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Communication Development and Its Disorders: A Psycholinguistic Perspective

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Abstract

There is a reciprocal relationship between the study of language disorders and research in normal language development. Recent studies in normal acquisition have led to a model of language development that includes not only linguistic achievements, but the development of social and cognitive abilities that lay the basis for the transition from prelinguistic communication to the use of conventional forms. This model has been applied to the study of developmental disorders of language learning. Such a model allows the more puzzling disorders of language development, such as childhood aphasia and primary autism, to be placed in a framework that predicts language disruption when underlying perceptual, cognitive, or social abilities are lacking. Assessment procedures that can be drawn from the model of language disorders are presented. It is argued that the study of these disabilities is important in the building of theoretical models of intact language processing that specify more precisely the contribution of underlying skills to overall functioning. Questions for future research that serve this reciprocal purpose are discussed.

One of the most frequent presenting problems in children referred for developmental disorders of any kind is a delay in the acquisition of language. Failure to talk at the appropriate age may be the first signal that alerts parents to the fact that their child is different from other children, or it may be the culmination of a long period of vague suspicion that there is something "funny" about the child. In both cases, it is very often the child's lack of speech that finally impels the parents to seek professional help.

Psycholinguistic research into these failures in language acquisition has been of interest not only to those who deal with communicatively impaired youngsters, but also to theorists concerned with the nature of language and the normal course of its development (Itard 1806; Jakobson 1968; Lane 1976). Disorders of language learning have been seen as "natural experiments" in which the usually integrated components of communicative function—motoric, perceptual, intellectual, affective, interactional, and linguistic—can be "teased" apart so that the effect of disruption of one aspect of the system on the others can be seen. In this way, the examination of language disorders has contributed to theoretical models of intact linguistic processing and to the understanding of the complex relations among the biological, psychological, and social forces that result in the normal child's remarkable and apparently effortless facility for picking up language.

At the same time, recent years have seen a tremendous increase in interest in normal language development on the part of clinicians and investigators who work with communicatively impaired children. One reason for this interest is the current explosion in the literature on language acquisition, which was sparked by Chomsky's (1957) formulation of a transformational grammar, a powerful theor-

etical model of the structure of human language. Transformational grammar influenced linguists' conception of their subject in many ways, but it also provided psychologists with testable hypotheses about, for example, the relative complexity of syntactic structures. These hypotheses could be examined by looking at the order of acquisition of these structures during the developmental period. Although transformational notions were eventually abandoned because they failed to take into account either the semantic limitations or the nonverbal communicative bases of early language, nonetheless they played an important role in kindling an intense interest in language acquisition among psychologists. These researchers have collected a wealth of information about the course of communication development and have made important changes in the way it is understood.

The accumulation and dissemination of this information has given rise to a second reason for interest in normal development on the part of clinicians. Understanding more about the nature of language learning has led to a growing conviction that the normal sequence provides the best curriculum guide for teaching language and communication skills to children who have not, for one reason or another, managed to learn them on their own (Lee 1974; Miller and Yoder 1974; Tyack and Gotsleben 1974; Bloom and Lahey 1978; Naremore 1980; Miller 1981). As a result of these mutual concerns, a reciprocal relationship has been established between clinicians and psycholinguists. Clinicians' skilled observations of children with disorders provide data

for psycholinguists to use in constructing theories of the acquisition of language and its role in development, while new data and theoretical formulations on the normal course of language learning give clinicians additional categories for organizing their observations and rationales for designing intervention strategies.

For this reason, it is useful to review what has been learned about the development of communication and to follow the shifts in focus that this research has taken. In this way, it will be possible to formulate the questions for future research that will be of the greatest interest not only for the study of clinical populations, but also for the understanding of the normal child's ability to learn to communicate through language.

Communication Development in Normal Children

The Neonate's Equipment for Language Learning. How is the newborn biologically organized to make use of the linguistic environment that must eventually be assimilated? Certain perceptual abilities appear to be present from the first weeks of life, including special responsiveness to sounds in the frequency range of the human voice (Hutt et al. 1968), a preference for speech over other rhythmic sounds (Butterfield and Siperstein 1974), and a tendency to synchronize movements with pauses in speech (Condon and Sander 1974). In addition, infants as young as 4 weeks of age have been shown to be able to make categorical distinctions between phoneme pairs, such as /b/ and /p/ (Eimas et al. 1971). It seems, then, that the infant comes to the task of

learning language with attentional mechanisms that favor linguistic stimulation and auditory equipment capable of imposing structure on it. This apparently innate organization is not limited to auditory processing, however. As Bornstein (1975) shows, infants divide the visual spectrum, as well, into adult categories, i.e., blue, green, yellow, and red.

Infants also exhibit well-organized social behavior in their first months. Looking, smiling, and vocalizing are put to use by young infants in securing and maintaining caregivers' attention (Ainsworth, Bell, and Stayton 1974). Infants also show early preferences for human faces over other visual stimuli (Fantz 1961, 1963, 1966; Kagan and Lewis 1965). These very early propensities for human interaction will certainly help bond babies to caregivers to ensure the nurturance necessary for survival, as Freedman (1974) suggests. But, in addition, they provide frames for increasingly complex communication routines which will eventually include conventional grammatical communication through language.

Thus, infants begin life with not only attentional preferences for human, linguistic stimulation, but also with social behaviors that can elicit this stimulation. In addition, they impose perceptual structure upon the events they experience. These abilities derive from a set of innate, "hard-wired" systems for processing sensory input. The existence of built-in systems such as these provides enormous economy to the task of learning language. Knowledge of their existence must also lead to questions about their role in later development. To what extent might these early

attentional, perceptual, and social capacities be impaired in language-disordered youngsters? How will their impairment impede later language learning? How can detection of these early deficits improve treatment strategies?

"Conversation" in the First Year of Life. Bruner (1974) has described the role of mother-infant interaction in the "ontogenesis of speech acts." Proto-conversational exchanges between caretakers and babies occur in the context of mutual gaze that is coordinated with interactive vocalizations. Infants and their caretakers look at each other and take turns babbling sounds that the infant is capable of producing (Jaffe, Stern, and Perry 1973). These back-and-forth interchanges may establish the basis for the later development of turn-taking in linguistic conversation.

In addition to learning turn-taking rules, children may be helped to make the transition from the attentional structures with which they come equipped (e.g., figure vs. ground) to the linguistic structures that develop later by early communicative experiences (Bruner 1974). Mothers focus infant attention on self or object in joint attention routines. ("See the pretty ball!") Once joint attention is established, mothers act on or encourage the child to act on the object, usually forming joint action rituals that are repeated over and over in play during the child's early months. ("Here, you take the ball. Good! Now give it back. Give Mama the ball. Good girl! Thank you!") As mothers remark on these ritual, predictable actions, the basic topic/comment structure of human language is repeatedly demonstrated for the child. As the

child participates in the routine through attention, action, and vocalization, progress is made in the ability to distinguish agent from action and from recipient of action—distinctions that will provide the basis for semantic categories and grammatical order relationships. Although it is not clear how much interaction of this kind is necessary for language learning (Snow 1981), early reciprocal routines do appear to provide mothers with an ideal opportunity for embedding the child's actions in a meaningful social context. From this reliable data, the child can form hypotheses about the connections between words and things that can be tested in subsequent interactions. In this way, the child begins the transition from prelinguistic to conventional communication.

Early Communicative Intents. Although children's first words do not generally appear until the beginning of their second year, infants show evidence of initiating communication between 9 and 12 months of age. These nonverbal communications have been found in a variety of studies (Halliday 1975; Bates 1976; Bates et al. 1979) to express the same range of intentions. They are generally limited to requesting objects or actions, rejecting offered objects or activities, and calling attention to objects or commenting on their appearance. These intents are expressed first with nonconventional gestures, such as reaching (for requests) and pushing away (for rejection). Somewhat later, vocalization accompanies the gesture or replaces it, although the range of intentions expressed remains similar until 16–18 months of age. These

vocalizations often contain intonation contours similar to those used by the adults in the child's life (Menn 1978).

Another achievement of this 9- to 12-month period is the beginning of the understanding of words. A few words associated with routine games, such as "pat-a-cake" and naming rituals will be recognized by children who have been playing these games more or less as passive responders up to this point (Bruner 1975). Now merely saying the words ("Let's play pat-a-cake!" or "Show me your nose!") in a familiar context will elicit a spontaneous action from the child (clapping, putting a hand on the nose). Comprehension is limited to these routines, however.

First Words. Conventional use of language begins around 12 months of age, when children usually say their first recognizable words. Around this time, children also show the first evidence of true lexical comprehension, responding appropriately to words outside the context of routine games (Huttenlocher 1974; Sachs and Truswell 1976). During the 12- to 18-month period, there is a rapid increase in both receptive and expressive vocabulary and an increase in successive one-word utterances. The words children learn in this period both name objects—usually those upon which the child acts (Mommy, cookie)—and encode relations among objects (all gone, more). Children also learn social words to be used in rituals such as greetings (hi, bye-bye) (Bloom and Lahey 1978). These first words are used to express ideas such as appearance ("There!"), disappearance ("All

gone!"), or recurrence ("More"), which are related to the child's developing notions of object permanence (Bloom 1973). They generally serve communicative purposes similar to those achieved by the earlier gestures and vocalizations (Halliday 1975).

Toward the middle of the second year, vocabulary size reaches 50 words, and children begin combining words to form two-word "telegraphic" sentences (Brown 1973). These sentences encode a limited range of meanings, such as possession ("Daddy shoe"), location ("sit chair"), and elaboration of earlier expressions of existence ("There doggy"), non-existence ("No milk"), disappearance ("All gone cookie"), and recurrence ("More candy") (Bloom 1970).

Linguistic comprehension in this period is not far ahead of expressive abilities (Bloom 1974). But children in their second year often appear to understand everything their parents say. They achieve this deception by employing a variety of nonlinguistic strategies that allow them to seem to be responding to what parents say, when, in fact, they are responding to what parents do or what they know to be the way things usually happen (Chapman 1978). These strategies include looking at what Mother looks at (resulting in the appearance of understanding object names, e.g., "See the ball?"), doing what is usually done (resulting in the appearance of understanding instructions, e.g., "Brush your hair"), and interpreting sentences as requests for the child to act (resulting in the apparent understanding of complex indirect requests: "Why don't you go close the door for me?").

The period from 18 to 24 months is also the time of important changes in conversational ability. Now children begin to recognize the conversational obligation to respond to speech with speech (Chapman 1981). Children reliably answer routine questions ("Where's the 'X'? What's this? What does the 'X' say?") and acknowledge their partner's comment with their own remark. Youngsters also begin to request information at this time, at first usually by asking for the names of objects. This heuristic use of language marks the beginning of the child's capacity to use words to learn about the world (Halliday 1975).

The Acquisition of Linguistic Structures. The preschool period (from 2 to 5 years) is the time in which the child's language evolves from primitive telegraphic utterances to fully grammatical forms. In addition to rapidly acquiring vocabulary—an average of 8 to 11 new words per day—the child also goes through a process of approximating more and more closely the syntax of the language spoken in the home. There is evidence of the child's active role as a syntactic hypothesis-generator in the frequent occurrence of overgeneralized forms, such as "goed," "comed," and "foots" (Cazden 1968). In these overextensions of the inflectional rules that the child has abstracted from the ambient language, forms are expressed which the child could never have heard. It is clear that children are not making these mistakes by imitating. They are producing novel—albeit wrong—forms by applying generative rules to words that happen to

be exceptions to them.

As the child's grammar becomes more complex, average sentence length increases (Loban 1976; Miller and Chapman 1981). Although rates of increase vary quite widely, children tend to acquire the same syntactic structures when their sentences are approximately the same length (Brown 1973). Mean length of utterance (MLU), then, can be calculated from a sample of spontaneous speech and used to make a reliable prediction of the syntactic rules the normal child will have mastered. As structures in simple sentences approach the adult model, complex sentences using embedded ("Whoever wins can go first") and conjoined ("Then it broke and we didn't have it any more") clauses emerge (Limber 1973; Paul, Chapman, and Wanska 1980). The abilities to encode ideas syntactically ("Daddy's shoe" vs. "Daddy shoe") and to relate ideas within one utterance ("I'll fix it if you give me a bite of your candy") free the child's language from dependence on the nonlinguistic context for interpretation. While an adult had to use knowledge of the child and the situation to interpret "Daddy shoe" (The shoe that's Daddy's? Daddy put on the shoe?), the syntactically marked "Daddy's shoe" is unambiguous and interpretable by anyone.

In addition to changing in syntactic form, children between ages 3 and 5 years also change the ideas that they express in their sentences. While earlier utterances generally described actions and objects that were immediately present, sentence content expands during the preschool years to allow for reference to events remote in time and space (Bloom and

Lahey 1978). The uses to which children put their language also become more diverse (Dore 1978; Tough 1977) to include imaginative, interpretive, and projective functions. In addition, a variety of conversational skills emerge and become refined. Children increase their ability to maintain and add new information to their interlocutor's topic (Bloom, Rocissano, and Hood 1976), to clarify and request clarification of misunderstood utterances (Gallagher 1975), to make their requests politely and indirectly (James 1975; Bates 1976), and to choose the appropriate speech style on the basis of the speaker's role (Sachs and Devin 1973) and the listener's status (Shatz and Gelman 1973).

Increasing comprehension skill is reflected in the expanding number of elements that can be processed in a simple sentence (Chapman 1978). In addition, strategies for comprehending sentences change from relying on knowledge of the way things usually happen (which could lead children to interpret "The dog is patted by the mother" correctly) to reliance on linguistic rules, such as word order (which would lead them to misinterpret "The dog is patted by the mother" by assigning the first noun to be the "doer" as it would be in a simple active sentence, i.e., "The dog pats the mother") (Bever 1970; Strohner and Nelson 1974; Maratsos 1974).

The Elaboration of Language. Although children have acquired most of the sentence structure of their language by age 5 (Menyuk 1963; Tough 1977), syntactic development continues into the school years as children learn devices for elaborating their utterances (Hass

and Wepman 1974) and for condensing more information into sentences by increasing the proportion of dependent clauses in narratives (Loban 1976). Children also gradually learn to use and comprehend the more complex, optional sentence types in their language, such as passives ("The boy was hit by the car") (Baldie 1976; Lempert 1978), and sentence types that violate usual rules for assigning subjects to embedded clauses ("John is easy to see" vs. "John is eager to see") (Chomsky 1969). In addition, they learn to use syntactic cues not only to decode semantic relations within sentences but also to identify the connections between sentence elements and those given previously in the discourse (Paul 1981).

Semantic and conversational abilities also continue to develop during the school years. Vocabulary size is still increasing and new words are now being learned from reading, as well as from conversation. Interestingly, the nature of children's word associations changes around age 7 from syntagmatic (association to words similar in meaning but not in grammatical class) to paradigmatic (association between words of the same class—a noun for a noun, an adjective for an adjective) (Brown and Berko 1960; Ervin 1961). These shifts in association suggest that the school-aged child's "mental dictionary" is being reorganized according to linguistic rather than episodic, or event-based, connections (Nelson 1977; Petrey 1977). School-aged children also gradually acquire the ability to communicate with precision and to take the listener's viewpoint into account in formulating an utterance (Asher 1978).

A final aspect of language that undergoes important developments in the school years is metalinguistic awareness, the ability to use language to talk about language and to examine language apart from the objects and events to which it refers. Children recognize the difference between words and their referents around age 6 (Pease 1981). They use their metalinguistic skills to create words (Clark 1980) and to develop codes and secret languages (Ferguson and Macken 1980), probably in the service of increasing social solidarity among peers during the preteen and teenage periods. Metalinguistic awareness is also important in the development of reading and writing abilities (Mattingly 1972).

Changes in the Focus of Child Language Research

Since the early 1960s, the study of language acquisition has undergone a series of shifts in direction. Chapman (in press) identifies five major shifts that have had important consequences for the study of language disorders. The first involved a change in theoretical models of the motivating force behind developmental progression. While transformational grammar implied that syntactic acquisition proceeds relatively autonomously as a result of the unfolding of innate grammatical capacities, investigators in the early 1970s were forced by their data to examine the semantic limitations they discovered in early speech in terms of developing cognitive abilities (Sinclair 1970, 1971, 1973; Bloom 1971; Slobin 1973; Beilin 1975; Cromer 1976). In the latter half of the dec-

ade, it became clear that simple cognitive prerequisites for specific linguistic skills were not easy to find (Miller et al. 1980). Attention then shifted to the role of social-communicative skills as the guiding force behind language development (Bates 1976; Bates and MacWhinney 1979; Greenfield 1979; Greenfield and Dent 1979). As a result, interest in pragmatic achievements such as the emergence of communicative intention, turn-taking, topic maintenance, and speech style adjustments to particular social situations became (and continue to be) a major focus of research (for a review, see Rees 1978).

A second shift involved a move away from comparing child language to adult rules. In recent years, attempts have been made to examine primitive utterances not as "mistakes," but as the output of a set of rules that are different from those used by adults to generate sentences. The task has been to describe these child-specific rules and to identify their contexts and scope of application.

Although these child language rules appear to be used with remarkable uniformity (Klima and Bellugi 1966; Brown 1973), there are certainly individual differences in language acquisition. These are now becoming the object of examination (Nelson 1973, 1981; Bowerman 1973). An attempt is being made to understand the diversity of patterns and styles available for normal acquisition and the effects of cultural differences on language learning (Blount 1970; Mitchell-Kernan 1971). A related change in the focus of this research is a shift from the study of macrodevelopment—the broad outlines of acquisition—to

microdevelopment—the detailed histories of the evolution of single rules (Bloom, Miller, and Hood 1975; Menn 1978; Bates et al. 1979). These studies have illuminated the early limitations of linguistic rules and underline the gradual, sometimes effortful process of increasing generalization and the amount of active learning necessary to expand the contexts in which rules can apply.

A final shift that is relevant to work in language disorders was the change from accepting speech (production or expressive language) as the single index of language development to the realization of the importance of investigating language comprehension (Bloom 1974; Ingram 1974; Chapman and Miller 1975, 1980). This shift led to analyses of the relations between the two modes of language and the recognition that the simple notion that "comprehension precedes production" cannot account for many aspects of the child's performance. This discovery has resulted in the building of new and more complex theoretical models of linguistic processing in the language-learning child (Bloom and Lahey 1978).

These changes in thinking about language development have had profound effects on the understanding of childhood language disorders. For example, the shift in emphasis from syntax, alone, to the meaning (semantic) and contextual (pragmatic) aspects of language has allowed clinicians to identify and describe pervasive deficits in communicative competence and to look at the conceptual and social abilities that may be basic to the failure to acquire language. As another example, exam-

ining the child's own rules, rather than identifying mistakes, allows investigators to compare children who suffer from developmental disorders, not to adults, but to their normal peers and to decide whether their language is delayed (similar to that of a younger, normal child) or deviant (showing an atypical system of intermediary rules). A review of current conceptions of communication disorders will reveal the extent to which they have benefited from the dialogue with research in normal development.

Current Views of Developmental Disorders of Communication

The model of language acquisition presented here implies that the development of communicative competence is not a strictly linguistic achievement. Rather, it is the result of the complex coordination of a set of interacting systems including those involved in perceptual, cognitive, and social functioning, to name but a few. The model predicts that breakdown at any point in this finely tuned orchestration will result in impaired language ability. Certain of these impairments can be traced easily to malfunctions in one of the systems subserving language development. Communication problems associated with congenital hearing impairment constitute an example. Here, failure to talk and understand speech is simply a result of lack of access to the auditory signals that contain linguistic information. Other failures to learn language are less easily traced to specific causes. Mentally retarded youngsters, for example, will usually acquire language commensu-

rate with their mental age. Yet, in some cases, these children have language deficits that exceed their cognitive limitations. These deficits may encompass not only linguistic structures but more basic failures of communicative intention. Other children without any apparent sensory or intellectual dysfunction nonetheless fail to learn to talk, or learn exceedingly slowly. In these youngsters, too, social-communicative deficits may accompany the linguistic disorder. The severity of these disabilities can vary from total absence of both language and communicative function to slight delays relative to the child's overall mental age. Idiosyncratic or deviant structures may also be present.

Two main categories can be identified within this more puzzling class of language disorders: childhood aphasia and primary autism. Although the two have similar features, there are several characteristics that distinguish between them (Cohen, Caparulo, and Shaywitz 1976; Fay and Schuler 1980). Children who can be labeled "aphasic" generally seem perfectly normal, healthy, and social during their first 2 years of life. Parents become anxious about them only when, by the end of the second or during the third year of life, they are not talking or are talking very little. Many of these children create their own gestural system for augmenting their limited linguistic communication skills, and some benefit from instruction in Total Communication using American Sign Language. Although they may become frustrated and disturbed about their communication difficulties and may develop behavioral problems as they become older, they

do establish meaningful social relationships and have a consistent history of doing so. In addition, they generally can engage in purposeful play with objects and show evidence of the ability to imagine and pretend.

On the other hand, those children categorized as autistic not only fail to talk during the preschool period, they also have a long history of poor or nonexistent social relationships—even with their often devoted parents. They show poor motor imitation skills, their play with objects is disorganized, and personal gesture systems rarely serve any communicative function. When autistic children do develop language, it has peculiar characteristics, such as pronoun reversals, protracted echolalia, the use of words for highly personalized meanings, and a deliberate, stiff quality of speech with unusual intonation contours. Although aphasic children often develop distractibility, aggressiveness, and social withdrawal that may make them appear autistic-like as they become older, their language will generally sound like that of a younger, normal child and will not display these peculiarities.

There may, of course, be mixed syndromes of these disorders, and children may experience multiple handicaps, such as a coincidence of hearing impairment and developmental aphasia. In an interactive model of language development such as the one presented here, any component or components of the system can malfunction, and these malfunctions will result in language disorders that vary in their features depending upon the underlying capacities that are disturbed. Despite this

possibility, developmental aphasia and primary autism do exist as distinct clinical entities that can be identified in their "pure" form in some children and recognized as components of a disorder in others. The present model would postulate that each of these syndromes arises from specific dysfunctions in one of the developing systems that contribute to intact language use, even though the precise nature of the dysfunction has not yet been identified. Such a model, derived from the interactive conception of language development that has arisen from recent research, allows the entire spectrum of language disorders to be placed in an integrated framework.

In addition to providing an inclusive structure for viewing the disorders of language learning, the shift in language acquisition studies away from syntax, alone, toward broader aspects of communicative competence makes communication assessment possible even in children who are not talking. Measures of nonverbal communicative function drawn from observations of preverbal communication in normal infants can now be applied to analyzing the interactions of children without overt language. In this way, more precise diagnoses can be made at an early point in the child's development. (See Appendix for a sample interview for assessing the history of development of prelinguistic communication skills.)

The current emphasis of research on normal children is on discovering the child's own rule system; that emphasis has also provided insights into disordered children's behavior. One example

is Fay's (1969, 1973; see, also, Fay and Schuler 1980) analysis of echolalia in autism. Instead of assuming that echolalia is a "mistake" in the use of language, Fay explores the purpose it serves for the child. He concludes that echoing gives the linguistically incompetent youngster *something* to say in order to continue a conversation. Echolalia appears, then, to serve an important phatic function for the autistic child—it keeps the lines of communication open and prolongs interaction. This analysis has important implications for the treatment of echolalia in the therapeutic setting. Understanding its function will make clinicians more wary of attempting to extinguish echolalia before more effective means of maintaining interaction have been substituted for it.

Psycholinguistic interest in the range of individual differences along the spectrum of normal development has contributed to clinical ability to assess language disorders. Having a quantitative notion of the normal range allows the clinician to make more reliable decisions about when a problem, in fact, exists. Miller and Chapman's (1981) studies of normal variation in mean length of utterance, for example, provide an index of language delay that can be of great value in deciding when children are so far behind agemates that intervention is required. There is now a reliable way of deciding when too long a time has elapsed for children to "grow out of" their failure to use words. The orientation in acquisition research toward microscopic analysis of development also has clinical applications. Looking at the development of single rules—from their early, limited sphere to their even-

tual generalization—provides models for teaching generative rules to children who have not learned them on their own.

The shift in child language research from production to comprehension has especially great significance for clinical work. Language disorders have traditionally been evaluated only in terms of productive deficits; little attention has been paid to the relation between expression and understanding. But it may be the case that some children who have been called "aphasic" suffer only from minor lags in receptive ability. In that case, *aphasia*, with its connotation of deficits in symbolic ability, may be a misnomer. For some of these children, failure to speak may be a result of more circumscribed neuromotor disabilities. This diagnosis would, of course, have important implications for treatment. An increasing awareness of the importance of evaluating speech and understanding independently will help in making such distinctions in the future.

Directions in the Study of Language Disorders

Research in communication development has contributed in many ways to the study of language disorders. At the same time, information from investigations of language disorders is valuable in deepening the understanding of, not only the disorders themselves, but the nature of language and its acquisition. What are the questions about disordered language, the answers to which would serve this dual purpose? One question is the relationship between language and cognitive development in language disorders, such as child-

hood aphasia and primary autism. Older aphasics, for example, fail to develop abstract thought and vocabulary (Caparulo and Cohen 1977), and there is a need to look more closely at the relations between language and thought in these youngsters. What specific subskills in the sequence of cognitive development might show deficits that would predict and contribute to language disturbance? What effects do limited linguistic skill have upon the development of high-level cognitive organization, which ordinarily relies so heavily on language as a mediating device? Will children with severe language disorders eventually develop deficits in problem-solving ability and disorders of thought as a result of their inability to represent and organize experience in language? The answers to these questions will contribute not only to diagnostic and prognostic capacity, but also to the understanding of the relations between language and thinking in normal individuals.

Similarly, more careful analysis of connections between social and linguistic performance in children with disorders will improve diagnostic and prognostic power, as well as shed light on the social bases of normal language acquisition. The area of mother-child interaction is particularly fertile ground for investigating this question, especially in light of the wealth of information now available on typical mother-child communication. What very early mismatches that appear in the mother-infant dialogue will predict later language-learning problems? How do parents react to absent or disorganized social behavior? Is there a response that

optimizes the child's chance for progress? (See Cohen, Caparulo, and Wetstone, in press, for an initial approach to this question.) This information would lead to a better understanding of the aspects of mother-child interaction that are necessary for language development, in addition to providing categories for early assessment.

The suggestion that disorders of perceptual and attentional regulation are also present in aphasic and autistic children represents another piece of the puzzle to be assembled in understanding these disorders (Caparulo and Cohen 1977). Although it is clear from the infant studies cited above that perception and attention are highly organized even in newborns, the relations among perception, attention, and communication are not yet clear. Simple prerequisite relations will probably fail to explain clinical observations that identify attentional deficits developed after the language-learning period in aphasic youngsters (Cohen, Caparulo, and Shaywitz 1976).

The relations between social and cognitive development are also of interest in building models of the interweaving of skill components in language. For example, is the observation of Bates et al. (1979) that language use correlates highly with performance on means-ends tasks (Uzgiris and Hunt 1975) true for this population? Might some language disorders be the result of, not a global, but a rather limited cognitive failure, perhaps a failure to understand relations between means and ends? Could this failure, in turn, lead to a deficit in social understanding, i.e., that people can serve as a means to desired ends if the tools for manipulating them (communication) are used?

Finally, the relations between the modes of language in these populations merit further investigation. What is the typical relationship between speaking and understanding in children with language disorders? Can subgroups within populations be isolated on the basis of receptive/expressive distinctions? Certainly, children who fail to develop receptive abilities will be impaired in their expressive language as well. But might the opposite relation-

ship be true? Could the inability to talk also impede progress toward the ability to decode complex linguistic signals?

All of these questions center around one fundamental issue in the study of normal communication and its disorders: How do the components of the communication system interact in development? Which components are necessary, sufficient, or simply associated with the growth of which others? Are the more puzzling disorders of language learning actually the result, not of global, but of highly specific, underlying failures of social-cognitive function? Or, on the other hand, do they, in some cases, cause disorders of thinking and relating because of the inability to use language to mediate thought and interaction? Not only will study of the language of communicatively impaired children improve therapeutic intervention, it will also contribute to understanding the complex integration of abilities that results in the normal child's remarkable achievement in mastering a first language.

Appendix. An outline for a communication development interview

Age	Communication developmental milestone	Question for parents	Reference
0–2 months	Responsiveness to sounds in the speech frequency range	Does the child turn head or look up at the sound of voices?	Hutt et al. (1968)
	Preference for speech over other rhythmic sounds	Can the child be soothed or made to smile by the sound of voices? Does the child seem to like listening to people talk?	Butterfield and Siperstein (1974)
	Tendency to synchronize movements to breaks in speech	Does the child seem aware of when you stopped talking? Does the child wait for a pause to reach or move?	Condon and Sander (1974)

Appendix. An outline for a communication development interview—*Continued*

Age	Communication developmental milestone	Question for parents	Reference
	Categorical perception for speech sounds		Eimas et al. (1971)
	Preference for human faces over other visual stimuli	Does the child attend to your face? Does the child seem to look at you more often than at other things when you are in the room?	Fantz (1961, 1963, 1966); Kagan and Lewis (1965)
2–8 months	Mother-child "dialogue" in mutual gaze, joint action, babbling	Does the child "talk back" to you when you talk "baby talk"? Can you direct the child's attention to objects? Does the child seem to enjoy playing with you using toys, playing games such as "pat-a-cake" or "So big"?	Jaffe, Stern, and Perry (1973); Bruner (1974)
9–12 months	Expression of nonverbal communicative intents to request, reject, call attention to self and object	Does the child make wants and needs known by gesturing and making sounds? Does the child attempt to get your attention this way? Does the child attempt to get you to play games or comment on his or her activities?	Halliday (1975); Bates (1976)
	Understanding a few words in routine contexts	Does the child eventually recognize a few words from games such as peek-a-boo and act spontaneously when he or she hears the word?	Bruner (1975)
12–18 months	Use of first recognizable word	Does the child use any words to express wants and needs?	Bloom (1973)
	Understanding of words outside routine contexts	Does the child understand any words without gesture or facial cues? For example, if you said, "Where's Daddy?" would the child turn and look for him?	Huttenlocker (1974)
18–24 months	Two words combined to form telegraphic sentences expressing a limited range of meanings	Does the child put words together in two-word sentences?	Bloom (1970); Brown (1973)
	Understanding of words for absent objects	If you ask for an object in another room, can the child fetch the correct item without gestural clues?	Miller et al. (1980)
	Understanding of conversational obligation to respond to speech with speech	Does the child attempt to answer questions or respond to your comments in some way, verbal or nonverbal?	Chapman (1981a)
	Use of language to request information	Does the child ever either verbally or nonverbally try to get you to say the names of objects?	Halliday (1975)

Appendix. An outline for a communication development interview—*Continued*

Age	Communication developmental milestone	Question for parents	Reference
2–5 years	Average sentence length increases from 2.0 to 4.5 words or more	Does the child gradually add more words to sentences?	Loban (1976); Miller and Chapman (1981)
	Rules for forming plurals, past tense, etc., are overgeneralized	Does the child ever say words wrong, such as *comed, goed,* or *foots*?	Cazden (1968)
	Mastery of morphological and syntactic rules for simple sentences; emergence of complex sentences	Do the child's sentences eventually sound more like an adult's?	Klima and Bellugi (1966); Brown (1973); Limber (1973)
	Use of linguistic rules for understanding sentences	Does the child ever misunderstand things you say, especially when you use long or complicated sentences?	Bever (1970); Maratosos (1974); Strohner and Nelson (1974)
	Use of language to talk about events remote in time and space	Does the child tell you about things that happened away from home? In the past?	Bloom and Lahey (1978)
	Use of language for diverse purposes, such as imagining, predicting, interpreting	Does the child talk about things that will happen later? Could happen? Does the child talk about "make-believe" things?	Tough (1977)
	Increased conversational skills; topic maintenance	Can the child stick to a subject in conversation, say something new about the subject?	Bloom, Rocissano, and Hood (1976)
	Clarification	If the child doesn't understand you, does he or she ask you to repeat? Can the child repeat or repair a sentence you misunderstand?	Gallagher (1975)
	Polite, indirect requests	Can the child use language to "wheedle something out of you"? Can the child "say it nicer" in other ways than just adding *please*?	James (1975); Bates (1976)
	Choice of the appropriate speech style for the social situation	Does the child talk differently to younger children? Is the child more polite to grownups than peers?	Sachs and Devin (1973); Shatz and Gelman (1973)
5–12 years	Use of devices to elaborate and condense information in sentences	Can the child tell stories without stringing sentences together only with *and*?	Hass and Wepman (1974); Loban (1976)
	Ability to use and understand unusual sentence types in the language, such as *passives*	Does the child sometimes use complex sentence forms in speaking? Writing?	Chomsky (1969); Baldie (1976); Lempert (1978)

Appendix. An outline for a communication development interview—*Continued*

Age	Communication developmental milestone	Question for parents	Reference
	Development of metalinguistic awareness	Does the child ever make up words, play games with words, make up puns? Could the child tell you his or her favorite word?	Mattingly (1972); Pease (1981)

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