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Understanding the Language and Communicative Impairments in Autism

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Understanding the Language and Communicative Impairments in Autism

1.0 Introduction

One of the key diagnostic features of autism includes “qualitative impairments in communication” (APA, 1994, p. 70). By definition children with autism show delays and deficits in the acquisition of language, which range from the almost complete absence of functional communication, to adequate linguistic knowledge but impairments in the use of that knowledge in conversation or other discourse contexts. Over the past several decades there has been a considerable number of descriptive studies on the nature of the language impairment in autism (see Lord & Paul 1997; Tager-Flusberg, 1996, Wilkinson, 1998 for recent reviews). These studies all focus on verbal children with autism, though it is important to note that about half the population never acquire functional language (Bailey, Phillips & Rutter, 1996). In this chapter I provide a summary of research on language and communication in children with autism, with particular emphasis on a developmental perspective and the links between areas of language impairment and other core features of deficit that define the disorder of autism.

1.1 Language impairment in autism

Parents of children with autism often report that the first sign of a problem with their child was either the absence of language, or the loss of the language that had begun to develop in the second year of life (Kurita, 1985; Lord & Paul, 1997). Sometimes the initial concern may be that the child is deaf because children with autism may be unresponsive to the voices and speech of others in their environment, including their parents (Ornitz & Ritvo, 1976). In retrospect, many parents recollect that even during the first twelve months, their infants were not very responsive to adult contact, did not

engage in turn-taking games, and failed to develop joint attention – the ability to share interest in an object with another person (Volkmar, Carter, Grossman, & Klin, 1997). By their first birthday, many infants who later receive the diagnosis of autism do not respond to their own name and fail to make eye contact (Osterling & Dawson, 1994). By the end of the second year, almost all toddlers with autism still have no functional language, and are extremely limited in their nonverbal communication with others, perhaps only engaging another person to fulfill requests using a pointing gesture or taking their hand to the location of a desired object (Stone, 1997). They also do not engage in any symbolic play by using one object, such as a stick to represent something such as a snake in a play context. To some extent, we can see that the primary social deficits in autism set the developmental course for deficits in language and communication. Children with autism do not know how to interact with others at any level or by any means, including language.

Nevertheless some children with autism, usually those who are less severely impaired overall, do increase the frequency of their communicative attempts and begin acquiring language before their fifth birthday. Indeed, acquiring some functional language by the age of five has been found to be the most powerful predictor of a more positive outcome in autism (Rutter, 1970; Ventner, Lord & Schopler, 1992). This group of verbal children has been studied extensively in recent years by researchers using a variety of methodological approaches. The findings from many studies of children with autism have provided a general picture of the patterns of relatively spared and impaired capacities, as well as clinical descriptions of the most striking characteristics of autistic language. At the same time it is important to note that because children with autism have

not been compared to many other populations (usually only Down syndrome or specific language impairment) we need to be cautious in how we interpret the available studies with respect to unique and specific characteristics of language in autism.

1.2 Clinical features of language in autism

Kanner (1943, 1946) was the first to note that children with autism would often simply echo the words, phrases, or sentences spoken by others. This classical feature of autistic language, known as “echolalia,” is most typical of children who have very little productive language (McEvoy, Loveland & Landry, 1988). Echolalic speech often retains the exact words and intonation used by others either immediately or after some time. It is now viewed as having some functional value for children with autism. Echolalia may help children with autism to maintain some role in the ongoing discourse even when they either do not understand or have not yet acquired either the pragmatic or linguistic skills needed to respond more appropriately (Prizant & Duchan, 1981; Tager-Flusberg & Calkins, 1990). Kanner (1946) also noted the tendency of the child with autism to use words with special or unique meanings, not shared by others. The use of idiosyncratic lexical terms, or “neologisms,” has been found even in higher functioning children and adults with autism (Volden & Lord, 1991) suggesting that it does not mark a developmental stage in acquisition.

Another striking feature of the use of language in children with autism is their reversal of pronouns – referring to themselves as “you” and their conversational partner as “I.” Although reversing personal pronouns is not unique to autism, it does occur more frequently in this group than in any other population (Lee, Hobson, & Chiat, 1994) and pronoun reversal errors are viewed as important in the diagnosis of this disorder (APA,

1994; Le Couteur et al., 1989). They reflect difficulties in conceptualizing the notion of self and other as it is embedded in shifting discourse roles between speaker and listener (Lee et al., 1994; Tager-Flusberg, 1993, 1994).

Autism has been identified as a language disorder that, at its core, involves pragmatic impairments – the ability to use language effectively in social contexts (Baltaxe, 1977; Lord & Paul, 1997; Tager-Flusberg, 1981). Children with autism can be unresponsive to the conversational initiations of others (Stone & Caro-Martinez, 1990). This has led many to question whether autism involves particular difficulties in comprehension (Paul & Cohen, 1984a), though this has proven difficult to investigate using standard methods. Even when children with autism do engage and respond to others, they may offer little to the ongoing discourse, have difficulty sustaining the conversational topic, or offer irrelevant comments (Tager-Flusberg & Anderson, 1991). These discourse deficits are seen as central to the defining characteristics of autism (Tager-Flusberg, 1996).

All these features of language in autism – echolalia, neologisms, pronoun reversals, and pragmatic impairment – make it difficult to investigate language acquisition in this population. Indeed, they have led some researchers to question whether children with autism develop language following the same pathways, and using the same underlying mechanisms as do typically developing children or other children with delayed or deficient language (e.g., Simon, 1975). Nevertheless, over the past two decades, psycholinguistic approaches have led to important advances in the study of language in children with autism.

2.0 A psycholinguistic perspective on language in autism

2.1 A model of language acquisition

At the simplest level, for example from the perspective of a traditional behavioral approach, one might propose that language acquisition depends on some general purpose learning mechanism (i.e., not devoted specifically to language, but for learning all kinds of information). This mechanism might process carefully modified language input, and use corrective feedback to shape the child's developing linguistic system. Research from the field of developmental psycholinguistics has shown that this simple model does not explain the empirical data. Instead, we know that language is far more complex and, at a theoretical level, poses serious learnability problems(cf. Pinker, 1979; 1984). Simply put, it has been shown that this kind of behavioral model in which there are no predetermined constraints define what is to be learned, namely language, could never acquire language. Furthermore, from studies of acquisition in a wide range of language communities we now know that not all children do receive modified linguistic input that might provide implicit language lessons (e.g., Ochs & Schieffelin, 1984; Pye, 1986), nor do children receive the kind of corrective feedback that would be necessary for the kind of model we have described here (Brown & Hanlon, 1970; Marcus, 1993). Language acquisition cannot be explained by the operation of a single general learning mechanism.

An alternative to this simple model is one in which several distinct processing mechanisms form the foundation for the acquisition of language. Language acquisition is one of the most significant developments, because it represents the *integration* of developments in three domains: conceptual, linguistic, and social. The child's conceptual system, which emerges in the first year of life, is the foundation on which lexical and semantic (or meaning) developments are built. The more formal aspects of

language, which include phonology, or the speech sound system, and syntax or the grammatical system, depend on separate computational mechanisms that are specific to the domain of language. Finally, pragmatics, or the use of language as a communicative system in different contexts, builds on developments in the social domain. Each of these systems processes different types of information from the environment. The conceptual system processes input about the physical world; the linguistic system operates on the input language; while the social system processes information about other persons. Language acquisition is made possible not through the independent operation of any of these systems, but through their *interaction* throughout the course of development (for further discussion of this kind of model see: Bloom & Lahey, 1978; Locke, 1994; Tager-Flusberg, 1997, 1999). We now turn to a review of developments in each of these language domains in children with autism.

2.2 Vocal and phonological development

Because autism is never diagnosed during infancy, there are no studies of early vocal development in this population. Nothing is known about the onset of babbling in infants with autism, in contrast to the research that has been done on other disorders. Thus we do not know whether babbling is delayed in this population, or whether infants with autism go through similar stages in the development of vocalization, prior to the onset of speech. Children with autism have been reported to vocalize less during early childhood, although the evidence for this is not strong (Lord & Paul, 1997).

There have been a few studies of phonological development in this population, however the evidence is somewhat mixed. Some controlled studies of children with autism report that their phonological skills are relatively unimpaired, and may even be precocious

(Bartolucci & Pierce, 1977). Yet Bartak, Rutter & Cox (1975) found that articulation development was slower than normal and that children with autism do make speech errors. According to these detailed studies, phonological errors produced by children with autism are similar to those reported in the literature on typical development (e.g., substituting a /w/ sound for /l/), suggesting delayed but not deviant development in this linguistic domain (Bartolucci, Pierce, Streiner, & Eppel, 1976). By middle childhood, as in typically developing children, children with autism who develop functional language generally have mature phonological systems; however, there are reports of a relatively small number of high functioning children with autism who continue to have extraordinary difficulty producing intelligible speech (Lord and Paul, 1997). Little is known about these children since they are typically not included in systematic studies.

Clinical documentation of suprasegmental aspects of the speech of children with autism (which refers to the pitch, timing, and stress patterns) have described their voice quality and intonation patterns as strikingly atypical and these problems appear to persist through adulthood. They can be found among both high and low functioning children with autism (Pronovost, Wakstein, & Wakstein, 1966; Simmons & Baltaxe, 1975). A variety of prosodic features has been noted, including monotonous speech, which may in part reflect difficulties expressing affect (Lord & Rutter, 1994). Other children appear to have a more melodious singsong pattern of speech (Fay & Schuler, 1980), but it is equally devoid of communicating emotion or intent. Atypical pitch patterns have also been documented in some children including unusually high fundamental frequency levels (Pronovost et al., 1966), and problems with both volume and voice (such as hoarseness, or hypernasality) have also been reported (Lord & Paul, 1997).

Despite the fact that these atypical speech patterns are very common and appear across the full range of the autistic spectrum, very little systematic research has been conducted into this abnormality that is usually associated with exclusively with autism, but may also be found in other populations. The explanation for these diverse speech characteristics remains obscure. Some have suggested that they reflect the pragmatic and social-affective deficits that are central to the syndrome of autism (e.g., Lord & Rutter, 1994; Tager-Flusberg, 1996). Interestingly, they are among the earliest symptoms to appear. Studies have found that mothers of pre-linguistic toddlers and children with autism have particular difficulty interpreting the meanings conveyed by vocalizations produced by other children with autism, although they can understand their own children's messages (Ricks & Wing, 1976; Lord & Paul, 1997). This is clearly an important area of research but so far the empirical work has been very limited in scope.

Prosodic deficits may also be related to difficulties in planning and producing complex utterances that require the integration of phonological, morphosyntactic, semantic and discourse-level information. Abnormalities in speech and voice may reflect the fact that infants with autism pay so little attention to the speech of others in their environment, and unlike other children are not concerned about matching their social surroundings.

2.3 Lexical-semantic development

Several researchers have hypothesized that autism is characterized by a fundamental inability to form concepts and extend word meanings even for concrete nouns (Menyuk, 1978). Thus, it has been suggested that children with autism may learn to label their particular cup with the correct word, but not use "cup" to refer to other exemplars they encounter, similar to their difficulties generalizing other learned skills in novel contexts.

This proposal was used to account for the idiosyncratic use of words and phrases that had been reported in the clinical literature, as well as other behavioral and social features that define autism. However, experimental studies with children with autism, matched on verbal mental age to children with retardation and typically developing children, found no support for this hypothesis (Boucher, 1988; Tager-Flusberg, 1985a). Children with autism were no different from matched control groups in their organization and representation of object concepts within taxonomic hierarchies (e.g., spaniel-dog- animal). The children with autism and mental retardation recognized the same kinds of systematic and well structured relationships among pictures of objects as do typically developing children at both basic (e.g., *car, chair, dog*) and superordinate (e.g., *vehicle, furniture, animal*) levels. For all the participants in this study, basic level concepts were psychologically more salient than superordinate or subordinate (e.g. *Mercedes, stool, spaniel*) levels, confirming the kinds of universal constraints that operate on conceptual representation. Furthermore, in looking at word meanings in both comprehension and production, the children with autism had no difficulty extending words to a range of different exemplars (e.g., referring to novel pictures of a dachshund, collie, and Labrador all as “dog”), and their extensions were based on a prototype organization of their semantic concepts (Tager-Flusberg, 1985b, 1986).

These findings suggest that for the child with autism, word meanings are acquired in a highly systematic and constrained way. The data are consistent with the view that lexical development in autism, as in typically developing and other children with developmental disorders, is constrained by a set of developmental operating principles (Golinkoff, Mervis, & Hirsh-Pasek, 1994). However there have not been the same kinds of systematic studies of the *process* of lexical development in autism (for example by teaching

new words), as has been conducted for other populations. Data from naturalistic longitudinal data (Tager-Flusberg et al., 1990) and standardized measures such as the Peabody Picture Vocabulary Test (PPVT) suggest that vocabulary development can be an area of relative strength for individuals with autism (e.g., Kjelgaard & Tager-Flusberg, 1999; Tsai & Beisler, 1984). Some people with autism have been found to score well above the mean on the PPVT, indicating an unusually rich knowledge of words (Fein & Waterhouse, 1979).

At the same time, it appears that certain classes of words may be under-represented in the vocabularies of children with autism. For example, Tager-Flusberg (1992) found that the children in her longitudinal study used hardly any mental state terms, particularly terms for cognitive states (e.g., *know*, *think*, *remember*, *pretend*). These findings were replicated in research including older children with autism (Storoschuk, Lord, & Jaedicke, 1995; Tager-Flusberg & Sullivan, 1994). Other studies suggest that children with autism have particular difficulties understanding social-emotional terms as measured on vocabulary tests such as the PPVT (Eskes, Bryson, & McCormick, 1990; Hobson & Lee, 1989; van Lancker, Cornelius, & Needleman, 1991). Thus, while overall lexical knowledge may be a relative strength in autism, the acquisition of words that map onto mental state concepts may be specifically impaired in this disorder.

There is wide variation in lexical use among individuals with autism, even among those who acquire functional language. For example, individuals with autism often misuse words and phrases producing idiosyncratic terms and neologisms (Volden & Lord, 1991) or metaphorical language as Kanner (1946) described it. Rutter (1987) suggests that these abnormal uses of words may be functionally similar to the kinds of early word meaning

errors made by young typically developing children. It is their persistence in autism which defines them as abnormal and they may reflect the fact that children with autism are not sensitive to the corrective feedback provided by their parents because of their social impairments.

2.3 Grammatical development

Only a few studies have systematically investigated grammatical aspects of language acquisition in autism. The longitudinal study of six boys with autism conducted by Tager-Flusberg and her colleagues found that these children followed the same developmental path as comparison children with Down syndrome who were part of the study, and to typically developing children drawn from the extant literature (Tager-Flusberg et al., 1990). Both groups of children showed similar growth curves in the length of their utterances (MLU), which is usually taken as a hallmark measure of grammatical development. Not surprisingly, however, for most of the children the rate of growth was slower than in typically developing children. The children with autism and Down syndrome acquired grammatical structures in the same order as typically developing children; the order of acquisition of syntactic and morphological aspects of language is determined by linguistic complexity.

To test whether MLU in the children with autism reflects the same level of grammatical knowledge as in other groups of children, Scarborough and her colleagues compared the relationship between MLU and Index of Productive Syntax (IPSyn; a measure of use of different grammatical structures) scores, using the data from Tager-Flusberg et al.'s (1990) longitudinal study (Scarborough, Rescorla, Tager-Flusberg, Fowler & Sudhalter, 1991). The main findings were that at higher MLU levels, MLU tended to

significantly overestimate IPSyn scores for the children with autism. Scarborough et al. (1991) suggest that for the children with autism the limited growth in IPSyn reflects the tendency of these children to make use of a narrower range of constructions and to ask fewer questions, which accounts for a significant portion of the IPSyn score.

Despite the similarity in developmental patterns reported by Tager-Flusberg et al. (1990), some researchers have argued that developmental processes might be different in autism. Prizant (1983) proposed that children with autism are especially dependent on the gestalt or holistic approach to acquiring language (cf. Peters, 1983). The primary evidence cited for the use of gestalt processes in the acquisition of grammar is reliance on imitation, repetitions, and formulaic routines. Because children with autism are known to be highly imitative (or echolalic), Prizant (1983) and others have argued that imitation is a crucial process in language acquisition, particularly grammatical development, for this population.

Tager-Flusberg and Calkins (1990) investigated whether variations in levels of imitation were tied to differences in the process by which grammar was acquired in autism, when compared to language matched groups of typically developing children and young children with Down syndrome. As predicted, the children with autism at the early stages of language development produced the most echolalic, repetitive and formulaic speech. For all children, imitation and formulaic speech declined quite rapidly over the course of development. In order to investigate whether the more imitative children with autism were using imitation as a means for acquiring new grammatical knowledge, Tager-Flusberg and Calkins compared imitative and non-imitative spontaneous speech drawn from the same language sample, for length of utterances using MLU, and for the complexity of grammatical constructions using IPSyn. If imitation is important in the acquisition of

grammatical knowledge, then length and grammatical complexity should be more advanced in imitation than in spontaneous speech produced at the same developmental point. This hypothesis was not confirmed for any of the children in this study. On the contrary, across all language samples, spontaneous utterances were significantly longer and included more advanced grammatical constructions. These findings suggest that imitation is not an important process in facilitating grammatical development in autism, though it clearly reflects a different conversational style, and plays an important role in children's communication with others, especially when they have very limited linguistic knowledge.

Studies of grammatical knowledge in children with autism have generally concluded that this domain of language is not specifically impaired in autism (Bartak, Rutter, & Cox, 1975; Jarrold, Boucher, & Russell, 1997; Pierce & Bartolucci, 1977). It is still not known whether individuals with autism have subtle impairments in the acquisition of more complex syntactic constructions, since few studies have addressed this issue in older individuals with autism. Paul and Cohen (1984a) concluded from their study of adults with autism that grammatical development eventually reaches a plateau in at least some individuals. Lord and Pickles (1996) also argue that it is likely that lags in development that are found in older children with autism are more severe than those in other groups of children with comparable delays in early childhood. It is evident that there is considerable heterogeneity in the autism population in grammatical development and level of achievement. In one recent study of 80 children with autism Kjelgaard and Tager-Flusberg (1999) found that even among the group that had nonverbal IQ scores in the normal range, about 25% scored in the normal range on standardized measures of grammatical ability while another 25% scored more than two standard deviations below the

mean. Clearly more studies are needed that follow language acquisition in older children and adolescents with autism in order to provide a more complete developmental picture in this domain of language.

2.4 Pragmatic development

Prelinguistic social-communicative development in infants with autism offers a striking contrast to other groups of atypical children. While some infants, who are later diagnosed autistic, apparently enjoy a normal and happy first year of life, others show obvious deficits, almost from birth. These infants with autism are described as showing little or no interest in people and some parents report, retrospectively, that it was difficult to maintain eye contact or engage in interaction with their babies (Ornitz, Guthrie & Farley, 1977). In contrast to typically developing infants, prelinguistic toddlers with autism show no preference to listen to their own mothers' speech (Klin, 1991) and may have idiosyncratic means of conveying different needs, which other people find difficult to interpret (Ricks & Wing, 1976). Thus, the severe social deficits that are at the core of autism have a profound impact on the social interactions of young children with autism.

These deficits culminate in their well-documented problems in non-verbal communication (Mundy, Sigman, Ungerer & Sherman, 1986; Mundy, Sigman, & Kasari, 1990, 1993). Studies of non-verbal intentional communication (including gestures or vocalizations) in children with autism consistently show that while they do produce and understand protoimperative requests, protodeclarative comments, which are used to share interest in an object, or direct attention to an event, are virtually absent (Baron-Cohen, 1989; Curcio, 1978; Mundy, Sigman, & Kasari, 1994; Wetherby, 1986). Longitudinal

studies of young children with autism suggest that these early deficits in protodeclarative communication are correlated with later language development (Mundy et al., 1990).

As toddlers moves on toward the onset of spoken language it is clear that communication with others provides one of the key motivations for learning language. Early researchers claimed that children with autism, when they talk, do not use language to communicate with others, particularly when most of their speech is echolalic (e.g., Carr, Schreibman, & Lovaas, 1975). This extreme view, however, has since been dispelled, and we now appreciate that children with autism do use language communicatively. However, the forms that they use (such as echolalia or repetitive phrases) and the functions they serve are more limited compared to either typically developing or other children with developmental disorders (Prizant & Duchan, 1981; Shapiro, 1977).

Wetherby and Prutting (1984) examined the range of speech acts that were expressed by children with autism in both gestural and spoken language at early stages of development, in comparison to language-matched typically developing children. They found that the children with autism were not significantly different from younger controls in their use of language for requests for objects or actions, protests, and self-regulation (e.g., *Don't do that*). Yet certain speech acts were apparently completely absent. These included comments, showing off, acknowledging the listener, and requesting information. Children with autism may sometimes spontaneously label objects but because these utterances are not socially directed, they are not coded as comments, even though they might actually function as such from the child's perspective. These findings are consistent with several other studies. For example, Ball (1978) found that children with autism only used declarative sentences that were direct responses to questions; they did not otherwise

make declarative statements or comments. Loveland and her colleagues found that, compared to children with specific language impairment, children with autism used fewer affirming or agreement utterances (Loveland, Landry, Hughes, Hall & McEvoy, 1988). And Rollins (1994) showed that, in comparison to children with Down syndrome, children with autism rarely communicated about an object that was the focus of their mothers' attention. The speech acts missing from the conversations of children with autism all have in common an emphasis on social rather than regulatory uses of language (Wetherby, 1986). Children with autism who in the prelinguistic stage exhibit serious deficits in non-verbal communication, continue to show language deficits at the level of speech act usage.

One study has explored the development of conversational skills in young children with autism. In a longitudinal study of six children with autism and six language (MLU) and age matched children with Down syndrome, no differences were found in their relatively high rates of turn-taking (Tager-Flusberg & Anderson, 1991). At least this low-level conversational skill is not specifically impaired in autism. As typically developing children's linguistic knowledge advances, they become more competent at maintaining the ongoing topic of conversation over an increasing number of turns (Bloom, Rocissano & Hood, 1976; Brown, 1980). The primary means for maintaining a conversational topic at more advanced language levels (MLU over 3.0) is to add new information to the ongoing discourse. Tager-Flusberg and Anderson (1991) reported significant differences between children with Down syndrome and autism in their ability to maintain conversational topic. The children with autism often did not respond in a topic-related way to their mothers; instead they would introduce irrelevant or repetitive comments. Even when the children with autism did respond on the same topic, they did not develop the capacity to expand or

elaborate on the information provided by their mothers. These deficits in conversational ability in autism continue through childhood and adolescence (Capps, Kehres, & Sigman, 1998).

There have also been a number of studies investigating more advanced discourse skills, specifically narrative skills, in higher functioning children with autism. Narratives provide rich information about children's developing linguistic, cognitive, and social knowledge (e.g., Bamberg, & Damrad-Frye, 1991; Britton & Pellegrini, 1990). Baron-Cohen, Leslie and Frith (1986) asked children with autism to narrate stories using series of pictures depicting physical causation, behavioral and mental causation (false belief) stories that they had previously sequenced. Only half the children with autism and Down syndrome in this study were in fact able to tell any stories in this context. The stories that were produced were coded only for the presence of mental state language. The children with autism were significantly worse than the matched children with Down syndrome and typically developing children in using mental state terms to explain the false belief stories.

A more detailed study was conducted by Loveland and her colleagues, who asked individuals with autism and Down syndrome, matched on chronological and verbal mental age, to retell the story they were shown in the form of a puppet show or video sketch (Loveland, McEvoy, Tunali, & Kelley, 1990). Compared to the controls, the children with autism were more likely to exhibit pragmatic violations including bizarre or inappropriate utterances and were less able to take into consideration the listener's needs. Some of the participants in this study with autism even failed to understand the story as a representation of meaningful events, suggesting that they lacked a cultural perspective underlying narrative (Bruner & Feldman, 1993; Loveland & Tunali, 1993).

Tager-Flusberg (1995) compared the stories narrated from a wordless picture book by ten children with autism, and ten verbal mental age matched children with mental retardation and unimpaired children. Overall, the children with autism produced significantly shorter and more impoverished stories. As in Loveland et al.'s study, a small number of children with autism did not interpret the picture book as a narrative sequence of events and therefore failed to produce more than simple independent descriptions of each page in the book. Another significant group difference was found in this study: not one of the participants with autism included in their narratives any causal explanations for the events in the stories. Not only did the participants with autism not use mentalistic explanations (as found by Baron-Cohen et al., 1986), they also failed to provide physical causal explanations, suggesting that they had quite fundamental impairments in viewing behavior and action within a causal-explanatory framework.

The research on narrative deficits in individuals with autism suggests that some of their difficulty may lie in their inability to consider their listener's need and current level of knowledge. For example, individuals with autism perform significantly worse than controls on referential communication tasks, in which they have to communicate about something only they know to a listener (Loveland, Tunali, Kelley, & McEvoy, 1989). They have trouble responding to requests for clarification by providing additional information (Paul & Cohen, 1984b). They also have difficulty judging the amount of information that needs to be included for effective communication, which Grice (1975), who described a series of obligations (or "maxims") that speakers must adhere to, as the maxim of quantity (Surian, Baron-Cohen & Van der Lely, 1996). These deficits in conversational discourse and narrative, which persist in older and higher-functioning

individuals, appear to be closely linked to social impairments that are at the core of the disorder of autism.

3.0 Relating language and communication to social deficits in autism

Delays and deficits in acquiring language are among the core features of autism. There is enormous variation in this domain, ranging from no functional language and very limited communicative ability to performance in the high normal range on standardized language measures (Kjelgaard & Tager-Flusberg, 1999). Nevertheless, across the spectrum of autism a particular profile of language functioning does emerge from the studies reviewed here. Looking at the profile across language domains, and comparing autism to other populations, there is relative sparing in the development of phonological, lexical-semantic, and grammatical aspects of language. In contrast, communicative and pragmatic skills are uniquely and specifically impaired. Thus, returning to the model of language acquisition presented earlier, we see that autism primarily involves impairments to one of the three processing mechanisms that contribute to language acquisition: pragmatics, which build on developments in the social domain.

The deficits in pragmatics and communication seem closely linked to non-verbal social deficits that are core features of autism. One theoretical account has been proposed that integrates deficits in these domains: the theory of mind hypothesis of autism (Baron-Cohen, Leslie & Frith, 1985; Baron-Cohen, Tager-Flusberg, & Cohen, 1993). On this view, autism involves unique difficulty in interpreting people's behavior as causally linked to mental states. Individuals with autism fail tasks that tap their understanding of minds and mental states such as belief, knowledge, and emotion (Baron-Cohen, 1993; Hobson,

1993). They fail to appreciate the mentalistic nature of other people, which is at the core of their social impairments (Happé, 1994).

The theory of mind hypothesis of autism provides an important way for linking deficits in social ability and language. While some rudimentary aspects of communication, such as turn-taking skills and requesting behavior or regulatory speech acts do not entail viewing people as mental beings, other aspects of verbal and non-verbal communication do. It is precisely in these latter aspects of language and communication that impairments are found in autism.

3.1 Joint attention and language development

The earliest manifestations of communicative impairment in autism may be found in selective deficits that reflect a lack of understanding of mind. As noted earlier, studies have shown a selective paucity of protodeclarative communicative gestures in both preverbal and older verbal children with autism (Baron-Cohen, 1989; Mundy et al., 1986; Wetherby, 1986). Unlike protoimperatives, which may only involve an expression of the child's needs, protodeclaratives critically involve joint attention (sharing with another person interest in an object or event) and entail an incipient understanding of intentionality or goal-directedness in the behavior of others, both of which are profoundly impaired in young children with autism (Loveland & Landry, 1986; Mundy, Sigman & Kasari, 1994).

At the earliest stages, it is likely that theory of mind is an important precursor to the onset and progress in language acquisition. Research on the relationship between joint attention and language development demonstrates that for children with autism, as well as for other groups of children, there are strong developmental connections between

these domains (Carpenter, Nagell & Tomasello, 1998; Loveland & Landry, 1986; Mundy et al., 1994). The clearest evidence comes from Sigman and Ruskin's (1999) longitudinal study, in which they found that responses to bids for joint attention by toddlers and preschoolers with autism, predicted language gains several years later, particularly on measures of expressive language. This relationship between joint attention and later language was evident even after the effects of IQ were taken into account and provides strong support for the view that joint attention is a crucial precursor of language acquisition in autism. Joint attention is considered to be one of the earliest manifestations of theory of mind development (Baron-Cohen, 1995; Tomasello, 1995), emerging at the end of the first year. The ability to share attention with others entails the implicit understanding that people are intentional agents. To acquire language the child must interpret the words and communicative gestures of others as intentional acts; indeed early word learning depends on this interpretation, especially in contexts of ostensive definition (cf. Baldwin, 1993, 1995). Deficits in joint attention in autism may thus be causally linked to and explain the significant delays in language acquisition that are the hallmark of this disorder (Baron-Cohen, Baldwin, & Crowson, 1997).

3.2 Theory of mind abilities and language

Pragmatic aspects of language development are closely tied to developments in children's theory of mind, particularly their mentalistic understanding of intentions and other mental states (Locke, 1994; Tager-Flusberg, 1993). Given the known deficits in theory of mind that characterize autism, it is not surprising that researchers have identified pragmatics as the aspect of language that is most seriously impaired in autism (Baltaxe, 1977; Tager-Flusberg, 1981). It has been argued that these deficits reflect their

fundamental impairment in the ability to process information about others' mental states (e.g., Baron-Cohen, 1988; Tager-Flusberg, 1993). The relationship between language and theory of mind in autism has been discussed primarily from a theoretical perspective (e.g., Tager-Flusberg, 1993, 1996, 1997), however it should be noted that there are very few studies that have directly assessed the relationship between these domains.

Studies of lexical knowledge, reviewed above, suggest that children with autism are selectively impaired in acquiring terms that refer to mental states (e.g., Hobson & Lee, 1989; Tager-Flusberg, 1992). These findings fit extremely well with the theory of mind interpretation of language deficits in autism. Other studies have shown that in autism the acquisition of grammar, which may be relatively spared, is quite dissociated from the developmental of functional aspects of language (Tager-Flusberg, 1993, 1994). Within a particular area of language these form-function dissociations may be quite striking. For example, the acquisition of the quite complex syntactic and morphological aspects of questions is not more delayed in autistic children relative to language-matched children with Down syndrome; however, the development of certain functions of questions is significantly impaired (e.g., requesting new information). The particular functions that are impaired are those that entail an appreciation of the mental state of the listener – particularly knowledge or belief states (Tager-Flusberg, 1994; 1997).

Finally, the widespread narrative deficits described earlier in this chapter may also be interpreted within the theoretical framework provided by the theory of mind hypothesis of autism (Bruner & Feldman, 1993; Loveland & Tunali, 1993). Theory of mind knowledge is particularly relevant for the interpretation of story characters' intentions, motivations, beliefs, and reactions that must be woven into the depiction of event

sequences within an overall story structure (Astington, 1990; Bruner, 1986). Following this view of narrative, Loveland et al. (1990) concluded that the discourse problems they had identified in the narratives produced by children with autism reflected their deficits in theory of mind. One recent study has directly investigated the relationship between narrative abilities and performance on a standard theory of mind task in people with autism (Tager-Flusberg & Sullivan, 1995). A group of adolescents with autism was matched on IQ and standardized measures of language production and comprehension to a group of adolescents with mental retardation. A wordless picture book was used to elicit a story. Participants were later probed about the emotional states of characters in the story. The adolescents with autism were significantly worse at providing appropriate explanations for the emotional states of the story characters. In addition, in the autistic group, all the narrative measures (including length, number of connectives, emotion and cognition terms) were significantly correlated with performance on the theory of mind task.

4.0 Future directions

This review of language characteristics associated with the diagnosis of autistic disorder suggests that there is a unique pattern of both relatively spared and impaired aspects of language functioning that may best be interpreted within a particular theoretical framework – referred to as the theory of mind hypothesis of autism (Tager-Flusberg, 1993, 1996, 1997). Core difficulties in understanding other minds provides a unified explanation for the language/communicative profile found in both verbal and non-verbal individuals.

At the same time there are still many unanswered questions in this field, that are not easily explained by the theory of mind hypothesis. Most of the research on autism has

focused on language production; much less is known about comprehension within and across different language domains. The paucity of work in this area is a serious problem because early response to language which is likely to include comprehension, is one of the strongest predictors of autism in very young children (Dahlgren & Gillberg, 1989; Lord, 1995; Lord & Paul, 1997). Furthermore, there is evidence to suggest that deficits in language comprehension are relatively more severe than deficits in production (Lord, 1985; Lord & Paul, 1997). While the majority of children with autism do not have particular difficulty acquiring phonological and grammatical aspects of language it is clear that some children with autism have serious deficits in these domains (e.g., Bartak et al., 1975). Some children with autism show relative strengths in lexical-semantic knowledge; others do not.

Over the past decade researchers in the field have neglected these deficits in comprehension, phonology, grammar and lexical knowledge that are found in at least some children with autism. The emphasis in the literature on pragmatic impairments, and their relationship to theory of mind and social functioning appears to have eclipsed work on these other domains of language functioning. Future work needs to provide a more comprehensive perspective on language functioning across the full spectrum of autistic disorder. Only with a broader view of language impairment in autism will we begin to develop the kinds of interventions that are appropriately tailored to the unique and individual needs of both verbal and non-verbal children with this diagnosis.

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