

Estimating prevalence of behaviour problems in kindergarten children based on population-level data

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Summary

In view of evidence that behaviour problems are the most serious factors placing children at risk for school failure, it is imperative to address them as early as possible so that preventive strategies could be used. Lack of reliable, population level prevalence data on behaviour problems in young children hinders these efforts. In this study, we are exploring several methodologies using already collected data on children's school readiness to estimate behaviour problems (aggression, anxiety and hyperactivity) at school entry. The prevalence levels obtained through each of four methods are compared with literature-based prevalence for similar age groups. Out of four methods, one proved to be adequate for estimates of prevalence of aggression and anxiety, and another for hyperactivity.

Introduction

Growing evidence indicates that Canadian children suffer from emotional and behavioural problems. Among children ages 4 to 7, approximately 10-15% have mild to moderate problems. Majority of adolescents identified with disruptive problems have a history of behavioural issues that began in preschool years. This suggests that intervention during early school years has a chance to reduce the prevalence of behaviour problems in adolescence. One of issues hindering a successful strategy for universal intervention is lack of reliable prevalence data. In Canada, most provinces collect data on child development at school entry using the teacher ratings on the Early Development Instrument (EDI, Janus & Offord, 2007). In this study, we examine the use of the EDI data to assess prevalence of behaviour problems in kindergarten children.

A number of epidemiological studies show some common patterns in the prevalence of emotional and behavioural problems. The rates tend to vary depending on the respondent (parent, child, or teacher) and type of criteria used (diagnostic system manual, or respondent checklist). Since the EDI is teacher-completed checklist, only studies including similar methodology were considered for comparison. Of the three behaviour problem types, hyperactivity is the most frequent, reaching prevalence rates as high as 11.8% in early school age children (DuPaul, McGoe, Eckert, & van Brackle, 1998), and anxiety the least frequent, with prevalence ranging from 0.6% (Lavigne et al., 1996) to 10.5% (Boyle et al., 1987). Externalizing problems like aggression and hyperactivity are more common in boys than girls in general. In hyperactivity, boys outnumber girls from 2:1 to 9:1 ratio (Boyle et al., 1987; Nolan, Gadow & Sprafkin, 2001; Wolraich, Hannah, Pinnock, Baumgaertel & Brown, 1996). Anxiety, on the other hand, is slightly more prevalent in girls in some studies (Breton, Bergeron, Valla, Berthiaume & Gaudet, 1999; Weine, Phillips, Achenbach, 1995), or in boys (Wolraich et al., 1996), while others found no significant difference between the two genders (Boyle et al., 1987). Most of these studies are based on representative samples of children within an age range with a span of between 2 to 7 years (e.g., 3 to 5 years, or 4 to 11 years of age). For developmental reasons, the prevalence may

vary across specific ages (e.g., aggression rates diminish with age, Tremblay et al., 2004, and anxiety rates raise in adolescence, Bosquet & Egeland, 2006). Therefore, the comparisons of the data in the present study, based on a specific age cohort of children, with published rates, have to be made with caution.

The goals of the present study were to first, examine several methods for establishing prevalence of behaviour problems using the EDI data for 5-year-olds, and second, compare thus established rates with prevalence levels published for similar-age children. Based on these comparisons, recommendations are made how the EDI data could be used for estimating population-level behaviour problems with highest accuracy.

Materials and Methods

The EDI is a population-based teacher-completed instrument that measures children's readiness to learn at school in five domains (Janus & Offord, 2007). One of these is the emotional maturity domain, which includes subdomains of anxiety, aggression and hyperactivity, whose structure was confirmed through a factor analysis (Janus & Duku, 2007). The items in these domains are rated on a 3-point scale: never/not true, sometimes/somewhat true, and often/very true. Each of the subdomains has an empirically-based threshold (Janus & Duku, 2007). A score below this threshold indicates a "challenge" in this area. For the whole instrument, if a child's score falls below these thresholds on 9 or more of 16 subdomains, they are considered to have multiple challenges and the Multiple Challenge Index (MCI) is set to 1. Frequencies of all the items in each subdomain were also established for the database. The checklist data were analysed through four approaches to establish the best approximation of prevalence rates.

1) Percentage of children whose scores fell *below the challenge threshold* in each of the three subdomains of interest.

2) Percentage of children who were endorsed as showing *all the items within the subdomain* at the highest level (often/very true).

3) Percentage of children who were rated on the *three most frequent items* within the subdomain as showing at the highest level (often/very true) (based on frequency rates in the sample).

4) Percentage of children who were rated on the *three items with the highest factor loadings* within the subdomain in the factor analysis as showing at the highest level (often/very true).

Data collected over 3 years in seven provinces in Canada, for 176,621 typically-developing children were used in the analyses. Children outside the typical kindergarten age-range and with missing data in the emotional maturity domain were excluded from the analyses, resulting in the sample of 174,354 (98.7%), with mean age of 5.72 years. There were 86424 girls (49.6%), and 85.9% of children spoke the school's language of instruction (English or French) fluently. Each of the analyses was repeated for the genders separately.

Results

The least stringent approach was the first one, based on children's reaching the "challenge" ability range on either subdomain while the most stringent one (the second one) included only children who were endorsed by teachers as exhibiting all behaviours within the subdomain.

The results of each prevalence pattern for the sample as a whole and girls and boys separately are in Table 1. Clearly, the most stringent approach (#2) results in very low prevalence rates. Approaches 3 and 4 result in low prevalence rates for aggression and anxiety.

Table 1 also presents the prevalence rates found in the literature for each of the three behaviour problems. For aggression and anxiety, the first approach based on MCI thresholds

appears to produce the most similar prevalence rates. For hyperactivity, however, this approach results in much higher estimates. Approaches 3 and 4 (identical in this case) appear to produce more similar estimates.

Table 1

Prevalence rates for hyperactivity, aggression and anxiety established by four approaches and other teacher-reported studies with sample populations with age ranges including 5-year-olds. Bold font indicates the approach that approximates best prevalence levels in published reports.

Approach	Anxiety			Aggression			Hyperactivity		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
1	2.3%	2.4%	2.2%	7.6%	11.2%	4.0%	12.8%	18.8%	6.7%
	3951	2069	1882	13304	9878	3426	22269	16518	5751
2	0%*	0%*	0%*	0.1%	0.1%	0%*	1.0%	1.7%	0.4%
	58	30	28	146	112	34	1793	1477	316
3	0.2%	0.2%	0.2%	0.7%	1.1%	0.2%	4.4%	6.8%	2.0%
	331	164	167	1143	951	192	7650	5964	1686
4	0.9%	1.0%	0.8%	0.5%	0.8%	0.2%	4.4%	6.8%	2.0%
	910	851	690	910	695	215	7650	5964	1686
Evidence from literature									
Range of ages in samples (years)	4-12 ^a	4-12 ^a	4-12 ^a	3-12 ^b	3-12 ^b	3-12 ^c	3-12 ^b	3-12 ^b	3-12 ^c
Range of prevalence	3.9%-10.5%	3.7%-10.2%	4.1%-10.7%	2.1%-8.9%	3.1%-11.0%	1.0%-6.8%	3.5%-8.2%	5.3%-10.1%	1.6%-6.8%

0%* = << 0.0001%

^a3 reports available

^b4 reports available

^c5 reports available

Conclusions

The purpose of this study was to explore whether general behavioural checklist like the EDI could assist in estimating teacher-reported prevalence for the three most common emotional and behaviour problems among kindergarten children. These rates were compared to the findings from other studies in which teachers were the primary informants for samples including kindergarten-age children. Modification of the selection criteria to indicate serious emotional and behaviour problems based on the EDI item responses, resulted in a range of potential prevalence rates.

In each of the approaches gender patterns were comparable with those established in literature: for aggression and hyperactivity, the prevalence among boys was higher than girls, while for anxiety there was no significant gender difference. However, different criteria

approaches appeared to approximate literature-based levels for different type of problems.

For anxiety and aggression, the first, least stringent approach, resulted in prevalence rates that were similar of those demonstrated in four other studies. In estimating the aggressive behaviour, the Approach 1 EDI rates were within the published range for all children, and for girls, but at the top of the range for boys. In estimating the anxious behaviour problems, the EDI rates calculated with Approach 1 were below the published ranges. It is worth noting that all of the studies referred to here relied on samples with ages including the kindergarten age, but not exclusive to this age. In particular, of the three studies reporting anxiety rates, two included children as old as 11 or 12 (Boyle et al., 1987; Wolraich et al., 1996), and the one with the smallest, and closest age range to the one in this study (Weine et al., 1995, ages 4-6) also reported the lowest rates of the three studies: 3.9% for all children, and 3.7% and 4.1% for boys and girls, respectively.

Approach 3, using only the three most frequently occurring items within the subdomain, resulted in prevalence percentages most resembling those published previously for hyperactivity. The prevalence for all children as well as for each gender fall within the published ranges, albeit close to the lower boundaries. Similarly to anxiety, this could be a reflection of wider age range in published studies than among children in this study.

Overall, the analyses reported here indicate that the EDI data are a potential source for information on regional and national behaviour problem prevalence in the kindergarten population. While more work needs to be done to confirm these findings, these results open a possibility for using the already-collected EDI data for policy and intervention recommendations in children's mental health.

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