

Development and Aging

Eyberg Child Behavior Inventory (ECBI): Norwegian norms to identify conduct problems in children

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This article presents the first Norwegian standardization of an assessment tool specifically designed to measure childhood conduct problems. Norwegian norms for the Eyberg Child Behavior Inventory (ECBI) based on data obtained from a random population sample ($N = 4063$) of children in the age range of 4 to 12 years are presented. The sample was drawn from rural and urban areas within three Norwegian town districts. Clinical and research advantages of having a properly standardized assessment tool for this specific subclass of childhood psychiatric problems in Norway are discussed.

Key words: Standardization, Eyberg Child Behavior Inventory, problem behaviors.

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INTRODUCTION

Childhood conduct problems are one of the most harmful categories of childhood psychiatric conditions (Rutter, Giller & Hagell, 1998). The origins of and development of conduct problems are in focus, and many promising treatment models are available (Brestan & Eyberg, 1998; Fossum, Handegård, Martinussen & Mørch, 2007; Kazdin, 1987).

More than 25 years ago, Robinson, Eyberg and Ross (1980) criticized the field of assessment in child and adolescent psychiatry for being far too eager to use assessment tools without first obtaining standardized norms for each instrument. Unfortunately, this critique has been valid throughout the 1990s as well (Bilenberg, 1999). Advances in child behavioral assessment has been seriously hampered by a failure to develop well standardized and widely used measures of child and family characteristics (Mash & Terdal, 1997). In Norway there are no properly standardized assessment instruments specifically aimed at identifying children with conduct problems. The aim of the present project is to provide standardized norms for such an instrument, the ECBI.

Identification of conduct problems

The ECBI is a parent rating scale consisting of items relating specifically to behaviors associated with conduct problems in children. Together with the Child Behavior Checklist (CBCL; Achenbach, 1991) and the Strengths and Difficulties Question-

naire (SDQ; 1997), it is one of the few standardized parent rating scales available for the assessment of conduct problems in children and adolescents (Goodman, 1999; Webster-Stratton & Herbert, 1994). The SDQ has reported to have acceptable psychometric properties (Rønning, Handegård, Sourander & Mørch, 2004), and has been increasingly popular in the Nordic countries (Obel *et al.*, 2004).

The ECBI is a behaviorally specific instrument consisting of a list of 36 behaviors, constituting two scales: (a) the Intensity Scale, which indicates how often these behaviors occur, and (b) the Problem Scale, identifying which specific behaviors are considered as problems by the parents (Robinson *et al.*, 1980).

The ECBI has good psychometric properties (Axberg & Broberg, 2007; Burns & Patterson, 1991, 2000; McMahon & Estes, 1997). Scores on the ECBI are stable over time, both in children (Robinson *et al.*, 1980) and in adolescents (Eyberg & Robinson, 1983). Adequate test-retest, split-half, and internal consistency reliabilities have been reported (Axberg & Broberg, 2007; Burns & Patterson, 1991; Eyberg, 1992).

Standardization of assessment tools

Up to 2007, norms for the ECBI have been available only from US samples. Now, in addition to the Norwegian norms, researchers in Sweden are in the process of establishing norms in Scandinavia (Axberg & Broberg, 2007). Standardization

of instruments for assessment outside the US is important for several reasons. Most important, phenomena investigated by checklists may be subject to cross-cultural variation (Bird, 1996). Indeed, standardizations of parent rating scales outside of the US have shown that the degree to which certain behaviors are seen as problematic by parents vary from country to country (Berg, Fombonne, McGuire & Verhulst, 1997; Bilenberg, 1999). If we do not know how much whining should be expected of a Norwegian child, or how often he or she can be expected to physically fight with peers, we cannot determine at what point the child whines or fights *too much* from a culturally valid clinical perspective. For example, a Swedish standardization of the CBCL shows mean scores for Swedish children to be approximately 10% below the mean scores of US children (Larsson & Frisk, 1999). This implies that although the instruments themselves are valid tools for research and assessment in other cultures than the one in which they originated, the original norms are not necessarily valid. This has serious implications for the use of such instruments both in research and clinical settings.

The present study

The primary goal of the present study was to provide valid norms for the ECBI as a measure of childhood conduct problems in Norway. To obtain a broad sample of children, samples from three different places in Norway were chosen. The data collection was conducted in the two large Norwegian town districts Tromsø and Trondheim first, and two towns and four municipalities in the County of Møre and Romsdal (Kristiansund, Molde, Averøy, Surnadal, and Sunndal) later. Previously, differences in the prevalence of conduct problems have been observed between rural and urban areas (Rutter, Yule, Quinton, Rowlands, Yule & Berger, 1974). To avoid effects of low or high population density confounding the data, children from both rural and urban areas within the three town districts were included.

Several studies indicate that the beginnings of persistent conduct problems can be identified as early as age four (Bennett *et al.*, 1999; Keenan, Shaw, Delliquadri, Giovannelli & Walsh, 1998; Newman, Caspi, Moffitt & Silva, 1997; Prior, Smart, Sanson & Oberklaid, 2001; Webster-Stratton, 1998). The consequences of childhood conduct problems are more severe with earlier age of onset (Moffitt, 1993), and interventions directed toward reducing the frequency of problem behaviors are most likely to succeed if introduced at an early age (Campbell, 1995; Webster-Stratton & Herbert, 1994). Consistent with this, a sample of children between the ages of 4 and 12 was chosen.

METHOD

Participants

Approximately 7,300 questionnaires were distributed to parents of children aged 4–12 attending kindergartens or schools in the

sampling area. The sampling area was three towns and four municipalities in mid and northern Norway (Tromsø, Trondheim, Kristiansund, Molde, Averøy, Surnadal, and Sunndal), and both rural and urban areas within the town districts were chosen. A total of 4,371 questionnaires were completed by any of the parents (66.8% mothers, 8.8% fathers, 23.8% mother and father together, and 0.6% others) and returned, yielding a total return rate of 60%. Questionnaires from parents of 3-year-old children, of children where gender and/or age were not filled in, and where more than 4 items were missing were all excluded from the analysis. Data from 4,063 questionnaires were used in the statistical analyses.

Measures

The ECBI provides a list of 36 problem behaviors commonly reported by parents of children with conduct problems. The inventory assesses behavior on two dimensions, the frequency of the behavior and its identification as a problem. The frequency ratings range from 1 (never) to 7 (always), and are summed to yield an overall problem behavior Intensity score ranging from 36 to 252. The problem identification measure requires the parent to circle “yes” or “no” in response to the question “Is this behavior a problem for you?” The total Problem Score (between 0 and 36) is calculated by summing the number of problems indicated.

The ECBI was translated and back-translated, and approved by Psychological Assessment Resources (PAR).

Procedure for the sample of preschool children in Tromsø and Trondheim

A randomized sample of preschool children (ages 4 and 5) was selected according to the following procedure: The total number of children born in 1995 and 1996, living in the Tromsø and Trondheim areas, was obtained from the local health authorities (1,845 children in Tromsø, 4,106 children in Trondheim).

The local community health centers received a letter asking them to pick a certain number of children from their health archives, according to a list of randomized numbers supplied by the authors. Personnel at the community health centers then distributed the survey to the randomly selected families in each region. The questionnaires were contained in an envelope together with a letter of information and a pre-paid envelope to return the questionnaires. Enclosed in each envelope was an instant-win ticket.

Procedure for the sample of school children in Tromsø and Trondheim

A randomized sample of school-age children (ages 6 to 8) was selected according to the following procedure: The total number of school age children attending first through fourth grade, living in the Tromsø and Trondheim town districts, was obtained from the local school authorities (3,475 children in Tromsø, 11,325 children in Trondheim).

According to a random list of school classes, the teachers from each class were contacted and offered to have their class participate in the survey. Each teacher received a letter of information and a complete set of questionnaires to distribute to their pupils. Each child was instructed to hand the questionnaires to their parents. The questionnaires were contained in an envelope together with a letter of information and a pre-paid envelope for returning the questionnaire. Each class was compensated with 500 Norwegian Kroner for their participation, to be spent on a social activity.

Procedure for the sample of preschool and school children in Møre and Romsdal

Children registered in kindergartens and schools were selected according to the following procedure: Questionnaires were distributed from the researchers to the school administration in each of the municipalities, who passed them on to each school and kindergarten together with information about the survey. Each teacher then distributed the questionnaires and an information letter and consent form to the parents. Parents who were willing to participate returned the completed questionnaires to their school and kindergarten, where these were collected and returned first to the municipality school administration for the town, and then to the researchers. The forms were anonymous, without names or birth dates. Each form had only an ID code containing information about town, school/kindergarten, birth year and class level. Participation was voluntary for parents. Parents received no compensation, but each class received 500 Norwegian Kroner for their participation.

Ethics

The Regional Committee for medical research ethics, Health region IV and V, Norway did not have any oppositions against the ethical characteristics of the project.

Statistical analysis

One-way ANOVA was used to test whether the ECBI differences on categorical variables with more than two levels. Multiple regression analysis was used to analyze the effect of gender and age on the Intensity and Problem scores. *R*-square indicates effect sizes in these analyses. When comparing two groups on continuous dependent variables, *t*-tests were used, and Cohen's *d* is used as a measure of the effect size in this case. We used the Kolmogorov-Smirnov test (KS-test) when testing whether the Intensity scores and Problem scores followed a normal distribution.

The amount of missing data on specific answers ranged from zero to 0.7% for 32 of 36 questions on the Intensity scale, and from 2–5% for all questions on the Problem scale. On item 8 (“Does not obey house rules on his/her own”) and 9 (“Refuses to obey until threatened with punishment”) approximately 2% was missing, and item 25 (“Verbally fights with sisters and brothers”) and 27 (“Physically fights with sisters and brothers”) 4–5% were missing. Missing answers in items 25 and 27 was replaced with “never” (1) at the Intensity scale and “not a problem” (0) on the problem scale. Missing on the other items at the Intensity scale was replaced according to the EM algorithm (Dempster, Laird & Rubin, 1977). Missing items on the Problem scale were replaced according to the following procedure: Based on the appurtenant Intensity score, a random number from the Bernoulli distribution was drawn to impute a “Yes” or “No” answer. The probability of imputing a “Yes” on the item on the Problems scale, having scored for example 5 on the item on the Intensity scale, was set equal to the proportion of “Yes” observed in our sample of informants, with complete data for this particular item, and also having scored 5.

RESULTS

Reliability

Cronbach's alpha for the ECBI Intensity scale was 0.93, and for the ECBI Problem scale 0.89.

The item-total correlations in general were in the “large range” (>0.50). However, one item displayed small item-total

correlation; “Wets the bed” (item 36, $r = 0.13$). As can be seen in Table 1, seven additional items showed item-total correlation between 0.30 and 0.40 (item 2, 4, 18, 21, 25, 26 and 27).

Normative data

There was a significant difference between the Tromsø, Trondheim, and Møre and Romsdal samples in terms of ECBI Intensity values when we adjusted for age ($F(2, 4059) = 0.5$, $p > 0.5$). However, the *R*-square change is only 0.002 when adding the Region variable to a model already containing age. There were no significant differences between the Regions in terms of ECBI Problem values ($F(2, 4060) = 0.4$, $p > 0.05$). The mean ratings for each of the 36 items of the ECBI Intensity scores ranged from 1.2 to 3.7 on seven-point Likert-type scales (see Table 1). This indicated that the behaviors on average occurred “seldom” or “sometimes”. The standard deviations in the frequency of individual items ranged from 0.6 to 1.6 on the Intensity scale (see Table 1). Test for normal distribution of ECBI scores (KS-tests) did not indicate non-normality in the Intensity score distributions. Measures of skewness and kurtosis for the total Intensity score were 0.32 and 0.08, respectively.

The Problem scores ranged from 0 to 34. The mean was 3.1, and a standard deviation of 4.5. The distribution of Problem Scores was positively skewed (skewness = 2.1) and peaked at the lower end of the scale (kurtosis = 5.5). Between 1.5% and 19.6% of the respondents endorsed each behavior as a problem (see Table 1). The behaviors most frequently labeled as being a problem were “Verbally fights with sisters and brothers”, “Slow in getting ready for bed” and “Interrupts”. The behaviors least frequently labeled as being a problem were “physically fights with friends his/her own age”, “Destroys toys and other objects”, and “Steals”. Table 1 shows normative data for individual items on the ECBI.

Scale scores. The mean Intensity score for the sample was 89.9 (SD = 24.6). The mean Problem score was 3.1 (SD = 4.5). Table 2 shows normative data and percentiles for ECBI Intensity scores and Table 3 shows normative data and percentiles for Problem scores.

The mean Intensity scores for boys are higher than for girls. According to Cohen's definition of small, moderate and large effect sizes (Cohen, 1988), the comparison of boys and girls in almost all age groups shows small (<0.3) effect sizes in this study. The largest effect is 0.36 for 6-year-old boys and girls. The pattern seen in the comparisons of boys and girls in Intensity scores holds true for problem scores as well. The comparison of boys and girls in all age groups also shows small (<0.3) effect sizes, with the largest effect being 0.24 for 6-year-old boys and girls.

Cutoff scores for screening

In their initial US validation of the ECBI, Robinson *et al.* (1980) recommended cutoff scores corresponding to the

Table 1. *Item statistics*

Item	Percentage of parents endorsing item as a problem	Frequency rating		Corrected Item-Total Correlation
		<i>M</i>	<i>SD</i>	
1. Dawdles in getting dressed	12.1	3.1	1.6	0.43
2. Dawdles or lingers at mealtime	9.4	2.7	1.5	0.39
3. Has poor table manners	8.0	2.4	1.3	0.53
4. Refuses to eat food presented	15.0	3.0	1.4	0.35
5. Refuses to do chores when asked	13.0	3.0	1.3	0.55
6. Slow in getting ready for bed	17.9	3.6	1.5	0.46
7. Refuses to go to bed on time	11.8	2.8	1.4	0.46
8. Does not obey house rules on his/her own	9.3	3.0	1.4	0.52
9. Refuses to obey until threatened with punishment	10.6	2.4	1.4	0.58
10. Acts defiant when told to do something	10.3	2.7	1.3	0.61
11. Argues with parents about rules	7.1	2.8	1.4	0.51
12. Gets angry when doesn't get his/her own way	12.5	3.4	1.3	0.64
13. Has temper tantrums	9.1	2.5	1.4	0.56
14. Sasses adults	8.1	1.9	1.1	0.54
15. Whines	8.3	2.7	1.3	0.54
16. Cries easily	5.8	2.9	1.4	0.42
17. Yells or screams	6.8	2.1	1.3	0.58
18. Hits parents	2.5	1.3	0.8	0.39
19. Destroys toys and other objects	2.4	1.5	0.9	0.46
20. Is careless with toys and other objects	4.6	1.9	1.2	0.49
21. Steals	2.1	1.2	0.6	0.33
22. Lies	6.6	1.9	1.1	0.49
23. Teases or provokes other children	7.1	2.2	1.2	0.51
24. Verbally fights with friends his/her own age	3.5	2.7	1.2	0.48
25. Verbally fights with sisters and brothers	19.6	3.7	1.5	0.35
26. Physically fights with friends his/her own age	1.5	1.6	0.9	0.39
27. Physically fights with sisters and brothers	10.6	2.5	1.5	0.37
28. Constantly seeks attention	6.4	3.1	1.5	0.59
29. Interrupts	12.3	3.2	1.4	0.59
30. Is easily distracted	10.6	3.0	1.5	0.57
31. Has short attention span	11.7	2.7	1.5	0.57
32. Fails to finish tasks or projects	8.2	2.4	1.3	0.60
33. Has difficulty entertaining him/herself alone	7.0	2.5	1.4	0.46
34. Has difficulty concentrating on one thing	6.6	2.4	1.3	0.58
35. Is overactive or restless	4.6	1.9	1.3	0.54
36. Wets the bed	3.5	1.4	1.1	0.13

N = 4,063.

90th percentile, as a means of screening children in potential need of psychiatric treatment for conduct problems. This represents a US cutoff of 11 for the Problem score scale, and 127 for the Intensity score scale. Despite sex differences of the ECBI (boys scoring higher than girls) in the original standardization sample, Robinson *et al.* (1980) chose to report normative data for children by age only. In the present study, data are reported for sex as well as age, since the multiple regression analysis showed significant gender differences for the Intensity scores. The 90th percentile has been used in a clinical study in Norway (Larsson *et al.*, 2007), and was meaningful in differentiating between diagnosed children and children who did not meet the criteria for a Conduct Disorder or Oppositional Defiant Disorder diagnosis.

Additional analyses

Effect of child's age and gender on scale scores. To evaluate the predictive effects of gender and age on the Intensity and Problem scores, two multiple regression analyses were conducted. For both Intensity and Problem scores no interaction between age and gender were found. For Intensity scores, this analysis revealed a significant effect for gender ($t(4060) = 6.2, p < 0.001$). The gender difference adjusted for age is 4.7 points such that boys exhibited more problem behaviors than girls. A one-year increase in age yields an estimated decrease in the Intensity score of 2.0 points ($t(4060) = 12.3, p < 0.001$), such that older children exhibited less problem behaviors than younger children. With regards to the effect sizes, age and gender combined

Table 2. Normative data for individual items and percentile scores for ECBI Intensity scale

Age	Gender	N	Intensity	Percentiles		
			M (SD)	90th	95th	98th
4	Boys	123	101.3 (26.7)	135.0	148.0	156.6
	Girls	137	96.0 (21.2)	122.0	131.1	136.7
	Total	260	98.5 (24.1)	128.9	138.8	148.8
5	Boys	217	94.3 (22.1)	121.0	134.2	149.0
	Girls	187	94.0 (20.9)	123.0	128.6	139.2
	Total	404	94.1 (21.5)	121.5	130.8	139.9
6	Boys	225	99.1 (24.7)	131.0	143.4	153.8
	Girls	212	90.9 (23.6)	121.7	132.0	154.5
	Total	437	95.1 (22.8)	127.2	139.1	153.5
7	Boys	285	94.5 (21.8)	121.0	130.8	142.0
	Girls	287	90.6 (24.2)	122.0	131.6	141.7
	Total	572	92.6 (23.1)	121.7	131.4	141.5
8	Boys	307	91.1 (24.4)	124.0	133.6	146.8
	Girls	310	86.0 (22.8)	115.9	130.4	138.0
	Total	617	88.9 (23.8)	120.0	132.1	141.6
9	Boys	292	91.5 (25.8)	123.1	134.0	158.6
	Girls	287	85.3 (25.4)	118.4	129.0	143.5
	Total	579	88.5 (21.8)	120.0	132.0	149.8
10	Boys	241	89.7 (26.0)	126.0	134.9	141.2
	Girls	219	88.7 (25.4)	124.0	133.0	145.8
	Total	460	89.2 (25.7)	124.9	134.0	142.0
11	Boys	234	86.9 (25.9)	123.0	130.0	146.3
	Girls	196	79.9 (23.6)	111.3	120.3	130.1
	Total	430	86.7 (25.1)	117.9	127.0	142.0
12	Boys	145	80.2 (23.2)	110.4	122.7	129.1
	Girls	159	77.7 (22.7)	110.0	120.0	131.4
	Total	304	78.9 (23.0)	110.0	120.0	129.0
Total	Boys	2,069	87.6 (25.0)	–	–	–
	Girls	1,994	92.2 (24.1)	–	–	–
	Total	4,063	89.9 (24.6)	–	–	–

Table 3. Normative data for individual items and percentile scores for ECBI Problem scale

Age	Gender	N	Problem	Percentiles		
			M (SD)	90th	95th	98th
4	Boys	123	3.8 (5.1)	10.6	14.6	19.5
	Girls	137	3.3 (4.2)	9.2	14.0	16.0
	Total	260	3.5 (4.7)	10.0	14.0	16.0
5	Boys	217	3.0 (4.4)	8.0	11.1	17.6
	Girls	187	3.0 (3.8)	9.0	11.6	14.5
	Total	404	3.0 (4.1)	8.5	11.0	16.0
6	Boys	225	3.9 (5.3)	10.4	15.7	22.5
	Girls	212	2.7 (4.3)	8.0	12.4	17.0
	Total	437	3.3 (4.9)	10.0	14.0	19.2
7	Boys	285	3.2 (4.4)	9.0	12.7	16.3
	Girls	287	3.1 (4.5)	9.2	13.0	15.2
	Total	572	3.2 (4.4)	9.0	13.0	16.0
8	Boys	307	3.4 (4.8)	10.0	14.0	17.0
	Girls	310	2.6 (4.2)	9.0	12.0	15.8
	Total	617	3.0 (4.5)	9.0	13.0	17.0
9	Boys	292	3.7 (5.0)	11.0	15.0	21.0
	Girls	287	2.7 (4.4)	9.0	11.0	17.2
	Total	579	3.2 (4.8)	10.0	13.0	20.0
10	Boys	241	3.6 (5.2)	11.8	15.0	20.0
	Girls	219	3.1 (4.9)	10.0	13.0	20.6
	Total	460	3.4 (5.1)	11.0	15.0	20.0
11	Boys	234	4.2 (4.4)	9.5	11.3	16.3
	Girls	196	3.7 (4.5)	8.0	10.2	15.0
	Total	430	4.0 (4.4)	8.0	11.0	15.0
12	Boys	145	2.2 (3.5)	6.4	9.0	13.3
	Girls	159	2.1 (3.8)	7.0	11.0	15.4
	Total	304	2.1 (3.7)	6.5	10.0	13.0
Total	Boys	2,069	3.2 (4.9)	–	–	–
	Girls	1,994	2.8 (4.2)	–	–	–
	Total	4,063	3.0 (4.5)	–	–	–

explains 4.4% of the total variation in the EBCI Intensity scores.

For problem scores this analysis revealed a significant effect for gender ($t(4060) = 3.8, p < 0.001$). The gender difference adjusted for age is 0.5 points such that parents of boys characterized their child as more problematic than parents of girls. A one-year increase in age yields an estimated decrease in the Problem score of 0.09 ($t(4060) = 3.0, p < 0.01$), such that older children were characterized as less problematic than younger children by the parents. However, the effects sizes were small; age and gender combined only explains 0.6% of the total variation in the EBCI Problem scores.

DISCUSSION

Psychometric properties

The results indicated that the ECBI is a psychometrically sound measure of behavior problems in children between the ages of 4 and 12 in Norway. There were no differences between the three samples (Tromsø, Trondheim, and Møre and Romsdal). These findings indicate that the distribution

of conduct problem behaviors is roughly the same in the three sample regions. There are no studies available suggesting that there are regional differences between our sample and the two largest cities in Norway. A Nordic study on the SDQ reported rather similar scores between children and youngsters throughout Norway (Obel *et al.*, 2004), even though the age groups are older than the sample in this study.

Tests also indicated that the ECBI has good internal consistency. Correlations between the ECBI Intensity and Problem scores indicate that the frequency of problem behavior in children and parents' endorsement of behaviors as problems are related dimensions, but shows that the two scales measure separate aspects of conduct problems. Although the two scores are correlated relatively high, they may provide unique information. McMahon and Estes (1997) argues that a low Intensity score in conjunction with a high Problem score may indicate that the parent is intolerant or personally distressed. A high Intensity score and a low Problem score might, on the other hand, occur when a parent has a high tolerance level or is reluctant to admit that the child's behavior is a problem.

Problem behaviors were found to be slightly more frequent among boys than among girls. This is consistent with other studies of the prevalence of conduct problems in children (Burns & Patterson, 1991, 2000; Eyberg & Ross, 1978; Moffitt & Caspi, 2001; Robinson *et al.*, 1980; Romano, Tremblay, Vitaro, Zoccolillo & Pagani, 2001). Age had a significant effect on behavior problems; mean Intensity Scores indicated that the frequency of problem behavior declined as age increased. This is also consistent with previous findings (Kratzer & Hodgins, 1997; Robinson *et al.*, 1980).

Across the sample, the Intensity score was normally distributed. Taken together with the reasonably large standard deviations of each item, this indicates that the ECBI is sensitive to a broad range of behavioral differences.

The moderately high return rate (60%) and the lack of differences between the Tromsø, Trondheim and Møre and Romsdal samples suggests that the results from the present standardization can be applied in screening procedures throughout Norway. However, the norms presented here might not be valid for certain relatively autonomous sub-cultures of the Norwegian population. For example, some Sami (Kvernmo & Heyerdahl, 2003) or immigrant communities might have perceptions of child behavior significantly differing from those of the majority of the population.

Although the present study does not provide data on the prevalence of psychiatric disorders among children in Norway, the substantially lower mean ECBI scores suggest a lower prevalence of childhood conduct problems in Norway than in the US. This is consistent with other Scandinavian standardizations of American child behavior checklists (Axberg & Broberg, 2007; Bilenberg, 1999; Larsson & Frisk, 1999), as well as studies on the prevalence of childhood psychiatric disorders in Europe (Almqvist *et al.*, 1999; Andrés, Catalá, & Gómez-Beneyto, 1999; Ferguson, 1998; Kratzer & Hodgins, 1997; Romano, Tremblay, Vitaro, Zoccolillo & Pagani, 2001; Rutter *et al.*, 1974). Whether the present findings should be taken to indicate that conduct problems are less frequent in Scandinavia than in the US, or if, in general, American parents may have lower thresholds for what behavior they consider to be problematic is not addressed in this study. A possible interpretation of the cross-cultural differences in mean ECBI scores is that Norwegian parents consider child antisocial behavior as less of a problem than do American parents. It is necessary to establish norms on the ECBI from a clinical sample to be able to draw wider conclusions regarding differences in behaviors within and between cultures. Using the ECBI among children with confirmed DSM-IV diagnoses of Oppositional Defiant Disorder or Conduct Disorder, will inform us more about the differences and similarities between clinical and normative samples, and of the cultural differences between the US and Scandinavian countries. Swedish researchers have proposed to use an algorithm combining ECBI Intensity and Problem scores to improve the "hit" rate in identifying children with possible psychiatric symptoms (Axberg & Broberg, 2007). In addition

to this, it is a great challenge to develop tools to identify children at risk for developing behavior problems.

Limitations and practical implications

This study might be criticized for the lack of information about the characteristics of the children who did not participate. It is possible that some of these children were experiencing problems, and therefore would have risen the scores for both genders. It is also possible that the families who participated included more families who experience more problem behaviors in their children. Filling out the ECBI may function as a way to "ventilate" their experiences, and families who experience more problem behaviors in their child may be in need of this kind of "airing their problems". However, the participation rate in the Tromsø and Trondheim sample differed substantially (77% to 56%) from the Møre and Romsdal sample, and still, no differences were found between the two samples. This indicates that there are no reasons to assume that the families who did not participate differed significantly from the children who are included in the study. In addition to this, there are several reasons to suppose that the response rate would have been lower without the promise of complete anonymity.

Another limitation is that this study does not provide test-retest data. However, this has been done in several other studies, and the test-retest properties of the ECBI are so far well documented (Axberg & Broberg, 2007; Burns & Patterson, 1991, 2000; Eyberg, 1992; Eyberg & Robinson, 1983; McMahon & Estes, 1997; Robinson *et al.*, 1980).

The gender differences in the present study suggest that the cutoff point for girls should be set lower than the one for boys. Equal cutoffs for girls and boys may have several implications. The most obvious one is that, in screening procedures, girls would be required to score higher than boys on the ECBI, relative to the normal distribution of conduct problems for each gender. Moreover, using the ECBI in evaluating treatment programs, applying the same cutoff values to both genders could result in lower outcome effects if cutoff scores are not specified for each gender. It is important to differentiate between gender and ages to get correct information for each individual in the use of the ECBI.

The advantages in using the ECBI are that it is easy to administer, easy to score, and easy to interpret. It gives a very concrete foundation for discussions with parents, and having established Norwegian norms gives the advantage of being able to categorize children in need of treatment or preventive efforts. Throughout Norway there are several psychosocial interventions available, aimed at preventing and reducing problem behaviors and the use of the ECBI to screen children will give valid information about who needs referrals to these interventions.

One general known disadvantage of health screening is that screening tools have the power to discover problem behaviors and needs for preventive efforts also in cases

where there are no interventions available in the nearby region of families. In these cases it might be frustrating for the family to know that their child needs something that they cannot get him or her. Also, screening may point out problems in a child's behavior, which the family did not recognize themselves. Hopefully, new tools in screening children's behaviors will put pressure on all health care workers so that they take steps to add specific competence to their services. This will enable them to serve those families who need preventive efforts related to the behaviors of their children.

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