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ABSTRACT

The author reviews the literature and considers clinical implications of three issues in language and cognition: the relationship between language and cognition, the strategies children use in the language-learning task, and the cognitive determinants of what children say. Examined are questions (such as whether cognitive skills are dependent on or prerequisite for linguistic skills) said to have bearing on the evaluation of language-disordered and learning disabled children; strategies children apply to determine the structure and meaning of language; and examples of the cognitive determinants in children's language (such as overextension in the meanings of words). (LS)

ISSUES IN LANGUAGE AND COGNITION: IMPLICATIONS FOR CLINICAL PRACTICE

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This kind of program is fundamentally different from some others I have attended recently. Here, instead of receiving training in how to use X's articulation therapy program or Y's language development kit, convention participants are willing to grapple with underlying concepts. Rather than be passive recipients of someone else's conclusions about what to do and how to do it, this audience is interested in the principles on which clinical decisions may be made. This approach may be more professional and more virtuous, but it is certainly harder; however, it is my strong prejudice that a well-trained speech pathologist has the clinical skills to determine his own day-to-day procedures, while he continues to need to learn more about relevant research and theory in order to expand and modify the principles upon which those procedures rest.

The subject of language and cognition is one of the topics in theory and research relevant to the principles on which clinical decisions may be made. It is fair to say that the topic has currently become glamorous. At least three issues emerge from the recent literature having direct bearing on the work of language specialists who deal with children. I will take up these issues one at a time and consider some clinical implications embodied in each.

I. The first, and most general, issue may be stated as the relationship between language and cognition. The pertinent questions are:

1. What, if any, is the role of language in the child's cognitive development?
2. Does the child's cognitive development progress independently and in advance of his development of language?
3. Are certain cognitive skills prerequisite for the mastery of certain linguistic skills?

Before reviewing the varying positions on these questions, it will be useful to consider some examples of their clinical relevance. For one thing, whether we believe that cognition is essentially independent of language or, conversely, that language plays a central role in thinking (of course these are extreme positions, but important for illustrating my point) will have a considerable effect on the way we look at language-disordered or learning-disabled children.

Examples:

For example, the notion that language is inextricably tied to thinking lends to the assumption, frequently expressed, that errors in syntax signal inadequacies in thinking. A speech pathologist told me the other day that school-age "minority inner city children" (her term) with whom she had had classroom experience demonstrated a "language delay" (her term) that accounted for their poor academic achievement. Examples were: "He gots a book" and the omission of

the plural marker from nouns. The latter error, she pointed out, implied that the child failed to conceptualize the difference between "one"and "many" that no doubt caused him trouble in learning mathematics.

This example illustrates the interesting notion that "correct" thinking will somehow automatically produce "correct" verbal expression according to the standards of the educated community. It reminds me very much of Chomsky's (1965) delightful example where he cites Diderot, writing in 1751, as concluding that French is unique among languages in the degree to which the order of words corresponds to the natural order of thoughts and ideas, French being therefore a suitable language for the sciences. But there is the implication that training the child to use the plural the way his teacher does will drag along the correct cognitions.

Another example of the notion that the child's cognitive development is dependent on his language skills seems to echo in the often-repeated statement that children with learning disability all have language disorders, or even that all learning disabilities are reducible to language problems. The further implication is that if we give the child the necessary language skills, his learning problems will be eliminated.

In contrast is the notion that the child's mastery of linguistic skills is dependent on his level of cognitive development. From this viewpoint, clinicians may conclude that a given child will be unable to learn to use a certain grammatical construction until and unless he has achieved the concept that it encodes. Arguing from this notion, the clinician may conclude that some linguistic constructions will never be mastered by some children of limited intellectual ability. Examples might include the use of past tense markers and other aspects of encoding temporal concepts, like before and after, and the mastery of complex sentences with relativized clauses.

Another aspect of the clinical relevance of issue #1 relates to what I have called the question of "what to teach next." The language clinician who takes the position that language depends on cognition will look for signs of emerging cognitive skills upon which to hang his decisions about what language structures to introduce in the next session. He may note, for example, that the child who has not used negative constructions in his spontaneous language may appear to be aware of the existence-nonexistence dichotomy, as when he labels the cup of milk with the utterance "Milk," but shows frustration or puzzlement when given an empty cup. From such observations the language clinician may conclude that the time is right to

introduce negation in the form "No milk" into the child's structural repertoire. If, however, the language clinician takes the alternate position that cognitive development depends on the mastery of language skills, he will attempt to teach specific language structures on the assumption that such training will advance the child's cognitive skills. In this case he will introduce negative constructions when they are appropriate to the situation rather than to the child's extra-linguistic behavior; he will present the structure "No milk" in a situation where the absence of milk is noteworthy, not waiting for a sign from the child that he perceives the situation accordingly. In fact, in his effort to promote the child's language development, the clinician sometimes takes one position and sometimes the other, probably without recognizing that he has shifted his assumptions about the primacy of language or cognition.

Whatever the approach the language clinician takes, he will not find it difficult to find support for it in the scientific literature on the subject of the relationship of language to cognition. Let us review some of these viewpoints, beginning with the extreme position that the emergence of language follows (and is dependent upon) prior-developing cognitive skills, and work our way by stages to the contrasting position that language plays a central role in developing cognition.

Piaget and his group are usually credited with the position that cognitive development is independent of language. Church (1970)

writes that "those who study 'cognitive' development in the Piaget tradition seem to treat language as merely a superficial garment for the structures of perception and thought." Inspection of some of Piaget's voluminous writings shows the matter to be somewhat more complicated. Inhelder and Piaget (1964) make it plain that in their view language is insufficient for the formation of operational structures like classification and seriation. Once these intellectual structures begin to develop from underlying mechanisms, language plays a necessary, but not sufficient, role in their refinement and completion. With regard to the child beginning to talk, Piaget believes that at first the child does not use the terms of his mother tongue to refer to the same "collective classifications" implied by the adult use of these terms: "Children assimilate the language they hear to their own semantic structures, which are a function of their development. Adult language may help to modify these in the long run, yet at any given moment, it is always interpreted in terms of them". The logical mechanisms of cognition are "not passively transmitted by language." Yet while asserting that thought precedes language, Piaget (1967; Inhelder and Piaget, 1964) states elsewhere that language profoundly transforms thought, extending the power and mobility of logical operations: "It is also evident that the more the structures of thought are refined, the more language is necessary for the achievement of this elaboration" (Piaget, 1967). Language thus has the dual role of symbolic condensation and social regulation,

but it is not viewed as central to the development of thinking nor as the major source of the structures of thought. Piaget's position on this question receives a stronger statement in the work of one of his colleagues, Sinclair-de-Zwart, who concludes that an adequate theory of language acquisition would give to language the role of symbolizing that which is known, in place of a view of language as a source for what is known (Sinclair-de-Zwart, 1969). Sinclair (1971) states that what the child brings with him to the language-learning task is not a set of inborn linguistic universals, but rather "innate cognitive functions which will ultimately result in universal structures of thought;" she asserts that the existence of universal thought structures explains the universality of language, not vice versa. Symbolizing, the core function of language, is made possible by and derives from such early actions as symbolic play and imitation, while the early development of syntax is a special case of the child's cognitive abilities to order, classify, and relate objects and actions in his world (Sinclair, 1971; Sinclair-de-Zwart, 1973). Her viewpoint therefore is that developing language does not rest on any specialized linguistic capacity, but rather that the acquisition of language is an instance of a cognitive skill not different in essential ways from any other cognitive skill.

Among American writers the best known proponent of the Piagetian position that thinking is independent of language is Furth (1966), whose theorizing arises from investigations of concept attainment

and problem solving in deaf children and adults. Furth snowed that the deaf are not handicapped in many such tasks, and concluded that language appears to influence thinking only when the problem-solving task involves the use of specific language items which deaf individuals may not have learned. The position that cognition develops independently of and prior to language has gained current support from the work of Lois Bloom (1971), who concluded from her study on the early stages of language development that "syntax is learned by the child in his efforts to code certain conceptual relations." The cognitive functions underlying these early linguistic utterances are "achievements in the child's early development of thought" as Piaget described them.

Since Sinclair-de-Zwart (1973) asserts that "the closest link between language and intelligent activity dealing with reality is to be found during the earliest period of language learning" and therefore that language stems from intellectual activity. We may summarize that position to state that, while language is dependent on prior cognitive skills, the development of cognition is little influenced by the acquisition of language until the later stages of the development and refinement of both cognitive operations and linguistic skills. In contrast to this position is the theory of Vygotsky (1962) who asserted that in the child thought and language develop independently of one another until the age of about two years, because thought and language have different genetic roots. At

this time, "the curves of development of thought and speech, till then separate, meet and join to initiate a new form of behavior" in which speech begins to serve intellect and thoughts begin to be spoken." In later development, while intellectual growth is dependent on mastering language, thought continues to some extent to exist independently of language. While Vygotsky does not claim that the earliest thought is dependent on language, neither does he claim that language derives from, is based on, or is a special case of thinking.

From still another corner of the literature on psychological aspects of language, owing little either to Piaget's developmental psychology or Vygotsky's theorizing about the origins of language, comes the work of the verbal mediation theorists. Operating within a learning theory framework related to Osgood-type models, the Kendlers and their associates have reported the results of numerous experiments suggesting a central role of language in thinking. In the paradigm experiment, subjects are presented with four stimuli varying in two dimensions such as size (large and small) and shape (square and circle). In the first part of the experiment the subject learns to respond to the circles only. In the second part, the condition is changed either to a reversal shift, where he must respond to the squares, or to a nonreversal shift, where he must respond to the large stimuli. In the case of the reversal shift, the subject is to respond to the previously incorrect stimuli. In the case of

the nonreversal shift, the subject is to respond to the previously irrelevant stimuli. Nonreversal shifts are assumed to require simple associative processes, while reversal shifts require mediating processes of which verbal mediators, or words, are the most common type. Associative processes are considered to be typical of the thinking of animals and young children, while verbal mediation processes are characteristic of the thinking of older children and adults, the transition occurring in the age range from five to seven years (Kendler and Kendler, 1959). The theory and some of the experimental findings predict that appropriate verbal responses are available to the child before he can use them as mediators, which postpones the crucial role of language in thinking until well after language has been learned. Verbal mediation theory makes no statement about any earlier dependence of thought on language or of language on thought.

Continuing to trace the theme along the dimension of whether thought or language has primacy in the development of both, we reach the work of Luria (1961). That author describes the child's early naming behavior as active efforts to organize his perception and attention. Luria's painstaking experiments show, however, that it is only as the child grows older that he uses an abbreviated form of internal speech as an "invariable part of the thought process" to orient and direct his behavior. It is reasonable to credit Luria with the position that language occupies a central, if evolving, role in the thinking processes that result in behaviors.

I said we would eventually arrive at the other extreme from where we started (with Piaget), at the theory that cognition is dependent on language, and here we are. The most familiar statement of this position is, of course, by Whorf (1956) although he was not its earliest spokesman. The hypothesis is that "all observers are not led by the same physical evidence to the same picture of the universe unless their linguistic backgrounds are similar;" in other words, that language, at least in part, shapes perception and thought. While the Whorf hypothesis has been pretty much abandoned by modern psycholinguists, a very few (but not very recent) residual comments are worth repeating.

Bruner, Goodnow, and Austin (1962) make the point that cognitive activity in general depends upon the process of categorizing, while categorizing itself must be understood to be an inventive process rather than a way of discovering nature. The classifications or categories of conceptualization are man-made, and the process by which the categories are invented is essentially coding. Bruner and his associates suggest that the speaker's language, while not blinding him to discriminations not readily coded in that language, gives him a set of "habitual tendencies" to use certain attributes or features of events rather than others "in making everyday discriminations and in searching out defining attributes." Roger Brown (1962) notes that speakers of a language take an unfamiliar word to be an indication that there is a category to be acquired; children's functioning demonstrates their assumption that the name of a category is an attribute of that category; and the child learning language uses the linguistic responses of others as a guide to establishing the categories

of the nonlinguistic world. "In speech we have a small number of highly available attributes providing a first approximation to all concepts. We have a common currency of cognition."

Werner and Kaplan (1963) argue a similar position, but with the emphasis on the beginning moments of language learning. They state that symbolization is a tool for knowing, and that the process of symbolizing is also the process of constructing cognitive objects, or concepts. The title of their book (Symbol Formation) is the key to their strong position that symbols are formed rather than acquired. The role of symbolization is therefore a creative one in the "cognitive organization of experience and thought" from the earliest instances of naming ability. Kagan (1966) makes a similar point,asserting that between 13 and 18 months of age, when the child's labeling vocabulary increases rapidly, he "acquires a set of symbols that allows him to categorize and conceptualize aspects of his environment." Kagan proceeds to analyze the changes in the child's types of categorization and in his growing use of language to form hypotheses in problem-solving situations as he matures into the early school years.

Having examined various points on the continuum of the controversy over language and cognition, it is sobering to note that Paula Menyuk (1973) calls the whole thing a non-issue, suggesting instead that language and cognition develop together and interact all along the way. Nonetheless, the current fashion, in spite of the place where we just wound up, is to regard at least the early stages of language acquisition as heavily dependent on prior cognitive learning; in other words, that the child learns how to code (and decode) what he already knows. This point of view, then, seems

strangely at odds with some of the pedagogical attitudes and clinical-practices that I mentioned earlier.

II. A second issue, and one that has received must attention in the recent literature, is the strategies children use in the language-learning task. These strategies are in some places referred to as cognitive strategies and in other places called perceptual strategies. Whichever term is used, the concept is that children must figure out how language works, given as raw data the language they hear plus relevant non-linguistic or contextual information. The child who is not yet an accomplished language-user, according to this approach, develops certain hypotheses about language which he uses both for understanding the sentences of others and formulating sentences of his own. At any given point, therefore, the child's performance in comprehending and producing spoken utterances is predictable, to the degree that we can determine his strategies.

This work also has important clinical implications. If we have knowledge of the developmental strategies children ordinarily apply to language, we will have a fairly good idea of which kinds of sentences children will find easier to understand and which harder. We will not be surprised to discover that some sentences children seem to be able to understand when they are quite young are not understood as well when they are older.(the passive form is a good example of this kind). If our clinical task is to expand and develop the child's linguistic skills, this kind of knowledge will help us make principled decisions about what to teach next. A further clinical application of information about children's cognitive strategies for language is that it can help us determine how to

talk to children when we wish to be certain that they understand us. As an example of the kind of thing we might take care to avoid, H. Douglas Brown (1971) points out that in spite of the fact that young school-age children have difficulty comprehending complex sentences with relativized clauses, teachers' manuals often direct them to ask their classes questions like "Do you know what the lady is called who works in the library?" and "Where will you look to find out the number of the page on which the new story begins?"

In the literature on the cognitive strategies children use to figure out language, it is possible to distinguish two themes. One approach is to define strategies children use to determining the structure of language. A second approach is to describe the strategies children use in figuring out meaning in language, or the way that spoken utterances match the child's perception of the non-linguistic reality. I will give some examples of both.

Slobin (1971) points out that "Every human child constructs for himself the grammar of his native language," and outlines a set of strategies children everywhere appear to use in this task. He states that "Cognitive development and linguistic development do not run off in unison. The child must find linguistic means to express his intentions. The problem is: What makes a given linguistic means of expression more or less accessible to the child?" Slobin's point of view is that children everywhere develop cognitive (non-linguistic) operations in the same order but always prior to learning their linguistic expression; however, if, comparing two children learning different languages, it is evident that one child masters the relevant linguistic expression earlier, the linguistic

device that language uses to express that concept must be the easier one to master and therefore is a more direct match to the child's hypothesis about language structure. From his cross-cultural studies he has outlined a series of "operating principles" children use to handle linguistic features, or what he also calls "linguistic discovery procedures." Some of these principles are:

Pay attention to the ends of words. This principle predicts that children will master grammatical inflections that take the form of suffixes more easily than those that take the form of prefixes or prepositions.

Pay attention to the order of words and morphemes. This principle predicts that when faced with sentences that deviate from the usual word order, young children will tend to interpret them in terms of standard word order.

Avoid interruption or rearrangement of linguistic units. This principle predicts that the child will find a sentence like The man who the girl watched slept harder than The man slept and the girl watched him.

(Slobin's lists seven operating principles in all, some of which have more relevance to English than others.)

Another attempt to describe children's strategies for determining linguistic structure is that of Bever (1970). Bever's argument is that "specific properties of language structure and speech behavior reflect certain general cognitive laws." Bever distinguishes between segmentation strategies and semantic strategies. Segmentation strategies are strategies for isolating major sentence units within a string of words. (Semantic strategies are strategies for figuring out what sentences could mean

by combining words in the ways they will make the most sense, and relate more to the next thing I want to talk about.) The most primitive of Bever's perceptual segmentation strategies is Strategy A: "Segment together any sequence X...Y in which the members could be related by primary internal structural relations, 'actor action object...modifier.'" Strategy A predicts that young children will have no trouble figuring out who did what to whom to in sentences like The cow kissed the horse or even in It's the horse the cow kisses but will have trouble with sentences like The horse was kissed by the cow. Bever has isolated other perceptual strategies that children use up to the age of about 4 years that account for children's performance in comprehending various linguistic structures.

The work of Carol Chomsky (1969) carries this approach to studying how older children comprehend certain types of sentences. Although Chomsky does not refer to the underlying principles as cognitive strategies, chances are that she would if she were writing on this subject today. For example, she points out that children should experience difficulty in comprehending sentences of the form John promised Bill to go because that sentence violates the Minimum Distance Principle that applies to superficially similar sentences like John persuaded Bill to go and John encouraged Bill to go. The Minimum Distance Principle, which children presumably have learned before the age of 5 years, provides that the noun closest to the verb in the complement is the subject of that verb. In other words, in both John persuaded Bill to go it is Bill who goes, while in the test sentence John promised Bill to go it is John who goes. The Minimal Distance Principle may be thought of as a strategy children use in determining the relationships among nouns and verbs in sentences like

these, and thus will also account for certain errors in comprehension children make on sentences where the strategy does not apply. Chomsky's results showed that accurate comprehension of sentences like John promised Bill to go is acquired by children sometime between 5-1/2 and 9 years, with considerable variation from child to child.

Perhaps a more fruitful approach has been the attempt to determine how children figure out what sentences mean. But it is well to recognize a bias here. Given that language may be defined as the rules that relate spoken sounds to meanings and given that children acquire meanings as a function of their cognitive development, the task of the language learner may be viewed as one of code-cracking. (This of course reflects the fundamental viewpoint that cognition is prior to and prerequisite for language acquisition, a controversy that we have already discussed.) There is by now a very considerable literature on sentence comprehension in children, some examples of which I will cite shortly. Some of that material has to do with the general notion that sentences that are more complex syntactically should also be more complex psychologically and therefore more difficult to understand; accordingly, it has been argued, children should be able to comprehend sentences of increasing syntactic complexity as they grow older. But the approach we are interested in here is rather different; it suggests rather that the attention ought to be to the complexity of the meanings that words and sentences encode as well as to the directness with which given sentence forms reflect the child's perception of the relevant meanings.

For example, Sinclair-de-Zwart (1973) considers that "the early

correct appearance of certain patterns" in children's language are explainable as "features of the cognitive apprehension young children have of certain situations which give rise to what can be called natural patterns." The way the child constructs his initial grammar for two-and three-word utterances (determining, of course, what he thinks such utterances mean when adults say them) corresponds fundamentally to "Piaget's structural analysis of the basic patterns of intelligence." In the earliest phase of development, the sensori-motor period, the child sees "all things and persons... in relation to his own actions and desires," and thus as he learns from the experience of his own activity that objects can be acted upon, e.g., moved, separated, opened, caused to make a noise, etc., at the start of this learning he himself is the only agent. "Only gradually will the child change his view of reality so that he himself is not the only agent or the only person concerned; he realizes that he is only one agent among many" (first, other persons and later, objects are understood as acting upon other objects). Correspondingly, the child's first spontaneous utterances generally refer to himself as the implicit subject. In terms of comprehension, when he discovers a relevant "short combination" in an adult utterance ("how and why is a mystery"), "he assumes these sounds express the action pattern aspect of the event, and he will use the same series (in better and better phonetic approximation) whenever there is, in his view, a recurrence of the action pattern. He relates the parts of such utterances to each other in terms of subject and predicate, ("that is, a description of an interesting state or property of an object or a person) or a relation of action-patient (that is, the expression of an action being, or to be performed by or in the interest

of the child himself)." In the next step the child learns to combine the two possibilities into Agent + Action (+ Patient), producing (and comprehending) utterances according to the pattern of functional relationships SV_{intr}, SVO, or SOV.

Similarly, Macnamara (1972) argues that "infants use meaning as a clue to the linguistic code," pointing out, as we have noted, that such an argument "rests on the assumption that in the period when infants begin to learn language, their thought is more developed than their language." An example of the early application of this strategy to acquiring vocabulary is that when the infant's mother names an object for him, he takes "the word he hears as a name for the object as a whole rather than as a subset of its properties, or for its position, or weight, or worth, or anything else." (Notably, this suggestion conflicts with that of Sinclair, who would consider that the young child is more likely to understand the utterance to refer to the action pattern and its relation to himself. Thus, a mother who taught her child "cookie" so he would know something he could ask for found that he subsequently said "cookie" whenever he wanted anything.) Macnamara goes on to state that the child "uses independently attained meaning to discover at least certain syntactic structures that are of basic importance." The way the child can figure out that Give me the book and Give the book to me are two syntactic versions of one another is on the basis of his non-linguistic, or semantic, knowledge

"that while books can be given to people, people cannot be given to books." Macnamara's viewpoint here correlates neatly with one of Slobin's (1971) operating principles that I did not mention earlier, namely, The use of grammatical markers should make semantic sense. This principle predicts that children will have trouble acquiring syntactic rules that do not express any meaning, like rules for grammatical gender, (from which happily English is almost free, but which are indeed acquired late by children learning French and Russian). Macnamara summarizes his position this way: "It seems natural to suggest that children initially take the main lexical items in the sentences they hear, determine referents for these items, and then use their knowledge of the referents to decide what the semantic structures intended by the speaker must be. ...Once the children have determined the semantic structures, their final task is to note the syntactic devices, such as word order, prepositions, number affixes, etc., which correlate with the semantic structures."

Macnamara's argument that the child utilizes his "nonlinguistic cognitive processes" to match meanings to linguistic signals suggests that as clinicians we may be barking up the wrong tree if we try to train children to produce certain word order sequences as an approach to teaching syntax. If we follow M.'s thesis, we ought to be working from meanings to structures, rather than the other way around.

Moving for the moment to individual words, it has been shown that what children think certain words mean is predictable from knowledge of the aspects of word meanings that are most accessible to children. The kind of words most studied in this respect are a subset "relational terms," or spatial comparative adjectives, including the examples of tall and short, high and low, wide and narrow, long and short, and deep and shallow. The first member of each pair is generally called the "unmarked member, because its distribution is less restricted than the other;" the more restricted member is then called the "marked" member (Wales and Campbell, 1970). In other words, we use tall in numerous and neutral constructions referring to height, like "How tall is he?" but short only when the fact of shortness is established and we call attention to it, like "How short is he?" It is also clear that these pairs of adjectives arrange themselves at different ends of the continuum, such that tall, high, and wide, indicate the presence of the attribute while their opposites short, low and narrow indicate its absence; thus tall has positive polarity while short has negative polarity. Herbert Clark (1970) has hypothesized a three-stage sequence in the child's acquisition of such comparative adjectives. To begin with children understand these words in a non-comparative sense, so that tall and short, high and low all refer to some aspect of height but do not contrast with one another; in the next stage, they understand both adjectives to refer to the "extended" member of the pair,

so that tall and short both mean "tall," and high and low both mean "high"; finally, they understand the terms in their "true comparative meaning." The implication is that children three years old or younger will not understand these terms as adults do, information that we can put to good use in our decisions about what to expect of children, what to teach them, and how to talk to them.

Another thread that runs through studies of how children understand the utterance of others may be summarized this way: other things being equal (like syntactic complexity), children understand sentences better to the degree that they match the non-linguistic reality as they perceive it. E. Clark (1970) points out that children's earliest strategy for comprehending sentences with two events related in time is that the order of mention matches the order of events. Thus, they will readily understand sentences like 1. He jumped the gate and then he patted the dog. More interesting are sentences like:

2. He jumped the gate before he patted the dog.
3. Before he patted the dog, he jumped the gate.
4. He patted the dog after he jumped the gate.
5. After he jumped the gate, he patted the dog.

In these sentences, adult listeners use the meanings of the words before and after to determine the order of events. Children at about 3 years, who have not yet acquired these words, however, rely on the order-of-mention strategy. As a result, they understand sentence #2 and #5 correctly but often err on #3 and #4. In a similar vein,

it appears that children (and probably adults as well) can comprehend most easily those sentences where the grammatical and logical subject corresponds to the perceived actor in the nonlinguistic situation. That complicated sentence means that when asked to follow instructions like "Make it so that the red truck is pushing the green truck" "Make it so that the green truck is pushed by the red truck," and given that one truck was already fixed in place, nine-year-old children performed best when the green truck was the fixed one (Huttenlocher, Eisenberg, and Strauss, 1968). In other words the children assumed that the movable block or the perceived actor corresponded to the logical subject of the sentence; because they did better on the active than the passive, a further interpretation is that when all three, that is grammatical subject, logical subject, and perceived actor, match up, that sentence is easiest of all to understand.

The above examples are but a few from a rather extensive list that I hope serve to illustrate the theme I referred to earlier of the cognitive strategies children use in figuring out how language encodes meanings.

III. The third issue I want to discuss is cognitive determinants of what children say. Here I would like to cover a few examples and only then mention some clinical implications.

It has been suspected for sometime, although only recently studied systematically, that young children often use words differently from their use in the adult system. It is often said that young children frequently say doggie to refer to any animal; while this seems to be true, parenthetically I have marvelled at the ease with which children soon learn to distinguish dogs from cats, and so forth, dogs coming in such a variety of sizes, colors, and textures and some of them being no larger than some cats. Anyhow, the tendency to use early words to cover large categories has been carefully studied by E. Clark (1973), who calls the phenomenon "overextension." She found it to be a universal phenomenon characterizing the age range one to two-and-a-half years. She accounts for this phenomenon on the basis of her theory that children do not learn the full meanings of words at once, but rather acquire partial meanings, or selected semantic features, at first and gradually add more meaning features "until the child's combination of features in the entry for that word corresponds to the adult's." She further hypothesizes that the meaning features the child uses early derive from salient aspects of his perceptions; they include characteristics of movement, shape, size, sound, taste, and texture. "The categories are clearly derived from the child's perception of the properties of the objects around him." Thus, she reports data showing a child's use of the same word to refer to a fly, a speck of dirt, dust, small insects, crumbs, and the child's own toes; another where the same word was used to refer to the moon, then to cakes, round marks on the window, and writing on the window and in books.

Next, an example from the spontaneous language of somewhat older children. Ervin-Tripp (1970) has studied the kinds of answers children between 2 1/2 and 4 years give to Wh-questions. Her results showed that when the children did not understand the Wh-word beginning the question, their answers did not match the question; nonetheless, the nature of mismatched answers were predictable. For example, her children over three answered questions like How did the man get into the house? with responses of the type Because he did. "Because" answers occurred incorrectly but quite regularly for questions with animate subjects and intransitive verbs.

A third example comes courtesy of my son at age five. He was playing with a wooden clown with a hat that swiveled loosely but did not come away. When he was unable to remove the hat, he handed it to me for help, saying "How the hat takes off?" Now, there are verbs in English that appear in such constructions; one can say I moved the stone or The stone moved; John opened the door or The door opened, because move and open are two members of a class of verbs that can be used transitively or intransitively. Unfortunately, take off is not in that class, so the construction "How the hat takes off?" is ungrammatical in English.

A final example comes from the work of Olson (1970), who points out that what people say depends on "the context of alternatives." If you look at the figure, you will see an example of Olson's theory.

In the hypothetical situation, a gold star is placed under a small round white wooden block. "A speaker who saw the act is asked to tell a listener, who did not see the act, where the gold star is." The figure shows four sets of alternatives, each corresponding to a different response the speaker is likely to make. In Case I he says "the white one." In Case 2 he says "the round one." In Case 3 he says "the round white one." In Case 4, however, where there are no alternatives to eliminate, the speaker may say "the round, white, wooden block that is about one inch across." In other words, the speaker will "specify the object to the level required by the listener to differentiate the intended referent from the alternatives." As the alternatives change, so does the speaker's utterance.

Now for the clinical implications of these examples:

1. The examples of overextension in the meanings of words used by children around two and the tendency of three-year-olds to answer many Wh - questions with <u>because</u> illustrates the point that it is well to avoid crediting the child with too much knowledge about language. We have inherited a recent tradition that from the spontaneous utterances of children it is possible to induce the rules that comprise their linguistic competence; in some instances, however, the things children say seem deceptively sophisticated. The moral is that it is not necessarily the case that every spontaneous utterance the child produces reflects the full set of linguistic rules that are presumed to generate that utterance in the adult language.

2. The example of "How the hat takes off?" suggests that some "errors" in child language might be easily misunderstood or taken too seriously. "How the hat takes off?" is, to be sure, ungrammatical in English, but it is a high-order error, revealing that the speaker has learned a rather subtle rule about verb usage in English albeit applying it here to the wrong instance. Another point worth making is that the clinician might mistakenly regard the example as an error in word order, which it emphatically is not; it is, rather, an instance of overgeneralization of the rule that produces grammatical sentences like The door opened. There is, of course, another grammatical error in the example; the speaker apparently has not mastered the rule for forming Wh-questions that requires the auxiliary verb and places it before the subject. Observing that rule, but not the transitive/intransitive rule, would result in "How does the hat take off?" The moral is: know something about syntax before you undertake to evaluate children's utterances.

3. The example of the small, white, round, wooden block, of course, speaks directly to one of the subtests of the Illinois Test of Psycholinguistic Abilities. In the Verbal Expression subtest, the examiner gives a small, square, yellow wooden block to the subject and says, "Tell me about this." Unless the child is a very sophisticated test-taker, he is likely to respond with a blank stare. The examiner can clue the child in, of course, by examples and coaxing,

but the nature of the test is entirely unrealistic in the light of Olson's (1970) illustration. There are two morals here: a) If we want to sample the child's skill at verbal expression, we would do better to provide him with a set of alternatives so that he is obliged to indicate the relevant contrasting attribute. If we want him to say yellow, we had better make sure that only one of the alternatives is yellow and that the object in question shares at least one attribute with each of the alternatives.

b) Teaching to the test is a questionable clinical strategy. Some thoughtful, innovative clinicians told me recently that they are sadder but wiser after observing the results of their language training efforts with a group of mentally retarded children when someone hands one of these children a cup, he is likely to say "It's cup, it's pink, it's made out of plastic, you drink out of it."

Issues in Language and Cognition: Implications for Clinical Practice

Norma S. Rees

A. Issues:

1. What is the relationship between language and cognition?
   a. What, if any, is the role of language in the child's cognitive development?
   b. Does the child's cognitive development progress independently and in advance of his development of language?
   c. Are certain cognitive skills prerequisite for the mastery of certain linguistic skills?

2. What are the cognitive strategies children use in figuring out how language works?

3. What are the cognitive determinants of what children say?

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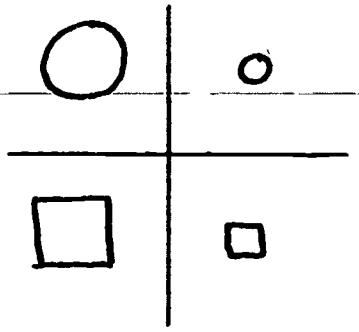

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C. "Do you know what the lady is called who works in the library?"

"Where will you look to find out the number of the page on which the new story begins?"

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D. Some operating principles:

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H. 1. He jumped the gate and then he patted the dog.

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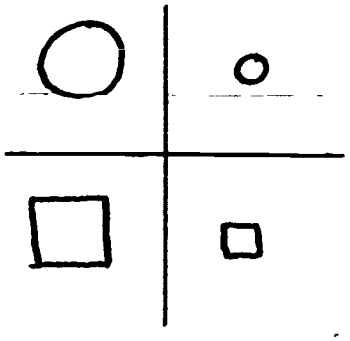

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