

Social and Pragmatic Deficits in Autism: Cognitive or Affective?¹

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Autism is characterized by a chronic, severe impairment in social relations. Recent studies of language in autism also show pervasive deficits in pragmatics. We assume, uncontroversially, that these two deficits are linked, since pragmatics is part of social competence. This paper reviews the literature describing these deficits, and then considers two different psychological theories of these phenomena: the Affective theory and the Cognitive theory. Although the Affective theory makes better sense of the results from emotional recognition tasks, the Cognitive theory predicts the particular pattern of impaired and unimpaired social skills in autism, as well as the pragmatic deficits. These two theories might usefully be integrated in the future.

Autism is characterized by a chronic impairment in social relations (Kanner, 1943). This is a necessary feature in all systems used in the diagnosis of autism (e.g., DSM-III, American Psychiatric Association, 1980; ICD-9, World Health Organization, 1978), and is widely seen as the primary symptom (Fein, Pennington, Markowitz, Braverman, & Waterhouse, 1986; Rutter, 1983). Speaking autistic children are also impaired in the pragmatic aspects of their language (Cromer, 1981; Tager-Flusberg, 1981, 1985). This feature does not appear in the diagnostic systems (despite the fact that no cases of speaking autistic children with normal pragmatic competence have ever been reported). The definition of pragmatics is using speech and gesture in a communica-

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tive way, appropriate to the social context (Bates, 1976). In other words, pragmatic skills are defined as a part of social skills. It is reasonable to assume, then, that whatever underlies the deficit in social skills is also likely to underlie the deficit in pragmatic skills. In this paper we review the literature concerning the social and pragmatic deficits in autism, and then consider two different theories concerning their underlying psychological basis. (In reviewing these deficits, social and pragmatic skills are considered separately, but it follows from our earlier assumption that no theoretical claim is implied by this separation.)

SOCIAL DEFICITS IN AUTISM

Reviews of the literature on social deficits in autism have appeared recently (Howlin, 1986; Shah & Wing, 1986; Stone & LaGreca, 1986; Volkmar, 1987), so the relevant studies are only summarized here.

Studies of Social Behavior

The earliest descriptions of the social impairment in autism are by Kanner (1943) and by Kanner and Eisenberg (1956). These take the form of clinical impressions. Their papers contain references to at least 12 different aspects of social impairment among the 11 cases described. These include lack of "apparent affection" (p. 2), withdrawal from people (p. 2), lack of attention to people (p. 32), noncommunicative use of language (p. 27), lack of communicative gestures (p. 8), treating parts of people as detached objects (p. 27), lack of eye contact (p. 26), treating people as inanimate objects (p. 15), lack of behavior appropriate to cultural norms (p. 30), attention to the nonsocial aspects of people (p. 31), lack of awareness of the feelings of others (p. 95), and lack of *savoir-faire* (p. 94). (Page numbers refer to the edition of collected papers, Kanner, 1973.) Most of these observations have been supported and refined by later studies.

Wing and Gould's (1979) epidemiological survey of handicapped children in the London borough of Camberwell revealed that social impairment is not restricted to autism but is also found among other mentally handicapped people. They found that 21.2 of every 10,000 children aged under 15 years in the area showed impairments of reciprocal interaction and, of these, 4.9 had a history of typical autism. Furthermore, they found that the social impairment could be distinguished into three types: social aloofness, passive interaction, and active-but-odd interaction. This latter description referred to social behavior that was undertaken mainly to indulge some repetitive, idiosyncratic preoccupation, showing no interest in the other person's needs.

Their study highlighted that not all autistic children show withdrawn, aloof social behavior (although 70% of their autistic subjects fell into this category), and that many do indeed approach and attempt to interact with others, but in inappropriate ways. Wing (1978) reported that the full, classic picture of aloofness and detachment seems much more marked in the younger autistic child, of less than 5 years old. Many authors make the point that one should be careful not to interpret any remittance of withdrawal seen in older autistic children as the onset of normal social behavior, since it is possibly only a sign of shifting between the categories of social impairment (Frith, 1982).

Hopkins and Lord (1981) found Wing and Gould's three categories of social impairment were useful descriptions for rating autistic children, and could be measured in terms of the number of initiations and responses to interactions. They found that the category that any one autistic child fell into varied according to the age, sex, familiarity, and diagnosis of the playmate. They concluded that an autistic child's social impairment thus takes different forms according to whom they are with, but it nevertheless persists. The impairment also changes developmentally. Lord (1984) proposed a progression from "aloof" to "passive" in social responsiveness, and from "aloof" to "passive" to "odd" in rate of initiation of interaction.

Hopkins and Lord's (1981) study showed clearly that autistic children do take account of other people's behavior. This was also found by Sussman and Sklar (1969) and Clark and Rutter (1981) who found differential social responsiveness to varied tone of voice and amount of interpersonal demands, respectively. These latter two studies measured social behavior in terms of degree of compliance, and this is obviously only a small part of social skills. Few papers have given much space to discussion of the definition of social behavior, and this has led to rather crude measures being used. For example, McHale (1983) scored children as part of a group "if they were judged to be within 5 feet of one another, or were playing on or with the same toy" (p. 87). Clearly however, neither physical proximity nor action on someone else's toy necessarily involves social behavior. The definition of what constitutes social behavior requires a separate paper in itself and cannot be discussed here, but it is worth noting that, in the literature on normal child development, one way in which social behavior has been discussed more thoroughly is in terms of "mutually intentional relations" (Damon, 1979; Frye, 1981). This approach has recently been applied to autism by Mundy, Sigman, Ungerer, and Sherman (1986), Sigman, Mundy, Sherman, and Ungerer (1986), and Loveland and Landry (1986) who found that autistic children showed significantly less "joint attention" than matched controls, and "showed" or pointed to toys less often.

Dewey and Everard (1974) reported that social abnormalities such as nonreciprocal speech are evident even in autistic adolescents of normal intelligence. Persisting social difficulties in able autistic adults were also found

by Newson, Dawson, and Everard (1984). Dewey and Everard's subjects were also unaware of such dimensions as social class and social status in others. These observations merit further experimental investigation. Rutter, Greenfield, and Lockyer (1967), in their follow-up of the social outcome of 63 autistic children, documented a very poor prognosis, and Rumsey, Rapoport, and Sceery (1985) confirmed this picture. The social impairment thus appears to be lifelong. Even Gajzago and Prior's (1974) description of two people who had "recovered" from autism showed clear and persisting social abnormalities.

It is important to stress, however, that autistic children's social development is not impaired in a blanket fashion. For example, Sigman and Ungerer (1984) found that autistic children do show some attachment behavior (e.g., proximity-seeking) after reunion with their care-giver, and Mundy et al. (1986) and Sigman et al. (1986) found simpler levels of social interaction (such as eye contact and reaching after tickling) were present in 3- to 6-year old autistic children. Similarly, Wetherby and Prutting (1984) found autistic children do exhibit gestural requests for social routines, and Curcio's (1978) study confirmed that requesting toys using gestures ("protoimperatives") is also within their ability. Areas of unimpaired social functioning have also been documented in experimental studies of autistic children's social understanding, described in the next section, although these studies indicate severe impairments in specific areas as well.

Experiments in Social Understanding

Hutt and Ounsted (1966) investigated the phenomenon of "eye-gaze avoidance." They found autistic children looked at people's faces less than controls, and this has also been found by Richer (1976) and Castell (1970). This result was refuted, however, by O'Connor and Hermelin (1967) who found that autistic children simply have shorter, more frequent fixations for all types of stimuli, and not faces in particular. Their finding was replicated by Davids (1974) and Langdell (1981). O'Connor and Hermelin also found that both autistic and normal children spent more time looking at a real face than at a photographed face, and spent equal amounts of time looking at a face with its eyes open or shut. On the basis of these results, O'Connor and Hermelin seriously questioned the very existence of the phenomenon of eye-gaze avoidance in autism.

Nevertheless, the matter remains controversial, as Richer and Coss (1976) reported evidence apparently refuting O'Connor and Hermelin's (1967) results. All of these studies may, however, be missing the social use of eye gaze by focusing on the quantitative aspects. Mirenda, Donnellan, and Yoder (1983), in a pilot investigation, found qualitative differences between

eye gaze use in autistic and normal children: Autistic children tended to look for longer periods of time and more frequently during monologues than did normal children. This abnormality may be related to deficits in turn-taking in dialogue (discussed later), in which eye signals play an important part (Argyle, 1972).

In tests of face-recognition, Langdell (1978) found autistic children were able to recognize their peers in photographs, and found they made fewer errors than their controls when the lower half of the face was shown only. This suggests they were less dependent on the information contained in the upper parts of the face, perhaps the eye region, for recognition. In addition, the older autistic children were better than their controls at recognizing the face when it was inverted, although they too showed the well-known inversion effect. This suggests they may use a qualitatively different strategy in face-recognition. Goode's (1985) finding that autistic adults are superior to controls at recognizing faces from achromatic photographic negatives supports this view. This area clearly merits further investigation.

In testing comprehension of emotions, Hobson (1986a, 1986b) found that autistic subjects made more errors in choosing schematic faces to match videotapes showing emotions expressed in gesture, vocalization, or context. This intermodal matching of different emotional indices appears to be more difficult for autistic subjects than recognizing emotions in one modality: Langdell (1981) found that autistic children were able to sort photographs of different emotional expressions (in faces) significantly above chance, and Weeks and Hobson (1987) found 6 out of 15 children spontaneously sorted photographs by facial expression, and 4 others did so when told that this was the dimension of interest. Jennings (1973) found that autistic children prefer to sort photographs of faces according to nonaffective stimuli (e.g., hats) rather than expressions, unlike matched controls. Weeks and Hobson's study obtained similar results.

In other experiments, Hobson (1983, 1987) investigated autistic children's recognition of age and sex, and found impairment. However Weeks and Hobson (1987) and Abelson (1981) found no impairment in sex recognition.

In tests of visual self-recognition, autistic children are unimpaired, as shown in their understanding of their own reflection in mirrors (Flannery, 1976; Neuman & Hill, 1978; Ferrari & Matthews, 1983; Spiker & Ricks, 1984; Dawson & McKissick, 1984; Baron-Cohen, 1985). They thus appear to have a concept of self, as an object of their own perception. These tasks of course measure only one aspect of the concept of self (i.e., as a separate physical object) and impairment may exist at other levels. For example, three of the mirror studies reported a striking lack of shyness, embarrassment, or coyness in front of the mirror (Baron-Cohen, 1985; Neuman & Hill, 1978; Spiker & Ricks, 1984), and such self-conscious reactions are found in normal chil-

dren (Amsterdam & Greenberg, 1977; Dixon, 1957) and in Down's syndrome children (Mans, Cicchetti, & Sroufe, 1978).

In another study, Hobson (1984) found that autistic children were unimpaired in their perceptual role-taking ability in three different tasks. Baron-Cohen (1985) also found perfect performance by autistic children in knowing what another person was looking at. However, significant differences between autistic and control children were found on tests of conceptual role-taking (Baron-Cohen, Leslie, & Frith, 1985), in which autistic children were impaired in their ability to predict where a person would look for an object if it was moved from its last location in the person's absence. This result was seen as a failure to attribute different beliefs to others, or to use a "theory of mind" (Premack & Woodruff, 1978). Similar results have been obtained using a picture-sequencing paradigm in which autistic children's ability to sequence social stories depended on whether attribution of mental states to the characters was required (Baron-Cohen et al., 1986). A similar picture has also been obtained using a gift-choosing paradigm (Dawson & Fernald, 1987).

A number of authors have investigated autistic children's imitation ability. DeMyer et al. (1972) found that, in autism, imitation of body movements was at a lower level than imitation of object use. Dawson and Adams (1984) found that very few of their autistic children showed Stage 6 performance of imitation using the Uzgiris and Hunt (1975) scale, but most were in the retarded IQ range, and the subjects who were at the ceiling on the imitation scale had a higher verbal mental age. Van Smeerdijk (1981) also found imitation was related to mental age. Jones and Prior (1985) found that imitation at lower levels was unimpaired, but was impaired at higher levels. Curcio (1978) and Hammes and Langdell (1981) have confirmed that imitation per se is not an autism-specific deficit (as indeed autistic children's excellent echolalia testifies), but imitation of abstract gestures is difficult for autistic children. Bartak, Rutter, and Cox (1975) and Ohta (1987) found a similar picture. The possibility has been raised that this reflects a form of dyspraxia (Jones & Prior, 1985).

To summarize, studies in autistic children's social behavior document the chronic nature of the social deficit, and suggest that although it may change its form both developmentally and across situations, an inability to participate in two-way reciprocal social interaction persists throughout the lives of autistic people. The studies of autistic children's social understanding have shown a number of *unimpaired* areas, such as face recognition, mirror self-recognition, and perceptual role-taking, but severe impairments have been found in intermodal matching of emotional expressions, in conceptual role-taking, specifically in attributing different beliefs to others, and in imitation of symbolic gestures. An important task for psychological theories in this area is to account for why autistic children's social understanding as-

sumes this particular uneven profile. We return to this question after reviewing the pragmatic deficits that have been found in autism.

PRAGMATIC DEFICITS IN AUTISM

There is no single study that has comprehensively assessed pragmatic skills in the language of autistic people, but many studies have looked at isolated aspects of pragmatics in autism. Some of the early studies we review do not use the term *pragmatics* but nevertheless describe deficits that would be covered by that term today. For example, Kanner (1943) spoke of a failure to use speech for communicating meaning to others, and Rutter et al. (1967) noted that those autistic children who developed language showed a tendency towards obsessive questioning. Both of these observations fall into the domain of pragmatic deficits.

Another early study of autistic children's language (Cunningham, 1968) divided speech into "egocentric" and "socialized", and found more egocentric remarks in autistic children's speech than in matched controls. Egocentric speech comprised echolalia, self-repetition, thinking aloud, and apparently purposeless remarks. Cunningham did not find autistic children asked more questions than control children, but did find their questions related more to obsessional interests. He also found autistic children made far fewer remarks giving spontaneous information. He discussed the excess of egocentric speech in terms of Piaget's (1932) theory of young normal children's egocentrism, and concluded that autism may represent an immaturity of development. Cunningham wrote:

As Piaget (1932) points out, the exchange of information requires the speaker to place himself at the point of view of his hearer. This the psychotic [ie: autistic] child is unable to do. He shows a lack of empathy or ability to apprehend his hearer's state of mind and therefore falls back on non-communicative or demanding speech. (p. 243)

In an early case description of an autistic child's language (Shapiro, Fish, & Ginsberg, 1972) the noncommunicative use of speech was again stressed, despite normal language test results. This was particularly seen in terms of a lack of sharing of information.

The first study to specifically examine pragmatic skills in autism was by Baltaxe (1977), who compared autistic adolescents' discourse to that of the normal children studied by Keenan and Klein (1975). She found that autistic children frequently failed to shift out of the hearer role to become a speaker. Baltaxe (1977) quoted one of her autistic subjects: "Well, I asked my parents. I told my parents I'd be good at home, but I feel you're too old to be at home, we feel you should be away" (p. 178). Baltaxe also found the autistic subjects violated "conversational postulates" of acceptability and politeness (Bates, 1976). Their behavior did not suggest they intended to be

rude, but simply that they did not understand the social rules governing what is acceptable in conversation. A third impairment Baltaxe found was that the autistic adolescents tended not to "foreground and background" their utterances. That is, their choice of words did not allow the listener to differentiate between old and new information. For example, they did not use such devices as definite articles and relative clauses to background old information, or use fully specified noun phrases and indefinite articles to introduce new information. In another study by the same author (Baltaxe & Simmons, 1977) the bedtime soliloquies of an autistic girl were recorded. They found that the girl tended to make her speech a monologue, whereas normal children often act out a two-way conversation (Weir, 1962).

The next study to specifically assess pragmatic abilities in autistic children was by Ball (1978). It is unfortunate that this undergraduate dissertation has not appeared in a published form as it contains a number of very interesting experiments. She found that, compared to matched aphasic children, autistic children were more impaired in the range of "speech acts" they employed (such as relating past experiences, conveying thoughts, commenting on objects, etc.) and in their understanding of discourse rules (such as the illegality of nonsequiturs). They were also less likely to use gesture communicatively. She concluded that autistic children lack "communicative intent," violate Grice's (1967/1975) Cooperative Principle, and appear not to understand pragmatic presuppositions.

Langdell (1980) reported that autistic children tend to ask embarrassing questions, such as "How old are you?" to a stranger in the supermarket, and not recognize that this is not acceptable. Another pragmatic deficit he noted was the pedantic and formal style of speech frequently heard in higher-level autistic children, inappropriate to an informal social context. In addition, autistic children often start to talk to people without first using boundary markers such as "Hello" or attempting to engage the listener's attention by trying to establish mutual gaze. He concluded that such examples reveal autistic children's difficulty in taking another person's point of view. In an unpublished pilot study, Langdell (1980) found autistic children were impaired in their ability to modify their account of what had happened when talking to someone who had or had not been present.

Against this picture of communicative deficits in autism it is somewhat surprising to encounter Needleman, Ritvo, and Freeman's (1980) study, which found that 24 out of 33 autistic children (73%) were using language communicatively. The definition they use of *communicative* is, however, rather superficial: "vocally makes requests or unsolicited comments directly to an individual or responds to questions or comments by more than the minimum utterance required." (p. 392). It is clear from the studies by Baltaxe (1977) and Ball (1978) that definitions of considerably more subtlety are required in order to identify communicative (or pragmatic) competence. The ques-

tion of how to define the term *communicative* is of fundamental importance, and we shall return to it later in the article.

In an interesting single case study, Bernard-Opitz (1982) found that an autistic child's language did vary as a function of the interlocutor (i.e., whether it was mother, stranger, or clinician), showing some social sensitivity, while nevertheless revealing pragmatic deficits, such as perseveration on a topic. Hurting, Ensrud, and Tomblin (1982) manipulated another variable, namely, listener-response to questions. They found that more conversational breakdowns (discontinuations) occurred if the listener did not ask a question back to the child, suggesting that the autistic children were unable to maintain the conversation by themselves. In addition, the autistic children appeared to use questions as their main device to initiate and continue conversation, but tended to ask questions to which they already knew the answers. They appeared not to understand the function of questions as requests for information. More generally, a number of authors have noted that autistic children do not seem to recognize the function of language which serves to inform others (Ball, 1978; Caparulo & Cohen, 1977; Cunningham, 1968). On these grounds, their language has been described as being primarily instrumental (Cunningham, 1968; Schuler, Fletcher, & Davis-Welsh, 1977).

The difficulty with speaker-hearer roles that Baltaxe (1977) found may be related to what Fay and Schuler (1980) noted as a difficulty in appropriate turn-taking. For example, autistic children are reported to interrupt a speaker inappropriately (Pacci-Cooper, Curcio, & Sacharko, 1981, cited in Layton & Stutts, 1985) and to fail to signal turn-taking using eye contact (Miranda et al., 1983). The result is that the autistic person remains either in the speaker role for too long (Bernard-Opitz, 1982; Paul & Feldman, 1984), violating Grice's (1967/1975) Maxim of Quantity, or in the respondent role for too long (McCaleb & Prizant, 1985). It is also manifested in topics remaining "unexpanded" (Fay & Schuler, 1980).

Wetherby and Prutting (1984) analyzed the range of speech acts (Austin, 1962) in autistic children's language. They found autistic children requested objects and actions more often than normal children did, and protested more. However, there was a complete absence of speech acts used for requests for information, for acknowledgments of others, for showing off, and for commenting. This supports Ball's (1978) findings. Wetherby and Prutting reported that the autistic children demonstrated the ability to regulate an adult's behavior to obtain objects, or to obtain an environmental end, but lacked the ability to attract and direct an adult's attention to him or herself or an object as an end in itself.

Tager-Flusberg's (1981) review article concluded that phonological and syntactic development in autistic children follows the same course as in normal children (but sometimes at a slower rate), while semantic and pragmatic functioning appears specially deviant. Her later experiments (Tager-Flusberg,

1985) suggest that representation of semantic knowledge in autism does not differ from mental age matched control subjects. Thus the pragmatic deficits appear to be the main area of deviance in language in autism.

Wetherby (1986) raised the question of whether autistic children are "noncommunicative." As we remarked in the discussion of Ball's (1978) work, this naturally begs the question of what is meant by communicative. Wetherby's (1986) and Prizant's (1983, 1984) definition is using language in an *intentional* way towards another person to achieve environmental or social ends. In support of the view that autistic children *are* communicative, Wetherby cited Prizant and Duchan (1981) and Prizant and Rydell's (1984) studies suggest that autistic children's echolalia functions as expressions of intentions to request, protest, affirm, etc. Wetherby and Prutting's (1984) study also indicated that autistic children use language intentionally (e.g., to obtain objects).

There is no dispute that autistic children can use language intentionally (just as they can use tools intentionally), but is this a full enough definition to conclude that they are communicative? Speech Act Theory (Austin, 1962; Searle, 1965) defines communication as comprising "complex intentions"—that is, the speaker's intention to affect the *listener's* intentions and beliefs. Under this theory, focusing on the speaker's intentions alone comprises only half of the definition of communication. We discuss this question further in the final part of this paper, when considering a cognitive theory of the social and pragmatic deficits in autism.

It is worth noting that pragmatic impairments are not restricted to spoken language. Use of gesture is also impaired (Bartak et al., 1975; Curcio, 1978; Attwood, 1984; Wetherby & Prutting, 1984; Ohta, 1987) as is the comprehension and production of communicative facial expression (Langdell, 1981).

To summarize, the literature on pragmatic skills in autism presents a strikingly consistent picture of severely impaired functioning on almost all aspects that have been tested. This has led to the view from a number of authors that autistic children use language instrumentally but not communicatively. The non-speech-specific nature of the pragmatic impairment supports the notion that its basis is more than a surface linguistic phenomenon.

In contrast to this picture of pragmatic deficits, the literature on normal children's language shows pragmatic competence at a surprisingly early age. For example, 2-year-olds can adapt their message to what the listener knows or does not know, and respond to listener feedback (Wellman & Lempers, 1977; Mueller, Bleier, Krakow, Hegedus, & Carnoyer, 1977; Furrow, 1984). Another contrast is with other handicapped groups: Language-delayed children (Rom & Bliss, 1981; van Kleeck & Frankel, 1981; Ball, 1978) and Down's syndrome children (Coggins, Carpenter, & Owings, 1983) show the normal range of speech acts, as do mentally handicapped adolescents (Price-Williams & Sabsay, 1979; Longhurst, 1974; Bedrosian & Prutting, 1978).

Mentally handicapped adults can also comprehend indirect requests, whereas autistic people cannot (Paul & Cohen, 1985). Nonautistic developmentally delayed clinical groups thus appear to possess pragmatic competence, in comparison to their autistic counterparts.

WHAT MIGHT UNDERLIE THE SOCIAL AND PRAGMATIC DEFICITS?

The above review makes plain the severity of the impairment in social and pragmatic skills in autism. Moreover, the research suggests a particular profile: the impairment affects *specific* social skills (but not others), and affects almost all pragmatic skills. What underlying psychological mechanism might be responsible for such a picture? In the final part of this paper we consider two possible theories that have addressed this question.

The Affective Theory

On a number of levels, autism should be counted a disorder of affective and social relations—and irreducibly so. (Hobson, in press)

One theory proposes that the social and communication deficits in autism are primarily affective. This view should not be confused with the notion that autism is an emotional response to trauma (Bettelheim, 1967; Tinbergen & Tinbergen, 1983). Rather, the Affective theory states that in autism there is an innate inability to enter into emotional touch with other people. This theory was originally proposed by Kanner (1943), as his title "Autistic Disturbances of Affective Contact" makes clear. The most detailed version of this view, however, has come from Hobson (1983, 1986a, 1986b, in press; Weeks & Hobson, 1987), whose work we touched on earlier. We consider his theory here. Unless otherwise stated, references to him are based on his most recent work, Hobson (in press).

Hobson summarized his theory in terms of four major axioms. These are:

- (1) that Autistic children lack the constitutional components of action and reaction as are necessary for the development of reciprocal personal relations with other people, relations which involve feelings. (2) Such personal relations are necessary for the 'constitution of an own and common world' with others (Bosch, 1970, p. 115); (3) Autistic children's lack of participation in intersubjective social experience has two results which are especially important, namely (a) a relative failure to recognize other people as people with their own feelings, thoughts, wishes, intentions, and so on, and (b) a severe impairment in the capacity to abstract and to feel and think symbolically. (4) The greater part of autistic children's cognitive and language disability may be seen to reflect either lower-order deficits that have a specially intimate relationship with affective and social development, and/or impairments in the social-dependent capacity to symbolize. (p. 3 original Manuscript).

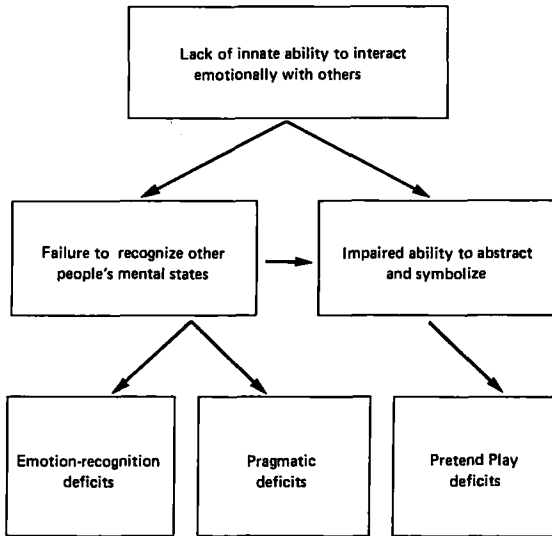


Fig. 1. The affective theory.

This position is expressed diagrammatically as in Figure 1.

Hobson's starting point is that normal infants are prewired to be sensitive to and comprehend another person's emotions. This assumption is drawn from studies on mother-infant interaction such as that by Murray and Trevarthen (1985). Their ability to do this, Hobson argued, is "beyond cognition." Butterworth (1986), referring to Hobson's theory, emphasized this by saying "the mind is transparent" (p. 20), that is, that other people's mental states such as their emotions are "naturally" available to us. Biological prewiring is the solution some philosophers have proposed to the problem of how we know other people have minds (Hamlyn, 1974). This led Hobson to argue that other people's mental states do not need to be inferred, but can be perceived "directly" in their bodily expressions. He calls this "non-inferential empathy" (p. 12). In autism, Hobson proposed, this biological, noncognitive prewiring for understanding emotional states in others is nonfunctional.

Hobson goes on to propose that the development of a symbolic capacity and of a conceptual role-taking ability are both directly derived from the infant's affective relationships with others. In such relations, he argues, the infant comes to appreciate another person's way of conceiving and seeing an object, and it is this that provides the infant with the notion of symbolic interpretation and other people's conceptual viewpoints.

How well does this account make sense of the social and pragmatic deficits in autism reviewed earlier? Hobson's own studies (1986a, 1986b) which

investigated autistic children's understanding of emotional expressions are some support for his theory, although his tasks required intermodal recognition of emotions (gestures, vocalizations, contexts, and facial expressions), and it is unclear which component in all this may have caused their failure. Langdell's (1981) results suggested that when only one modality (facial expressions) is tested, their performance is still impaired, but is above chance. Similarly, 17 of the 23 autistic children in Hobson's (1986a) experiment could match schematic facial expressions with videotaped facial expressions, after some teaching, and Hobson (1986b) found they could match drawings of gestures with films of gestures. This suggests that the difficulty was in matching facial, vocal, and gestural emotional expressions. Weeks and Hobson's (1967) result suggested autistic children can recognize facial expressions but do not do so preferentially.

Axiom 3(a) of Hobson's model predicts that conceptual role-taking should be impaired in autism, as has been found (Baron-Cohen et al., 1985, 1986). However, it is not clear why his model should make this prediction, as difficulty in understanding emotions does not necessarily imply difficulty in understanding beliefs. Nor does his model account for *unimpaired* functioning in perceptual role-taking (Baron-Cohen, 1985; Hobson, 1984) or in self-recognition (Flannery, 1976; Neuman & Hill, 1978; Ferrari & Mathews, 1983; Spiker & Ricks, 1984; Dawson & McKissick, 1984; Baron-Cohen, 1985). In addition the Affective theory does not account for why attachment in autism may to some degree be unaffected (Sigman & Ungerer, 1984), or why the social smile at 6 weeks of age may be present in autism (Park, 1983) nor why autistic children may enjoy rough-and-tumble play (Damasio & Maurer, 1978).³

Axiom 3(b) suggests that one direct consequence of a nonfunctional innate ability to perceive people's emotional states is an inability to abstract and symbolize.⁴ Hobson used this claim to account for autistic children's deficits in pretend play (Baron-Cohen, 1987a; Ungerer & Sigman, 1981), in

³Unpublished data we have collected from parental reports of 22 autistic children in Britain reveals that 81% smiled at 6 weeks of age, and 50% played "peek-a-boo" games, enjoyed cuddling in infancy, and became upset when a parent left. Volkmar (1987) also reported that 50% of their sample (N = 50) of autistic children smiled socially in infancy, and enjoyed cuddling. DeLong (1978) reported that only 3 of 17 autistic children (18%) had a social smile, as parents recalled. Clearly, more reliable methods of assessing these early social skills are needed, but such findings, if confirmed, pose a problem for the Affective theory.

⁴Hobson (personal communication), commenting on Fig. 1, suggested the arrow from the "Failure to recognize other people's mental states" box to the "Impaired ability to abstract and symbolize" box, as he sees the latter as the developmental outcome of the former as well as of the top box. I am grateful to him for this improvement in the accuracy of the figure.

abstract imitation (Curcio, 1978; Hammes & Langdell, 1981), and in language. However, the mechanism by which the development of a symbolic capacity necessarily "depends upon the infant's experience of a world of shared feelings and patterns of activity with others" (p. 14) and is "essentially affective-conative and/or social in origin" (p. 20) requires much more clarification and empirical evidence than is presently available.

The Meta-Representation Theory

In contrast to the Affective theory, we have proposed a primarily cognitive explanation for the social impairment in autism (Baron-Cohen et al., 1985). This is not the only cognitive theory of autism that has been formulated (e.g., see Hermelin & O'Connor, 1970; Boucher, 1981; Rutter, 1983), but it is referred to as the Cognitive theory in order to distinguish it from the Affective theory. We discuss its assumptions here; for purposes of quick comparison with the Affective theory we then summarize the Cognitive theory as five axioms and as a diagram (Fig. 2).

Like the previous theory, the Cognitive theory also considers as central the autistic child's difficulty in understanding other people's mental states. However, unlike the Affective theory, this view starts from the premise that mental states are not directly observable but have to be inferred, an inference that requires a complex cognitive mechanism which is described later. The Cognitive theory also places more emphasis on the ability to infer mental states such as beliefs, rather than emotions, for the following reasons: Beliefs and desires are held to be the most important mental states in making sense of the social world, because they have a causal relationship to action (Dennett, 1978), and they have this by virtue of their content; beliefs and desires are always about something (i.e., I believe that x, and I believe you believe that y). This "aboutness" of mental states is termed its *Intentionality* (Brentano, 1874). Unlike such mental states as beliefs and desires, emotional states (such as happiness, sadness, fear, anger) do not necessarily have content, and as such may be of less use in predicting and making sense of social behavior.

The ability to attribute mental states with content to others has been called a "theory of mind" (Premack & Woodruff, 1978), because it involves the person postulating the existence of mental states and then using these to explain and predict another person's behavior. Dennett (1978) and others argued that we use such a folk psychology all the time to make sense of the social world (e.g., "He won't talk to me because he *believes* I don't like him," etc.).

Wimmer and Perner (1983) and Hogrefe, Wimmer, and Perner (1986) found that normal children of 4 years of age can attribute a false (and there-

fore different) belief to another person (e.g., the chocolate is in the cupboard) and can use this to predict the person's behavior (she will look in the cupboard), as can Down's syndrome children (Baron-Cohen et al., 1985). In contrast, autistic children of normal intelligence failed to demonstrate that they could distinguish their own belief from someone else's (Baron-Cohen et al., 1985; 1986). This is seen as an autism-specific deficit, and has been confirmed by others (Dawson & Fernald, 1987).

As mentioned earlier, the inferential operation involved in attributing mental states such as beliefs is held to require complex cognitive structures. Their basis can be summarized as follows: Our beliefs about or concepts of the physical world may be called "primary representations." However, our beliefs about other people's mental states (such as their beliefs and desires) are representations of other representations. These may be called "second-order representations" (Dennett, 1978; Johnson-Laird, 1983) or "meta-representations" (Leslie, 1987; Pylyshyn, 1978).⁵ Primary and meta-representations have very different logical properties (Leslie, 1978). The Cognitive theory posits that in autism the capacity for meta-representation is impaired.

Leslie (1987) outlines the way in which such meta-representations may operate to allow not only attribution of different beliefs and desires to another person but also pretend play. In the latter, the cognitive system must simultaneously represent an object as real and unreal. Pretend play is not immediately relevant to this article but is discussed more fully elsewhere (Baron-Cohen, 1987a).

At what age would one normally expect a capacity for meta-representation to develop? Neither the ability to attribute different beliefs to another person nor the ability to pretend play (or symbolize) have been convincingly shown to be within the repertoire of infants until at least the end of the first year of life. Current evidence suggests that in normal children the ability to pretend precedes the ability to attribute beliefs to others (for a review of this, see Leslie, 1987).

What sense does this theory make of the literature on social deficits in autism? The theory predicts that only those social skills requiring a meta-representational capacity should be impaired, such as conceptual role-taking. Our earlier studies support this prediction (Baron-Cohen et al., 1985, 1986). In addition, the lack of any self-conscious reaction in the mirror self-recognition studies in autism is explained in terms of an inability to conceive of oneself as the object of another person's thoughts. Indeed, this explanation can be extended to the lack of embarrassment in autism in general (Baron-Cohen, 1985). Mundy et al. (1986) used the theory-of-mind explana-

⁵Elsewhere we have used the term *second-order representation* (Baron-Cohen, 1987a). Here we use its synonym *meta-representation* because it is marginally less cumbersome, and is consistent with other authors (Leslie, 1987).

tion to account for the observed deficits in joint attention in autism. They referred to it as "a failure to develop an adequate concept of others as 'agents of contemplation' (Werner & Kaplan, 1963) who possess independent psychological states, such as interest in objects" (p. 667). In contrast, mirror self-recognition and low-level imitation all require a capacity for primary representation only, and their nonimpairment in autism is consistent with the Cognitive theory. This is also true of perceptual role-taking, which can be performed using a strategy of mental rotation on primary representations.

A limitation of the cognitive theory is that the only mental state which has so far been tested in autism is belief, as this is considered the most fundamental (Wimmer & Perner, 1983). Other Intentional states, such as intend, know, think, desire, etc., await investigation. It may thus be premature to call the deficit in autism an impaired theory of mind.⁶ A further shortcoming of the Cognitive theory is that it has not accounted for Hobson's results in the emotional role-taking results (Rutter, 1986).

Before considering the application of the Cognitive theory to the pragmatic deficits in autism, let us summarize the theory by stating it in the form of five axioms:

1. Autism is caused by central cognitive deficits. 2. One such deficit is in the capacity for meta-representation. 3a. A meta-representational capacity is required in social skills which involve attributing mental states such as beliefs and desires to others (i.e., using a "theory of mind"). Such social skills will therefore be impaired in autism; 3b. Social skills which do not require a meta-representational capacity may be unimpaired in autism. 4. A meta-representational capacity is required in symbolic skills (e.g., pretend play). 5. Almost all pragmatic skills require a theory of mind (which itself requires a meta-representational capacity). These will therefore also be impaired in autism.

The Cognitive Theory is shown diagrammatically in Fig. 2.

Axiom 5 proposes that pragmatic skills are predicted to be impaired in the theory for the same reasons as certain social skills, that is, because of an inability to attribute mental states to others. Let us consider this claim in more detail. There are a number of reasons why, in order to communicate in a socially appropriate way, a speaker must be aware of the listener's mental state. These include the following (Note: The mental state in each case is italicized.): (a) The listener holds certain *beliefs* about what particular words refer to when the speaker uses them; (b) the listener is trying to *represent* the message in just the way the speaker intended it to be represented

⁶Leslie and Frith (personal communication) are at present exploring autistic children's understanding of other mental states.

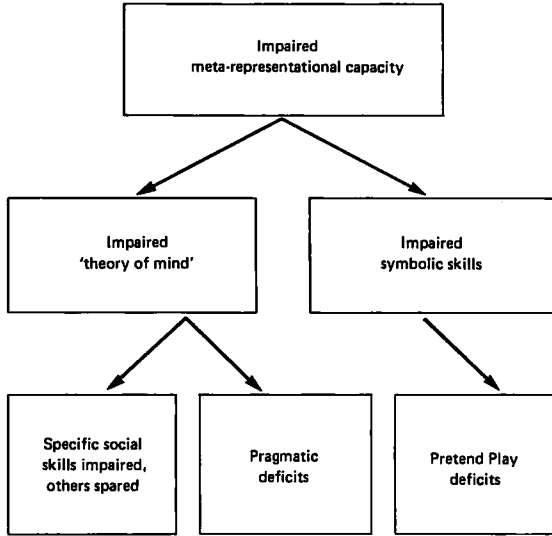


Fig. 2. The cognitive theory.

(Shatz, 1978); and (c) the listener and speaker share some *information* but do not share other information. This involves the speaker making what Bates (1976) calls “psychological presuppositions”; and finally (d) the listener holds certain *beliefs* about how the speaker will act, such as that the speaker will be informative, truthful, relevant, sincere, etc. (Grice, 1967/1975). This is what Grice called the “Cooperative Principle” of conversation, and he argued that violations of these maxims provide additional (meaningful) information.

In philosophy of language this relationship between mental states and communication has been discussed in Speech Act theory (Austin, 1962; Grice, 1957, 1967; Searle, 1965; 1979 Strawson, 1964, 1979), referred to earlier. Speech Act theory argues that for communication to be meaningful both speaker and listener must take account of each other’s mental states. This is because the meaning of an utterance is seen as residing *in the speaker’s intention* to refer to something. In searching for meaning in speech, therefore, a listener must make inferences about the speaker’s intentions behind the use of words and, in making speech meaningful the speaker must monitor whether his or her intention behind the utterance has been recognized. This theory has been reviewed and extended by Sperber and Wilson (1986).

Thus, according to Speech Act theory, using language meaningfully and communicatively requires a theory of mind. If autistic children are impaired

in their theory of mind, then it may be that autistic children are not using language meaningfully or communicatively.

To summarize, the Cognitive theory proposes that the observed pragmatic deficits in autism are those that would be expected if autistic children are using language without a theory of mind. In addition, specific social skills are predicted to be impaired (namely, those that require a theory of mind and/or a meta-representational capacity), leaving other social skills intact. Some predictions from the Cognitive theory can be made: First, there should be cases of autistic children in whom development has proceeded entirely normally until the age at which a meta-representational capacity usually appears (towards the end of the first year of life). Second, the small subgroup of autistic children who *do* have a theory of mind at the lowest level should be predicted to be less pragmatically impaired than the majority who show no theory of mind at all. Baron-Cohen et al. (1985) found this subgroup constituted 20% of their sample. (This subgroup is presently being followed up; Baron-Cohen, 1985, 1987b.)

CONCLUSIONS

We have reviewed the social and pragmatic deficits in autism, and have considered two theories that address themselves to these deficits. The main difference between them is that one views these deficits as primarily affective, the other as primarily cognitive. Although there are a number of similarities between these two theories, the cognitive theory predicts a profile of particular social skills being impaired (those requiring a meta-representational capacity) while other social skills remain intact, and predicts pragmatic deficits as a consequence of an impaired theory of mind. In addition, a cognitive mechanism is outlined for why symbolic skills (such as pretend play) should also be affected in autism. The Affective theory makes better sense of the difficulties autistic children have in emotional recognition. However, it does not specify why certain social skills are unimpaired nor exactly how or why emotional and symbolic development are linked. The Affective theory explains the pragmatic deficits in autism by reference to an inability to attribute beliefs, intentions, etc. (i.e., an impaired theory of mind) and, in this respect, overlaps with the Cognitive theory.

Whether a prior deficit in affective sensitivity is necessary for an impaired theory of mind is the key difference between the two theories. A separate question concerns the extent to which these two theories are necessarily independent. Hermelin and O'Connor (1985) have proposed that cognitive and affective systems interact in an inseparable way, producing a system which they term the "logico-affective" state. A productive future develop-

ment may be to consider to what extent the Cognitive and Affective theories can be integrated.⁷

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⁷One anonymous reviewer made the useful suggestion that the two theories described in this paper may refer to two subgroups of autism, one suffering from affective deficits from birth, and the other only from cognitive deficits towards the end of the first year of life.

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