Social Communication Competence and Functional Adaptation in a General Population of Children: Preliminary Evidence for Sex-by-Verbal IQ Differential Risk

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ABSTRACT

Objective: The proportion of schoolchildren with mild social communicative deficits far exceeds the number diagnosed with an autistic spectrum disorder (ASD). We aimed to ascertain both the population distribution of such deficits and their association with functional adaptation and cognitive ability in middle childhood. **Method:** The parent-report Social and Communication Disorders Checklist was administered to participants ($n = 8,094$) in the Avon Longitudinal Study of Parents and Children. We correlated impairment severity with independent clinical diagnoses of ASD, cognitive abilities, and teacher-rated maladaptive behavior. **Results:** Social and Communication Disorders Checklist scores were continuously distributed in the general population; boys had mean scores 30% higher than girls. Social communicative deficits were associated with functional impairment at school, especially in domains of hyperactivity and conduct disorders. A sex-by-verbal IQ interaction effect occurred: verbal IQ was protective against social communication impairments across the range of abilities in female subjects only. In male subjects, this protective effect did not exist for those with above-average verbal IQ. **Conclusions:** Social communicative deficits are of prognostic significance, in terms of behavioral adjustment at school, for boys and girls. Their high general population prevalence emphasizes the importance of measuring such traits among clinically referred children who do not meet diagnostic ASD criteria. Above-average verbal IQ seems to confer protection against social communication impairments in female subjects but not in male subjects. *J. Am. Acad. Child Adolesc. Psychiatry*, 2009;48(2):128–137. **Key Words:** autistic spectrum disorder, ALSPAC, Social and Communication Disorders Checklist, sex differences, verbal IQ.

The population prevalence of autism seems to have increased in the last decade, possibly because of better recognition[1]; current estimates range up to 116 per 10,000 children with an autistic spectrum disorder (ASD).[2,3] We propose that population estimates of prevalence may underestimate the importance of autistic characteristics of lesser severity, for two main reasons. First, cases are usually ascertained from secondary screening, based on the initial selection of children who have severe and obvious symptoms. Consequently, mild or moderate deficits in social and communicative competence may be missed, especially if they are

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associated with marked degrees of comorbidity in the context of psychiatric disorders such as conduct problems[4] and attention-deficit/hyperactivity disorder (ADHD).[5] Second, methods of ascertainment are designed to maximize the distinction between valid cases of autism, defined according to conventional criteria, and to exclude conditions that do not reach diagnostic significance.[6,7] Yet, recent evidence suggests that ASDs are simply the extreme end of a continuous distribution of one or more dimensions of autistic behaviors. Constantino and Todd[8] measured autistic traits in a large community child sample and found no discontinuity between normality and psychopathology, as would have been evidenced by a bimodal distribution. This finding has since been replicated in a Scandinavian community sample using both parent and teacher report questionnaires.[9] Neither study considered the critical question: at what degree of severity do autistic traits become functionally impairing in the general population of children? We aimed to address this question in the research reported here.

ASDs are associated with elevated risk of a range of impairments to functional adaptation.[10] These include conduct problems,[4] hyperactivity,[11–13] difficulties with peers,[14] and emotional difficulties.[15,16] In addition, there is extensive evidence of an association between autism and low IQ.[17–20] No previous study has sought to quantify a range of functional impairments associated with subclinical social and communication deficits of an autistic character, which may have significant public health and educational costs.[4]

Our investigation was based on a large, geographically defined population of children who have been the subject of intensive scrutiny in terms of their biological and psychological development since before birth. Social and communication deficits were measured in middle childhood, using a parent-report rating scale—the Social Communication Disorders Checklist (SCDC).[21] Approximately 1 year later, we obtained teacher ratings of behavioral and emotional adjustment[22] and antisocial behavior.[23] IQ was measured shortly after SCDC administration.[24] All contributory sources of data were derived independently of each other. We tested the predictions that increased levels of social and communication difficulty would be associated with the following: lower IQ, more conduct problems, greater hyperactivity, more emotional problems, and greater peer relationship problems.

METHOD

Sample

The Avon Longitudinal Study of Parents and Children (ALSPAC) is a prospective longitudinal intensively studied population cohort of children.[25] Initial recruitment targeted all pregnant women living in the geographical region of Avon, England, who were expected to deliver their baby between April 1, 1991, and December 31, 1992, and more than 85% participated (average age was 28 years; range 14–46 years). Approximately 45% were expecting their first child; 6% had 3 or more children. Contact has been maintained with the families of 11,500 of the original cohort of 13,971 surviving children. Further details are given on the ALSPAC Web site.[26] The highest educational qualifications of mothers were recorded as a proxy for socioeconomic status using a five-point classification of achievement, from minimal (14%) to a university degree (16.1%). Approximately 70% of all cohort mothers (8,094/11,500) completed the SCDC screening questionnaire; 16% of the participants (compared with 7% of nonparticipants) had a university degree.

Measures

Social Communication Disorders Checklist. The SCDC[21] is a questionnaire, completed by parents, that measures social reciprocity and verbal/nonverbal characteristics resembling those found in ASD. There are 12 items, rated according to whether the corresponding behavior has been seen during the past 6 months; if so, whether the associated statements are "not true," "quite or sometimes true," or "very or often true." Scores of 0-1-2 apply, so the maximum possible score is 24. In our analysis, a small proportion of cases had missing items (205/8,094); total scores have been prorated. The scale was derived from a principal components analysis of a longer instrument and represents just one factor. The single dimension measured by the instrument has strong internal consistency; Cronbach α is .93.[21] Discriminant validity, measured in a clinical population, predicted autism with a sensitivity of 0.9 and specificity of 0.69 (threshold score of 9/24), which is equivalent to the Social Communication Questionnaire.[27,28] Criterion validation showed modest correlations between the SCDC total score and ADI algorithm scores[29] (0.41 with qualitative abnormalities in reciprocal social interaction, $p < .001$; 0.3 with qualitative abnormalities in communication, $p < .001$; 0.21, with restricted, repetitive, and stereotyped patterns of behavior, $p < .01$). The SCDC-measured trait has high heritability (0.74),[30] which is similar in magnitude to the heritability of autistic traits measured by other screening scales, estimated to be between 0.6 and 0.9.[31]

Strengths and Difficulties Questionnaire. This behavioral screening questionnaire,[22] administered to parents and/or teachers of 4- to 16-year-olds, measures emotional and behavioral difficulties and the resulting functional impairment. It has acceptable reliability and validity. In this study, we used data that had been provided only by teacher report, to avoid contamination between informants. Parents and teachers provide Strengths and Difficulties Questionnaire (SDQ) information of roughly equal predictive value, although information from teachers is slightly more useful for detecting conduct and hyperactivity disorders. The subscale "hyperactivity disorder" corresponds approximately to "any ADHD disorder," according to *DSM-IV*[32] criteria.

Children's Communication Checklist. This 70-item parent- or teacher-report questionnaire[33] measures aspects of communication impairment, mainly in terms of pragmatic competence. It calculates