Original Research

Inattention, Hyperactivity, and Impulsivity in Teenagers With Intellectual Disabilities, With and Without Autism

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Objective: To explore inattentive, hyperactive, and impulsive behaviours in teenagers with intellectual disabilities (ID), with and without autism.

Method: We identified teenagers with ID, with and without autism, in a single geographic area. Those with autism were matched for age, sex, and nonverbal IQ to those with ID only. We compared inattentive, hyperactive, and impulsive (IHI) behaviours in the 2 groups, along with adaptive functioning and medical circumstances. We further subdivided the autism group into those with IHI behaviours (autism IHI) and those without (autism non-IHI) and explored similarities and differences between autism subgroups.

Results: As a group, those with autism and ID had more IHI behaviours than those with ID alone. More in the autism group met criteria for attention-deficit hyperactivity disorder and hyperkinetic syndrome. Lifetime exposure to psychotropic medication was greater in the autism group, with stimulant and antipsychotic medications predominating. However, just under one-half of those in the autism group showed no IHI behaviours. Comparison of autism IHI and autism non-IHI groups showed that those with IHI behaviours were significantly more likely to have past (but not current) exposure to stimulant medication.

Conclusions: One in 2 teenagers with ID and coexisting autism displayed clinically significant inattentive, hyperactive, and (or) impulsive behaviours, compared with 1 in 7 of those with ID alone. Most of the remaining teenagers with autism displayed no IHI behaviours. Our results support the need for further investigation into the prevalence and etiology of these IHI behaviours in individuals with autism.

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Clinical Implications

- IHI behaviours displayed by individuals with ID need to be assessed separately from the core features of autism.
- Potential exclusionary criteria inherent in the DSM and ICD classificatory systems likely contribute to the underdiagnosis of clinically significant IHI behaviours, ADHD, and HKS in individuals with autism and ID.
- Separate and specific assessments of IHI behaviours and the behaviours associated with the core features of autism may lead to more targeted treatment and better outcomes.

Limitations

- The study focuses on teenagers.
- Although drawn from a population base of 400 000, statistical power for some comparison analyses (for example, for ADHD and HKS) was reduced owing to group size (the latter being defined by the prevalence rate of autism).
- The study did not identify possible etiologies giving rise to the ID and autism.

Key Words: *attention-deficit hyperactivity disorder, autism, intellectual disabilities*

Inattentive, hyperactive, and impulsive behaviours have been described in individuals with ID, and there is evidence that these behaviours may be increased in this population, compared with peers without ID (1–5). Several factors should be considered in the clinical assessment of these behaviours in individuals with ID. Although sometimes considered symptoms, these behaviours may not be inappropriate, given the individual's developmental level. The developmental manifestation of these behaviours may also be sex-related (3,4,6) These behaviours are not infrequently observed in individuals with autism to the extent that coexisting autism can be considered an exclusionary criterion according to DSM criteria for ADHD (7) and ICD criteria for HKS (8). On the one hand, this potential exclusionary criterion may prevent inappropriate diagnosis of ADHD and HKS in individuals with autism. For example, the ICD-10 inattention criterion "is often easily distracted by external stimuli" (8, p 155) may be more related to sensory hypersensitivity (not infrequently seen in autism) than to inattention, and the DSM-IV item for impulsivity "often interrupts or intrudes on others," (7, p 84) may be better understood in the context of the inappropriate social interactions seen in autism. Conversely, this exclusionary practice precludes the pursuit of a more comprehensive understanding of these behaviours in individuals with both ID and autism; as well, it contributes to decreased interest in and study of ADHD and HKS in autism across the range of intellectual functioning. A greater understanding of the extent to which these behaviours may (or may not) be associated with coexisting autism is clearly needed to ensure that appropriate assessment of both the autism and of these behaviours takes place and that appropriate targeted treatment is offered (9). A population study of psychopathology in teenagers with ID provided an opportunity to compare IHI behaviours in subjects with autism matched for sex, age, and IQ to subjects without autism.

Abbreviations used in this article

ADHD	attention-deficit hyperactivity disorder
ADI-R	Autism Diagnostic Inventory-Revised
HKS	hyperkinetic syndrome
ID	intellectual disabilities
IHI	inattentive, hyperactive, and impulsive
OR	odds ratio
PDD	pervasive developmental disorder
RDC	research diagnostic criteria
SD	standard deviation
VABS	Vineland Adaptive Behaviour Scales

Methods

We identified subjects in the matched groups through an epidemiologic survey of ID and autism in the population of teenagers in the Niagara Region (total population 400 000) of Ontario (10). The methods employed for this larger study and the prevalence outcomes for ID and autism are provided in detail elsewhere (11; Bryson, Bradley, Thompson, and Wainwright, 2006, unpublished observation). Briefly, this larger study was conducted in several successive stages (also outlined in Figure 1):

1. Through screening and individual assessments, the total population of teenagers with ID was identified.
2. Participants were individually assessed to identify autism and collect medical information.
3. Those with autism were matched to those without autism.
4. Matched groups were psychiatrically assessed for episodic (12) and nonepisodic psychiatric disorders. The latter included assessment of IHI behaviours, as described in this paper.

Ethics review board approval for the study was obtained from the academic and service settings with which the first author was affiliated at the time of the data collection.

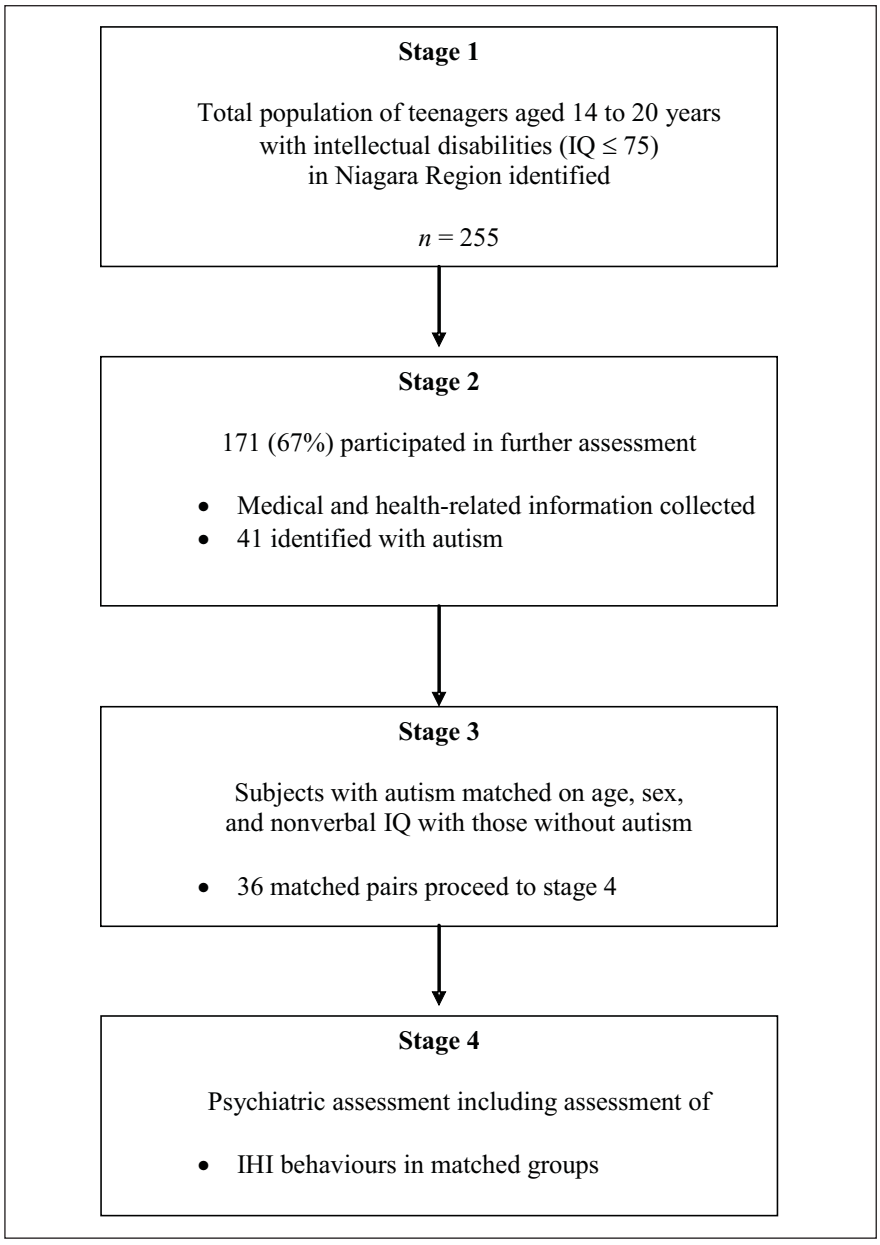
Instruments to Measure Cognitive and Adaptive Functioning

Depending on participants' age and level of functioning, we assessed nonverbal intelligence with either the Performance subscale of the Wechsler intelligence tests (13,14) or the Merrill-Palmer Scale of Mental Abilities (excluding the verbal items) (15). We used the VABS-Survey Edition (16) to assess functioning in Socialization (interpersonal relationships, play and leisure, and coping), Communication (expressive, receptive, and written), Daily Living (personal, domestic, and community), and Motor Skills (gross and fine) and to provide an Adaptive Behaviour Composite score . We also administered the Maladaptive Behavior domain (Parts 1 and 2) from the VABS. Part 1 of the domain considers minor behavioral issues, and Part 2 describes more serious behavioural concerns.

Screening for Autism

We used the ADI-R (17) to identify autism. This is an investigator-guided structured interview administered to a primary care giver. We took special care to ensure that, for each individual assessed, the ADI-R items considered were developmentally or otherwise appropriate (for example, that the individual's mental age, either currently or at age 4 to 5 years, was within the range expected for each behaviour assessed). For those with severe or profound ID (IQ < 35), some of whom also had sensory and (or) motor impairments,

Figure 1 Flow Chart Outlining Methodology and Sample Identification



several items were not appropriate and were therefore excluded. Scores were treated as absolute rather than as ratios of the number of items considered, which raised the threshold for a diagnosis of autism in this more impaired group (revised scoring). These methods and our approach in applying the ADI-R to individuals with more impairment will be detailed in a subsequent paper.

Assessment of Inattentive, Hyperactive, and Impulsive Behaviours

During the psychiatric assessment, we looked for the presence or absence of symptoms listed in the ICD-10 research diagnostic criteria (8) for each of inattention, hyperactivity, and impulsivity, which yielded a symptom score. We also determined whether each participant met clinical criteria for each category, in terms of the pervasiveness (defined as occurring in at least 2 settings) and persistence (defined as lasting at least 6 months) of symptoms. For inattention, subjects had to meet at least 6 of the symptoms listed; for hyperactivity, at least 3 of the symptoms listed; and for impulsivity, at least one of the symptoms listed. As well, we determined whether the participant met criteria for ADHD according to the DSM-IV-TR (either 6 or more of the symptoms of inattention or 6 or more of the symptoms of hyperactivity and impulsivity occurring before age 7 years and in 2 or more settings) (7) and HKS according to the ICD-10-RDC (meets clinical criteria for

inattention and hyperactivity and impulsivity occurring before age 7 years and in 2 or more settings) (8).

Identification of Subjects in the Matched Groups

Of the population of teenagers with an IQ of 75 or lower, 171/255 (67%) participated in the study (Figure 1). Of these individuals, 41 met ADI-R criteria for autism and had a nonverbal IQ of 75 or lower. Of these, 27 met criteria in each of the 3 domains, according to unrevised scoring, and 14 met criteria according to revised scoring. These 41 individuals were individually matched for age, sex, and nonverbal IQ to participants without autism. Five individuals with autism dropped out of the study before the psychiatric interview was completed (1 died, and care providers of 4 did not want to participate in the last stage of the study), leaving 36 matched pairs. There was no difference in age, sex, and nonverbal IQ between this group of 5 and the remaining 36 with autism.

Procedure

All the interviews and assessments took place in a location that was convenient for the participants and their caregivers; usually, this was in their own homes. The ADI-R, VABS interview, psychiatric interviews, and collection of medical information were completed with an informant. For both the autism and nonautism groups, 32/36 (89%) of the informants were parents. For one individual (in the autism group) an aunt was interviewed, and for another (in the nonautism group), an older sister was interviewed. Four participants in the autism group and 3 participants in the nonautism group were adopted or in foster care after age 7 years. For these individuals, interviews were completed with current foster parents who had known them on a daily basis for at least 4 years (range 4 to 16 years). We obtained informed written consent from both participants (wherever possible and using a simplified form) and informants.

Psychological assessments (27 of the matched pairs were tested using the Weschler scales) and adaptive functioning interviews were conducted by 1 of 2 research staff trained to administer these instruments. As stated by the criteria outlined by Lord, Rutter, and Le Couteur (17) for using the ADI-R for research, the 2 research staff met the recommended criterion of greater than 85% interrater reliability. All ADI-R interviews were audiotaped, and we checked interrater agreement between the 2 interviewers at regular intervals throughout the study to ensure reliability. In addition, the audiotapes were independently reviewed by the principal and coinvestigator of the larger study. Difficulties in scoring individual items occasionally arose in association with very low levels of functioning and (or) where there were additional sensory or motor impairments. We resolved these difficulties by considering observations made by research staff during the psychological assessment and through consensus.

All psychiatric interviews were conducted by the first author, who was unaware of ADI-R outcomes or whether the participant was in the matched group. Further, the first author did not participate in the matching process. If the young individual was not present with the informant during the psychiatric interview, an arrangement was made to meet with or observe him or her at a later time in a usual daily activity. This provided an opportunity to confirm and (or) clarify clinical impressions obtained during the interview.

Results

Comparison of the Autism and Nonautism Groups

Five individuals in the nonautism group and one in the autism group had scores of 3 and higher on the Gross Motor Function Classification System for Cerebral Palsy (18) and were considered nonambulatory, which thus invalidated full assessment of attention, hyperactivity, and impulsivity according to the ICD-10 RDC. These individuals and their matched pair were therefore dropped from this comparison analysis. In one pair, both individuals were nonambulatory; thus, 5 matched pairs in total were dropped, leaving 31 pairs. Table 1 shows the profile of the groups. There were twice as many male subjects as female subjects in each group (a reflection of the greater prevalence of autism in men and boys). The mean chronological age was 16 years, and the mean performance IQ age equivalence was 8 years. As might be expected, the autism group had significantly lower scores on the VABS Socialization domain. This group also had significantly lower scores on the Adaptive Behaviour Composite and higher scores on the Maladaptive domains. More subjects in the autism group were identified with episodic psychiatric disorder (for example, mood, adjustment, and psychotic disorders; 12), and more were exposed, currently and (or) in the past, to psychotropic medication (with antipsychotics and stimulants predominating and equally prescribed).

We used a series of logistic regressions to explore differences in the likelihood that individuals in the groups with autism and without autism would score or meet criteria for inattention, hyperactivity, and impulsivity. Table 2 shows frequencies and resulting chi-squares and ORs. In Table 2, the OR for each variable is represented as the odds of an individual in the group with autism being coded as "yes" divided by the odds of an individual in the group without autism being coded as "yes." As expected, individuals with autism were more likely to score and meet criteria for inattention, hyperactivity, and impulsivity than were those without autism. These differences were significant for hyperactivity and impulsivity. The likelihood that an individual with autism would meet criteria for inattention was 4.44 times greater than that for an individual without autism; however, the relatively low prevalence of meeting criteria for inattention (4 in the autism and 1 in the

Table 1 Profile of matched groups with and without autism

Demographic, psychological, behavioural, and medical characteristics	With autism $n = 31$ Mean (SD)	Without autism $n = 31$ Mean (SD)	t	P (2-tailed)
Chronological age, years	16.46 (2.20)	16.81 (2.12)	0.59	0.56
Performance IQ (age equivalents)	8.41 (2.12)	8.32 (2.26)	0.18	0.86
ADI-R Scores				
Social interaction	16.87 (4.66)	6.08 (3.68)	10.11	0.00
Communication	12.39 (4.46)	5.23 (3.20)	7.26	0.00
Behaviours	5.40 (2.25)	0.87 (0.85)	10.45	0.00
VABS domain age equivalents				
Socialization	5.03 (2.70)	7.69 (2.96)	3.68	0.00
Communication	5.65 (2.81)	6.43 (2.27)	1.20	0.24
Daily Living	6.46 (2.45)	7.26 (2.18)	1.35	0.18
Motor	4.60 (1.43)	4.83 (1.14)	0.68	0.50
Adaptive Behaviour Composite Score	5.71 (2.31)	7.13 (2.24)	2.45	0.02
Vineland Maladaptive Score Parts 1 and 2	1.97 (0.75)	1.39 (0.56)	3.45	0.00
Frequencies			χ^2	P
Male–female ratio	21:10	21:10		
Wears glasses	12	15	0.28	0.60
Uses hearing aids	3	7	0.22	0.64
History of seizures	12	9	0.29	0.60
Episodic psychiatric disorder	14	5	6.34	0.01
Prescribed psychotropic medication (currently or in the past)	20	8	9.64	0.00

nonautism group) resulted in a nonsignificant between-groups comparison. Table 2 also shows that 7 in the autism group met criteria for ADHD, and 4 met criteria for HKS, compared with 2 and 1, respectively, in the nonautism group. Although they did not reach significance in the analysis, the odds of an individual in the group with autism meeting criteria for either of these disorders were more than 4 times greater than those for an individual in the group without autism. The difference did, however, approach significance for ADHD.

Nevertheless, many individuals in the autism group did not score for inattention (51.6%), hyperactivity (48.4%), or impulsivity (51.6%). Overall, 45% of individuals with autism did not score for any one of these symptoms. Even greater numbers did not meet clinical criteria for inattention (87%) or hyperactivity (64.5%). Note that any score in impulsivity means criteria are met; thus, the numbers scoring and meeting clinical criteria are the same. Overall, 48.3% of individuals in the group with autism did not meet clinical criteria for any one of inattention, hyperactivity, or impulsivity.

We therefore split the group with autism ($n = 35$, excluding the single individual who was nonambulatory but now including the 4 individuals who were excluded from the previous comparison analysis because their nonautism pair was nonambulant) into those who met criteria for any one of inattention, hyperactivity, or impulsivity (autism IHI group, $n = 17$) and those who did not (autism non-IHI group, $n = 18$) and compared their adaptive functioning and medical circumstances.

Within-Autism Group: IHI Compared With Non-IHI

We used logistic regression to compare frequencies between these subgroups according to sex (the probability of male sex) and being coded as "yes" for the following: history of seizures, wearing glasses, using hearing aids, diagnosis of episodic psychiatric disorder, and exposure to past or current antipsychotic and stimulant medication. Table 3 shows resulting chi-squares and ORs. The groups did not differ significantly in most areas. Notably, the presence of IHI behaviours was not associated with coexisting episodic psychiatric disorder. The odds of an individual in the autism IHI group being

Table 2 Frequencies and logistic regression results comparing individuals with and without autism, scoring, and meeting clinical criteria for IHI

	Frequency		Logistic regression results		
Scores and criteria	With autism (n = 31)	Without autism (n = 31)	χ^2	P	OR
Scores for inattention	15	7	4.59	0.03	3.21
Meets criteria for inattention	4	1	2.09	0.15	4.44
Scores for hyperactivity	16	5	9.05	0.003	5.55
Meets criteria for hyperactivity	11	3	6.20	0.01	5.13
Scores for and meets criteria for impulsivity	15	6	5.98	0.01	3.90
Scores for any one of IHI	17	7	6.96	0.01	4.16
Meets criteria for any one of IHI	16	6	7.24	0.01	4.44
Meets criteria for ADHD	7	2	3.41	0.07	4.23
Meets criteria for HKS	4	1	2.09	0.15	4.44

Table 3 Medical profiles, frequencies, and logistic regression results comparing autism subgroups (autism IHI and autism non-IHI)

	Frequency		Logistic regression results		
Profile	Autism IHI (n = 17)	Autism non-IHI (n = 18)	χ^2	P	OR
Male sex	14	11	1.98	0.16	2.97
Wears glasses	4	7	0.97	0.33	0.484
Uses hearing aids	0	3	4.26	0.04	0.0
History of seizures	5	9	1.56	0.21	0.417
Episodic psychiatric disorder	8	8	0.02	0.88	1.11
Currently on antipsychotics	2	2	0.00	0.95	1.07
Antipsychotics in past	7	6	0.23	0.63	1.4
Currently on stimulants	1	0	1.48	0.224	—
Stimulants in past	10	4	5.01	0.025	5.0

— = undefined

prescribed stimulant medications in the past were significantly greater than for an individual in the autism non-IHI group. Current use of stimulant medications, however, was low and almost identical in both groups (a single individual in the autism IHI group and none in the autism non-IHI group).

We used *t* test to compare age-equivalent scores for IQ and VABS domains and subdomains, as well as ADI-R scores of the autism IHI and non-IHI sub groups (Table 4). The autism IHI group demonstrated consistently higher mean age equivalence, but none of these differences were significant.

Discussion

These results raise questions about recommendations in the DSM and ICD classificatory systems to consider coexisting autism as an exclusionary criterion in the diagnosis of ADHD and HKS. In this study, the autism group as a whole showed greater prevalence of IHI behaviours and clinically significant IHI-related symptoms and disorders, compared with the nonautism group. This finding could have been predicted from the clinical literature. However, one-half of the individuals in the autism group did not have any IHI behaviours endorsed, which points to the need for careful consideration

Table 4 Functioning profiles: means (standard deviation) and *t* test results comparing autism subgroups (autism IHI and autism non-IHI)

Age, psychological, and behavioural characteristics	Autism IHI (*n* = 17) Mean (SD)	Autism non-IHI (*n* = 18) Mean (SD)	*t*	*P* (2-tailed)
Chronological age, years	16.41 (2.18)	16.44 (2.22)	0.04	0.97
Performance IQ, age equivalents	8.60 (1.94)	8.03 (2.47)	0.71	0.48
ADI-R Scores				
Social interaction	16.92 (4.27)	16.23 (5.37)	0.41	0.67
Communication	13.04 (3.86)	11.16 (4.90)	1.25	0.21
Behaviours	6.04 (2.44)	4.79 (1.75)	1.74	0.09
VABS domain (age equivalents in years)				
Socialization	5.09 (2.45)	4.30 (3.10)	0.83	0.41
Communication	5.89 (2.73)	4.70 (3.08)	1.20	0.24
Daily living	6.71 (2.22)	5.50 (2.90)	1.38	0.18
Motor	4.83 (1.21)	4.04 (1.72)	1.61	0.12
Adaptive Behaviour Composite Score	5.62 (1.63)	4.66 (2.56)	1.26	0.22
VABS Maladaptive score Parts 1 and 2	1.94 (0.74)	1.89 (0.83)	0.19	0.85

of the underlying causes of IHI behaviours before autism is applied as an exclusionary criterion. The behavioural syndrome of autism is likely underpinned by etiological subgroups that may be differentially associated with IHI behaviours. In addition, given the particular responsiveness of individuals with autism to environmental circumstances (for example, certain social and sensory environments), the role of such circumstances in contributing to these IHI behaviours should also be considered.

The autism group as a whole had significantly lower social and adaptive functioning, higher maladaptive scores, a greater prevalence of coexisting episodic psychiatric disorder, and a greater history of psychotropic medication use, compared with the nonautism group. Social impairments are among the core deficits in autism, and lower scores on the VABS have previously been reported (19,20). Children with both PDD and ADHD have been reported as more impaired and having greater rates of hospitalization, medication treatment, and medication combined with psychotherapy, compared with those having PDD alone (21). It could be hypothesized that IHI-related symptoms cause or contribute to difficulties in adaptive functioning, which might also give rise to the greater medication use in those with autism. However, subsequent comparison of the 2 autism subgroups in this study showed that these 2 autism subgroups did not differ significantly in VABS Socialization, Adaptive, or Maladaptive scores, nor did they differ significantly in the prevalence of coexisting episodic psychiatric disorder. The significant difference between these subgroups was in the greater past exposure to stimulant medication (both groups had similar past exposure to antipsychotic medication). In both subgroups, there was currently less prescribing of antipsychotic and stimulant medication than in the past—a finding that warrants further investigation because it may point to a lower efficacy of stimulant medication for the treatment of IHI behaviours in those with autism and ID.

Although comparison of the 2 autism subgroups showed no significant differences in performance IQ, levels of functioning, or autistic impairment, it was observed that the autism IHI group did score consistently higher than the non-IHI group in these areas. Possibly, statistical significance was not achieved owing to reduced power because of the relatively small sample. Thus, although no conclusions can be reached from the current data, further investigations, with a larger sample, of the relations between IHI and functioning in autism may also be warranted.

IHI behaviours need to be considered from a developmental perspective. A child in a learning environment beyond his or her intellectual and emotional capacity may well present with any or all of these behaviours, and these behaviours may

diminish as the child matures with age or the environment is more appropriately matched to his or her existing capacities (22). The DSM and ICD classificatory systems for ADHD and HKS are primarily targeted to evaluate these behaviours in children. Many of the items are inappropriate for older individuals or for individuals with ID. Caution is therefore needed when classificatory systems not specifically standardized to address these developmental perspectives are used. In this study, we used the ICD-10 RDC descriptions of IHI behaviours. Comments in these ICD guidelines assist in ensuring that developmental criteria are appropriately met (such as, "the symptoms . . . (for example of inattention) . . . have persisted . . . to a degree that is maladaptive and inconsistent with the developmental level of the child . . ." (8, p 155). However, problems did arise when this system was used to study individuals with learning disabilities and autism, which may have resulted in the underendorsing of some behaviours relevant to a particular category. For example, in the inattention category, individuals were sometimes reported not to pay attention to the tasks itemized in the check list; conversely, on tasks that they initiated, some demonstrated extraordinary perseverance and attention. Assessment tools that shift the focus from measures of hyperactive and impulsive behaviours to measures of the specific cognitive impairments, such as developmental impairments in executive function (23), might better tap into these apparent discrepancies in behaviour and should be explored.

The strength of this study's findings lies in the various approaches taken to compensate for a lack of current adequate measures of IHI behaviours that take into account developmental concerns and the apparent inconsistent behaviours presented by the population of individuals with ID. We controlled for several crucial variables: the groups were drawn from an epidemiological sample (and not a clinical sample); the groups were matched on variables known to influence IHI behaviours, namely, chronological age, sex, and nonverbal IQ; the interviewer was blind to the autism status of the subjects; and finally, the interviewer conducted all the interviews, and judgments regarding behaviours and their developmental context was therefore consistent across subjects.

Future studies of IHI behaviours in individuals with ID, of whom more than 20% may have autism (24; Bryson, Bradley, Thompson, and Wainwright, unpublished observation), should explore both the etiology of the ID and individuals' emotional responses to specific environmental contingencies. Widening the conceptual framework in understanding these behaviours—for example, including attention to executive function and the regulation of emotion (23)—may also provide fruitful directions for further research in this area.

Meanwhile, it seems prudent to consider IHI behaviours as possible symptoms of coexisting conditions that need to be comprehensively evaluated separately from the diagnosis of autism so that appropriate interventions can be offered.

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References

1. Rutter M, Graham PJ, Yule W. A neuropsychiatric study in childhood. London (UK): Heinemann Medical; 1970.
2. Epstein MH, Cullinan D, Gadow KD. Teacher ratings of hyperactivity in learning-disabled, emotionally-disturbed, and mentally-retarded children. Journal of Special Education 1986;20:219–29.
3. Epstein MH, Cullinan D, Polloway EA. Patterns of maladjustment among mentally retarded children and youth. Am J Ment Defic 1986;91:127–34.
4. Fox RA, Wade EJ. Attention deficit hyperactivity disorder among adults with severe and profound mental retardation. Res Dev Disabil 1998;19:275–80.
5. Seager MC, O'Brien G. Attention deficit hyperactivity disorder: review of ADHD in learning disability: the Diagnostic Criteria for Psychiatric Disorders for Use with Adults with Learning Disabilities/Mental Retardation [DC-LD] criteria for diagnosis. J Intellect Disabil Res 2003;47 Suppl 1:26–31.
6. Szatmari P, Offord DR, Boyle MH. Ontario Child Health Study: prevalence of attention deficit disorder with hyperactivity. J Child Psychol Psychiatry 1989;30:219–30.
7. American Psychiatric Association, American Psychiatric Association Task Force on DSM-IV. Diagnostic and statistical manual of mental disorders. 4th ed. Text revision. Washington (DC): American Psychiatric Association; 2000.
8. World Health Organization. The ICD-10 classification of mental and behavioural disorders: diagnostic criteria for research. Geneva (CH): World Health Organization; 1993.
9. Goldstein S, Schwebach AJ. The comorbidity of pervasive developmental disorder and attention deficit hyperactivity disorder: results of a retrospective chart review. J Autism Dev Disord 2004;34:329–39.
10. Statistics Canada. CANSIM. Population by age group. Ottawa (ON): Statistics Canada; 1996.
11. Bradley EA, Thompson A, Bryson SE. Mental retardation in teenagers: prevalence data from the Niagara region, Ontario. Can J Psychiatry 2002;47:652–9.
12. Bradley EA, Bolton P. Episodic psychiatric disordrs in teenagers with learning disabilities with and without autism. Br J Psychiatry. Forthcoming.
13. Wechsler D. WAIS-R manual. Wechsler Adult Intelligence Scale, Revised. New York (NY): Harcourt Brace Jovanovich [for] Psychological Corp; 1981.
14. Wechsler D. WISC-R: Wechsler Intelligence Scale for Children, Revised. New York (NY): Psychological Corp; 1974.
15. Stutsman R. Guide for administering the Merrill-Palmer Scale of Mental Tests. New York (NY): Harcourt, Brace & World; 1948.
16. Sparrow SS, Balla DA, Cicchetti DV, Doll EA. Vineland Adaptive Behavior Scales: survey form manual. Circle Pines (MN): American Guidance Service; 1984.
17. Lord C, Rutter M, Le Couteur A. Autism Diagnostic Interview-Revised: a revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. J Autism Dev Disord 1994;24:659–85.
18. Palisano R, Rosenbaum P, Walter S, Russell D, Wood E, Galuppi B. Development and reliability of a system to classify gross motor function in children with cerebral palsy. Dev Med Child Neurol 1997;39:214–23.
19. Volkmar FR, Sparrow SS, Goudreau D, Cicchetti DV, Paul R, Cohen DJ. Social deficits in autism: an operational approach using the Vineland Adaptive Behavior Scales. J Am Acad Child Adolesc Psychiatry 1987;26:156–61.

20. Loveland KA, Kelley ML. Development of adaptive behavior in adolescents and young adults with autism and Down syndrome. Am J Ment Retard 1988;93:84–92.
21. Frazier JA, Biederman J, Bellordre CA, Garfield SB, Geller DA, Coffey BJ, Faraone SV. Should the diagnosis of attention-deficit/hyperactivity disorder be considered in children with pervasive developmental disorder? J Atten Disord 2001;4:203–11.
22. Mahoney WJ. The aggressive and impulsive child: Innovations in assessment and treatment—acommentary. Paediatrics & Child Health 2004;9:537–8.
23. Brown TE. DSM-IV: ADHD and executive function impairments. Advanced Studies in Medicine 2002;2:910–4.
24. Nordin V, Gillberg C. Autism spectrum disorders in children with physical or mental disability or both. I: Clinical and epidemiological aspects. Dev Med Child Neurol 1996;38:297–313.

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Résumé: L'inattention, l'hyperactivité et l'impulsivité chez les adolescents ayant des déficiences intellectuelles, avec et sans autisme

Objectif : Explorer les comportements inattentif, hyperactif et impulsif chez les adolescents ayant des déficiences intellectuelles (DI), avec et sans autisme.

Méthode : Nous avons identifié des adolescents ayant des DI, avec et sans autisme, dans une seule région géographique. Ceux qui souffraient d'autisme ont été jumelés selon l'âge, le sexe et le QI non verbal avec ceux ayant des DI seulement. Nous avons comparé les comportements inattentif, hyperactif et impulsif (IHI) chez les 2 groupes, ainsi que le fonctionnement adaptatif et la situation médicale. Nous avons en outre sous-divisé le groupe de l'autisme entre ceux qui avaient les comportements IHI (autisme IHI) et ceux ne les ayant pas (autisme non IHI), et nous avons exploré les similitudes et les différences entre les sous-groupes d'autisme.

Résultats : Comme groupe, ceux qui souffraient d'autisme et de DI avaient plus de comportements inattentif, hyperactif et impulsif que ceux qui n'avaient que des DI. Un plus grand nombre de sujets du groupe de l'autisme satisfaisaient aux critères du trouble d'hyperactivité avec déficit de l'attention et du syndrome hyperkinétique. L'exposition de durée de vie aux médicaments psychotropes était plus importante dans le groupe de l'autisme, les stimulants et les antipsychotiques prédominant. Cependant, un peu moins de la moitié des sujets du groupe de l'autisme ne présentaient pas de comportements inattentif, hyperactif et impulsif. La comparaison entre les groupes autisme IHI et autisme non IHI a montré que ceux présentant des comportements IHI étaient significativement plus susceptibles d'avoir eu une exposition passée (mais pas actuelle) aux médicaments stimulants.

Conclusions : Un adolescent sur 2 ayant des DI et un autisme co-existant affichait des comportements inattentif, hyperactif et/ou impulsif cliniquement significatifs, comparativement à 1 sur 7 de ceux n'ayant que des DI. La plupart des autres adolescents souffrant d'autisme n'affichaient pas de comportements IHI. Nos résultats soutiennent le besoin de recherche additionnelle sur la prévalence et l'étiologie de ces comportements IHI chez les personnes souffrant d'autisme.