Journal of Autism and Childhood Schizophrenia, Vol. 5, No. 3, 1975

Language, Communication, and the Use of Symbols in Normal and Autistic Children[1]

Derek M. Ricks
Harperbury Hospital, Harper Lane, near St. Albans, Hertfordshire
Lorna Wing[2]
Medical Research Council Social Psychiatry Unit, Institute of Psychiatry, London

The characteristics of language and other forms of communication in normal and autistic children are described. The main basis of comparison is the extent to which each group can comprehend and use spoken and non-spoken language and also develop inner language. It is suggested that the central problem in early childhood autism is an impairment of complex symbolic function affecting all forms of communication. This problem can occur on its own, but, in the majority of cases, it is associated with other impairments of the central nervous system. The relationship of early childhood autism to mental retardation and to normal intellectual function is discussed.

Abnormalities of language are very obvious in early childhood autism. Kanner (1943, 1946) described the way children use speech and other authors have also dealt with these problems (Cunningham, 1966; Churchill, 1972; Pronovost, Wakstein, & Wakstein, 1966; Rutter, 1965; Rutter, Bartak, & Newman, 1971; Wing, 1969). There are, however, no descriptions of the full range of impairments of communication in autistic children, including the nonverbal as well as the verbal aspects. This paper attempts to fill in the gap. Parts of it, therefore, read like a catalogue of abnormalities, but the subject is of such importance in the formulation of hypotheses concerning the nature and cause of autism that the publication of a detailed account seems worthwhile.

[1]This paper is a slightly modified version of a chapter which will appear in L. Wing (Ed.), *Early childhood autism* (2nd ed.). Oxford: Pergamon, 1975.
[2]Requests for reprints should be sent to Dr. Lorna Wing, M.R.C. Social Psychiatry Unit, Institute of Psychiatry, DeCrespigny Park, London SE5 8AF, England.

©1975 Plenum Publishing Corporation, 227 West 17th Street, New York, N.Y. 10011. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, microfilming, recording, or otherwise, without written permission of the publisher.

DEFINITION OF TERMS

Early childhood autism will be used to refer to a pattern of abnormal behavior first defined as a separate syndrome by Kanner (1943). The children described in the present paper as showing this behavior pattern have a somewhat wider range of impairments than those originally diagnosed by Kanner. Kanner tried to confine the use of the term to children who had the typical syndrome without any associated handicaps. Recent follow-up studies (for example, Rutter et al., 1971) have shown that evidence of organic lesions may appear by adolescence or adult life in people diagnosed as typically autistic in early childhood. It is also clear that the islets of ability in autistic children, which Kanner thought were evidence of a potentially normal intelligence, can exist against a background of retardation in other skills (DeMyer, Barton, & Norton, 1972; Rutter, et al., 1971; Wing, 1969, 1974). The label is therefore here extended to cover children with known organic neurological lesions, or general mental retardation, in addition to their autistic behavior.

The definitions of words such as *language, speech,* and *communication* are still under debate among linguists (MacKay, 1972; Lyons, 1972). Different views are adopted depending upon the interests and purposes of the workers concerned. The issues are exceedingly complex and any system of classification that is used involves many assumptions. Nevertheless, when discussing abnormalities of language development in children, which can affect different aspects of communication independently of each other, it is necessary to accept a set of working definitions in order to avoid confusion. This can be done while still recognizing that most of the subtleties and complexities of the subject have been bypassed.

The terms *symbol* and *symbolic* appear frequently in discussions of language. The Shorter Oxford English Dictionary (1968) gives several definitions, of which the most relevant for the present purpose is "something that stands for, represents, or denotes something else, not by exact resemblance, but by vague suggestion or by some accidental or conventional relation." The word *code* will refer to any system of symbols, including, but not confined to, language (see discussion by Conn, 1974).

The term *concept* will also be used in the discussions in this paper. The most relevant definition given for this word in the same dictionary is "an idea of a class of objects."

Language will be used as defined by Sheridan (1972) to mean the symbolization of concepts for the purpose of self-communication regarding past, present, and future events and for interpersonal communication, the latter involving both reception and expression. In order to merit the term

language, the symbols used must have a systematic relationship to each other, allowing for the creation of an infinite number of new messages which are understandable to all those with an adequate command of that language (Lenneberg, 1967).

The system of symbols making up a language can be received or expressed in various nonvocal forms as well as in sounds. These include written words, the Morse code, semaphore, Braille, and the various systematic sign languages used by the deaf. Some of the systems—for example, Morse—utilize visible or audible signs for letters so that individual words can be spelled out in ways that are analogous to conventional writing. Others—for example, some of the sign languages of the deaf—have signs for whole words or concepts.

Vygotsky (1962) discussed an important aspect of language usually called *inner language* and defined it as "speech for oneself" which helps one to orient, to understand, and to overcome difficulties. Sheridan (1972), describing inner language in children, referred to it as "that repository of concept-in-code upon which the decoding of incoming messages and the encoding of outgoing communications depend."

Speech is "the use of systematized vocalizations to express verbal symbols or words" (Sheridan, 1972). As Rutter (1972) pointed out, speech may also be used to refer to the process of articulation, so it is necessary to make the distinction clear when discussing speech disorders.

When working with autistic children, it is appropriate to distinguish between *spontaneous speech*, which will be used here to mean the vocalization of concepts generated by the speaker, and *echolalic speech*, which is the production of words that are an exact or partial copy of those originally spoken by another person. The echoing may be *immediate* or *delayed* for varying periods of time. It is sometimes difficult to tell whether speech is echolalic or spontaneous, especially when it is used in contexts where it appears to be appropriate (see below), but the distinction has to be borne in mind when evaluating the level of development of language in an autistic child.

The understanding and use of language involves a number of different components, all of which must operate smoothly for perfect performance. To illustrate this, the different ways in which the understanding and use of speech can be impaired will be summarized. Detailed descriptions of developmental speech problems have been given by Ingram (1959, 1969, 1972).

First of all, hearing must be adequate to cope with the variations in the pitch and volume of human speech. Then the brain must be able to recognize as words the sounds that are heard. Difficulties at this point are known as *receptive* speech problems.

The next stage is the linking of these words with the appropriate associations stored in symbolic form, which is necessary for complete understanding of the meaning of what is heard.

If a reply is intended, the words for this reply must be brought to mind in readiness for speaking. Problems in doing this are described as *expressive.*

Then the muscles of speech must be organized to *articulate* the words in a way which is intelligible to the hearer. Defects in articulation can be produced by a wide variety of abnormalities, including those affecting the brain, the motor nerves, the muscles used for speech, and the anatomy of the mouth.

A similar analysis could be made of abnormalities affecting the reception and use of other forms of language such as writing or Braille. Impairments can occur at any point in the chain and may disturb one or more of the necessary functions.

Abnormalities may affect predominantly one aspect of language only—for example, speech—or they may be more widespread. Diagnosis of language problems involves disentangling the different elements in order to identify which are impaired and which are still intact.

Communication is a more general term than language or speech and is used to refer to the transmission of information by any means, not only through a system of symbols. MacKay (1972) argues that the term should be restricted in certain ways, including limiting its use to interactions in which the signals from one organism are directed toward another. MacKay acknowledges all the difficulties in deciding whether or not an act can be called "intentional" but believes that it is important to recognize the difference between directed and undirected activity, even though the latter may have considerable effects upon other organisms. He suggests that activity intentionally directed toward another (which he refers to as "goal-directed") is distinguished by the fact that the organism emitting the signal evalutes the response produced in the target and then modifies its behavior in consequence. A relevant example would be that of two children, both of whom make the remark, "Where's the ball gone?" Child A ceases to repeat these words, looks pleased, and holds out his hands when his mother finds the ball and gives it to him. Child B, who has a severe language problem, continues to repeat the words regardless of the response they elicit. This behavior may eventually be modified when the adults concerned work out the contingencies associated with it and carry out a program aimed at its extinction. It would seem reasonable to define child A's behavior as goal-directed communication, but to be extremely cautious about interpreting the "intentions" of child B, although his behavior did in fact produce responses in

other people. This discussion is of interest because some people working with autistic children have been tempted to suggest that the children are intending to communicate by means of their stereotyped movements, their rituals, or even their mutism. It is worth trying to estimate just how much these abnormal behavior patterns are goal-directed, even if the question is difficult to answer.

Communication includes the use of language and of a variety of other signals, some of which are not sufficiently systematized to be classified as language, using the definition given above. The latter are often referred to collectively as *nonverbal communication*. Argyle (1972) classified the kinds of nonverbal communication used by humans under ten headings: bodily contact; proximity; orientation (the angle at which people sit or stand in relation to each other); appearance, including clothing; posture; head nods; facial expression; gestures; looking (eye contact); and nonverbal aspects of speech produced by variations in pitch, stress, timing, and volume. He also suggested that nonverbal communication has three different functions: (a) to communicate attitudes and emotions and to manage the immediate social situation; (b) to support and complement verbal communication with, for example, head nods, emphatic gestures, appropriate pauses while speaking, gestures illustrating size and shape; and (c) to replace language. This last category cannot be accepted within the definition of terms used in this paper without considerable qualification, since a systematized sign language with signs for letters or words should properly be called a *verbal*, although nonspoken, *language*. Some other sets of signs, such as the simple system devised for retarded, nonspeaking, spastic children (Levett, 1970), are too unsystematic and limited in scope to be defined as languages, but are still *verbal*, because each sign precisely represents a word or a short phrase. On the other hand, gestures of greeting and good will made from a distance, or meaningful looks exchanged by listeners when someone else is speaking could be called examples of nonverbal substitutes for language when they do not have precise verbal equivalents.

No system of classification is perfect, so it must be accepted that it is not always easy to draw the line between gestures which are "verbal" and those which are "nonverbal." The "thumbs up" sign, for example, always signifies that things are going well but, on the other hand, may convey approval, acknowledgement of information received, or that an action has been successfully completed, depending on the circumstance. This point may appear to be of academic interest only, but it has special relevance when considering children with language problems, some of whom use simple and limited forms of communication. It is of considerable interest to decide if any of these forms of communication have precise verbal

equivalents. If a nonspeaking child is using signs in this way, he has achieved a most important step in his development which can be utilized for teaching and for management of behavior.

Another important distinction to be made when observing children with language problems is between nonverbal communication which is symbolic and that which is nonsymbolic or *concrete.* Pointing to an object from a distance, to indicate interest in it or a desire to hold it, is symbolic though nonverbal. Pushing away or striking another person can, at least in some circumstances, be described as concrete, although these gestures can sometimes be used as symbols. Some severely handicapped children are limited to concrete gestures only, which is a very low level of development in the area of communication.

THE DEVELOPMENT OF COMMUNICATION IN NORMAL CHILDREN

Much work has been done on the development of language and social communication in normal children, especially in recent years when there has been a rapid expansion of interest in linguistics. Only those aspects which are of special relevance to language in autistic children will be mentioned here.

The descriptions of normal babies and young children are based on those by Sheridan (1973) and Egan, Illingworth, and MacKeith (1969), unless otherwise stated.

The Development of Nonverbal Communication

Although children do not usually begin to use words before the second year of life, nonverbal communication is much in evidence in the first year. It may be difficult to determine just when in the early weeks vocalizations become "goal-directed" in MacKay's sense, but by about 9 months the normal baby is clearly using his voice to attract attention, express emotion, and to engage in social exchanges with familiar adults. Crystal (1970) noted the use of intonation to convey meaning from about 9 months onward. Understanding of nonverbal communication develops earlier than its use, and by 6 months response can be seen to the mother's tone of voice, which may convey affection, irritation, or an invitation to play, among other things.

The use of simple gestures for communication—such as smiling and pointing, waving, lifting arms before being picked up—also precede the

onset of speech. By 12 months, for example, normal babies point to things that interest them, making excited noises and looking around to attract the attention of the mother.

Schaffer (1974) and Trevarthen (1974) have described mouth and limb movements in infants under 12 weeks of age during interactions with their mothers. These movements show temporal patterning reminiscent of adult conversational behavior. It could be suggested that nonverbal methods of communication precede but are intimately linked with the development of verbal language.

Ricks (1972, 1975) investigated the way in which normal babies express emotional meaning in their intoned (not articulated) vocalizations. The sounds made by 10 babies aged 8 months to 1 year, whose development appeared to be normal, were tape-recorded by their parents. Six of the families were English and four were from non–English-speaking countries. The parents of the latter spoke only their native tongue at home. Recordings were made in four types of situations which would be expected to elicit sounds with a specific emotional quality, as follows:

1. requesting (e.g., seeing a meal being prepared);
2. frustration (e.g., seeing a meal that was withheld);
3. greeting (e.g., on first seeing mother in the morning);
4. pleasant surprise (e.g., seeing a balloon or a lighted sparkler).

Each family persisted until satisfied that sounds had been recorded in all four situations. The English parents were then asked to listen to the tapes made from their own baby, two other English babies, and one non-English baby. They were not told which was which but were asked to identify the meaning of the message, the situation in which the sound had been recorded, which was their own child, and which the non-English child.

The parents accurately identified the sounds made in the four situations, irrespective of which baby was involved; that is to say, they understood the message conveyed. They had, of course, prior knowledge that there were only four possible choices, but, nevertheless, the results were very clear-cut. What was surprising was that they could not, for the individual sounds, pick out either their own or the non-English baby significantly better than chance. It could tentatively be suggested that the intoned sounds with which babies express needs and feelings are inbuilt and universal, not learned. How these vocalizations relate to the later development of nonverbal communication and to verbal language is still unknown, but the findings are of considerable interest, especially when compared with those in autistic children, which will be described later.

The Development of Speech

Normal babies begin to comprehend the meaning of words relating to familiar objects and events by the end of the first year. As mentioned previously, they also begin to obey very simple instructions when accompanied by gestures.

In addition to the noises expressing emotions, babbling, involving the use of vowel and consonant combinations of increasing complexity, develops throughout the first year. Toward the end of this time the normal baby uses jargon with intonation like that of conversation. The exact nature of the relationship between babble and speech is still a matter of speculation. Ricks (1972) described the onset of speech in normal children. He observed that the first "words" (excluding "da da" and "ma ma" sounds) appeared suddenly in the child's vocalizations and were associated with some definite and (to the child) striking event. The examples he gave included the child noticing an airplane, the pet dog, or the noise made by a cuckoo clock. The children who were observed produced an articulated sound in response to the particular event which excited them, such as "bow-wow" for dog or "uck-uck" for cuckoo clock. These sounds did not appear in babble but occurred only when the relevant stimulus was presented. They were clearly used to indicate specific objects, although they were not conventionally accepted words. They will therefore be referred to as *sound-labels.*

With repeated usage the sound-label was not modified to become the same as the adult word. Instead the parents usually adopted the child's own pronunciation. Once the sound-label had been used by the child, it tended, over a few days, to be generalized, suggesting that the child was forming his own concept or classification scheme, which was often different from any scheme adopted by adults. Thus "uck-uck" came to refer to any kind of dial and "bow-wow" to any four-legged animal. Jesperson (1922) described similar generalizations made by the young children he observed. He mentioned one child who used the sound-label "bing," thought to be a corruption of "bang," to mean a door, a brick, and any building made of bricks.

It was very noticeable that the children used these first sound-labels with enormous zeal and enthusiasm. If the same sound was spoken by an adult, the child at once alerted, looked around for the appropriate object, and said the sound himself. It may well be that the parents adopted the child's sound-label because this enthusiastic response was so delightful that it acted as a potent reward. In a further experiment, Ricks made tape recordings of the parents repeating their own child's first sound-labels and he also recorded a stranger imitating the parents. The children showed a more marked alerting response to the recording made by their own parents. In

general, the children who showed the most obvious enthusiasm and excitement in relation to their first sound-labels were those who were the most chatty and the most generally responsive.

The Development of Grammar

By the age of five most normal children are able to use the basic grammatical structures, although they continue to widen their vocabulary and increase the complexity of their speech throughout childhood. It is suggested by some linguists that children become competent with language because the human brain has an inbuilt capacity to extract rules from the speech heard as part of everyday experience (Brown, 1965; Lenneberg, 1967; McNeill, 1966). Children have to learn the language of their own culture but these workers believe that the rules are demonstrably *not* learned by a process of conditioning. They suggest that, at each stage of his development, the child extracts a different set of rules. Each stage is more complex than the previous one, but each is complete in itself and not just an incomplete version of adult grammar. Eventually the stage is reached when the rules are the same as those adopted by the adults with whom the maturing child is in contact. Each child appears to devise his own theories about the rules governing language on the basis of his own personal experiences. However, the stages of acquisition of grammar are similar among different normal children, suggesting that the human brain is organized to extract certain types of rules, which may possibly be fundamental to any human language. The rapid development of language in normal children, and their ability to use the more complex sets of rules to generate an infinite number of new sentences never used or heard by them before, fit much better with the above theories than with those of Skinner (1973), who argued in favor of the major importance of conditioning in the development of all human skills. One example of the difficulty of explaining language acquisition on operant conditioning alone is the ease with which normal children learn to use pronouns such as *you* and *me* appropriately. They can hardly do this by straightforward copying, since this would produce the pronominal reversal noted in the speech of autistic children. Neither do parents of normal children have to work out elaborate programs of rewards and punishments to teach this remarkable skill.

The Development of Inner Language

Sheridan (1969) suggested that the beginnings of inner language can be seen in the normal child around 12 months of age, at the same time as he is

starting to understand a few words in context. At this stage he shows that he understands the use of everyday objects by applying them to himself, for example, brushing his own hair with a brush. By 18 months he uses the objects appropriately in relation to other people or pets and by 2 years he is able to use correctly miniature objects such as a doll's tea set.

The further development of inner language can be seen as play becomes more and more complex. It reveals the level at which the child is able to symbolize and abstract and how far he can understand new events by matching them against his coded store of past experiences, using this comparison as a basis for appropriate action. In older children and adults this store of inner experience is no longer revealed in play but may be judged on conversation, observations of behavior, and knowledge of the interests of the person concerned.

THE DEVELOPMENT OF COMMUNICATION IN AUTISTIC CHILDREN

The Development of Nonverbal Communication

Although some mothers of autistic children say that they felt there was something wrong almost from birth, a firm diagnosis of early childhood autism is rarely made before the end of the second year at the earliest. Therefore, there are no reports of systematic observations on babies who later show the autistic pattern, and the only evidence of behavior in the first year of life is anecdotal and retrospective. This is a great pity, since details of the prelinguistic development of these children would be most valuable.

In a study of 27 autistic children aged 6 to 15 years (Wing 1971), parents completed a retrospective questionnaire concerning the children's behavior in the first year of life. Fourteen were thought to have been abnormal from birth and of these 10 did not lift their arms to ask to be picked up, 7 showed little response to the sound of their mother's voice, and 11 did not point things out for their parents to look at. The same problems were also reported in some of the children who were supposed to have had an onset of autism after the age of one year. These findings are in marked contrast to the normal baby's behavior.

Expression of Emotion in Nonverbal Sounds. Ricks (1972) studied eight autistic children between 3 years and 5 years 11 months and three children aged 5 to 8 years who were retarded but not autistic. None of them had begun to use any sound-labels or words. The parents tape-recorded the noises their children made to express the same feelings as in the study with normal babies described above; that is requesting, frustration, greeting, and

pleased surprise. The parents of the autistic children were then asked to listen to a recording of their own child, two other autistic children, and one retarded but nonautistic child. As in the study of normal babies, the parents had to try to understand the meaning of each of the four messages and to say which was their own child. They were also asked to identify the nonautistic child.

The results were very different from those found with normal babies. The parents could identify their own child with ease. They also had no problem in picking out which was the nonautistic retarded child, who they said "sounded normal." They understood the messages conveyed by their own child and the nonautistic child but not those of the other two autistic children. The sounds made by the autistic children were articulated, whereas those of the normal babies were intoned.

From this it appears that autistic children can express at least the four emotions elicited in the experiment, but they have a personal, idiosyncratic way of doing this and do not use the expressive noises which Ricks's work suggests are common to normal babies.

This abnormality of expressive sound does not seem to be due to mental retardation, since the retarded children who did not have autistic behavior expressed their feelings in the same way as normal babies. It is impossible to say from these results whether the autistic children had had normal, intoned, expressive sounds as babies but developed the idiosyncratic, articulated methods of expression at a later stage. In the present authors' clinical experience, however, some parents do remember finding it difficult to interpret the sounds made by their autistic child when he was a baby, but eventually learned what he meant.

Facial Expressions. The authors' clinical experience and current research work (Wing & Gould, unpublished) suggest that autistic children are usually able to smile, laugh, weep, and show fear or anger, but they tend to show only the extremes of emotions. Facial expression of finer shades of feeling, such as doubt, slight embarrassment, and mild annoyance, are rarely seen. In fact, none of the types of nonverbal communication as classified by Argyle (1972) (see above) are used easily or naturally by autistic children. Even those who make the most progress have to learn the rules of nonverbal behavior painstakingly by rote, instead of developing these skills naturally as part of the process of maturation.

Some autistic children and adults appear wooden and expressionless most of the time. Others frequently show the extremes of emotion in a way which is quite inappropriate for their age and the social situation. Parents and other close relatives usually learn to recognize how an autistic child or adult is feeling. Clinical impression suggests that the expression of emotion in the older age groups, including those who can talk, is just as idiosyncratic

as in the preverbal 3- to 5-year-olds studied by Ricks. Some children express themselves by singing different tunes. Parents get to know the sad song and the happy song, although strangers cannot tell the difference in mood. Pleasure may be shown by covering the face with the hands and only the child's own family will know how to differentiate this from distress, which is often shown in similar way.

Gesture. Autistic children are late in beginning to speak and about half remain mute all their lives, but, unlike children who are deaf or who have developmental receptive speech disorders, they do not use gesture as a substitute for speech.

Many autistic babies and toddlers show their needs only through crying and screaming. Their parents have to guess what is wanted, the sole guide being the volume of the noise. Once the children are able to walk, they usually develop the very concrete gesture of pulling an adult by the hand and placing it on the object that is wanted. This is done without looking at the adult concerned. Sometimes a child will push the adult's hand through a movement, for example, getting the adult to turn on a tap when a drink is required. After this, the child may reach the stage at which he shows what he wants by taking the container and pushing it into an adult's hand. He may ask for a drink by getting a cup and a bottle of soda and giving these to his mother. Pushing people away when interaction and assistance are not wanted is also a characteristic action.

After the stage of concrete demonstration, there may be the slow and imperfect evolution of the symbolic gesture of pointing. Nodding and shaking of the head to mean yes and no are rarely seen either as substitutes for or as accompaniments of speech.

Some attempts have been made to teach mute autistic children to use gestural languages (Bartak, Rutter, & Cox, 1975). This is extremely difficult to do, even if only a few simple and obvious signs are attempted. In the experience of the present authors, the children may learn, with suitable rewards, to copy the movements, but they tend to reduce them to the barest minimum. Thus the miming of the act of drinking to ask for a drink may be reduced to a quick lift of the hand without any movement of the head or lips. This reduction to a minimum is probably analogous to the tendency, seen in speaking autistic children, to reduce the number of words to as few as possible and to contract the words themselves. It is even more difficult to teach the children to use the signs to communicate, as distinct from copying them to order. However, Webster, McPherson, Sloman, Evans, and Kuchar (1973) reported success in teaching an autistic child to understand and use a few simple gestural commands.

Bartak et al. (1975) observed that autistic children use gesture very little even when they reach the stage of understanding other people's

gestures fairly well. They tend to rely on speech if they can talk, without nonverbal supplements, however difficult they find it to express themselves. Wing (1971) also found that use of gesture changed very little with increasing age, although comprehension of gesture tended to improve.

Tubbs (1966) found that autistic children were particularly poor on the encoding subtests of the Illinois Test of Psycholinguistic Ability. These subtests are concerned with the *expression* of ideas. They performed least well on motor encoding, which involves miming the use of various objects such as a hammer or a violin. Problems in both using and understanding mime and gesture were also found by Bartak et al. (1975). Hermelin and O'Connor (1970) suggested that the apparent poverty of social response in these children could be related to a general disability affecting expressive skills.

Nonverbal aspects of language are as abnormal in autistic children as other nonverbal communication. Vocal delivery tends to be jerky, with poor control of pitch and volume and odd intonation (Rutter, 1965, 1972; Wing, 1969; Wing & Gould, unpublished). In consequence, little information is carried by the sound of the voice. The present authors, in their clinical practice, have seen some autistic children whose speech resembles that of children who are congenitally deaf. Facial expression, hand movements, and bodily posture are not used to accompany speech as they are in normal people, which gives a curious impression of woodenness when the autistic child is engaged in social interaction (Wing & Gould, unpublished).

Any generalizations about autistic children have to be qualified, since one can always find exceptions. Rutter (1965) mentioned one child who, though showing marked autistic behavior when young, at the age of 10 years 6 months was still mute but was able to communicate by gestures and signs. By this time he had lost all his autistic behavior. Another child had very limited speech but communicated by drawings, gestures, and some muttered comments. Children of this kind, though rare, are of considerable theoretical interest from the point of view of classification and etiology.

Comprehension of Nonverbal Communication. Understanding of facial expressions appears to be very slow in developing. Normal children seem able to pick up very small clues from their parents, such as a slight frown or the lift of an eyebrow. Nonautistic mentally retarded children can also do this, although they are slower to develop the skill. The behavior of young autistic children cannot be controlled in this way. Eventually they may learn the meaning of exaggerated expressive movements combined with the appropriate tone of voice. When comprehension is beginning, an autistic child may study the face of his mother, evidently trying to find out what mood she is in before making a request. Sometimes a child will hold an

adult's face with his hands while gazing intently, as if seeking for a meaning which eludes him.

Development of understanding of other aspects of nonverbal communication is also delayed. Often the only way to teach motor skills to a young autistic child is to move his limbs through the action which is required, since he cannot follow instructions given in speech or gesture.

After a variable length of time, depending on the child concerned, it becomes possible to teach through concrete demonstration. This cannot be done until the child is using his eyes to obtain information. Some autistic children are able to do this early in life, but others seem to go through a phase in which visual input is as meaningless to them as the sound of speech. This may improve with maturation (Wing 1969; 1971) and then teaching becomes easier.

Pointing is one of the earliest of the "symbolic" gestures which the children learn to understand (Wing & Gould, unpublished). They may later learn to comprehend nodding and shaking of the head, even if they do not use these gestures themselves. It is usually helpful for teachers and parents to supplement speech with plenty of simple, obvious gestures used consistently.

Even those children who make the most progress have difficulty with the complexities of nonverbal communication, which regulates all aspects of social life (Gould & Wing, unpublished) and may be teased by their normal companions for their gaucheness and naiveté. They have to learn by rote both the meaning of and the way to use nonverbal social cues and this is a long, slow process which is never completed. For example, some bright autistic children make themselves conspicuous in public because they speak very loudly, regardless of the social situation. Those who have special subjects about which they like to talk fail to recognize the signs of boredom in their audience unless these are carefully described by an understanding parent. Life hardly seems long enough to give the autistic child all the detailed instruction he needs to learn the rules of social conduct.

The Development of Speech

Little is known about the way in which autistic children babble in the first year of life. Rutter et al. (1971), in a study of 14 autistic children and 11 children with developmental receptive speech problems, noted that the parents reported diminution in amount or deviation in the quality of babble in about half of the former group and the majority of the latter. The parents of the autistic children in Ricks's study (1972, 1975) reported, on questioning, that their children had not developed normal conversational babble in their first year.

Ricks recorded the vocalization of these autistic children when they were aged 3 to 5 years. He observed that their babble was monotonous, like that of a normal baby falling asleep. He did not hear any of the lively babbling which normal babies produce in the early morning, and the sound did not have conversational inflections.

Ricks also found that 10 normal babies and 8 preverbal children with Down's syndrome aged 3 to 6 years paid little attention to their own babble when it was recorded and played back to them. The autistic children in the study, on the other hand, if they responded at all, did so by precisely imitating their own vocalizations. They ignored recordings of other autistic children. They also ignored a recording which was an imitation of their own babble made by a normal child. The possible significance of this finding will be discussed later on in this paper.

Some autistic children remain mute all their lives. In Lotter's epidemiological survey (1966, 1967a, 1967b), 6 children out of a total of 32 (19%) were still mute by the time they were 8 to 10 years old. A further 10 (31%) had some words which were not used for communication or conversation. Each of the mute children in Lotter's study had an IQ below 55. In general, level of speech is closely related to intelligence as measured on appropriate tests (Rutter, 1965), but there is a small minority of mute children who score fairly highly on IQ tests and who have reasonable comprehension (Wing, 1969). Their lack of speech may be due to specific executive problems complicating the autistic pattern.

Although there are now many accounts of autistic children acquiring the ability to say words through operant conditioning (e.g. Lovaas, Berberich, Perloff, & Schaeffer, 1966), there have been no systematic studies of the way in which the use of words develops without this formal training, as it does in the majority of those who acquire speech. Of the 63 children in Rutter's follow-up study (Rutter & Lockyer, 1967; Rutter, Greenfield, & Lockyer, 1967), only one had a history of a normal onset of speech. The children may begin to say words at almost any age, although the majority of those who learn to speak do so by the age of five. Some appear to be developing normally for a time and then lose speech as part of a general regression. The problems of organizing a study comparable to that of Ricks's observations of the onset of speech in normal children are therefore formidable.

As with so many other aspects of the early development of autistic children, the evidence available is retrospective and anecdotal and can be obtained only if the clinician or research worker asks the appropriate questions. Parents with whom the present authors have discussed these problems do not recall any period in which their autistic child showed the exuberant joy in producing sound-labels which Ricks described in normal children. Instead, the parents recall a long period in which they tried all kinds of ways

to persuade the reluctant child to say something. When a word did come, usually without any display of enthusiasm, there did not seem to be the rapid generalization to cover a category of similar experiences. One child, for example, began to say "hegg" for "egg," "me" for "meat," and "n-n" for "I want" at the age of 3, appropriately, but with a monotonous, unvarying inflection. The first two words were strictly confined to the foods in question and never generalized at all.

Echolalia. The first speech may be meaningless echoing of the words spoken by other people. Rutter (1965) and Wing (1971) found that this was reported in at least three-quarters of the speaking autistic children they studied, although there is a tendency for improvement to occur with increasing age. For some children all speech is echolalic, but in others some spontaneous speech occurs as well.

Echoing is also found in young normal children who are in the early stages of speech acquisition, but this is a temporary phase not lasting beyond about 2½ years (Rutter & Bax, 1972). Autistic children, at least when they first begin to speak, echo in a parrotlike, meaningless way with no show of interest in what they are saying. They may repeat the last words in a phrase, whole sentences, or even whole conversations. The words are often spoken with the inflection of the original speaker, exactly imitating any regional or foreign accent.

Linguists studying the development of language in normal children have examined the way in which they imitate adult utterances (Brown, 1965). They have found that the young child translates the sentence to fit the particular set of grammatical rules with which he is operating at the time, or skips the part which he is as yet unable to handle. This is in marked contrast to some autistic children who may be able to echo perfectly without changing what is heard at all.

Echoing can be immediate or it may be delayed. A child may habitually repeat words or phrases in a stereotyped manner (Kanner, 1943, 1946; Rutter, 1965; Wing, 1969). In the authors' clinical experience, this can sometimes occur while the child is absorbed in some activity such as assembling constructional toys or making lines and patterns of objects. The words spoken are irrelevant to the activity and not an aspect of imaginative play. Parents listening in may be able to deduce the events of a school day and things heard at home may be repeated at school. Words spoken loudly and with emphasis are the most likely to make an impression and to be repeated (Hermelin & O'Connor, 1970). This means that much of the echoed speech may consist of scoldings and expletives, and can cause considerable social embarrassment when spoken in public. A special voice different from the child's usual one may be used. Sometimes this can be identified as copied from someone else, but sometimes the source cannot be traced.

Appropriate Use of Stored Phrases. Meaningless echolalia may be the only kind of speech that is acquired, but a proportion of the children reach the next stage, which is the *appropriate* use of phrases copied from others. The child usually begins by using his store of phrases to make requests. He reproduces exactly the words which he associates with occasions when his wants were satisfied. He therefore asks for a biscuit by saying, "Do you want a biscuit?" if this is what his mother says before opening the biscuit tin. The use of "you," "he," or the child's own name, instead of "I," has been interpreted as an unawareness of personal identity (Bettelheim, 1967; Creak, 1961). The fact that there is a high correlation between pronoun reversal and echolalia suggests rather that the former is a consequence of the latter (Rutter, 1965; Wing, 1969). Parents and teachers may utilize the tendency to echolalia to teach the use of "I." In a minority of autistic children, understanding of the use of pronouns eventually dawns and reversals diminish or disappear. In the rest, the phrases containing "I" which have been specifically taught (such as, "Please, can I have . . .?") are used appropriately, but in other situations copying of the "you" form still occurs.

The children's tendency to use echoed phrases, especially those that were first connected with an object or an event, can produce some strange effects. Kanner (1946) described a child who always said, "Don't throw the dog off the balcony," to check himself from doing something wrong. This could be traced back to the time when his mother said the phrase with some irritation when he persisted in throwing his toy dog from the balcony of their hotel room.

Abnormalities in Spontaneous Speech. In parallel with, or occasionally replacing, the echolalia, some of the children produce a varying amount of spontaneous speech. This can often be recognized by the great effort with which it is produced and the immaturity or, in many cases, the abnormality of grammatical constructions. The immaturities are those described in the development of speech of young normal children (Jesperson, 1922; Brown, 1965) but they continue much longer than normal. One example is that of an autistic child who, by the age of nine, grasped the rule that present participles are made by adding "ing" to the verb root and, like a much younger normal child, applied this to all situations. She described a picture of a man smoking a pipe as "Daddy piping?" and of a boy blowing bubbles as "boy bubbling." The same child later observed that people ended some sentences with phrases like "isn't it?" She then added these indiscriminately, producing comments such as "We were sad, wasn't it?" and "She was a good girl, won't they?"

Abnormalities of grammatical construction like those in children with developmental receptive speech disorders are present in some speaking autistic children (Rutter, 1965). Wing (1969) found that just over half of a

group of 20 speaking autistic children showed these problems in varying degrees of severity. They dropped prepositions, conjunctions, and pronouns from phrases ("go walk shops") or else used them incorrectly ("you sit for chair in table"). Letter order in words and word order in sentences were confused ("pasghetti" for spaghetti; "pladding ploo" for paddling pool; "put salt it on"; "have you shake-milk"). Words of similar sound or related meaning were muddled ("teapotmental" for "departmental"; "on" instead of "off"; "sock" instead of "shoe"; "mummy" instead of "daddy"). In some cases the children described objects by their use ("sweep-the-floor" for broom; "make-a-cup-of-tea" for kettle; "Mrs-Mend-a-Toof" for the dentist) or else invented words of their own ("cooshin" for stewed apples; "diddle-up" for shoe).

There is a marked tendency for the contraction of phrases and even words down to the barest possible minimum. One child, when asked what he had done that day, said, "Hut stick walk," meaning he had gone for a walk to a hut and had found a stick on the way. "Home after bread" meant "Can we go home after we have bought some bread?" and "One more" was used to mean "I am tired of this task and will do one more thing before I stop." When pressed very hard, the child could produce longer phrases but always used this shorthand if no one corrected him.

A small proportion of autistic children eventually acquire the ability to use the rules of grammar correctly. A few children, though the onset of speech may be delayed, begin by talking in complete sentences. In other cases, some of the characteristic speech problems are seen in mild form and then disappear.

Despite the normality of their grammar, the autistic children in this group show their underlying handicaps through the content of their speech. They are still peculiarly restricted in the range of their conversation. Close acquaintance with them shows how much they, too, rely upon stereotyped phrases and repetition when they talk. Conversing with them is rather like holding a discussion with a well-programmed computer. They are able to exchange concrete pieces of information about subjects that interest them, or else ask a series of questions, but once the conversation departs from this simple level the autistic child or adult becomes lost and may withdraw from social contact. There is a tendency to choose words without any feeling for colloquial speech (for example, "I wish to extract a biscuit from the tin"), which gives an air of pedantry. This is exacerbated by the lack of variation in tone of voice. If the autistic person has a special interest, he is inclined to talk about this *ad nauseam* but without actually being able to discuss and explore any new angles on his subject. The same pieces of information tend to recur whenever the same subject is raised. One young man, when tele-

phoning his aunt, always began by saying, "This is Charles Smith, your nephew, speaking." He liked music and enjoyed talking about it but his contribution invariably consisted of a list of all the records he owned and all the conductors he had heard, although his grammar was impeccable. He was unable, for example, to say why he enjoyed the interpretation of a particular piece of music by one conductor more than another, although he knew which recording he preferred.

As mentioned previously, the nonverbal as well as the verbal aspects of communication are as poorly developed in this group as in more handicapped autistic children. This, combined with their apparent ability to use speech normally, can be very puzzling to other people who sense that something is wrong but are unable to define precisely what gives this impression of strangeness.

The Understanding of Speech. There is, in most autistic children, a marked lack of interest in speech. In the early years some of the children show no response at all, even when their parents speak to them. They may later begin to understand a few single words which have specific associations. At this stage, parents may complain that their child understands what he wants to, because they know that he responds when, for example, they say the words *chocolate* or *orange juice* but ignores his parents when they give him instructions. Careful observation shows that the children's understanding is genuinely limited and that they have learned the meaning of a few words through a process of accidental operant conditioning because these words are closely connected with rewards, especially food.

If comprehension improves with increasing age, it becomes clearer that the children perform poorly because of their language impairments and not with intent. They try to obey instructions but make characteristic mistakes, such as the child who was sent upstairs to fetch the pullover from the chair in the bedroom and came down with the chair.

The growth of understanding of speech is typically slow. Severely retarded autistic children may never develop any awareness of the meaning of speech. Other children who are less handicapped develop comprehension to a varying degree.

The group of children who make the most progress and who develop grammatically normal speech have good understanding for all practical everyday purposes, but show their remaining handicaps when they become involved in conversation on complex, particularly abstract, issues outside their own limited experience.

Even the children who do develop enough comprehension of speech for simple practical purposes still show many problems. Replies to questions tend to be concrete and limited to the here and now. Thus a child may

be able to give a list of items in response to a simple question ("What did you have for dinner?" "Meat and cabbage and potatoes and gravy and salt and jam tart and custard and orange juice and cup of tea"), but it may be virtually impossible to obtain a reply to inquiries concerning his own feelings or his likes and dislikes.

Autistic children often have difficulty in understanding when they are asked to make a choice. If they are echolalic, they may automatically repeat the name of the last object mentioned whether or not it was their preference. They show by their behavior that they have strong likes and dislikes but they fail to understand the meanings of sentences that ask them to choose.

Words tend to be used and responded to in a limited, sometimes pedantic, way (Rutter, 1965; Gould & Wing, unpublished). An autistic child who always referred to the dog's dinner plate as a "dish" was confused when asked to put some scraps in the dog's "bowl." She solved the problem by giving the food to the dog in the washing-up bowl.

Slapstick comedy and simple, obvious jokes involving words may be much enjoyed, but humor depending upon the multiple associations of words is greeted by blank incomprehension or by a totally literal interpretation without any realization that the anecdote was intended to be funny (Dewey, 1973).

It is not surprising to find, in clinical experience, that idiomatic expressions can be confusing for even the brightest autistic child, and parents and teachers learn through experience to choose their words with care. For example, one child was terrified when her mother used the familiar phrase "crying her eyes out." Another, when asked if he had lost his tongue, started anxiously searching for it.

Bartak et al. (1975) pointed out that the autistic child's biggest problem is in understanding and using those parts of speech which change with the context and with the speaker, such as pronouns and prepositions. These words describe relationships rather than concrete objects or events. The tenses of verbs also have the disconcerting habit of changing with circumstances and autistic children have problems with these as well. Jesperson (1922) discussed the words that change their meaning acording to the situation, which he called "shifters," and he described the problems they present for young normal children who are just learning to speak. The difficulties are more severe in autistic children and tend to be permanent rather than temporary, but may not be different in kind.

The authors have noticed, through their contact with families, that parents often develop a way of communicating with their autistic children which circumvents some of these problems. They give instructions one at a time; they avoid complex grammatical constructions; they supplement with concrete demonstration and gesture; they speak clearly, loudly, with a rising

inflection; they repeat as often as necessary and know that they have to allow time for the message to sink in and be understood.

Pronunciation. Problems of pronunciation are common in young autistic children (Rutter, 1965). Wing (1969) found that these were present in three-quarters of a group of 20 speaking autistic children when they were under 5 years old. There was some improvement with increasing age. The difficulties are like those found in some young normal children and in children with developmental expressive speech problems. There may be a marked contrast between the clearly enunciated echolalic speech and the poorly pronounced spontaneous speech.

The problems vary in severity in different children. Some may be unable to produce any intelligible words, some may cut off the beginnings or ends of words ("wee" for "sweetie"; "na" for Ribena; "bi" for bicycle), while others have comparatively minor problems with only certain sounds ("doup" for "soup"; "glubs" for "gloves"; "fumb" for "thumb"). This aspect of speech, in some autistic children, may be more severely affected than comprehension. There are, however, some who have never shown any difficulties with pronunciation.

Lack of Inner Language

Poverty of development of inner language is an important characteristic of autistic children. In the early years this is shown by the quality of their play. Most young autistic children handle toys and other objects as if they are seeking sensory stimuli. They do not use them for their proper purpose or for imaginative play. They may be able to do jigsaw puzzles and assemble constructional toys, so long as these require only visuospatial or mechanical skills and not imaginative understanding.

A very few autistic children do reach the stage of imitative play. They may line up their dolls and talk to them as if they are playing school, but this tends to be an exact repetition of their own experiences and does not contain any novel invention.

The more competent children may learn to read but parents often complain that their children take no pleasure in this activity. Those who read from choice tend to use this skill to acquire more facts about the subjects that especially interest them. Works of fiction have little appeal, probably because a rich inner life, dependent upon inner language, is necessary for their enjoyment.

Parents of the brighter autistic adolescents are often worried because they see no signs of appropriate planning for the future and no interest in the realities of adult life. This type of foresight depends upon the existence of inner language which can be used for thinking and planning.

THEORETICAL IMPLICATIONS

In the light of the definition given at the beginning of this article, autistic children could be said to have impairments affecting all aspects of communication, not just speech or language. This may sound simple in theory, but in practice there are many difficulties in defining the nature of these impairments, because of the remarkably wide variation to be found in the severity with which the autistic behavior pattern is manifested in different children. Each time it seems that the essence of the problem has been grasped, and that the primary features of the syndrome can be defined in such and such a way, other children are found who do not have these particular features but who clearly show the behavioral patterns of early childhood autism.

Formation of Concepts

At the lower end of the scale of severity, among the children who are severely mentally retarded as well as showing autistic behavior, there are some who appear to have developed no concepts at all. They show no sign that they differentiate among the people with whom they come into contact and they cannot perform the simplest task requiring any kind of classification. It is tempting to explain their lack of response, their stereotyped movements, and other abnormal behavior by their total inability to comprehend their environment.

The majority of autistic children, however, *are* able to form some concepts. These may be limited to the simple ones of size, shape, color, and number, but, in the brighter children, the concepts are sufficiently advanced to allow for the correct classification of the more familiar contents of the environment, including people, other animals, plants, and means of transport, and may even include such complicated abstractions as the characteristics of different human age groups.

Problems arise, even for the most able autistic children, at the level where concept formation depends upon the ability to *manipulate* instead of just storing linguistic symbols.

Comprehension and Use of Symbols

Among the most severely impaired autistic children, there are some who have no ability to understand or use symbols. These obviously include the children who have no demonstrable concepts, but there are other children who can, for example, match size, color, or shape when shown how by

concrete demonstration, but who do not seem to have any appreciation of even the simplest symbols in whatever sensory modality they are presented. They do not respond to their own names or to any other words or gestures. It may be possible to condition some limited response to a simple stimulus but nothing higher than this can be achieved. These children are presumably unable to store or reproduce even the simplest linguistic codes.

Children who have meaningless echolalia seem to be able to store the sounds of words and to reproduce them in vocal form when the appropriate stimulus recurs, but without any understanding. The process is an automatic response and not a symbolic activity.

Echolalia used purposefully may indicate that the child concerned treats each whole phrase as an indivisible symbol for a person, object, or event. There is no recombination of the individual words to form new phrases.

Those children who produce at least some spontaneous, nonechoed speech are clearly using words as symbols. This can occur at different levels of complexity, but even the brightest autistic children and adults tend to be limited and concrete and inefficient in their response to and use of words.

Comprehension and Use of Grammatical Rules

The difficulties which many speaking autistic children have in understanding and producing grammatical language have already been described in some detail. The problems are very similar to those found in children with developmental receptive speech disorders (Wing, 1969) and it could therefore be suggested that developmental "aphasia" was one of the essential impairments in early childhood autism. Its frequent presence in the condition is of considerable importance when considering the possible etiology, but developmental receptive speech disorders can occur on their own without the additional features of the syndrome of early childhood autism. The main differences between autism and developmental aphasia stem from the fact that purely receptive aphasic children can understand and use nonspoken (for example, gestured or written) language, whereas the impairments of autistic children affect *all* forms of communication.

It might be suggested that autistic behavior results from a combination of developmental speech disorders plus equivalent disorders affecting the comprehension and use of language expressed in nonspoken ways. This seems a plausible hypothesis but it cannot be accepted without qualification, since the abnormalities found in the developmental receptive speech disorders are not present in all autistic children. There is a small group of children with a clear history of the classic autistic syndrome who, at least when seen in later childhood, understand and produce sentences without any evi-

dence of problems in using grammatical rules. Despite this apparent competence, conversation of more than a few minutes duration with such a child or adult will bring out very marked limitations in the way he uses language.

The Central Problem

The central problem, present in even the most mildly handicapped autistic people, appears to be a specific difficulty in handling symbols, which affects language, nonverbal communication, and many other aspects of cognitive and social activity.

Ricks's work suggests that, in normal children, the first sound-labels, like the preverbal vocal signals indicating emotional states, owe virtually nothing to social reinforcement. These sound-labels do not necessarily relate to objects pointed out to the child, or to the objects whose labeling might be expected to secure parental approval. The sound used may be unlike any real word and may be adopted by the parents before they teach the child the socially accepted word. Furthermore, when generalization occurs and this label is attached to other objects, the child often uses a method of classification different from that adopted by the adults in his environment. For example, one normal child had the same sound-label for light bulb, airplane, moon, and bird.

Ricks postulated that the growing normal brain is organized so that it is constantly scanning, checking, and looking for similarities and also so that labeling the concepts derived from this process is an inborn activity. The earliest categories seem to be self-generated but the criteria for classification are constantly changing in the light of experience, including conversation and social interaction.

This mechanism for scanning, classifying, and reclassifying may well be the basis of the later development of the ability to organize verbal symbols according to sets of grammatical rules which change and become more complex as the child matures.

The concept of inner language fits neatly into this formulation. It has already been defined as the store of concepts in coded (symbolic) form which grows as the child acquires competence in understanding and using language. In the normal child and adult, the symbols in the store must be readily available for the purpose of comparison with current experiences and must be modifiable in the light of new information. The acquisition of such a store of symbols allows the child to form new categories (concepts), not only from concrete experiences, but also by recombining and reshaping ideas already stored in symbolic form. Thus one can imagine a series of new abstractions based on previous abstractions, restricted only by the capacity

of the person concerned to marshal and handle all the necessary coded material. The practical relevance of these abstractions can be tested by a return to concrete experience, but there is no absolute limit to the possibilities of abstract theorizing.

The process of language acquisition, if it occurs at all, seems to be quite different in an autistic child. It can be suggested that, in such a child, the mechanism underlying the normal active scanning, checking, and classifying of experience is either absent or severely limited. In consequence, words (if they are acquired at all) are learned passively by operant conditioning, instead of as an integral part of an active "processing" of experience.

As the normal child matures, the words in his vocabulary subtly expand and change their meaning. They acquire overtones and ambiguities as well as their original connotation. For an autistic child, words seem to retain the precise meaning they had when first learned. Thus errors in naming and classifying tend to be perpetuated for many years instead of being rapidly modified as they are by a normal child. Although they may be able to understand and use verbal symbols for practical purposes, autistic children and adults, however high their tested intelligence, do not seem to be aware of the undertones and overtones, the many associations, some clear and obvious, others fleeting, hard to grasp, but none the less capable of evoking ideas and emotions, which give words the power and significance they have for normal people. An autistic child lacks any feeling for the poetry and the humor of language, even when his grasp of vocabulary and grammar is adequate.

The problem with inner language can be predicted from this hypothesis. Autistic people do not seem to be able to use their store of concepts in code in order to modify their ideas or to form complicated abstractions. As has been emphasized throughout this discussion, it is not a question of an absolute lack of abstracting ability. Apart from the profoundly retarded children with autistic behavior who appear to have no concepts at all, most autistic children can classify visually presented material, at least on a few simple variables such as form, color, and size (Wing & Gould, unpublished). Those who are only moderately or mildly handicapped may have the ability to abstract on the basis of remembered experience, providing that this does not involve any complicated associations. For example, one very competent autistic child was able to choose the cheapest offer when buying groceries and could go to more than one shop to find the best bargain, showing that he could retain and use his recent observations.

The problems arise when such children or adults have to make further abstractions from material that is already abstract and to appreciate complex relationships among a series of different categories held in the

mind. This is the function of inner language in the normal person—shown for example, in the appreciation of subtle verbal humor, the expression of a reasoned opinion on any subject, working out the future consequences of a series of events, or inventing an imaginary story. These skills are all virtually unattainable by autistic people. On the evidence described earlier in this paper, they appear to have especially severe problems in understanding other people's feelings because this requires the reading of many subtle nonverbal signs which have to be interpreted, linked to the context, and matched up with past experiences of the particular way in which people show emotions. One finds autistic adults who can, for instance, tune a piano to an unbelievable degree of accuracy, but cannot hold down a job because of their total social naiveté, arising from their inability to understand social cues.

The other part of the picture of early childhood autism, and one which allows some measure of compensation for the basic impairments, is the excellent memory which characterizes those who are moderately or mildly handicapped (Kanner, 1943). From their observations, in both clinical and research work, the authors have the impression that autistic people store experiences in the "memory" exactly as they occurred, as programs are stored in a computer, and can reproduce them unchanged in response to the appropriate stimulus. For example, some autistic people can do lengthy numerical calculations in their heads and a few can play chess, though usually not creatively. These activities involve the use of symbols, but in each case they follow strict, inflexible rules which, once learned, can be applied without the need for variation. The type of memory described would be of obvious advantage in these fields. Autistic children in school may appear to be making good progress because they can reproduce, on request, virtually anything they have learned from textbooks. When they reach the stage at which they are asked to discuss the implications of the facts they have learned, their handicaps become apparent.

The pleasure and excitement which autistic people find from listening to music and looking at symmetrical or regularly repeated patterns is probably related to these basic impairments and the remaining abilities. It may be that, although they cannot derive interest and satisfaction from stories, poetry, new ideas, and all the other activities needing a wealth of associations for their appreciation, the autistic persons' high level of ability to remember simple patterns rather than meanings allows them to enjoy repetitive experiences. Ricks's observation that young preverbal autistic children sometimes precisely imitated their own vocalizations which had been recorded and played back to them (a response never observed in normal babies) may be another example of the interest in a *pattern* of sound as opposed to its meaning.

It can be argued that severely mentally retarded people are also poor at verbal abstractions and reasoning. In order to deal with this point, it is necessary to emphasize that the term *mental retardation* is a general one which covers many different patterns of impairments. In particular, three patterns need to be distinguished here (Wing, 1974). In the first place, there is a group of very severely retarded children who are at the preverbal level of development but who differ from autistic children in that *all* their functions, including motor skills, are equally retarded. This group should be differentiated from the second group comprising those with little or no language development but whose motor and visuomotor skills are comparatively more advanced. These are the children who have either the full picture of childhood autism or who have marked autistic features as well as mental retardation.

Finally, there is a third group of children without autistic features in whom language has developed to about the same level as would be expected from their motor skills. These children can use verbal symbols more or less as flexibly as a normal child of the same language age. Words have some associations for them, as shown by the appreciation of the cruder forms of verbal humor in the older children; they can give opinions and discuss ideas among themselves, albeit at an immature level; they can give a narrative account of their experiences and tell an imaginary story, even if this consists of a string of loosely associated events without an overall plot. All these skills can be observed, for example, in older children with uncomplicated Down's syndrome with an IQ between 30 and 50, but would be beyond the grasp of classically autistic adults even with an IQ in the normal or superior range (Wing & Gould, unpublished).

The relationship between the autistic syndrome and normality is also of interest. To a certain extent, all normal people have to rely upon automatic rather than thought-out responses in order to carry out routine activities without wasted effort—for example, the polite exchange of standard remarks about the weather, or the bus conductor's request for "Any more fares please?" Young normal children enjoy the precise repetition of songs and stories and may have uncannily accurate memories for certain things that interest them. The point is that normal people, unlike those who are autistic, can think spontaneously and flexibly as well as produce habitual responses. It may be that there is a continuum between mild autism and normality, and that the position of any individual on this continuum depends upon the degree to which he is able actively to categorize his experiences and call, in a controlled way, upon all the associations as opposed to storing them in the precise form in which they first occurred. Perhaps the most gifted normal people have both types of ability developed to a high degree. The characteristic problems in using language found in autistic chil-

dren can throw some light on language development in normal children. In the opinion of the present authors, the purely behaviorist model does not provide a satisfactory explanation for the ability, observed in normal children, to categorize objects and events in the environment and then to enlarge and change the system of classification in the light of new experiences. This behavior strongly suggests that the human brain actively imposes order on incoming information and is not just a passive recipient waiting to be conditioned into storing the appropriate data.

The latter description does, however, fit the pattern of language learning in the autistic child, who provides a sad demonstration of the inadequacy of this method of functioning. Even the most competent autistic child or adult is limited to those concepts which can be learned through the conditioning provided by his own practical experience. This experience can be enlarged by sympathetic and skilled teaching, but the inevitable result is a patchy and distorted picture of the world.

Brown (1965), in his discussion of the process of language acquisition in normal children, suggested that language is but one example of the way in which human beings are able to organize all information according to complex rules. He pointed out the analogy between the rules governing language and those governing social behavior. This idea is of considerable relevance in the present context, since clinical observation shows that the inflexibility characteristic of an autistic child's language spreads to all aspects of his life. It is particularly clearly demonstrated in his inability to understand and use the rules of social conduct, thus providing some indirect support for Brown's hypothesis.

Even for the most competent autistic adults, the daily program depends upon the observance of a series of habitual actions and any unexpected occurrence is liable to cause confusion and anxiety. Sometimes an adult who has been autistic as a child is able to live an independent life because he has unvarying routines for self-care, for getting to work and carrying it out, for evening interests, and even for holidays. People of this kind are usually known by their colleagues and neighbors to be eccentric and rather unsociable but utterly dependable. It is when changes in the environment occur which directly affect their routines that their basic lack of adaptability becomes a problem, which other people have to solve for them.

It must be emphasized that the foregoing is a tentative formulation of the central impairment underlying autistic behavior and not an etiological explanation. Many suggestions as to the basic causes of autism have been put forward, but the theories are not worked out in sufficient detail to show precisely how the problems of language development, communication, and use of symbols could be produced.

Even if there is an impairment of the ability to classify and symbolize experience, as suggested in this paper, it is not clear whether this can explain

all the abnormalities of verbal or nonverbal communication in autistic children. Nor is it clear how such an impairment can be related to the other aspects of the syndrome—namely, the abnormal responses to sensory input, such as oversensitivity to sounds or fascination with light; the unusual movements, such as jumping and tiptoe walking; the difficulties with motor imitation; and the various peculiarities of autonomic function, vestibular control, and physical development, all of which can be observed in many of the children.

All that can be said with certainty at the present stage is that abnormalities in the handling of symbols and in the development of language and other forms of communication are prominent features in early childhood autism. They may be the primary problems which explain all the other aspects of the syndrome, but, until more facts are available, the question must remain open.

The formulation suggested by Wing and Wing (1971) still seems both reasonable and practical. Early childhood autism can be regarded as a condition in which a number of specific impairments occur in combination, giving rise to a recognizable pattern of disturbed behavior. Partial forms of the syndrome can occur as well as the complete picture and both partial and complete forms can be associated with other types of handicaps. Of all the impairments, those affecting language and communication in general have the greatest importance in practice, since they determine the type of education and management needed by the child.

REFERENCES

Argyle, M. Non-verbal communication in human social interaction. In R. A. Hinde (Ed.), *Non-verbal communication.* London: University Press, 1972.

Bartak, L., Rutter, M., & Cox, A. A comparative study of infantile autism and specific developmental receptive language disorders: I. The children. *British Journal of Psychiatry,* 1975, *126,* 127-145.

Bettelheim, B. *The empty fortress.* London: Collier-MacMillan, 1967.

Brown, R. *Social psychology.* London: MacMillan, 1965.

Churchill, D. W. The relationship of infantile autism and early childhood schizophrenia to developmental language disorders of childhood. *Journal of Autism and Childhood Schizophrenia,* 1972, *2,* 182-197.

Conn, P. The interrelations of alternatives in symbolic representation. *Disorders of Communication,* 1974, *9,* 92-101.

Creak, E. M. (Chairman). Schizophrenic syndrome in childhood; progress report of a working party. *Cerebral Palsy Bulletin,* 1961, *3,* 501-504.

Crystal, D. Prosodic systems and language acquisition. In P. Leon (Ed.), *Prosodic feature analysis.* Paris: Didiet, 1970.

Cunningham, M. A. A five year study of the language of an autistic child. *Journal of Child Psychology and Psychiatry,* 1966, *1,* 143-154.

DeMyer, M. K., Barton, S., & Norton, J. A. A comparison of adaptive, verbal and motor profiles of psychotic and non-psychotic subnormal children. *Journal of Autism and Childhood Schizophrenia,* 1972, *2,* 359-377.

Dewey, M. A. Vocational guidance for former autistic children. *Communication,* 1973, *4,* 67-70.

Egan, D., Illingworth, R. S., & MacKeith, R. C. *Development screening 0-5 years,* Clinics in Developmental Medicine No. 30. London: Heinemann, 1969.

Gould, J., & Wing, L. Language and social interaction in mildly autistic children and young adults: A clinical report. Unpublished.

Hermelin, B., & O'Connor, N. *Psychological experiments with autistic children.* London: Pergamon, 1970.

Ingram, T. T. S. Specific developmental disorders of speech in childhood. *Brain,* 1959, *82,* 450-467.

Ingram, T. T. S. Disorders of speech in childhood. *British Journal of Hospital Medicine,* 1969, *2,* 1608-1625.

Ingram, T. T. S. The classification of speech and language disorders in young children. In M. Rutter and J. A. M. Martin (Eds.), *The child with delayed speech.* Clinics in Developmental Medicine No. 43. London: Heinemann, 1972.

Jesperson, O. *Language—Its development, nature and origin.* New York Henry Holt, 1922.

Kanner, L. Autistic disturbances of affective contact. *Nervous Child,* 1943, *2,* 217-250.

Kanner, L. Irrelevant and metaphorical language in early infantile autism. *American Journal of Psychiatry,* 1946, *103,* 242-246.

Lenneberg, E. H. *Biological foundations of language.* New York: Wiley, 1967.

Levett, L. M. *A method of communication for non-speaking severely subnormal children.* London: Spastics Society, 1970.

Lotter, V. Epidemiology of autistic conditions in young children: I. Prevalence. *Social Psychiatry,* 1966, *1,* 124-137.

Lotter, V. Epidemiology of autistic conditions in young children: II. Some characteristics of the parents and children. *Social Psychiatry,* 1967, *1,* 163-173. (a)

Lotter, V. *The prevalence of the autistic syndrome in children.* Ph.D. thesis, University of London, 1967. (b)

Lovaas, O. I., Berberich, J. P., Perloff, B. F., & Schaeffer, B. Acquisition of imitative speech by schizophrenic children. *Science,* 1966, *151,* 705-707.

Lyons, J. Human language. In R. A. Hinde (Ed.), *Non-verbal communication.* Cambridge: Cambridge University Press, 1972.

MacKay, D. M. Formal analysis of communicative processes. In R. A. Hinde (Ed.), *Non-verbal communication.* Cambridge: Cambridge University Press, 1972.

McNeill, D. Developmental psycholinguistics. In F. Smith & G. A. Miller (Eds.), *The genesis of language.* Cambridge, Massachusetts: M.I.T. Press, 1966.

Pronovost, W., Wakstein, M. P., & Wakstein, D. J. A longitudinal study of speech behaviour and language comprehension of fourteen children diagnosed as atypical or autistic. *Exceptional Children,* 1966, *33,* 19-26.

Ricks, D. M. *The beginning of verbal communication in normal and autistic children.* M. D. thesis, London, 1972.

Ricks, D. M. Vocal communication in pre-verbal normal and autistic children. In N. O'Connor (Ed.), *Language, cognitive deficits and retardation.* London: Butterworths, 1975.

Rutter, M. Speech disorders in a series of autistic children. In A. W. Franklin (Ed.), *Children with communication problems.* London: Pitman, 1965.

Rutter, M. Clinical assessment of language disorders in the young child. In M. Rutter & J. A. M. Martin (Eds.), The child with delayed speech. Clinics in Developmental Medicine No. 43. London: Heinemann, 1972.

Rutter, M., Bartak, L., & Newman, S. Autism—a central disorder of cognition and language? In M. Rutter (Ed.), *Infantile autism: Concepts, characteristics and treatment.* London: Churchill, 1971.

Rutter, M., & Bax, M. Normal development of speech and language. In M. Rutter and J. A. M. Martin (Eds.), *The child with delayed speech.* Clinics in Developmental Medicine No. 43. London: Heinemann, 1972.

Rutter, M., Greenfield, D., & Lockyer, L. A five to fifteen year follow-up study of infantile psychosis: II. Social and behavioural outcome. *British Journal of Psychiatry,* 1967, *113,* 1183-1189.

Rutter, M., & Lockyer, L. A five to fifteen year follow-up study of infantile psychosis: I. Description of the sample. *British Journal of Psychiatry,* 1967, *113,* 1169-1182.

Schaffer, H. R. Early social behaviour and the study of reciprocity. *Bulletin of the British Psychological Society,* 1974, *27,* 209-216.

Sheridan, M. D. Playthings in the development of language. *Health Trends,* 1969, *1,* 7-10.

Sheridan, M. D. The child's acquisition of codes for personal and interpersonal communication. In M. Rutter & J. A. M. Martin (Eds.), *The child with delayed speech.* Clinics in Developmental Medicine No. 43, London: Heinemann, 1972.

Sheridan, M. D. *Children's developmental progress from birth to five years:The Stycar sequences.* Windsor, Berkshire: N.F.E.R., 1973.

Skinner, B. F. *Beyond freedom and dignity.* Harmondsworth: Penguin, 1973.

Trevarthen, C. Conversations with a two-month-old. *New Scientist,* 1974, *62,* 230-235.

Tubbs, V. K. Types of linguistic disability in psychotic children. *Journal of Mental Deficiency Research,* 1966, *10,* 230-240.

Vygotsky, L. S. *Thought and language.* Cambridge, Massachusetts: M.I.T. Press, 1962.

Webster, C. D., McPherson, H., Sloman, L., Evans, M. A., & Kuchar, E. Communicating with an autistic boy by gestures. *Journal of Autism and Childhood Schizophrenia,* 1973, *3,* 337-346.

Wing, L. The handicaps of autistic children—a comparative study. *Journal of Child Psychology and Psychiatry,* 1969, *10,* 1-40.

Wing, L. Perceptual and language development in autistic children: A comparative study. In M. Rutter (Ed.), *Infantile autism: Concepts, characteristics and treatment.* London: Churchill, 1971.

Wing, L. Language development and autistic behaviour in severely mentally retarded children. *Proceedings of the Royal Society of Medicine,* 1974, *67,* 1031-1032.

Wing, L., & Gould, J. Speech and gesture in autistic and mentally retarded children: An epidemiological study. Unpublished.

Wing, L., & Wing, J. K. Multiple impairments in early childhood autism. *Journal of Autism and Childhood Schizophrenia,* 1971, *1,* 256-266.