

**DOCUMENT RESUME**

**ED 098 793**

**FL 006 384**

**AUTHOR** Morehead, Donald M.; Johnson, Maxine  
**TITLE** Piaget's Theory of Intelligence Applied to the Assessment and Treatment of Linguistically Deviant Children. Papers and Reports on Child Language Development, No. 4.  
**INSTITUTION** Stanford Univ., Calif. Committee on Linguistics.  
**PUB DATE** Jun 72  
**NOTE** 20p.

**EDRS PRICE** MF-\$0.75 HC-\$1.50 PLUS POSTAGE  
**DESCRIPTORS** \*Child Language; \*Cognitive Development; Cognitive Processes; \*Intellectual Development; Intelligence; \*Language Development; \*Language Handicapped; Learning Theories; Linguistic Theory; Psycholinguistics; Retarded Speech Development  
**IDENTIFIERS** \*Piagetian Theory

**ABSTRACT**

Since the 1950's there has been a tremendous shift in the way language and language behavior is viewed. The shift is characterized as a general movement away from surface observation and analysis to attempts at the description and analysis of underlying linguistic forms. The interest in underlying linguistic forms has, in a rather natural way, led investigators to confront once again the seemingly awesome relationship between language and cognition. In the area of child language, there have been some interesting attempts to describe cognitive precursors to language and the cognitive relations expressed in semantic intention. These cognitive aspects of language development have important implications in instruction and program development for the linguistically deviant child. (Author)

EL 096793

PIAGET'S THEORY OF INTELLIGENCE APPLIED  
TO THE ASSESSMENT AND TREATMENT OF  
LINGUISTICALLY DEVIANT CHILDREN

Donald M. Morehead  
Department of Child Development  
California State University  
Hayward, California

U.S. DEPARTMENT OF HEALTH,  
EDUCATION & WELFARE  
NATIONAL INSTITUTE OF  
EDUCATION

THIS DOCUMENT HAS BEEN REPRO-  
DUCED EXACTLY AS RECEIVED FROM  
THE PERSON OR ORGANIZATION ORIGIN-  
ATING IT. POINTS OF VIEW OR OPINIONS  
STATED DO NOT NECESSARILY REPRESENT  
OFFICIAL NATIONAL INSTITUTE OF  
EDUCATION POSITION OR POLICY

Maxine Johnson  
Department of Communication Disorders  
University of Pacific  
Stockton, California

ABSTRACT

Since the 1950's there has been a tremendous shift in the way language and language behavior is viewed. The shift is characterized as a general movement away from surface observation and analysis to attempts at description and analysis of underlying linguistic forms. The interest in underlying linguistic forms has, in a rather natural way, led investigators to confront once again the seemingly awesome relationship between language and cognition. In the area of child language, there has been some interesting attempts to describe cognitive precursors to language and the cognitive relations expressed in semantic intention. These cognitive aspects of language development have important implications in instruction and program development for the linguistically deviant child.

Papers and Reports on Child Language Development  
Number 4

June, 1972



FL00 6384

Over the past twenty years there has been a dramatic shift in the paradigm used to study the linguistic development of the child. Prior to the 1950's, little was made of Saussure's distinction between langue and parole. The distinction between competence and performance was not considered to be essential or even necessary. Moreover, speech was viewed in a global way with either the syllable or the phoneme reigning supreme. With the appearance of Jakobson, Fant and Halle's classical work in 1952 on distinctive feature theory, the shift to studying more abstract aspects of the phonological system in particular, and language in general, began. Chomsky's transformational theory was published in 1957 and the trend toward abstract analysis now included syntax, and in some basic ways, semantics. In 1968, two important works appeared; one by Chomsky and Halle, which advanced a transformational theory of phonology and one by Fillmore, which suggested that semantics rather than syntax might be central to the study of language. Recently, a number of published and unpublished papers have begun to emphasize the importance of cognitive precursors to language and the necessity of being able to systematically study the semantic intentions of the child through close scrutiny of the context of an utterance (Bloom, 1970; Brown, 1970; Slobin, 1971; Sinclair, 1970). This focus represents a completion of the paradigm shift from consideration of surface aspects to the underlying aspects of language and language behavior.

Prior to the appearance of Chomsky's transformational grammar, too few children with language deviance were identified as such because of the failure to distinguish between speech and language as different kinds of linguistic behavior. The failure to make this important distinction was due in large part to the posture of American psychology, namely learning theory, which focused almost entirely on overt performance in behavior. With the advent of transformational grammar and the rediscovery of cognitive theories such as Piaget's, the necessity to distinguish between speech and language became apparent. As a result, investigators began to look at what the child knows, as well as what the child does--the former characterizing language and the latter characterizing speech. Moreover, the fact that many children were being incorrectly classified as articulation disorders resulted in the development of a test specifically designed to assess language functions. The test appeared in 1961 and was appropriately titled the Illinois Test of Psycholinguistic Abilities (ITPA). The title, as well as the emphasis of the test characterizes one of the more important recent developments in the field of applied developmental psychology. That is, the separate testing of language as opposed to language behavior.

A specific group of children who have attracted considerable attention are those who manifest delays in the rate they acquire language and yet lack sufficient intellectual or physiological impairments to account for their difficulties in acquiring language (Morehead and Ingram, in press). This description excludes children who are moderately to severely emotionally disturbed, mentally retarded, brain damaged, sensory handicapped (i.e., the blind or deaf), or the multiply handicapped. This

population of children is of particular interest because they represent a significant proportion of the population of pre-school and school children who are now classified under the general rubric of learning disabilities. Thus, this population represents a large number of cases seen by special educators in the public school systems.

Piaget (1970) offers a general theory of mental development that is extremely useful in describing the nature of linguistic deficits in children. Piaget divides the development of intelligence into three major processes which collectively construct reality. The first, operative intelligence, is the most basic of the three. It attempts to describe what the child comes to know about objects, their properties, and the relationship between objects. Objects, in Piaget's terminology, refer roughly to all things in the external world, including physical as well as social "objects" and the ways in which they can be transformed from one state to another. To know a dynamic world, the child must learn that an object's identity remains constant even though its position and context may be constantly changing. He must follow the transformation of objects from one state to the next. For example, a child comes to know the category of ball, even though his experiences with balls will reflect different angles of exposure, different shapes, and different textures and materials from which balls are made, as well as different transformations. Thus, operative intelligence allows the child to handle reality even when it changes or transforms.

The second way in which the child constructs reality is through figurative intelligence. The term figurative intelligence corresponds, in part, to the term perception in American psychology. In addition to perception, figurative intelligence includes imagery which is intimately related to short term memory and attention. This mode of intelligence handles or constructs that part of reality which is static or non-transforming. In other words, that part of reality that is not dynamic or changing. Since a large part of external reality is dynamic, the child needs a mechanism by which he can capture or recreate reality until operative intelligence can act. For example, in order for the child to handle ambiguity, such as that found in the-figure-ground tests developed by Gestalt psychologists, he must be able to attend alternately to figure and then to ground in order to disambiguate static figures. In addition, simple match-to-sample tests require that the child evoke an image after viewing the sample, allowing him to select the appropriate match. Moreover, simple integration tasks such as imagining a bicycle made of suckers and candy canes, with the candy canes representing the handle bars and the seat, and the suckers representing the wheels and the frame, the child must evoke an image of the whole bicycle in order to integrate its separate parts. Thus, whole-part relationships depend on the two aspects of figurative intelligence, namely perception and imagery (Elkind, 1969).

The third mode of intelligence is symbolic or representational intelligence. This aspect of intelligence allows the child to construct or symbolize reality when it is not present. The symbolic function is

seen in deferred imitation, imagery, symbolic play, language, dreaming, and drawing. The importance of this mode of intelligence, according to Piaget (1970), is that it frees the child from depending upon his actions or direct experience in the construction of reality. This freedom from direct experience allows the child to know many things that he could not otherwise know if he depended only on direct contact with reality. Language is an excellent example of a symbolic function that allows the child to receive a great deal of information through communication with adults and other children, through literature and mass media, and finally through his own imagination or fantasies. It is not uncommon for young children to invent names and things to be used in their symbolic play and drawings. This aspect of coming to know reality is extremely crucial for children in modern technological societies, since a great deal of the information that will be most adaptive for them will be received and acted upon through the medium of a representational system, primarily language.

The relationship between operative, figurative and symbolic intelligence is complex. Piaget (1970) approaches this complex interaction in essentially two ways. One approach is to specify development which acts as a precursor to later development. The other is to specify the relationship between two existing aspects of development. In the case of language, the concern is to first describe the relationship between a signifier and a significant. A signifier is any behavior including actions, images, or words which represent an object or an event; i.e., the significant. During the first year to year and a half, the signifier and the significant are fused in what Piaget calls an index. For example, the opening of the door to the child's room (the signifier) signals the appearance of the principle caretaker (the significant). The first indications that the signifier and the significant are being separated generally appear around eighteen months when the child begins to symbolize; i.e., the establishing of a physically similar relationship between a signifier and a significant. This behavior is best exemplified when the child knows two objects such as a shoe box and a doll bed and because of their common features of enclosure is willing to substitute one object for the other. Substitutions of this kind are often observed in symbolic play. Finally, the signifier and the significant are totally differentiated by about two years of age and the child is capable of using true signs or words. The relationship between the signifier and the significant at the level of the sign is abstract and, in part, determined by conventions shared among speakers of the same language.

The development of the index, symbol and sign is dependent upon the development of more base aspects of intelligence, namely operative intelligence. During the first stage of mental development, the sensorimotor stage, the child separates himself from his actions and from other objects. Once the child has made the separation, or in Piaget's terms, has developed object constancy, he is capable of using his actions to represent an object or event in the absence of that object or event through deferred imitation. This action may be motoric gesture or vocal behavior. This marks the beginning of symbol or representational behavior.

Shortly after the onset of deferred imitation, the child is also capable of evoking images to represent objects in their absence. Once the child has separated himself from his actions and objects and developed base representational behavior such as deferred imitation and imagery, he is capable of using the symbol as a means of increasing his knowledge of objects. That is, he is capable of knowing an object as a symbol for another object in that he can now substitute objects that share common features--he may use a shoe box for a doll bed. This aspect of symbolic intelligence is an important precursor in the use of signs or words since it marks a significant step in differentiating the signifier from the significant. According to Piaget (1970), the child is not capable of using true signs or words until the signifier and the significant are totally differentiated. That is, until there is an abstract rather than a physical relationship between the two.

Fortunately, some research has been done with children having language disorders using Piaget's developmental system, or experimental tasks related to it. Inhelder (1966) and de Ajuriaguerra (1966) have found that children with a slow rate of linguistic development frequently have normal base or operative intellectual development. However, these children do show a specific deficit in both the figurative and symbolic or representational aspect of cognition. The importance of these findings is that they suggest a relationship between delayed language acquisition and more base aspects of cognitive development. For example, perceptual and imagery deficiencies, which according to Piaget's theory are related to figurative and symbolic development, have long been suspect in children who fail to develop language at a normal rate. Such deficits have been demonstrated across sensory modalities (i.e., vision and audition).

In the case of vision, Grandstaff, Mackworth, de la Pena, and Pribram (1972) have shown that the performance of linguistically deviant children on a simple match-to-sample task is not different from that of normal children in terms of the number of matching errors. However, the deviant children take nearly twice as long, once the correct choice is located, to indicate their choice. This finding suggests a deficit in immediate imagery, in that it appears that deviant children take much longer to form an image. In the case of audition, Rosenthal and Eisenson (1970) have shown that linguistically deviant children have more difficulty than do normal children in detecting auditory signals of short duration.

Symbolic or representational development has also been studied in children who fail to develop language at a normal rate. Lovell, Hoyle, and Siddal (1968) reported a significant correlation between sentence length and the amount of time spent in symbolic play by linguistically deviant children. Thus, the fewer the number of words per sentence, the less time the child spends in symbolic play.

The nature of the linguistic systems of children who fail to develop language at a normal rate has been studied, utilizing recent methodological advances in linguistics. Compton (1970), Oller (1972) and Lorentz (1972) have studied the sound or phonological systems of children who display articulatory errors atypical of their age group. Their analyses suggest two major findings: (1) the underlying sound systems of these children are normal and surface constraints account for their errors, and (2) the amount of variation or creative use of their existing underlying rule systems is highly restricted. These children do not appear to use sound sequences which are as varied as their underlying rule systems could derive or generate. Surface rather than underlying constraints explain the apparent contradiction in children who understand the difference between spoon and fool in other persons' speech but not in their own.

Morehead and Ingram (in press) studied five aspects of sentences or syntactic development in a group of normal children as compared to a group of linguistically deviant children. The five aspects studied were phrase structure rules (base sentence rules), transformations (changes in base sentences such as active to passive), sentence types, inflectional morphology (plural form, progressive affix, etc.), and minor lexical categories such as pronouns and demonstratives. The two groups were matched on mean morpheme per utterance length (roughly words per sentence) in an attempt to control for the linguistic level of development in each group. When the two groups were matched in this way, the chronological age difference clearly showed a marked delay in the deviant group for both onset and acquisition time for language. The major finding indicated that these children, like phonologically deviant children, had normal underlying rule systems but were highly restricted in the number of sentences they produced from their underlying rule systems. The most salient difference between normal children and children who have deviant linguistic systems appears to be primarily: (1) the onset and rate of development, and (2) the variation that is allowed by surface constraints of utterances generated from their underlying rule systems. Thus, the creativity displayed in utilizing the underlying rule systems in the production of language appears to be considerably restricted in the linguistically deviant child.

Assessment procedures for detecting dysfunctions in children vary depending on whether a position of continuity or discontinuity in development is assumed. The essential distinction is that continuity theorists assume that the child gradually becomes more adultlike, with the approximations being governed by the laws of learning, while discontinuity theorists assume that development takes place in definable levels or stages, and that each stage is qualitatively different from the preceding or following stage (Kohlberg, 1968). Most standardized tests assume that development is continuous rather than discontinuous. Recent research in the development of thinking, language, dreaming, moral development, and play seems to suggest that much of development is governed by an invariant sequence of stages. For example, the study of children's art has suggested that children learn to represent reality in definable stages. Moreover,

these stages appear to be universal across cultures. This work has suggested that the Goodenough draw-a-man test, which has been used extensively to measure intelligence in children, fails as a test because it does not measure the natural sequence of development (Kellogg 1967).

The problem of measurement becomes even more compounded when attempts are made to match normal and deviant groups of children. The problem of matching can be seen most clearly in the case of language, where the matching of children has been done on the basis of such variables as age, intelligence, and socio-economic level. These methods of matching have led investigators to the conclusion that there is a qualitative difference between linguistically normal and deviant children. However, if children are matched according to age, for example, and the deviant children are developing at a slower rate of development, the investigator is comparing children at two different levels of development; hence, a qualitative difference is obtained. For example, in the study by Morehead and Ingram (in press), mean number of morphemes per utterance was used as the criterion for matching the normal and the deviant groups. This measure allows the establishment and, hence, the comparison of similar levels of linguistic development. Brown (1970) has found the mean number of morphemes per utterance to be a reliable indicator of linguistic level of development up to around four years. This extensive study of three normal children suggests five distinct levels of linguistic development between approximately two and four years of age. Thus, the studies in language support the findings in cognition that each level of development is characterized by the production of specific kinds of behavior. In language, certain linguistic constructions have been identified as indices of particular levels of linguistic development (Brown, 1970). Level or stage specific behavior has also been found for children's art, symbolic play, dreaming and morality (Kellogg, 1967; Piaget, 1962; Kohlberg, 1968).

It appears then that levels of linguistic development can be identified and that these levels have characteristic behavior patterns. These two concepts, along with Piaget's precursors to language would seem to be extremely useful in not only the assessment but also the treatment of children who are delayed in their rate of language development. Once a particular level of development is established in the linguistically deviant child, then it becomes possible to develop tutorial programs which characterize the present level of development, as well as probable succeeding levels including those that precede language.

To assess the linguistic level of development in children, it is necessary to first collect a language sample or observations of pre-linguistic behavior. Previous work has shown that samples of between 50 to 75 utterances are adequate for assessment purposes in the normal child if the sample has been collected under different conditions (Shriner, 1969). Since the language of children is highly context dependent, it is necessary to vary the context in which the child produces language. Bloom (1970)

suggests that four conditions be used in collecting large language samples for experimental purposes: (1) during familiar activities such as eating and dressing; (2) during play with peers or younger children; (3) during interaction with familiar adults, and (4) while playing with specific toys and books that the investigator can manipulate to check the reliability of those utterances collected under the previous conditions. For assessing linguistically deviant children, samples of at least 100 to 150 utterances are usually collected because of high variance in the length of individual utterances (Morehead, 1972). Observational techniques of pre-linguistic children are available in Sinclair (1970).

Once the language sample has been collected, Brown's (1970) five levels of linguistic development, which cover an age range between approximately 18-20 months and 36-42 months, can be used to determine the linguistic level of development for a particular child (Table 1). Each individual utterance is identified and the number of words is computed for that utterance. Once each utterance is assigned a score for the number of words in that utterance, then all of the individual utterance scores are added and the total is divided into the utterances in the language sample. This score is then compared to Brown's (1970) five levels of linguistic development and the child is assigned to the lower level nearest his own mean length of utterance score.<sup>1</sup> One limitation of this method is that it depends heavily on recent research on language acquisition which has studied extensively the child between 12 and 40 months of age. Little is known about language development between the ages of four and ten years save the recent work of Chomsky (1969). This limitation is not as severe as it first appears, since many children who are between five and eight years of age have linguistic systems much like children four years of age or younger. Finally, recent investigators in language acquisition suggest that by the time the child is about four years of age, he has mastered most of the base aspects of adult language (McNeill, 1970). Three levels of development for pre-linguistic children have been described by Sinclair (1970).

Ingram (1972) has developed a program for teaching syntax or sentence constructions which attempts to characterize typical linguistic development for each of the five levels suggested by Brown (1970). The program is based on the language samples taken from the fifteen normal and fifteen deviant children used in the study by Morehead and Ingram (in press). Appendix A provides examples of the types of constructions used by children at level 1. These children are generally between 18 to 26 months of age and have an average range of 2.0 to 2.5 in their words per utterance length. Level 1 was selected because the constructions at this level are

---

<sup>1</sup> Morehead (1972) found little difference between morpheme and word counts for determining the particular linguistic level of a child.

---

Table 1. Mean morpheme (word) per utterance length at each of five linguistic levels of development according to Brown (1970).

		Linguistic Level				
Mean and range	I	II	III	IV	V	
$\bar{x}$	2.00	2.50	3.13	3.75	4.63	
range	1.75-2.25	2.25-2.75	2.75-3.50	3.50-4.00	4.00-5.25	

rather simple and reflect, according to Piaget (1970), the distinctions that a child of this age group has made. As mentioned previously, during the first two years of development the child separates himself from his actions and from other objects. That is, his basic knowledge would include knowing an actor, a set of actions, a group of objects which receive those actions. If this information is translated into linguistic terms, it is found that the child generates utterances which reflect the following relations: (1) actions plus objects or verbs plus nouns; (2) actors plus actions or nouns plus verbs, and (3) actors plus actions plus objects or nouns plus verbs plus nouns. In addition, the child will specify properties of objects through the use of adjectives plus nouns, noun plus predicate adjective constructions such as red ball and ball red. He will also specify possession in noun-noun construction such as John ball, and actor plus location in noun plus locative constructions such as dog here. Further, he will specify location by preposition plus noun (in car), verb plus preposition plus noun (put in bag), and preposition plus adjective plus noun (in big truck), and so on.

The methods to be used in teaching constructions at a particular level of linguistic development depends on the level of the child. One general principle seems to hold throughout the five levels of development, namely, that the less advanced the child, the more necessary it is to coordinate operative knowledge with early representational knowledge such as deferred imitation, imagery and symbolic play prior to direct language training. In fact, since deferred imitation and imagery act as precursors to language, it is quite possible that therapy for pre-syntactic children should begin with those aspects of representational behavior which precede language.

To demonstrate how the language program would be used for a particular child, it is useful to consider a hypothetical case of a three and a half year old child who has been referred to a language clinic because of "baby talk." From his language sample, it is determined that the mean number of words per utterance is 1.72. Comparing this measure of sentence length to Brown's (1970) five levels of linguistic development, we find that the child is slightly below level 1 in his linguistic development. Moreover, a more general diagnostic evaluation reveals that his general intelligence is within the normal range, and he does not appear to be deviant in any way except symbolic or representational behavior.

A comparison of his construction or sentence types to Ingram's (1972) developmental program reveals that the child is capable of linguistically marking the following distinctions in his language: (1) action plus object or verb plus noun; (2) attribute plus object or adjective plus noun; (3) actor plus action or noun plus verb, and (4) actor plus attribute or noun plus predicate adjective (see Appendix A).

The first task is to get the child to linguistically mark, in symbolic and real play activities, additional specific aspects of the actor and the object. For example, his noting the position or location of the actor and the object with the child or the therapist as the reference point. This would elicit the marking of spatial relations by certain linguistic constructions such as this one and that one (that or this plus predicate noun) baby here, baby there (noun plus here or there), and location marked by prepositions such as on table, under chair, etc.

Second, the child should now be ready to incorporate actions as marked by verbs, forming new constructions by specifying actor-object location. Tasks could be used which involve his acting on objects or observing others acting on objects and marking the action plus the positional effect of the object. Linguistic constructions for these tasks would include action plus location plus object relations or verb plus preposition plus noun such as look in house. Also, where questions could be used to elicit locative plus attribute plus object relations or preposition plus adjective plus noun such as in big box, in small box, etc. Next, the child could be asked to specify the actor or object used in the above relations which would generate constructions like doll in box, Marty in house, etc.

Presumably, the child at this point is now capable of marking one relation by using three words instead of two. This contrast can be seen in sentences like doll in box and in big box, versus baby cry. The next linguistic marking of relations would include two relations, but would maintain the sentence length of three words. This marking would allow the child to form his first sentence which specifies actor plus action plus object relations or a noun plus verb plus noun construction such as boy hit ball. Again, the play activities would involve real objects including the child and others since context is extremely important for eliciting comments on events.

Although the example has been brief, it demonstrates the systematic complexity with which language programs can be developed, if those cognitive aspects which underlie language are incorporated as a guide to what is linguistically marked by the child. The importance of such an approach is that it allows the therapist to assess the child's linguistic level and, on the basis of that information, to determine systematically what the child knows and marks linguistically and to develop a language program which follows naturally from the child's present level of development. In the example provided above, the child is specifically tutored to move from two words and one relation, to three words and one relation to three words and two relations. The emphasis should be directed to the number of relations marked in the utterance as well as the number of words used.

The approach described in this paper varies considerably from both the approaches used by speech pathologists and approaches recently developed for "culturally disadvantaged" children. Most of the programs in speech pathology use learning theory as a base for instructing children with linguistic disabilities. As a result, the instruction focuses on presenting a model sentence or sound and asking the child to repeat that linguistic form. Behavior modification varies as an approach, but generally the emphasis is on the response and its appropriate reward. A similar posture is assumed by investigators who have developed programs for the culturally disadvantaged child. One of the most noted programs is the one developed by Bereiter and Englemann (1966). This program relies heavily on imitation, reinforcement and immediate feedback. It has produced some notable changes in Stanford-Binet scores, but the changes do not appear to be stable and long lasting. That is, two years after the programs were administered, few differences were found between those children who had received the program and those who had not.

The most important difference between Piagetian-based programs and those based on learning theory is that the former assumes that mass generalized experience is crucial to learning whereas the latter assumes that direct, immediate experience is crucial. Most speech and language therapy is structured for direct immediate experience and the unstable changes that occur with the use of this technique are well known to therapists and generally referred to as "carry-over" problems. Piaget's theory demands entirely new methods for therapy and these should provide more stable changes in the development of the child's linguistic system.

REFERENCES

- Ajuriaguerra, J. de. "Speech disorders in childhood." In C. Carterette (Ed.), Brain Function: Speech, Language, and Communication, Vol. III. Los Angeles, California: University of California Press, 1966.
- Berater, C. and Englemann, S. Teaching Disadvantaged Children in the Preschool. Englewood Cliffs, N.J.: Prentice Hall, 1966.
- Bloom, Lois. Language Development: Form and Function in Emerging Grammars. Cambridge, Mass.: M.I.T. Press, 1970.
- Brown, R. "Stage I: Semantic and grammatical relations." Unpublished paper, Harvard University, 1970.
- Chomsky, Carol. The Acquisition of Syntax in Children from 5 to 10. Cambridge, Mass.: M.I.T. Press, 1969.
- Chomsky, N. Syntactic Structures. The Hague: Mouton and Co., 1957.
- Chomsky, N. and Halle, M. The Sound Pattern of English. New York: Harper and Row, 1968.
- Compton, A. J. "Generative studies of children's phonological disorders." Journal of Speech and Hearing Disorders, 1970, 35: 315-339.
- Elkind, David. "Developmental studies of figurative perception." In L D. Lipsitt and C.C. Spiker (Eds.), Advances in Child Development and Behavior, Vol. 4, New York: Academic Press, 1969.
- Fillmore, C. "The case for case." In E. Bach and R.T. Harms (Eds.), Universals in Linguistic Theory. New York: Holt, Rinehart and Winston, Inc., 1968.
- Grandstaff, N., Mackworth, R., de la Pena, A., and Pribram, K. "Model formation and use by aphasic and normal children during visual matching to sample." Unpublished paper, Stanford University School of Medicine, 1972.
- Ingram, David. "Language program for linguistically deviant children." Unpublished paper, Stanford University School of Medicine, 1972.
- Inhelder, Barbel. "Cognitive development and its contribution to the diagnosis of some phenomena of mental deficiency." Merrill-Palmer Quart., 1966, 12: 299-319.

- Jakobson, R., Fant, G., and Halle, M. Preliminaries to Speech Analysis, Cambridge, Mass.: M.I.T. Press, 1963.
- Kellogg, Rhoda. The Psychology of Children's Art. San Diego, California: CRM Books, 1967.
- Kohlberg, L., "Early education: A cognitive developmental view." Child Development. 1968, 39: 1013-1062.
- Lorentz, J.P. "An analysis of some deviant phonological rules of English." Unpublished paper, University of California at Berkeley, 1972.
- Lovell, K., Hoyle, H., and Siddall, M. "A study of some aspects of the play and language of young children with delayed speech." J. of Child Psych. Psychiat., 1968, 9: 41-50.
- McNeill, D. The Acquisition of Language: The Study of Developmental Psycholinguistics. New York: Harper and Row, 1970.
- Miller, G.A., Galanter, E., and Pribram, K.H. Plans and the Structure of Behavior. New York: Henry Holt and Company, 1960.
- Morehead, D.M. "Language sampling in the study of linguistically deviant children." Unpublished paper, Stanford University School of Medicine, 1972.
- Morehead, D.M. and Ingram, D. "The development of base syntax in normal and linguistically deviant children." Journal of Speech and Hearing Research, in press.
- Oller, K. "Five studies in abnormal phonology." Unpublished paper, University of Washington, 1972.
- Piaget, J. Play, Dreams, and Imitation in Childhood. New York: W.W. Norton and Co. Inc., 1962.
- Rosenthal, W. and Eisenson, J. "Auditory temporal order in aphasic children as a function of selected stimulus features." Unpublished paper, Stanford University School of Medicine, 1970.
- Shriner, T. "A review of mean length of response as a measure of expressive language development in children." Journal of Speech and Hearing Disorders, 1969, 34: 61-67.
- Sinclair, Hermina. "The transition between sensory motor behavior and symbolic activity." Interchange, 1970 1: 119-126.
- Slobin, D. "Cognitive prerequisites for the development of grammar." In C.A. Ferguson and D.I. Slobin (Eds.), Studies in Child Language Development. New York: Holt, Rinehart, and Winston, 1972.

Appendix A

Level I: Average Range 2.0-2.5 Words

Basic Constructions

1. Verb plus noun

hit ball	hit nail	hit boy	hit box
kick ball	kick can	kick stick	kick box

2. Adjective plus noun; e.g., little dog.

big boy	small boy	happy boy
big girl	small girl	happy girl

3. Possessor plus noun; e.g., Tom ball (Tom's ball).

John ball	John dog	John hand
Mary ball	Mary dog	Mary hand

4. Noun plus verb; e.g., boy run (boy runs).

man walk	man run	man swim	man jump
dog walk	dog run	dog swim	dog jump

5. Noun plus predicate adjective; e.g., boy tall (boy is tall).

ball red	ball big	ball small
car red	car big	car small

6. That plus predicate noun; e.g., that ball (that is a ball).

that fish	that pig	that boy
that cat	that apple	that book

7. Noun plus here ( here [locative] ), there; boy here (boy is here); girl there (girl is there).

boy here	boy there	Bobby here
girl here	girl there	Mary here

Function Words

a. Preposition: In plus noun; e.g., in box (in the box).

in house	in bag
in pan	in cup

b. Verb plus preposition plus noun; e.g., put in box.

put in cup	put in truck	put in bowl
put in bag	put in pan	put in pot

c. Preposition plus adjective plus noun; e.g., in big truck.

in big box	in small box	in red box
in big house	in small house	in red house

d. Preposition plus possessive plus noun; e.g., in John truck.  
(in John's truck)

in man truck	in Mary house	in girl box
in boy truck	in Bobby house	in boy box

e. Noun plus here, there; e.g., ball in there.

doll in there	car in there
doll in here	car in here

That plus here, there as locatives.

that in there

that in here

Pronouns: it, me, my, I, you

a. Verb plus it

hit it	throw it
kick it	catch it

b. Verb plus me

hold me

wash me

c. It plus verb; e.g., it run (it runs)

it go

it fall

it walk

it jump

d. I plus verb

I walk

I throw

I talk

I catch

e. My plus noun

my ball

my wagon

my dog

my cookie

f. My plus adjective plus noun

my big doll

my small doll

my big ball

my small ball

g. It plus here, there (here, there as locatives)

it here

it there

h. You plus verb

you walk

you eat

you jump

you kick

Verb plus verb particle (verb particle)

a. Verb

fall down

go in

go up

pick up

b. Noun plus verb particle

boy fall down

dog fall down

Bobby fall down

girl fall down

doll fall down

Mary fall down

Combinations of Previously Established Features

a. Verb-in-it

got in it

look in it

put in it

jump in it

b. Verb-in-adjective-noun

go in big box

jump in big box

put in red box

jump in red box

c. Verb-in-possessor-noun (go in John house; go in John's house)

put in Bobby box

go in boy truck

put in Mary box

look in Bobby house

d. Verb-in-my-noun

go in my house

go in my car

go in my truck

put in my box

put in my house

put in my car

e. Verb-in-here; there

go in here

look in there

jump in here

go in there

put in here

jump in there

f. I-verb-particle

I fall down

I dig down

I go up

I walk up

g. It-verb-particle

it fall (falls) down

it walk (walks) up

it go (goes) up

it walk (walks) down

Level II: Average Utterance Range 2.5-3.0 Words

Basic Constructions

1. Noun-verb-noun; e.g., girl hit boy (girl hits boy).

boy hit ball

girl hit ball

boy wash face

boy kick ball

girl kick ball

girl wash face