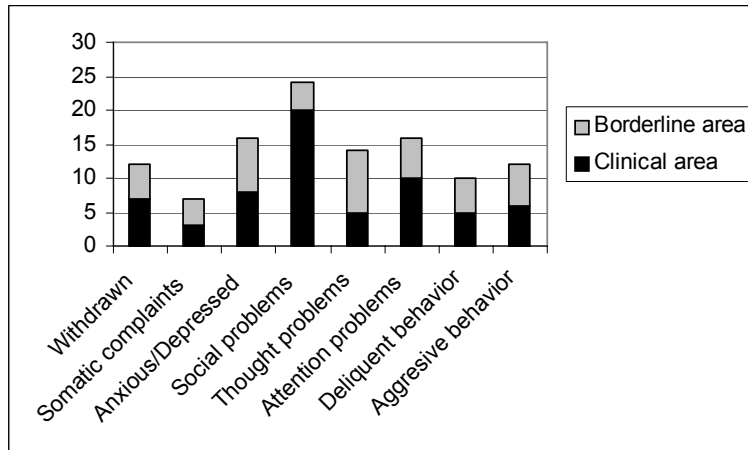
Figure 1: Number of participants whose subscales scores on Teacher's Report Form were above the clinical cut-point, the 95th percentile. Borderline area is between the 95th and 98th percentile, the clinical area above this.

In addition to social problems, attention problems and anxiety or depressive traits, thought problems were reported for nearly half the group, 14 children. Also withdrawal and aggressive behaviour were reported for a substantial number of participants, 12 children. One third of the group, 10 children, were observed to have norm breaking behaviour, while somatic complaints were characteristic for a little less than a fourth of the group.

Skills

The mean of the groups' cognitive skills, measured with the Norwegian version of WISC-R (Undheim, 1978), was 84.79 (SD 16.95), and the results varied from 50 to 112. Approximately the same results were registered both for verbal and non-verbal subskills. Half the group, 16 children, had a total score within one SD of the normative mean of 100 points (SD 15) while the results for five children were below 2 SD. The results forthe 12 subtests can be seen in Figure 2.
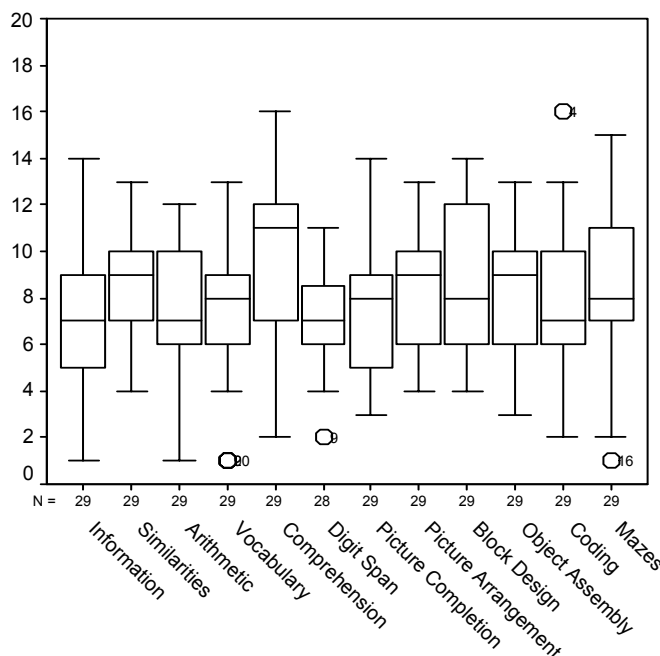

Figure 2: Weschler's Intelligence Scale for Children – Revised. Boxplot presentation of the results for the 12 subtests. The numbers on the vertical line refer to the subscale scores. The line within each box is the median. The box for each subscale represents approximately the middle 50% of the results. Outliers are marked with a circle and are results beyond 1.5 box-lengths from the edge of the box.

The influence of extreme scores is eliminated when medians, as illustrated in Figure 2, is computed. The stronger and weaker areas were, however, the same for the group whether medians or means were calculated. The highest mean score was on the Comprehension subtest (9.59, SD 3.82). In this subtest the child can demonstrate his or her understanding of social situations, and his or her evaluation and use of past experiences. The lowest mean scores were found on Information (6.93, SD 3.05), reflecting general factual knowledge, and Digit Span (6.93, SD 2.30), which measures auditory short-term memory and to some extent working memory. Poor performance was also obtained on Arithmetic (7.28, SD 3.06), which is computational skills and Coding (7.52, SD 3.29), which is paper and pencil skills and visual-motor coordination. Figure 2 illustrates that some of the children did quite well, while others had more problems solving the various tasks. The two children, whose TRF-scores were in the normal area, had cognitive scores in the normal area, one scored 1SD below normal mean, the other ⅔ SD above.

The linguistic assessment (ITPA, Gjessing et al., 1975) also showed that some of the children performed well while others struggled more. Normative mean for this test is 36 (SD 6), and the group had a mean of 31.77 (SD 4). The total mean results varied from 23 to 39. The results for the 10 subtests can be seen in Figure 3.
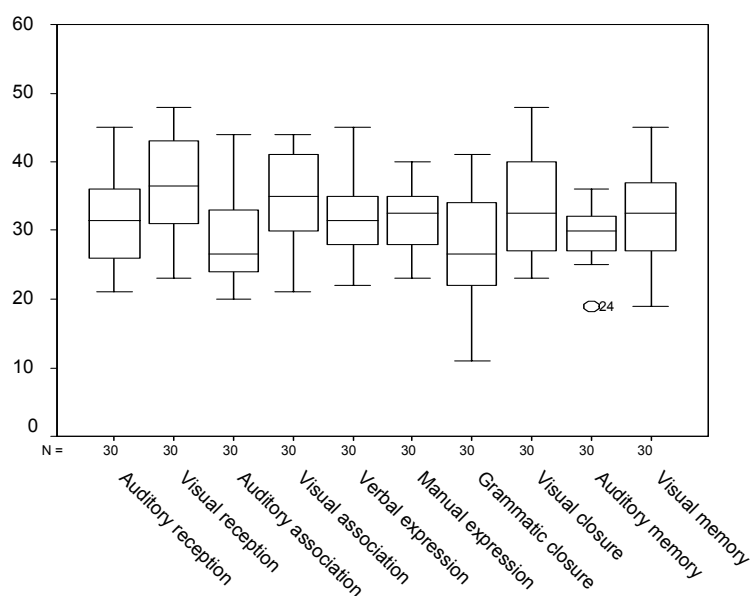

Figure 3: Illinois Test of Psycholinguistic Abilities. Boxplot presentation of the results for the 10 subtests. The numbers on the vertical line refer to the subscale scores. The line within each box is the median. The box for each subscale represents approximately the middle 50% of the results. Outlier is marked with a circle and is result beyond 1.5 box-lengths from the edge of the box.

Figure 3 shows the median results, also these in accordance with computed mean results. The highest mean was found on the Visual Reception subtest (36,80, SD 7.03), measuring a child's ability to register visually presented information. The lowest mean scores were found on Grammatic Closure (27.53, SD 8.54), reflecting the use of the normal syntax of the language, Auditory Association (28.83, SD 6.59), reflecting cognitive abilities of manipulating verbally presented information, and Auditory Memory (29.63, SD 3.85), auditory short-term memory.

While the group had a mean chronological age of six, their linguistic age had a mean psycholinguistic age of five. The two children for whom problem behaviour had not been registered, scored in the normal area, one close to the normal mean, the other one SD below.

Regarding motor abilities, it should be noted that on Movement ABC (Henderson and Sugden, 1992) low scores indicate that the tasks are mastered, while high scores indicate motor problems. A total score of 10 points is the cut point for the 15th percentile and 13.5 points the cut point for the 5th percentile. The group had a total mean score of 14.48 (SD 9.43). The range was zero to 28. Half of the group, 17 children, had scores lower than the 5th percentile, as their scores were higher than 13.5 points.

Movement ABC (Henderson and Sugden, 1992) consists of three subareas. Manual dexterity, assessment of fine motor skills, had a mean of 5.37 (SD 4.30). Ball skills had a mean of 4.60 (SD 3.05) and Balance a mean score of 4.52 (SD 3.83). The two participants with no registered problem behaviour had severe motor problems, the test results indicated function below the 5th percentile.

Correlation between behavioural traits

Possible relationships between the syndromes scales scores were explored, and more significant correlations than could be expected by chance when multiplying the number of variables were found. The correlations are presented in Table 3.

Table 3: Spearman Rank Order Correlations between behavioural syndrome scales measures on Teacher' Report Form (n = 31)

Measures	1	2	3	4	5	6	7	8
1. Withdrawn								
2. Somatic Complaints	.204							
3. Anxious/ Depressed	.650**	.095						
4. Social Problems	.236	.381*	.378*					
5. Thought Problems	.296	.264	.530**	.510**				
6. Attention Problems	.197	.388*	.201	.618**	.541**			
7. Delinquent Behavior	-.277	.188	-.228	-.031	-.150	.173		
8. Aggressive Behavior	-.442*	.155	-.248	.454*	.026	.395*	.589**	
9. Total T-score	.190	.471**	.333	.791**	.573**	.827**	.391*	.613**

* p < .05, ** p < .01

It should be noted that significant correlations were found not only for the items within the broadband internalizing behaviour (Withdrawn correlating to Anxious/Depressed) and externalizing behaviour (Aggressive behaviour correlating to Delinquent Behavior). Strong relationships were found between Anxious/Depressed and Thought problems, between Social problems and Thought problems, between Social problems and Attention problems, and between Thought problems and Attention problems. Significant correlation scores were obtained

between the Total T-score and the syndrome scales, except for Withdrawn and Anxious/Depressed. Furthermore, the Internalizing T-score was significantly correlated to Withdrawn (r_s = .836), Anxious/Depressed (r_s = .906), Social Problems (r_s = .401), and Thought Problems (r_s = .570). The Externalizing T-score was significantly correlated to Withdrawn (r_s = -.412), Social Problems (r_s = .389), Delinquent Behavior (r_s = .706), and Aggressive behaviour (r_s = .977).

Correlation between behavioural traits and skills

More significant correlations than could be expected by chance were found between the behaviour and the skills. The analyses showed that Attention problems were linked to cognitive performance on five of the subtests. Significant negative correlations were found between Attention problems and Information (r_s = -.396), Arithmetic (r_s = -.374), Comprehension (r_s = -.405), Digit span (r_s = -.427), and Picture completion (r_s = -.637). Significant negative correlations were also found between Attention problems and the Non verbal score (r_s = -.474) and the Total score (r_s = -.455). The behavioural traits Withdrawn was negatively related to Information (r_s = -.434), while the only positive relationship was found between Anxious/Depressed and Mazes (r_s = .467).

A possible relationship between the various behavioural traits and the linguistic skills were sought out. Significant correlations were found between Withdrawn and Visual Association (r_s = -.574), between Somatic complaints and Visual reception (r_s = -.387), and between Thought problems and Visual Association (r_s = -.393). Furthermore Attention problems correlated significantly to both Auditory reception (r_s = -.368) and Visual closure (r_s = -.448). The Internalizing T-score was significantly correlated to Visual Association (r_s = -.463) and Auditory Memory (r_s = .369).

With regard to a link between the behaviour and the motor skills, significant correlations were detected between Manual dexterity and Social problems (r_s = .406), Attention problems (r_s =.424), Aggressive behavior (r_s = .564), the Externalizing T-score (r_s =.501), and the Total T-score (r_s =.534). The total score of motor problems was also positively correlated to Aggressive Behavior (r_s = .378).

Discussion

The study was conducted to obtain information on behavioural traits and skills and correlations between these in a group of six year old children with severe problem behaviour. Social problems, attention problems, anxiety and depressive traits were the most frequently reported behavioural problems, and linguistic delay, lower than normal cognitive scores as well as motor coordination difficulties were found. Correlations were found between various behavioural traits, and between the behaviour and the skills. Attention problems were most frequently correlated to cognitive, linguistic and motor functioning.

Regarding methodological issues the participants had been identified by the school psychology service as children with problem behaviour, representing less than 1% of the group of six year olds in the community. To obtain as objective information as possible, standardised tests and registration forms were used, by trained specialists in special education and in physiotherapy, and the assessment was carried out during the school day, in familiar school surroundings, with the class teacher present for the more anxious children. It should be emphasized, though, that testing these children is not easy, and that the results always have to be interpreted with care. The test results may be influenced by the child's mood, by an upcoming flu etc., or by the tester's ability to communicate and create a relaxed atmosphere. Information on behaviour was obtained through highly educated

teachers in special education. Their observations were collected and registered under stable conditions, thus avoiding environmental biases from stressful family lives or living conditions under which many children with problem behaviour grow up (Barker, 1988; Campell, March, Pierce, Ewing, and Szumowski, 1991; Dadds and Powell, 1991; Lee and Bates, 1985; Lytton, 1990; Webster-Stratton, 1990). The participants in our study represent a small, but challenging group of school starters, and a larger number of participants would have strengthened the results.

Regarding behavioural traits, mainly externalized or internalized behaviour could be expected, and both these and a mixture of the two, were registered. Mainly internalizing behaviour was found in 12 children, which is a rather high number as the internalizing behaviour may easier be overlooked than the disturbing, externalising behaviour. The professionals responsible for recommending the "high-risk programme" should be credited for this.

It was rather puzzling, though, that two of the children were rated, by their teachers, to have normal behaviour. Could the strict structure and predictable daily programme have had such major impact after only two months for these two children? Could their severe motor problems have accounted for problem behaviour in previous kindergarten programme? These questions cannot be answered, the participants had been selected to the programme for their behavioural problems. So had the rest of the group, of which 24 were rated with severe problems, while five obtained scores in the borderline area. When evaluating this, it should be taken into account that the norms for the Achenbach forms are American. According to Heiervang and coworkers (Heiervang, Stevenson, Lund, and Hugdahl, 2001) Scandinavian population based studies have reported significantly lower problem behaviour than the published American norms. Lower problem scores are also reported in a recent Norwegian study on selective mutism in which a control group of 108 ordinary children participated (Kristensen, 2001). This may reflect cultural differences of what is regarded normal or more challenging in children's behavioural patterns. It should also be noted that in Norwegian special education there is a long tradition of looking for the strengths and individuality in children with special needs, more than focusing on problems or abnormal behaviour. Furthermore the teachers might have reported lower frequency of problem behaviour than parents, a phenomenon recently reported by Grietens and coworkers (2004) in a study comparing Achenbach schemes filled in by parents and teachers for the same 424 five to six year old children.

As for the subscales, the most striking result was found on the Social problems subscale. This corresponds with previously reported problems for children with problem behaviour such as difficulties in establishing and maintaining peer relationships (Ogden, 2002), delayed play skills with peers, fewer positive problem-solving strategies, and more negative strategies for solving conflicts (Webster-Stratton and Lindsay, 1999). The lack of social skills may also reflect developmental disorders (Gjærum and Grøsvik, 2002). Problems with social interaction are common in for example autistic syndromes and AD/HD (Duvner, 1994), and for children with motor problems (Losse, Henderson, Elliman, Hall, Knight, and Jongmans, 1991; Schoemaker, Hijlkema, and Kalverboer, 1994; Hay and Missiuna, 1998). It has also been reported that young children with conduct problems overestimate their social competence and attribute hostile intent to others (Webster-Stratton and Lindsay, 1999).

In this group of six year olds, attention problems also had a mean score in the clinical area. Attention problems could be the first markers of various clinical disorders, and certainly may influence learning in all developmental areas. The anxious or depressed traits could also be linked to various developmental disorders.

Various behavioural traits were significantly linked to each other, amongst them attention problems and social problems that perhaps may explain some of the other problems expressed by these young children.

With regard to the various skills, the original assumptions were confirmed. The children as a group had lower than normal cognitive and linguistic skills, and above average motor problems. The results correspond with previous reports on cognitive and linguistic delays, attention problems and motor problems (Cantwell, Baker, and Mattison, 1979; Cohen, Davine, and Meloche-Kelly, 1989; Kadesjø and Gillberg, 1998; Landgren, Kjellmann, and Gillberg, 2000; McGee, Partridge, Williams, and Silva, 1991; White, Mofitt, Earls, Robins, and Silva, 1990).

The individual scores on the cognitive tests varied more than anticipated. It had been expected that the results would be within the normal area, +/- 2 SD, with the majority in the lower end. The latter was found, but surprisingly five children had scores lower than 2SD below normal mean. Whether this reflects the children's real learning potential is impossible to say. Possible influential factors during assessment have been mentioned and also the more general living conditions for young children with problem behaviour. A matter of concern is the significant negative correlation between attention problems and several of the subscales. Although this is not a surprising result, it underlines the necessity of identifying these children as early as possible to provide structured educational programmes that may prevent some of the negative effect of their attention problems. Concern should also be raised due to the low subscores found on Information, Arithmetic, Digit Span, and Coding as children with dyslexia often have low scores on these subtests, and these low scores also indicate attention problems (Kayser, 1999). The behaviour seen in our participants, externalizing and internalizing behaviour, is reported in various learning disabilities (i.e. Grigorenko, 2001), amongst them reading disabilities (Heiervang et al., 2001; Willcutt, and Pennington, 2000).

The linguistic skills of the children were more or less as expected. Problems with syntax may reflect some of the children's attention problems and social problems. Imitating and learning through social interaction was difficult for many of the children. They possibly lack sufficient training from interaction with other, more verbally fluent children, or they may lack specific stimulation or training in this area. The problems with short-term memory also correspond with their social and attention problems.

Severe motor problems were found for more than half of the children in the group. Adequate motor skills are necessary in the play ground and important in peer interaction. Both aggressive behaviour and social problems could be explained by the lack of motor competence. Attention problems might also in this area of development have influenced the children's learning of new skills negatively. Attention problems and motor problems have repeatedly been reported to co-exist (Landgren, Kjellman, and Gillberg, 1998; Piek, Pitcher, and Hay, 1999; Pitcher, Piek, and Barret, 2002; Tervo, Azuma, Fogas, and Fiechtner, 2002).

The children in this study struggled particularly with social interaction, attention and motor problems. Due to the complexity of the children's problems, assessment and intervention calls for a multidisciplinary approach, and so does future research in which a valuable and needed focus might be on evaluating screening instruments through which the children might be identified as early as possible. As there is no simple cure for deviant behaviour, but intervention seems more successful for the younger than the older pupils (Loeber, 1990), evaluation of intervention programmes for these children is also needed.

References

Achenbach, T. M. (1991). *Manual for the Teacher's Report Form and 1991 Profile.* Burlington, VT: University of Vermont Department of Psychiatry.

Achenbach, T. M. (2004). ASEBA. Achenbach System of Empirically Based Assessment http://www.aseba.org/research/research.html (2004, May 12).

Barker, P. (1988). *Basic Child Psychiatry. 5th ed.* Oxford: Blackwell Scientific Publications.

Campbell, S. B. (1990). *Behavior problems in preschool children: clinical and developmental issues.* New York:Guilford Press.

Campbell, S. B. (1995). Behavior problems in preschool children: A review of recent research. *Journal of Child Psychology and Psychiatry*, 36, 113-149.

Campell, S. B., March, C. L., Pierce, E W., Ewing, L. J., and Szumowski, E. K. (1991). Hard-to-manage preschool boys: Family context and the stability of externalizing behaviour. *Journal of Abnormal Child Psychology, 19*, 301-317.

Cantwell, D. P., Baker, L., and Mattison, R. E. (1979). The prevalence of psychiatric disorder in children with speech and language disorder: An epidemiological study. *Journal of the American Academy of Child Psychiatry, 18*, 450-461.

Caspi, A., Henry, B., McGee, R. O., Mofitt, T. E., and Silva, P. A. (1995).Temperamental origins of child and adolescent behavior problems: From age 3 to age 15. *Child Development, 66*, 55-68.

Cohen, D. A., Davine, M., and Meloche-Kelly, M. (1989). The prevalence of unsuspected language disorders in a child psychiatric population. *Journal of the American Academy of Child and Adolescent Psychiatry, 28,* 107 111.

Deator-Deckard, K., Dodge, K. A., Bates, J. E. and Pettit, G. S. (1998). Multiple risk factors in the development of externalizing behavior problems: Group and individual differences. *Development and Psychopathology, 10*, 469-493.

Dadds, D. J., and Powell, M. B. (1991). The relationship of interparental conflict and global marital adjustment to aggression, anxiety and immaturity in aggressive and nonclinic children. *Journal of Abnormal Child Psychology, 19*, 553-567.

DuPaul, G. J., and Stoner, G. (1994). *ADHD in the schools. Assessment and intervention strategies.* New York: Guilford Press.

Duvner, T. (1994). *Barnneuropsykiatri: MBD/DAMP, autistiska störningar, dyslexi.* Falkøping: Liber Utbildning.

Gillberg, C. (1995). *Clinical Child Neuropsychiatry*. Cambridge: University Press.

Gillberg, C., and Coleman, M. (2000). *The biology of autistic syndromes. 3rd ed.* London: Mac Keith Press Oxford.

Gjessing, H., Nygaard, H. et al. (1975). *ITPA. Håndbok. Norsk utgave.* Oslo: Universitetsforlaget.

Goodman, R., and Scott, S. (1997). *Child Psychiatry*. Oxford: Blackwell Science.

Grietens, H., Onghena, P., Prinzie, P., Gadeyne, E., van Assche, V., Ghesquière, P. and Hellinckx, W. (2004). Comparison of mothers', fathers', and teachers' report on problem behaviour in 5- to 6-year-old children. *Journal of Pshychopathology and Behavioral Assessment, 26,* 137-146.

Grigorenko, E. (2001). Developmental dyslexia: An update on genes, brains, and environments. *Journal of Child Psychology and Psychiatry, 42*, 91-125.

Hay, J., and Missiuna, C. (1998). Motor proficiency in children reporting low levels of participation in physical activity. *Canadian Journal of Occupational Therapy, 65,* 64-71.

Heiervang, E., Stevenson, J., Lund, A., and Hugdahl, K. (2001). Behaviour problems in children with dyslexia. *Nordic Journal of Psychiatry, 55*, 251-256.

Hellgren, L., Gillberg, I. C., Bågenholm, A., and Gillberg, C. (1994). Children with deficits in attention, motor control and perception (DAMP) grown up: Psychiatric and personality disorders at age 16 years. *Journal of Child Psychology and Psychiatry, 35*, 1255-1271.

Henderson, S., and Sugden, D. (1992). *Movement Assessment Battery for Children.* Sidcup, Kent: The Psychological Corporation Ltd.

Kadesjø, B., and Gillberg, C. (1998). Attention deficits and clumsiness in Swedish 7-year-old children. *Developmental Medicine and Child Neurology, 40*, 796-804.

Kayser, H. G. (1999). WISC-R : håndbok for tolkning av WISC-R /ved Hans Georg Kayser. - Omarb. og utv. utg. Jaren: PP-tjenestens materiellservice.

Keenan, K., Shaw, D., Delliquadri, E., Giovannelli, J., and Walsh, B. (1998). Evidence for the continuity of early problem behaviors: Application of a developmental model. *Journal of Abnormal Psychology, 26,* 441-452.

Kristensen, H. (2001). Multiple informants' report of emotional and behavioural problems in a nation-wide sample of selective mute children and controls. *European Child & Adolescent Psychiatry, 10,* 135-142.

Landgren, M., Kjellman, B., and Gillberg, C. (1998). Attention deficit disorder with developmental coordination disorder. *Archives of Disease in Childhood, 79,* 207-212.

Landgren, M., Kjellman, B., and Gillberg, C. (2000). Deficits in attention, motor control and perception (DAMP): a simplified school entry examination. *Acta Pædiatrica, 89*, 302-309.

Lee, C. L., and Bates, J. E. (1985). Mother-child interaction at age two years and perceived difficult temperament. *Child Development, 56*, 1314-1323.

Loeber, R. (1990). Development and risk factors of juvenile antisocial behavior and delinquency. *Clinical Psychology Review, 10,* 1-41.

Losse A., Henderson S. E., Elliman D., Hall D., Knight E., and Jongmans M. (1991). Clumsiness in children-do they grow out of it? A 10-year follow-up study. *Developmental Medicine & Child Neurology, 33,* 55-68.

Lytton, H. (1990). Child and parent effects in boys' conduct disorders: A reinterpretation. *Developmental Psychology, 26*, 683-697.

Marakovitz, S. E., and Campbell, S. B. (1998). Inattention, impulsivity, and hyperactivity from preschool to school age: Performance of hard-to-manage boys on laboratory measures. *Journal of Child Psychology and Psychiatry, 39*, 841-851.

McGee, R., Partridge, F., Williams, S., and Silva, P. A. (1991). A twelve year follow-up of preschool hyperactive children. *Journal of the American Academy of Child and Adolescent Psychiatry, 30,* 224-232.

Newth, S. J., and Corbett, J. (1993). Behaviour and emotional problems in three-year-old children of Asian parentage. *Journal of Child Psychology and Psychiatry, 34*, 333-352.

Ogden, T. (2002). *Sosial kompetanse og problematferd i skolen. Kompetanseutviklende og problemløsende arbeid i skolen.* Oslo: Gyldendal Norsk Forlag.

Piek, J. P., Pitcher, T. M., and Hay, D. A. (1999). Motor coordination and kinaesthesis in boys with attention deficit-hyperactivity disorder. *Developmental Medicine & Child Neurology, 41,* 159-165.

Pierce, E. W., Ewing, L. J., and Campbell, S. B. (1999). Diagnostic status and symptomatic behavior of hard-to manage preschool children in middle childhood and early adolscence. *Journal of Clinical Child Psychology, 28*, 44-57.

Pitcher, T. M., Piek, J. P., and Barrett, N. C. (2002). Timing and force control in boys with attention deficit hyperactivity disorder: subtype differences and the effect of comorbid developmental coordination disorder. *Human Movement Science, 21,* 919-945.

Richman, N., Stevenson, J., and Graham, P. J. (1982). *Preschool to school: A behavioral study*. London: Academic Press.

Roff, J. D., and Fultz, J.M. (2003). Childhood antecedents of schizophrenia: Developmental sequencing specificity of problem behaviour. *Psychological Reports, 92*, 793-803.

Robertson, M. M. (1994). Annotation: Gilles de la Tourette syndrome – an update. *Journal of Child Psychology and Psychiatry*, *35*, 597-611.

Schoemaker, M. M., Hijlkema M. G., and Kalverboer A. F. (1994) Physiotherapy for clumsy children: an evaluation study. *Developmental Medicine & Child Neurology, 36,*143-55.

Tervo, R. C., Azuma, S., Fogas, B., and Fiechtner, H. (2002). Children with ADHD and motor dysfunction compared with children with ADHD only. *Developmental Medicine & Child Neurology, 44,* 383-390.

Undheim, J. O. (1978). *Håndbok for Wechsler Intelligence Scale for Children – Revised*. Oslo: Norsk Psykologforening.

van Lier, P. A. C., Verhulst, F. C., van der Ende, J., and Crijnen, A. A. M (2003). Classes of disruptive behaviour in a sample of young elementary school children. *Journal of Child Psychology and Psychiatry, 44,* 377-387.

Webster-Stratton, C. (1990). Stress: a potential disrupter of parent perceptions and family interactions. *Journal of Clinical Child Psychology, 4*, 302-312.

Webster-Stratton, C., and Lindsay, D. W. (1999). Social competence and conduct problems in young children: Issues in assessment. *Journal of Clinical Child Psychology, 28*, 25-43.

Wechsler, D. (1974). *Wechsler Intelligence Scale for Children – Revised*. New York: The Psychological Corporation.

White, J., Mofitt, T. E., Earls, F., Robins, L., and Silva, P. A. (1990). How early can we tell. Predictors of childhood conduct disorder and adolescent delinquency. *Criminology, 28*, 507-533.

Willcutt, E. G. and Pennington, B. F. (2000). Psychiatric comorbidity in children and adolescents with reading disability. *Journal of Child Psychology and Psychiatry*, *41,* 1039-1048.

Øgrim, G., and Gjærum, B. (2002). Urolige, uoppmerksomme og impulsive barn. I B. Gjærum and B. Ellertsen (Eds.) *Hjerne og atferd. Utviklingsforstyrrelser hos barn og ungdom i et nevrobiologisk perspektiv*. Oslo: Gyldendal Akademisk.