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Review

Oral language impairments in developmental disorders characterized by language strengths: A comparison of Asperger syndrome and nonverbal learning disabilities

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ABSTRACT

Asperger syndrome (AS) and nonverbal learning disabilities (NLD) are developmental disorders in which linguistic ability is reported to be stronger than in disorders from which they must be distinguished for diagnosis. Children and adults with AS and NLD share pragmatic weaknesses, atypical social behaviours, and some cognitive features. To date, potential similarities between these disorders in oral language have not been directly examined in the literature. A review of the available research suggests that adequate structural language is another area of similarity for AS and NLD. However, systematic investigations of phonology, morphology, or syntax were not found; thus, the evidence for largely intact structural language in these disorders is indirect. The review also pointed to a common semantic profile across both disorders, characterized by strong vocabulary breadth in the face of limited depth and organization. These higher-order problems with semantics are proposed to be consistent with theoretical accounts of poor integrative abilities in AS and NLD, and to contribute to the well-documented pragmatic difficulties in these disorders.

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The debate about whether Asperger syndrome (AS) may be differentiated from high-functioning autism continues. One attempt to distinguish the two disorders has been to compare AS to nonverbal learning disabilities (NLD or right hemisphere developmental syndrome, diagnosed in individuals with deficits in visual-spatial perception and organization, visual-motor coordination, visual working memory, and nonverbal concept formation (Cornoldi, Venneri, Marconato, Molin, & Montinari, 2003; Mammarella, Lucangeli, & Cornoldi, 2010; Myklebust, 1975; Rourke, 1989; Weintraub & Mesulam, 1983). The suggestion has been that similarities between AS and NLD are indicative of shared underlying deficits in right hemisphere functions, in contrast to linguistic, left hemisphere impairments that are more strongly indicated in autism (Klin, Volkmar, Sparrow, Cicchetti, & Rourke, 1995). Empirical evidence for reported strengths in oral language would provide further support for similarity between AS and NLD, and for the suitability of using NLD cognitive profiles to distinguish between AS and high-functioning autism. Consequently, the following review examines empirical research into oral language in AS and NLD.

AS may be diagnosed when individuals demonstrate the impaired social reciprocity and atypical interests and activities seen in autistic disorder, but show no delays in their early language development. AS is commonly distinguished from other forms of pervasive developmental disorder, in particular high-functioning autism, by the lack of such a delay (APA, 2000). Thus, structural language is, at least superficially, a strength in AS (Landa, 2000). NLD is a learning disability subtype characterized by deficits in the cognitive functions noted above, as well as weaknesses in mathematics and reading comprehension (Forrest, 2004; Stothers & Klein, 2010), and social skill impairments (Semrud-Clikeman, Walkowiak, Wilkinson, & Minne, 2010). NLD is distinguished from dyslexia or reading disability by intact single word reading and the absence of core deficits in phonemic representations or awareness. Phonology has been described as average or better in NLD, and verbal IQ is usually higher than nonverbal IQ (Myklebust, 1975; Rourke, 2000). Thus, linguistic ability is generally characterized as stronger in AS and NLD than in the disorders from which they must be distinguished for diagnosis.

It has been suggested that individuals with AS and NLD also share pragmatic weaknesses, including unusual prosody; pedantic, verbose, and tangential speech; difficulties interpreting jokes and figurative language in conversation; and lack of response to nonverbal social cues (Klin et al., 1995; Ryburn, Anderson, & Wales, 2009; Semrud-Clikeman & Glass, 2008). Common behaviours such as a tendency to insist on rules and routines, childhood histories of attention problems, and difficulties with emotional regulation have been documented, as have shared cognitive features. The latter include weaknesses in visual memory and nonverbal concept formation, both characteristics of NLD, occurred significantly more frequently in the AS group than the group with HFA (p. 1134). As a consequence of these similarities, Klin et al. (1995) hypothesized that the disorders are convergent, such that the cognitive profile typical of NLD may capture essential features of AS that do not also appear in high-functioning autism. Studies have only recently begun to investigate this possibility (Bloom & Heath, 2010; Goldstein, Beers, Siegel, & Minshew, 2001; Liddell & Rasmussen, 2005; Nydén et al., 2010; Ryburn et al., 2009; Semrud-Clikeman, Walkowiak, Wilkinson, & Christopher, 2010; Semrud-Clikeman, Walkowiak, Wilkinson, et al., 2010; Stein, Klin, & Miller, 2004; Yalof, 2006), and no consensus has emerged concerning the nature of the relationship between AS and NLD.

Potential similarities in oral language have not been directly examined in these disorders. Separately, little linguistic research can be found for either, in part because of the ways in which AS and NLD have been conceptualized. According to Boucher (cited in Williams, Botting, & Boucher, 2008), the introduction of AS as a diagnostic category on the autism continuum fundamentally changed language study in autism. The earliest hypothesis that autistic symptoms were caused by extreme deficits in structural language could no longer be supported if such symptoms occurred in people with adequate oral language. When the symptom-language hypothesis was abandoned, so was the investigation of structural language impairment in high-functioning, verbal people with autism. In the NLD literature, early discussions focussed on the deficits summarized by the label: proposagnosia; spatial, time and visual-size agnosia; and distortions of weight, distance, and direction. These weaknesses were reported in detail, in contrast to only general observations that concerned comparatively early speech and vocabulary acquisition (Johnson & Myklebust, 1967; Weintraub & Mesulam, 1983). NLD has also been called a right hemisphere syndrome (Grace & Malloy, 1992; Gross-Tsur, Shalev, Manor, & Amir, 1995; Tranel, Hall, Olson, & Tranel, 1987; Voeller, 1986; Weintraub & Mesulam, 1983), again focussing research and observation on non-linguistic capacities. Consequently, the defining features of AS and NLD have limited investigation into structural language in either disorder (Groen, Zwiers, Gaag, & Buitelaar, 2008; Humphries, Oram Cardy, Worling, & Peets, 2004; Volden, 2004).

There are good reasons, however, to examine structural language within and between these and other disorders. The first is to better understand pragmatic impairments (Volden, Coolican, Garon, White, & Bryson, 2009) and communication in general. Without this knowledge, researchers and clinicians cannot determine to what degree differences in social and academic language performance may be due to structural language differences, pragmatic impairments, or to other disability-specific explanatory models such as central coherence and Theory of Mind in AS (Fisher, Happé, & Dunn, 2005; Paynter & Peterson, 2010; Saalasti et al., 2008), or visual-spatial deficits and broader perceptual organizational deficits in NLD (Stothers & Klein, 2010; Worling, Humphries, & Tannock, 1999). If the influence of structural language on atypical communication in AS differs in comparison to its impact in NLD, the divergence would stimulate research into linguistic markers that differentiate them. Alternatively, if the language profiles appear to be indistinguishable, systematically investigating the convergence would address nosological questions in the larger arenas of autism spectrum disorder and learning disabilities.

The clinical relevance of fundamental oral language skills has been established. Early development of spoken language predicts better outcomes for individuals with an autism spectrum disorder (Mawhood, Howlin, & Rutter, 2000; Szatmari, Byron, Boyle, Streiner, & Duku, 2003; Tidmarsh & Volkmar, 2003). Improvements in language in adults with learning