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# 25

## The language of children with autism

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### 25.1 Introduction

In its earliest clinical description (Kanner 1943), autism was characterized by marked social impairment and considerable heterogeneity in language. While eight of the eleven children with autism Kanner described eventually acquired language, the other three did not. Kanner noted that even those children who learned ‘structurally sound’ language did not use it in a communicative fashion, instead speaking in an undirected and repetitive manner. These observations of autism and the considerable variability in language skills, as well as the apparent divergence between language structure and language use within it, still ring remarkably true. In the years since Kanner’s report, research has expanded what we know about linguistic development in this population, and as larger samples and more detailed measures are employed, our characterization of language continues to advance.

Autism is a developmental disorder with a strong genetic component (Freitag 2007, Gupta & State 2007). It is currently understood to be the most severe prototypic disorder on an ‘autism spectrum’, which also includes Asperger syndrome and Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS), as well as several more rare disorders with some similar symptoms. These three most common diagnoses are the focus of this chapter and are considered together as autism spectrum disorder (ASD), an umbrella term now preferred by most autism researchers and families to the previous designation of Pervasive Developmental Disorders (World Health Organization 1992). ASD is characterized by three features: (1) impairments in social interaction; (2) impairments in communication (which includes speech); and (3) the presence of restricted

This work was supported by grants R01MH066496 from the National Institute of Mental Health and HD 35482-01 from the National Institute of Child Health and Human Development to Catherine Lord.

and repetitive interests or behaviours (American Psychiatric Association 1994. Note: the terms autism and ASD will be used interchangeably throughout this chapter to refer to this broad group of individuals). ASD is about four times more common in males than in females; current estimates of the occurrence rate of the entire spectrum of disorders are one child per 150 children (Autism and Developmental Disabilities Monitoring Network 2007).

ASD is a lifelong disorder. There is no cure, although studies have indicated that the provision of early intervention can improve outcome for some children (Harris & Handleman 2000, Turner *et al.* 2006) and a small proportion of the least impaired children and adolescents may move out of the spectrum (Lord *et al.* 2006). Early studies of language outcome indicated that as many as half of all individuals with ASD remained non-verbal into adulthood, suggesting that the absence of language was a common feature of the disorder (Bailey *et al.* 1996, Lord & Rutter 1994). However, newer reports have suggested that only about 15 to 20 per cent of individuals with ASD fail to acquire at least communicative single words by late childhood or adolescence, and at least half obtain functional, complex expressive language (Eaves & Ho 2004, Turner *et al.* 2006). This change may be related to the increasing identification of individuals who are more mildly affected than those who were diagnosed two or three decades ago (Chakrabarti & Fombonne 2005, Yeargin-Allsopp *et al.* 2003).

Language impairment or delay is not required for an ASD diagnosis. However, a progression of language impairments are associated with ASD (Tager-Flusberg 2004b). The earliest language abnormality identified is usually a delay, but for many children, it gradually becomes apparent that the language the child comes to use is unusual (Chawarska *et al.* 2007). Figure 25.1 provides some typical early language profiles of children with ASD. As an example, a two-year-old boy with ASD may not yet be speaking, but by three years of age, he may have acquired functional language as well as some repetitive speech (reciting phrases from a favourite movie). As his language emerges, unusual intonation may become evident, and he may have difficulty appropriately using pronouns, such as *I* and *you*. Not surprisingly, the mastery of language in early childhood has been positively associated with a number of skills in later childhood and beyond. Children with relatively stronger language skills early in life have higher IQ scores, social skills, adaptive skills and school ability in adolescence (Eaves & Ho 2004, Lord, Risi & Pickles 2004). Language skills at age 2 are moderately correlated with later outcome, and language at age 3 is much more strongly related (Charman *et al.* 2005), such that a child who is still experiencing a language delay at age 3 has a reduced likelihood of becoming a fluent speaker. Interestingly, if one looks back at the early years of children with ASD who *have* acquired fluent language, a history of language delay makes relatively little difference in severity of social measures later in childhood (Eisenmajer *et al.* 1998) or eventual verbal IQ (Szatmari *et al.* 1995).

<p><b>Case 1: Max</b></p> <p>When Max was 16 months old, his parents were excited to notice that their son was learning new words. However, as the months went by, they started to get worried. Max seemed only to be using certain kinds of words. He was learning the names of his two favourite kinds of things: vehicles and shapes. Max had learned twelve words for different kinds of cars and trucks, and he knew almost fifteen different shapes. He learned a few words for some other things he really wanted, like “juice” and “cookie,” but he never learned all the usual first words that his older sister had said, like “Mummy” or “hi” or “that”. Occasionally, he would ask his parents for something he wanted (like juice), but mostly he talked when he was by himself. He would recite lists of shapes when he was sitting alone, and when he saw a truck on the street, he would say “truck” without ever looking at his parents or trying to get them to pay attention too.</p>
<p><b>Case 2: Amelia</b></p> <p>Amelia’s parents were surprised that she was using phrases by the time she was 20 months old, but the more they listened to her talk, the more it seemed like something wasn’t quite right. Instead of putting words together on her own, Amelia just repeated things that she’d heard from the shows on television. While other people who heard Amelia talk were often impressed to hear such long phrases come from such a young child, her parents were more worried than pleased. Amelia would often say the same phrase over and over again in exactly the same way, and she didn’t seem to understand what it meant. Her father also noticed that when he asked her a question, like “Do you want juice?”, Amelia would just repeat the phrase “want juice?” instead of answering the question.</p>

**Figure 25.1** Early language development in children with ASD: two case studies

As just described, the acquisition of language varies widely across the autism spectrum. It is also of note that language abilities themselves are quite heterogeneous (Kjelgaard & Tager-Flusberg 2001). While the core structural features of language (i.e. phonology, syntax, grammar) have historically been assumed to be relatively intact, the ability to appropriately *use* language (i.e. pragmatics) has consistently shown impairments (Tager-Flusberg 2004b). The remainder of this chapter will summarize what is known about receptive and expressive language – in terms of structure and use – in children with ASD, starting with a description of prelinguistic development, followed by a presentation of research on early language mastery and change throughout childhood. Related research in augmentative communication and reading will be briefly addressed, and emerging bodies of research on language processing, the genetics of language and early intervention will be highlighted.

## 25.2 Early development

### 25.2.1 Prelinguistic development

It is important to begin our exploration even before speech emerges. The term ‘social communication’ refers to a set of nonverbal skills which are socially directed and intended to be communicative, including an extensive set of behaviours such as eye contact, facial expression, non-word vocalizations, gestures and shared affect. In typical development, these skills

The term 'Theory of Mind' (ToM) refers to an individual's ability to attribute mental states – such as desires, beliefs and intents – to other people. It is a set of skills which typically develops in the first several years of life and is understood to be a fundamental component of cognitive, social and language development. Many researchers have noted that children with ASD demonstrate ToM impairments and have suggested that ToM deficits are one possible explanation of the social and linguistic difficulties in ASD. For a discussion of how ToM impairments may be related to the language profile of children with ASD, see Baron-Cohen, 2000 and Walenski *et al.*, 2006.

**Figure 25.2** Theory of Mind (ToM) in children with ASD

emerge in the first months of life and are believed to be important precursors to speech (Carpenter *et al.* 1998). They are also understood to be related to other socio-cognitive attainments often implicated in discussions of ASD, most importantly the mastery of a 'Theory of Mind' (see Figure 25.2 for a brief discussion).

A growing body of research has followed infants who are at risk for developing ASD (usually younger siblings of children on the spectrum because of their increased risk for ASD; Freitag 2007) from the first months of life. These reports have indicated that by 12 months of age, many children later diagnosed with ASD show impairments in eye contact, socially directed smiling and vocalization and interest/enjoyment in engaging with other people (Bryson *et al.* 2007, Chawarska *et al.* 2007, Zwaigenbaum *et al.* 2005). Other studies – which reviewed videotapes taken when the children were infants – revealed early differences in children's tendency to look at other people (Osterling *et al.* 2002) and their ability to respond when other people call their names (Baranek 1999, Werner *et al.* 2000). Overall, these results suggest an early difficulty in orienting to social stimuli (Dawson *et al.* 2002, 2005a).

Early abnormalities are evident in emerging language as well. Canonical babbling is not clearly impaired (Sheinkopf *et al.* 2000, Werner & Dawson 2005), but it may be less frequent (Iverson & Wozniak 2007). By their first birthday, children later diagnosed with ASD have consistently been shown to have receptive and expressive language impairments (Landa & Garrett-Mayer 2006, Mitchell *et al.* 2006, Zwaigenbaum *et al.* 2005) and to be delayed in early gesture use (Bryson *et al.* 2007, Zwaigenbaum *et al.* 2005). Moreover, whereas typically developing infants have a preference for speech sounds over non-speech sounds (e.g. synthesized analogues; Vouloumanos & Werker 2007), infants later diagnosed with ASD generally do not (Klin 1992, Kuhl *et al.* 2005). For children with autism, the degree of preference is negatively related to their concurrent expressive language development (Kuhl *et al.* 2005).

### 25.2.2 Assessment of language in young children with ASD

Researchers have questioned whether standard tests of language are valid for children diagnosed with ASD, particularly those who are very young or

markedly impaired in either language or related nonverbal skills (Charman 2004, Risi *et al.* 2006). Partly, this is because children who are significantly language impaired may not be able to earn a meaningful score on some standardized tests, either because the norms do not extend to their age or because they cannot complete a sufficient number of tasks. In addition, individuals with ASD may be proficient at some things (i.e. identifying animals and reciting a script from a video) but experience profound deficits in others (i.e. answering questions or following directions). Consequently, their overall scores may be biased by a relative strength – such as single word vocabulary – or weakness, such as verb usage (Jarrold, Boucher & Russell 1997).

Tests which are designed to evaluate language in typically developing children are premised on the assumption that the child has certain other skills (such as the basic motivation to engage with the examiner). When these fundamental skills are impaired – as they are for children with ASD – results may not only reflect the child's language ability but also the child's ability to attend and engage in a social interaction. For this reason, many researchers have suggested that additional methods, like taking language samples and recruiting parent report, may be important complementary approaches (Charman 2004, Luyster *et al.* 2007b).

### 25.2.3 Trajectories of early language development

Studies have begun to explore the trajectories of language development in ASD during childhood. In general, the language skills of individuals with ASD improve over childhood (Ballaban-Gil *et al.* 1996, Lord *et al.* 2004a). However, a particularly striking path of development in ASD has been noted in a considerable minority of children who experience a *loss* of language, a developmental pattern which has not been observed in typically developing children. This 'regression' has been documented in about 25 per cent of children with ASD (Goldberg *et al.* 2003, Lord *et al.* 2004b). It is distinct from the losses observed in other developmental disorders (such as Rett syndrome) in that the language skills are usually re-acquired, and it is not accompanied by changes in motor or adaptive skill (e.g. using utensils, bladder control). Although this trajectory is unique to ASD, it is *not* unique to language. Language loss is accompanied by the loss of a number of related social communication skills, such as eye contact and social responsiveness (Goldberg *et al.* 2003, Lord *et al.* 2004b, Luyster *et al.* 2005). Regression has been associated with slightly poorer outcomes in some studies (Bernabei *et al.* 2007; Richler *et al.* 2006) but not others (Lord *et al.* 2004b, Werner *et al.* 2005).

## 25.3 Receptive language

Making a distinction between language understanding and production has been useful in identification efforts. *Receptive* language delay (as opposed to

an *expressive* language delay) is important for distinguishing between ASD and other disorders (Bartak *et al.* 1977, Lord & Paul 1997). Furthermore, in typically developing children, receptive vocabulary is in advance of expressive usage: children understand more language than they can generate (Fenson *et al.* 1994). This is also generally understood to be the case in children with ASD.

However, some results have indicated that children with ASD show less of an advantage in receptive skills than do their typically developing peers (Charman *et al.* 2003). When language scores were compared to age expectations for adults with ASD, there was a greater deficit in receptive vocabulary than in expressive vocabulary (Howlin 2003). Similarly, children with ASD demonstrated a profile in which expressive language standard scores were higher than the receptive scores; the opposite profile was observed in a group of children with specific language impairment (Lloyd *et al.* 2006). Other studies have not confirmed this profile. Neither Jarrold and colleagues (1997) nor Kjelgaard and Tager-Flusberg (2001) found any relative advantage in expressive language versus receptive language in ASD.

Studies have also explored children's understanding of the structure of language. Swensen *et al.* (2007), using a preferential looking paradigm, found that the understanding of subject-verb-object (SVO) word order preceded the production of SVO structure in two- and three-year-old children with ASD. Similar reports of intact SVO understanding have been reported by other researchers (Kelley *et al.* 2006, Paul *et al.* 1988). While children with ASD and concurrent language impairment have difficulty using sentence context to decide which meaning of a homograph is most appropriate (e.g. *bank*, which could refer either to a financial institution or the side of a river), children with ASD and average language scores perform as well as their typically developing peers (Norbury 2005).

Of late, researchers have begun to look beyond such basic characterizations of the receptive abilities of young individuals with ASD to explore the complex underlying processes of early language understanding. Theories of typical language development have invoked word learning biases (see Clark Ch.16), suggesting that children have a tendency to interpret new words in certain ways (i.e. as referring to objects rather than actions, called the 'noun bias'). Young children with ASD appear to abide by some of these biases (i.e. the noun bias, Swensen *et al.* 2007) but not others (i.e. the shape bias, Tek *et al.* 2007).

Other researchers have investigated children's understanding of how language can be used in different ways, where the focus is the intended meaning within a social context. Examples of different kinds of language use include humour, sarcasm, irony and metaphor. Understanding these different non-literal uses of words has consistently been found to be impaired in children with ASD (Happé 1994, Wang *et al.* 2006).

## 25.4 Expressive language

The study of expressive language in ASD has addressed children's ability to produce structurally correct language and their ability to use language appropriately, (the latter is considered 'pragmatics', see [section 25.4.2](#)). Given the centrality of language for the development of children with ASD, one might suppose that the field had firmly established the characterization of expressive language. In fact, the degree of language integrity and impairment is still up for discussion, partly due to inconsistent findings across projects and partly due to heterogeneity within samples.

### 25.4.1 Structural aspects of expressive language

Phonological abilities of children with ASD appear to be intact. Some studies have indicated possible phonological and articulation abnormality lingering into adolescence (Shriberg *et al.* 2001), while other studies have confirmed delay but not chronic impairment (Bartak *et al.* 1975, Kjelgaard & Tager-Flusberg 2001). The prosody and intonation of speech is often unusual in individuals with ASD (see McCann & Peppe 2003 for a review, Paul *et al.* 2005). Some children speak in an almost mechanical manner, lacking the ups and downs of normal speech. Others have the opposite problem, using intonations which are exaggerated and 'sing-songy'. In addition to abnormalities of intonation, other aberrations of speech are often reported, such as inappropriate volume or speed.

The acquisition of vocabulary is an area of some uncertainty. The lexicons of children with ASD have been reported to be comprised similarly to those of typically developing children across different word categories (e.g. nouns, predicates) (Charman *et al.* 2003, Luyster *et al.* 2007a). On the other hand, impairments have been noted in the appropriate use of emotional terms (Hobson *et al.* 1989) and deictic terms (which mark the differential reference of language between speaker and listener, such as *this* or *that*) (Lord & Paul, 1997, Tager-Flusberg 1994). A particularly salient example of deictic impairments are pronoun errors (Le Couteur *et al.* 1989); at some point in development, a high proportion of children with ASD consistently reverse their pronouns, saying 'you' for 'I' (Lee *et al.* 1994).

The question of semantics and underlying conceptual organization has also yielded varied results. In some reports, children with ASD demonstrated lexical organization similar to typically developing children (meaning that they form conceptual categories in the same way, e.g. Tager-Flusberg 1985, Ungerer & Sigman 1987). Other studies reported deficits in connectedness and depth of lexical knowledge (Dunn *et al.* 1996, Minshew *et al.* 2002). A recent study revealed differential performance of ASD children across different *kinds* of words, suggesting that impairments may be related specifically to the conceptual understanding of animate things (Kelley *et al.* 2006).

In their mastery of syntax and grammar, children with ASD generally follow a normal, albeit delayed, developmental progression (Tager-Flusberg *et al.* 1990, Waterhouse & Fein 1982). Nevertheless, some studies have suggested that they may show important differences from typically developing children in their use of morphological and syntactic terms, either in the ability to use forms correctly (Volden & Lord 1991) or in the range of produced forms (Bartolucci *et al.* 1980, Fein *et al.* 1996). One recent study indicated that the inconsistency of results may be partly due to the particular skill in question: when given a variety of standardized and experimental tests, school-aged children with ASD performed as well as their typically developing peers on most morphology and syntax tasks but showed difficulties with verb argument structure (Kelley *et al.* 2006). Verb agreement has been shown elsewhere to be an area of difficulty for children with ASD who also have receptive vocabulary deficits (Roberts *et al.* 2004b).

#### 25.4.2 Pragmatic aspects of expressive language

Perhaps the most noted language deficits of children with ASD are in the realm of pragmatics. In general, challenges in the appropriate social use of language are associated with ASD in particular, although some researchers have suggested that pragmatic impairment can also be present in children without ASD (Bishop & Norbury 2002). In the ASD population, pragmatic impairments have been observed in a variety of manifestations. A boy may repeat words or phrases that he has just heard (a behaviour called 'echolalia') or has heard in the past ('delayed echolalia'). This 'echoed' language is frequently used in an undirected repetitive fashion (though some researchers have discussed its communicative function, see Prizant & Duchan 1981). In addition, children may use stereotyped words or phrases – that is, they may say the same thing repeatedly, even if the word or phrase is used appropriately (e.g. a young child named James saying "Good job, Mr James!" every time he completes a task).

The term 'neologism' refers to the generation of a non-word (for instance, saying *bloosers* for 'bruises', or *plin* for floating pieces of paper or fabric; Volden & Lord 1991). The use of neologisms is somewhat rare; what may be more frequent is an idiosyncratic use of language, in which the child phrases things in an unusual manner (Bartak *et al.* 1975, Kanner 1943). An example of this is asking "When was it born?" (instead of "When was it made?") or referring to tears as "sad water". Interestingly, these abnormalities have been linked to concept formation, such that children's unusual use of words or phrases may indicate that they are not abiding by common concepts or accepted meanings of a word (see Volden & Lord 1991 for a discussion).

In typical development, children use language for a variety of reasons: ask a question, make a request, comment on an object or event or just chat.

Children with ASD tend to use language in a more limited manner. They are much more likely to speak in order to make a request than to share their interest in something with another person (Landry & Loveland 1989, Stone & Caro-Martinez 1990). Often, this renders individuals profoundly impaired in conversational ability. Individuals with ASD who are able to engage in reciprocal dialogue with another person generally find it difficult to move flexibly from topic to topic, often responding inappropriately to the cues of others (Tager-Flusberg & Anderson 1991, Volden 2004). A child with ASD who was particularly interested in bus schedules might be capable of maintaining a simple discussion about local public transportation but would have a difficult time following the conversation if the topic changed to the price of gasoline and its effect on public transportation.

Rigidity in language use is demonstrated in other ways as well. Some individuals engage in verbal rituals, in which either they feel a need to say something in a certain way or demand that their social partner provide a particular verbal response (Le Couteur *et al.* 1989). For instance, a child might recite a favourite scene from a television show and, if interrupted, start over again until he completes the entire script. Alternatively, a young girl might repeatedly ask her father “Does the elevator go up or down?” until her father answers, “The elevator goes down.”

One very important aspect of language in typically developing children is its integration with other nonverbal communication skills, such as gaze, facial expression and gestures. This too is an area of difficulty for children with ASD, as discussed in section 25.2.1. As children with ASD age, deficits become clear in other, more complex nonverbal behaviours, such as using ‘beat’ gestures while speaking and nodding or shaking one’s head to indicate engagement with one’s conversational partner (Garcia-Perez *et al.* 2007).

## 25.5 Issues related to language development

As discussed above, a minority of children with ASD remain nonverbal into adolescence, and these children require assistance in order to communicate. Augmentative and alternative communication (AAC) systems have been developed to meet this need. A recent meta-analysis of AAC on speech production (for individuals with ASD as well as other developmental disabilities) reported that, overall, AAC programmes appear to be successful in increasing expressive language (Millar *et al.* 2006). Perhaps the best-known AAC system is the Picture Exchange Communication System (PECS), which requires the child to hand a picture to a recipient in order to make a request, and there is some emerging evidence that PECS may be particularly valuable in increasing communication use (Howlin *et al.* 2007, Yoder & Stone 2006).

Reading ability in children with ASD has not yet been extensively researched. Results suggest – as in other areas of language ability – considerable heterogeneity across individuals. For instance, a recent study of children with ASD between 6 and 15 years of age reported that nine children (about 22 per cent) were unable to read at all (Nation *et al.* 2006). For those children who do master some reading skills, studies have fairly consistently reported that decoding skills (that is, deciphering unfamiliar words) exceed comprehension skills (Minschew *et al.* 1994, Whitehouse & Harris 1984).

## 25.6 Emerging areas of research in language development

A particularly relevant approach for our knowledge of language and language processing in ASD is neuro-imaging. Results from these endeavours suggest that individuals with ASD may have atypical associations between language and brain structure and function, characterized by diminished left hemisphere lateralization (the left hemisphere is associated with language processing in typically developing individuals) and increased association with the right hemisphere (e.g. Bigler *et al.* 2007, Boddaert *et al.* 2003). These findings suggest the failure of the left hemisphere to ‘specialize’ in language the way that it does in typical development (Dick *et al.* 2007), resulting in a less integrated and efficient neural network; this observation is similar to others noted in electrophysiological studies addressing the ability of children with ASD to process faces (see Dawson *et al.* 2005b for a review).

A second emerging body of research has to do with exploring genetic differences. It has become increasingly clear that ASD has a strong genetic component, and investigators are currently exploring the ways in which the genetic profile of ASD may be related to the behavioural profile of ASD. Studies have explored whether associations of ASD with specific genetic regions are increased for children who have autism *and* language delay. Results have been somewhat inconsistent, but some promising linkages have been reported both with age of language acquisition (Alarcon *et al.* 2002, Schellenberg *et al.* 2006) and the pattern of developmental regression (Molloy *et al.* 2005, Schellenberg *et al.* 2006). Further research will be required in order to explore observed associations between language development and other confounding factors, such as IQ, age and autism severity (Hus *et al.* 2007). These associations make replication difficult and cloud the relationship between language itself and underlying genetic profiles.

Finally, with the growing numbers of children diagnosed with ASD and the increasing demands on families, schools, and communities to provide long-term support, considerable attention has been paid to providing

high-quality intervention services. Because of the evidence that early language mastery is associated with positive outcomes, intervention programmes often primarily emphasize children's verbal development. The provision of intervention services varies widely, although speech and language therapy is most commonly sought (Thomas *et al.* 2007). Research has indicated that individuals with ASD who receive intensive intervention early in childhood have better language than their peers who did not receive such services (Harris & Handleman 2000, Turner *et al.* 2006). It remains unclear whether there are certain intervention approaches that work better than others (see Goldstein 2002 for a review). Moreover, while large effects of intervention were initially claimed (Lovaas 1987), recent reports have suggested that the influence is much more modest, though still meaningful (Eikeseth *et al.* 2007, Kasari *et al.* 2006).

## 25.7 Conclusions

There remain challenges ahead for the study of language in children with ASD. Despite having been widely studied, language in ASD does not yet have a generally accepted standardized measure. Currently, there are a range of tests (primarily normed on typically developing children) which are commonly used but which present a number of difficulties, as discussed above (see section 25.2.2). With the growing numbers of children with ASD and the increasing need for appropriate standardized measures, many researchers have begun to tailor tests for this population and then work to establish basic psychometric properties. Measuring language (especially expressive) in children with ASD can be particularly difficult because of the inconsistency of language use across situations. Ideally, it would be possible to find a reliable and meaningful set of behaviours which has concurrent validity and also provides unique information about language development. Formalizing these behaviours as part of an ASD-specific language assessment would support efforts to clarify a number of the observed discrepancies in the literature.

Furthermore, the varied observations of language and social impairment in ASD have led many diagnosticians to contemplate the ways in which language, nonverbal communication and social interaction are intertwined. We are now beginning to consider the notion that the building blocks of language are separable from communication but communication is not separable from social interaction, as evidenced by indications that behaviours such as social imitation and play load onto social *and* communication factors (Bishop 1998, Lecavalier *et al.* 2006). There is a movement in the field to restructure the formal diagnostic guidelines to reflect this new conception of ASD. Whereas there are currently three required domains of symptomatology outlined in the *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition* (DSM-IV; American Psychiatric Association 1994),

the upcoming revision is anticipated to outline two core features, both of which have been established in the literature (Gotham *et al.* 2007, Lecavalier *et al.* 2006): social communication and repetitive behaviours. According to the updated criteria, these two features may have associated impairments in nonverbal IQ and language. The shift of language impairment from a required to a possible symptom is largely the result of the many observations discussed throughout this chapter: language impairment is not specific to or universal throughout ASD, so it is less useful as a defining feature. Nevertheless, along with nonverbal IQ, language characteristics are central to both the diagnostic process and treatment planning. As we continue to study the language skills of individuals with ASD, it will be important to include well-matched comparison samples in order to clarify whether there are certain abnormalities (e.g. verbal rituals) which *are* unique to ASD. These new discoveries can, in turn, inform the refinement of diagnostic frameworks and enrich our understanding of ASD itself.

### Suggestions for further reading

- Charman, T., & Stone, W. (Eds.). (2006). *Social and Communication Development in Autism Spectrum Disorders: Early Identification, Diagnosis, and Intervention*. New York: Guilford Press.
- Paul, R. (2006). *Language Disorders from Infancy Through Adolescence: Assessment and Intervention* (3rd edn.). St. Louis, MO: Mosby.
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