Comparative Study of Early Childhood High-function Autism and Developmental Mixed Receptive-expressive Language Disorder

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Verbal cognitive profile and general social functioning were compared between two groups of children aged 5 to 7 years, one with high-function autism and the other with developmental mixed receptive-expressive language disorders. The two groups, totaling 50 children, were matched for age and non-verbal IQ (mean, 90). Both groups had impaired verbal cognitive profile and social adaptive functioning, with no statistically significant differences between the two groups. The implications of our findings are discussed. Current preschool and early childhood medical-educational intervention programs in Taiwan must design and implement curricula in which children with language delay, whether autistic or not, can develop essential social skills.

Key Words: autistic disorder, intelligence, language disorder, social behavior
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Autism is a developmental behavioral syndrome defined by the presence of communication and social deficits, ritualistic, repetitive behaviors, and onset before the age of 3 years [1]. Autism is considered a chronic developmental disorder. Currently, the level of intelligence and other comorbid conditions (such as medical syndromes and other neuropsychiatric disorders) are believed to be important predictors of outcome [2]. Language abnormalities are a major component of autism and current classifications (Diagnostic and Statistical Manual of Mental Disorders, fourth edition, DSM-IV; International Statistical Classification of Diseases and Related Health Problems, tenth revision, ICD-10) have continued to reflect the importance of language deficit in diagnosing autism [1,3]. The development of language ability is considered a crucial prognostic factor in autism spectrum disorders. Longitudinal studies have shown that adult outcome is heavily dependent on whether useful speech has been developed by the age of 5 to 6 years [2,4–6].

Nevertheless, approximately 3% of 3-year-old children exhibit an unexplained language impairment [7]. The consensus is that between 50% and 90% of these children continue to exhibit language difficulties throughout childhood [8]. For non-autistic children with normal non-verbal intelligence, preschool language difficulties are frequent precursors of language and academic problems that persist throughout childhood and adolescence [9–12]. Previous findings have also revealed that non-autistic 5-year-old children with speech or language impairments have increased rates of concurrent psychiatric diagnosis, especially attention-deficit hyperactivity disorder and anxiety disorders [13]. They also have increased rates of psychiatric disorders from age 12 to young adulthood, especially social phobias [14,15].

The current study compared cognitive profiles and social adaptive functioning in two groups of 5- to 7-year-old Taiwanese children with speech delay but with normal

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non-verbal intelligence. The first group consisted of children with high-function autism and the second group consisted of children with developmental mixed receptive-expressive language disorder. These two groups were matched pair wise by age and non-verbal intelligence level. The aim of the study was to investigate the nature of problems in early childhood when language deficit is one of the core concerns reported by parents.

Materials and Methods

The subjects were 50 children who were seen as part of an outpatient evaluation at the developmental clinic of Kaohsiung Medical University Hospital, Taiwan. All the children were diagnosed on the basis of clinical observation together with data provided by the primary caregiver; the evaluation procedures for all children were almost identical. All subjects had taken individually administered IQ tests and each child's primary caregiver had been administered the Vineland Adaptive Behavior Scale-short form, Chinese version (VABS-C) [16]. The use of the VABS in autistic children is reported to be as valid and sensitive to severity of impairment as in other childhood populations [17,18]. The short form of VABS-C applied in this study includes 89 items selected from the original VABS and has been standardized with available Taiwanese norms. For cognitive assessment, the children were given the most chronologically appropriate tests on which they could achieve a basal score. On account of the range of ages and abilities, three cognitive tests were used, including the Leiter International Performance Scale-Revised [19], the Wechsler Intelligence Scale for Children-III [20], and the Chinese version of the Wechsler Preschool and Primary Scale of Intelligence-Revised [21]. Only children with a normal non-verbal IQ (> 70) were recruited. The primary caregiver of each child with suspected autism was interviewed using a questionnaire adapted from the Wing Autistic Disorder Interview Checklist [22]. In addition, each primary caregiver was asked to provide information regarding diagnostic history (focusing on early symptoms), associated handicaps and diseases, developmental milestones, family history, siblings, and general social situation.

Patients were enrolled in the study based on the following criteria: clinically significant language deficit in both comprehension and expression as ascertained by an experienced pediatric neurologist; no hearing impairment; monolingual; no gross motor deficit, uncontrollable seizures, neuromuscular disease, nor any other neurologic disease; and no history of extreme financial deprivation.

The autism group consisted of 25 children diagnosed with autistic disorder according to DSM-IV criteria. The average age was 69 months (range, 60–85 months). Children diagnosed with "pervasive developmental disorder not otherwise specified" (including atypical autism) were not included. Only boys were included in this group due to the difficulty of identifying girls with normal non-verbal IQ who met the criteria for autistic disorder. The language group consisted of 25 children who had received a DSM-IV diagnosis of mixed receptive-expressive language disorder. The average age was 68 months (range, 60–83 months). Ten children in the language group were females. The two groups of children were matched by age and non-verbal IQ, but they were not matched by level of verbal expressive ability.

The groups were compared according to verbal scores on the Wechsler tests, the subscales and total scores of the VABS-C, and the converted percentile rank.

Results

Cognitive functioning

Two children in the language group were unable to achieve the minimum measurable score on the verbal items of the Wechsler tests due to severe communication impairment. Hence, Leiter scores for these two subjects were used as the non-verbal IQ. The average non-verbal IQ scores were 89.9 ± 11.2 in the autism group and 91.4 ± 11.5 in the language group. The average verbal IQ (VIQ) ranged from borderline to mildly impaired (72.4 in the autism group and 71.6 in the language group). The Wechsler intelligence test manual indicates that the minimum significant difference between VIQ and performance IQ (PIQ) is 12 points. According to this standard, significant PIQ-VIQ differences were noted in both groups. The average PIQ-VIQ differences were 17.5 ± 13.4 in the autism group and 20.5 ± 13.4 in the language group. VIQ showed more variability in the autism group, although Student's *t* test showed no group difference in average VIQ. In each group, verbal and non-verbal IQ were approximately the same. Because of their relevance to verbal comprehension, three subscale items (similarity, comprehension and vocabulary) on the Wechsler test were compared between the two groups. Student's *t* test demonstrated no meaningful difference between the two groups (Table 1).

Social functioning

Both groups had low scores on the VABS-C short form compared with Taiwanese normative data. When analyzed

Table 1. Mean scores ± standard deviation on cognitive assessments

	Autism group (n = 25)	Language group (n = 25)	Group difference (T value)
Verbal IQ*	72.4 ± 15.4	71.6 ± 13.6	–0.5
Non-verbal IQ†	89.9 ± 11.2	91.4 ± 11.5	0.2
Non-verbal–verbal discrepancy	17.5 ± 13.4	20.5 ± 13.4	–0.8
Verbal comprehension subscale‡	15.0 ± 7.2	14.5 ± 6.1	0.2

*Two subjects in the language group failed to score on the verbal items of the Wechsler test; †Leiter score was used for the two subjects who could not perform the Wechsler test; ‡the sum of comprehension, similarity, and vocabulary subscales.

by percentile rank (converted from total score), only eight children (32%) in the autism group and seven (28%) in the language group had performance ranking above the 20th percentile (Table 2). In other words, the social adaptation in 68% of the autism group and 72% of the language group was in the range of the lower 20% of Taiwanese children of the same age. Nevertheless, the difference in total score was not statistically significant between the two groups according to Student's t test.

Discussion

It is widely recognized that the prognosis for autism is generally poor. Follow-up studies in Europe, Canada, the USA, Japan, and Hong Kong have shown that, as adults, even when general intelligence is within the normal range, relatively few individuals are able to live independently [23,24]. On the other hand, the long-term outcome of individuals with developmental language disorders is more variable, probably due to methodologic problems [25]. Statistically, the risk of continuing problems in children with developmental language disorders varies from 50% to 90% [9]. Bartak and colleagues were the first to compare a group of 7- to 8-year-old children with high-function autism with another matched group of children with developmental mixed receptive-expressive language disorder [26]. They included a total of 47 children, all of normal intelligence. The two groups were matched for non-verbal IQ and expressive language ability. The study found that, in early childhood, language-related deficits, social and communicative skills, and stereotyped behaviors in the autism group were more profound and more extensive than those in the language group. When these two groups of children were followed up in middle childhood, social and behavioral problems had become more apparent in the language group [27]. Finally, after 25 years of longitudinal follow-up, when the two groups were evaluated at a mean age of 23 to 24 years, the group difference in social domains and life adjustment had decreased [28,29]. Discriminant function analysis, which had distinguished the groups as 7- to 8-year-old children, showed much greater overlap between them in cognitive, language, social, behavioral, and psychiatric outcomes when these children reached young adulthood.

Table 2. Vineland Adaptive Behavior Scale-short form (mean ± standard deviation)

	Autism group (n = 25)	Language group (n = 25)
Total score	85.3 ± 17.2	92.2 ± 21.2
Percentile rank > 20th, n	8	7

These well-organized, Western, longitudinal studies spanning 25 years have demonstrated that social adjustment problems experienced by young children with developmental language disorder are no less disturbing than those of children with high-function autism. The results of our study are consistent with reports from developed Western countries, indicating that social support for children with developmental language disorder is presently inadequate. Our study compared 7- to 8-year-old Taiwanese children with high-function autism to those with developmental language disorder. The findings support the notion that, in the domains of verbal cognitive profiles and social adaptation, impairment in these two groups of children may be no different.

Clinical reports suggest that many children fall between classic autism and developmental language disorder; the boundary is not clear [22,30,31]. More than two decades ago, Bishop and Rosenbloom described a specific developmental language disorder which they termed semantic-pragmatic disorder. Children with this diagnosis often have mild autistic features, although these are not severe enough to warrant a diagnosis of autism [32]. It has also

been observed that non-autistic children with developmental language disorders may show non-language impairment similar to that seen in autism [33]. Recently, both twin and family studies of autism have found increased rates of language difficulties in relatives [31,34]. Bailey et al suggest that the genetic liability may be for the development of a combination of specific cognitive, social, and/or communication abnormalities, with autism as the most severe phenotype [35]. Thus, the question of whether the autism group differed from the language group simply because their language impairment was wider and deeper and, therefore, more likely to affect other areas of development, was left largely unanswered.

We note several limitations to the interpretations of our results. The children in the autism group all had a normal non-verbal IQ and those in the language group all had receptive difficulties. Therefore, impairment in the language group, as a whole, may have been more severe than sample subjects recruited in similar studies, or more severe than in the overall population of children with mixed receptive-expressive language disorders, and impairment in the autism group may have been less severe. These characteristics may account for the lack of difference between the two groups. However, our results could be used to identify clinical and research implications. They demonstrate the severe problems experienced by children with language disorders and their need for much greater help and support than is presently available. The management of developmentally delayed children frequently requires clinicians to make recommendations regarding school placements, curriculum content, vocational training and placement, and community-based living facilities. Current Taiwanese educational policy and resource allocation provides more support for children with autism. Our report demonstrates the need for development of treatment programs focusing on social adaptation skills for both autistic and non-autistic language-impaired children. Finally, long-term follow-up into middle childhood/adolescence/adult life is essential for further understanding of the relationship between autism and developmental language disorders.

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