

WHY NOT PIVOT GRAMMAR?

Lois Bloom

Teachers College, Columbia University, New York, New York

CITATION: Bloom, L. (1971). Why not pivot grammar? *Journal of Speech and Hearing Disorders*, 36, 40-50. Deposited in Academic Commons, Columbia University, with permission of the American Speech, Language, and Hearing Association, <http://jshd.pubs.asha.org/article.aspx?articleid=1747140>.

ABSTRACT

Children's early attempts at syntax have been described in the recent language development literature in terms of "pivot grammar." The pivot-open class distinction is discussed in the light of the author's more recent research that inquired into the semantic intentions that underlie early sentences. When utterances were examined along with context and behavior in the speech events in which they occurred, certain underlying conceptual relations could be identified. It is concluded that the "pivot grammar" account is only a superficial characterization of the form and distribution of linguistic elements in early two-word utterances. It is suggested that a more productive model of early language development to use for evaluation and treatment of language pathology would need to specify the semantic relations among objects and events that are coded by syntax.

Recent studies of language development have focused attention on the early stages of emerging syntax—the use of two-word and three-word sentences sometime during the second half of the second year of life. A number of investigators have reported similar distributional phenomena in samples of early child speech. When children begin to use two words in juxtaposition there are often a small number of words that occur frequently, in relatively fixed position, in combination with a large number of other words, each of which occurs less frequently. Braine (1963) named this first group of words "pivots"; children's speech has since been described in the literature as "pivotal," and an account of the systematic productivity of early utterances is often referred to in terms of "pivot grammar." The apparent convergence on this point in the literature (in particular, Bellugi and Brown, 1964; McNeill, 1966a) has led to its application to programs for language disorders (see, for example, McNeill, 1966b). However, more recent research (Bloom, 1970) and a careful examination of earlier studies, such as the classic diary study of Leopold (1949), indicate that the time is at hand for a reevaluation of the phenomenon. How real is pivot grammar?

This paper will begin with a review of the original evidence. Subsequently, several important questions will be raised concerning the adequacy of the notion of pivot grammar as an account of what children know about grammar as they begin to use syntax in their speech. Recent evidence of the underlying conceptual relations in children's early speech will be reported, and, finally, this

information will be discussed as it relates to possible approaches to language disorders in children.

THE ORIGINAL EVIDENCE

The studies of Braine (1963), Miller and Ervin (1964), and Brown and Fraser (1963) were essentially distributional studies. They viewed children's speech as evidence, potentially, of a distinctive language, and for this reason they were admirably motivated to avoid the classes and categories of adult speech in their accounts. As a linguist would approach an exotic language in order to describe its grammar, these investigators looked at large numbers of children's utterances, and described what they saw in terms of classes of words based on their privileges of occurrence. What they found was essentially an orderly arrangement of at least two, possibly three, classes of words. Certain words, such as "no," "no more," "all gone," "more," "this," "that," "here," "there," "off," "on," occurred frequently, in fixed position as either the first or second constituent in a two-word utterance, and shared contexts with a larger number of words that occurred relatively less frequently. Braine (1963) referred to the classes as "pivots" and "x-words," Brown and Fraser (1963) referred to "functors" and "contentives," and Miller and Ervin (1964) referred to "operators" and "non-operators."

Only Braine (1963) was discussing a relatively complete corpus. His data consisted of (1) the records kept by the mothers of two boys of all of their first two-word utterances over a period of several months, and (2) tape-recorded samples of a third boy's speech during play sessions. Brown and Bellugi (1964) described only the constituents of noun phrases and the developmental differentiation of the initial position modifier class. Brown and Fraser (1963) and Miller and Ervin (1964) presented for discussion lists of two-word and three-word utterances that demonstrated the distributional phenomenon—for example, utterances with "this" and "that" or "Mum" and "Dad."

McNeill (1966a), using some of Brown's data, presented an extended account of the "pivotal" nature of children's speech. He viewed the original classes of pivots and x-words, or, as he named them, "open" words (because of the apparent tendency of the class to admit new members freely), as the original generic classes from which all the category classes of the adult model ultimately develop, through some sort of differentiation. McNeill (1970) has since refined his distinction between pivot forms and other forms further, in terms of their syntactic features with respect to cooccurrence with noun forms. Essentially, his account specifies all noun forms as an unmarked class in the child's lexicon—the class of "open" words. All other words are marked forms—marked, in the sense that they are identified as occurring only with nouns—the verbs, modifiers, and determiners which constitute the originally undifferentiated "pivot" class.

At least two critical questions can be raised about the adequacy of the pivot grammar notion as an account of children's early speech. First, how does pivot grammar relate to the grammar of the adult, model language? Large enough samples of adult speech would undoubtedly reveal similar kinds of distributional evidence based on relative frequency of occurrence (see Zipf, 1965). Certain words such as determiners, pronouns, and other function words or syntactic markers occur more frequently and in more varied linguistic environments in adult speech than do verbs, adjectives, and nouns. However, such rules of grammar as "pivot + open," "open + pivot," or "open + open" have no real analog among the syntactic structures of the adult model. How does the child progress from using pivotal utterances to using utterances that reflect the complex interrelation of rules that is the essence of adult phrase structure? McNeill, in both of the foregoing accounts, attempted to deal with this question. However, his conclusions are based upon certain assumptions—for example, that pivot forms do not occur in isolation, and that two nouns cannot occur together—that simply are not supported in the data.

The second question concerns the adequacy of the pivot grammar account for describing and explaining children's early speech. What does the notion of pivot grammar tell us about what children know about grammar when they begin to use syntax in their speech?

THE ADEQUACY OF A PIVOT GRAMMAR ACCOUNT

The studies just discussed focused attention on the formal syntax of children's speech—on the arrangements of words in utterances. However, such descriptions of the form of speech provide minimal information about the child's intuitive knowledge of a linguistic code. Linguistic expression is intimately connected with cognitive-perceptual development and the child's interaction in a world of objects, events, and relations. The goal of the research discussed here (and reported at length in Bloom, 1970) was to investigate the development of linguistic behavior in relation to aspects of experience related to the speech children use.

The subjects of the study—Kathryn, Eric, and Gia—were the first-born children of white, college-educated, American English-speaking parents. They were each visited in their homes for approximately eight hours over a period of several days. Each sample of spoken language (at six-week intervals) was obtained during the child's (1) play with a selected group of toys, (2) eating, dressing, and toileting, and (3) play with a peer. The syntactic components of generative grammars were proposed for the earliest texts with mean length of utterance less than 1.5 morphemes. The syntactic and semantic development of negation was described until mean length of utterance was approximately 3.0 morphemes (in Bloom, 1970). Kathryn was 21 months old when the study began; Eric and Gia were each 19 months, one week old.

Judgments were made of the semantic intent of utterances, based upon clues from the context and behavior in the speech events in which utterances

occurred. Using this kind of information, an attempt was made to propose rules of grammar to account for the inherent semantic relations that underlie the juxtaposition of words in early sentences. The notion of sentence structure implies a pattern of organization—an arrangement of otherwise independent parts that is based on the relationship of the parts to each other—which is something more than simply a sequence of words. The semantic relations that were coded in the children's speech were essentially of two kinds: functional relations with invariable grammatical meaning, and grammatical relations with variable grammatical meaning between constituents in subject-predicate relationship.

Functional Relations: Semantics of Certain Pivot Forms

To begin with, the data from Kathryn, Eric, and Gia contained utterances that were similar to those reported in the earlier studies and described as pivotal: Kathryn's utterances with "no," "this," "that," "more," and "hi"; Gia's utterances with "more" and "hi"; and Eric's utterances with "no," "another," "there," and "it." The children's use of these forms, in terms of semantic intention, could be described with some confidence. "No" most often signaled the nonexistence of the referent named by the second constituent (as in "no pocket"), where there was some expectation of its existence in the context of the speech event. "More" or "another" was used to comment on or to request the recurrence or another instance of an object or event (as in "more raisin" and "more read"). "This" and "that," and "there" were not contrastive in proximal-distal reference, and were used to point out an object or event in the environment (as in "this book," or "this cleaning"). "Hi," which occurred less frequently, was used in a nonsalutatory way as the child took notice of an object, person, or picture (as in "Hi shadow," "Hi spoon," "Hi Jocelyn"). The forms occurred frequently, in fixed syntactic position, with a number of different words, and they shared contexts. All occurred as single-word utterances as well. However, they occurred with specific semantic intent, either in relation to the words with which they were juxtaposed or with inherent relation to something not specified, in the case of single-word utterances. Their use was motivated by their semantic function; they occurred in speech events that shared features of context and behavior. This last point is of considerable importance; certain words occur often in children's speech apparently because of the nature of their referential function. Description of such utterances as pivotal is only a superficial description of relative frequency of occurrence and syntactic position.

Moreover, it turned out that the utterances described as pivotal, in the limited sense just indicated, proved to be a small percentage of the total number of utterances that were obtained from Gia and Kathryn. Only Eric's speech—during the period of time under discussion, when mean length of utterance was less than 1.5 morphemes—contained a preponderance of utterances such as have been so far described. The majority of the utterances of Kathryn and Gia presented certain critical problems for a pivot grammar account.

There were certain words in the children's speech that met all the distributional criteria for specification as pivots. The most frequent of these was either "Mommy" or reference to self—either by first name or, in Kathryn's case, "Baby" as well. However, not only did syntactic utterances with "Mommy" occur frequently, but it was also the case that "Mommy" occurred in relatively fixed position. For example, in 32 sentences with "Mommy" in the first speech sample from Kathryn (when mean length of utterance was 1.32), "Mommy" occurred in sentence-initial position 29 times. Moreover, "Mommy" also shared contexts with other forms, for example "Mommy sock" and "no sock," "Mommy haircurl" and "more haircurl."

One immediate objection to "Mommy" as pivot is that "Mommy" is a form having lexical status as a substantive or content word rather than a function word or syntactic marker. There is something intuitively wrong about classing "Mommy" as a function word, and, indeed, there has been a general inclination to avoid such characterization in the literature (see, for example, the discussion in Smith and Miller, 1966).

However, more important reasons for arguing against the distributional evidence that would class "Mommy" as a pivot or function form had to do with the fact that different utterances with "Mommy" meant different things. For example, in the first sample from Kathryn, the utterance "Mommy sock" occurred twice in two separate contexts:

- (1) Kathryn picking up her mother's sock
- (2) Mommy putting Kathryn's sock on Kathryn

It appeared that the difference in semantic interpretation between the two utterances (1 and 2) corresponded to a structural difference in grammatical relationship between the constituents "Mommy" and "sock." In one instance the structure was a genitive relation and in the other the relation between subject and object.

Grammatical Relations

Constructions with two substantive forms (the 32 utterances with "Mommy" and 24 utterances with "Baby" or "Kathryn," for example) were described by Braine (1963) and McNeill (1966a) as the juxtaposition of two x-words or open class words, respectively. But whether such utterances are classed together as "pivot + open" or "open + open," the two instances of "Mommy sock" would have the same structural description in either case, because the surface form of each is the same. Rules that account for utterances in terms of the juxtaposition of pivots and open words cannot account for differences in semantic interpretation. And yet there was strong evidence in the data for ascribing different structural descriptions to utterances with similar surface form but different underlying relationship between constituents. The full argument regarding the correct structural representation of such utterances has already been presented (Bloom, 1970). For the purpose of this paper, it will

be pointed out that interpretation of the semantic intent of utterances with two substantive forms provided evidence that the children knew more about grammar at this early stage than merely rules for permitted juxtaposition of two different kinds of words.

There were a number of potential interpretations of the utterances that occurred with “Mommy” in constructions with nouns. The first possibility was that the child had simply named two aspects of a referent, or two referents, within the bounds of a single utterance—a conjunction (for example, “Mommy” and “sock”). If one interpreted children’s use of single-word utterances (before and during the emergence of syntax) as labeling or naming behavior, then this would be an intuitively appealing interpretation of the juxtaposition of two noun forms within an utterance. If such were the case, and the two noun forms were simply conjoined without connection or with any possible connection between them, one could reasonably expect the constituents to be named in variable order. If the child had simply named two referents, or two aspects of a referent, there would be no motivation for naming them in a particular order. But the occurrence of “Mommy” in sentence-initial position 29 times in the 32 utterances that included “Mommy” was impressive evidence that the motivation for the order of the constituents was strong.

In addition to the utterances with “Mommy,” there were 37 other noun + noun constructions in the first sample of Kathryn’s speech and 66 utterances that juxtaposed two nouns in the second sample of Gia’s speech (when mean length of utterance was less than 1.5 for each). Clearly, this utterance type was one of the most productive constructions in the speech of both children. Of the total of 135 noun + noun utterances, there were only seven that occurred with no other interpretable relationship between the forms than simple conjunction, for example, “umbrella boot” from Kathryn as her mother walked into the room carrying her umbrella and boots, and “Mommy Gia” from Gia as she looked at a photograph of Mommy and Gia. All of the remaining utterances appeared to present constituents with an inherent relationship between them, although in some instances the relationship was equivocal.

The utterances with two noun forms specified the following grammatical relations (given here in order of frequency): subject-object (“Mommy pig-tail”), the genitive relation (“Kathryn sock”), the attributive relation (“bread book”), subject-locative (“sweater chair”), and, marginally, conjunction (“umbrella boot”). However, it was not the case that any two words could occur with any possible relation between them. There were no instances of such other possible relations that could hold between two noun forms as identity (“Mommy lady”), disjunction (either-or relation), or direct-indirect object. If it could be assumed that the unobtained relations existed in the child’s experience, for example, giving something to someone (direct-indirect object), then the children’s utterances were not merely reflections of nonlinguistic states of affairs. Such selectivity in expression and the impressive consistency of word order provided evidence for assuming that the children’s utterances were motivated by an underlying cognitive-linguistic rule system.

The most frequently expressed relationship between two nouns was subject-object. All three children produced verb forms in predicate relation to noun forms in subject-verb and verb-object strings in the early two-word utterances, when subject-verb-object strings occurred only rarely. Utterances that have been described in the literature as simply the cooccurrence of two substantive words (x-word + x-word by Braine [1963], or two open-class words by McNeill, [1966a]) could thus be explained in terms of the inherent semantic relationship between the constituents. It was apparent that the children in the study were talking about the relations between actors or agents, actions, or states, and objects or goals, and that the order of constituents reflected the underlying order of basic sentence relations with remarkable consistency—subjects and verbs preceded objects or goals.

The possible grammatical relations were not equally represented in the data. Not only were certain relations more productive than others—that is, they occurred more often in different situations with different words—but the children differed in their use of each. For example, Eric used the verb-object relation first, and utterances expressing this relation were dominant in his speech before he began to use subject nouns in relation to verb forms. The most productive early relationship for Gia and Kathryn was subject-object; Eric never produced such utterances. I. M. Schlesinger (in press) reported the productivity of this structural relationship between two nouns in the early speech of two Hebrew-speaking Israeli children, and Leopold (1949) described its frequent occurrence in the speech of his daughter Hildegard. In the speech of Kathryn, Eric, and Gia, verb-object strings appeared earlier and were more productive than subject-verb strings.

SUMMARY

The children's earliest sentences could thus be seen as expressing two kinds of conceptual relations. In grammatical relations, substantive words such as "Mommy" and "sock" enter into variable grammatical relationship with other words in sentences. Such words are not in themselves relational terms in the sense that they have independent lexical meaning. The children's earliest sentences also expressed functional relations, where inherently relational words such as "more" and "no" operate in linear structure with other (substantive) words to specify a particular relational aspect of such words (or their referents). Spoken alone as single-word utterances, such words manifestly imply such a semantic relationship to some unspecified aspect of experience.

It is not the case that the words the children used—for example, "no" and "more"—have only one meaning. All of the children used "no" subsequently to signal rejection, as in "no dirty soap" (I don't want to use the dirty soap) and, still later, denial, as in "no truck" (that's not a truck, it's a car). In the adult model, "more" is used to express the partitive notion (here is sand—and here is an addition to the quantity of sand, or "more sand"), and the

comparative notion as well. The partitive may be a derivative of recurrence, but it is clear that the notion of comparative "more" is a relatively late development. Similarly, substantive forms with essentially constant semantic meaning vary in grammatical meaning in relation to other words in sentences, for example, "*Mommy* push," "push *Mommy*," "*Mommy's* shoe," and "my *Mommy*." The function or use of certain forms is not implicit for the child in the word itself.

Given that children comment on the notions of existence, nonexistence, and recurrence of objects and events, one might well wonder why they should talk about anything else—in the light of what we know to be the achievements of sensory-motor intelligence. Piaget (1960) has described a major achievement in the child's development of thought with the realization of the endurance of objects when removed in space and time. The child learns that objects and events exist, cease to exist, and recur, and so he talks about it. The important conclusion about the development of grammar appears to be that children do not simply use a relatively uncomplex syntactic frame (such as pivot + open); they talk about something, and syntax is learned by the child in his efforts to code certain conceptual relations.

There is a necessary distinction between a speaker-hearer's knowledge of grammar and the notion of grammar as a linguistic account of that knowledge. The nature of the underlying rules that the child uses to speak and understand utterances cannot be described directly. A generative grammar represents a formal linguistic account of how such rules specify the inherent relations in sentences. Such an account specifies the syntax of utterances (the arrangements of forms) that accounts for the semantic relations among the forms, and in this sense there is a crucial relationship between linguistic structure and underlying cognitive function. Indeed, it is difficult to distinguish between cognitive and linguistic categories when accounting for the expressed relations between actors or agents, actions or states, and objects or goals.

It appears that the notion of pivot grammar describes children's early speech in only the most superficial way. Although the notion of pivot speech describes certain distributional phenomena in early utterances, it is clear that children know more about grammar, that is, more about the inherent relationships between words in syntactic structure, than could possibly be accounted for in terms of pivot and open class analysis. If treatment for language disorders in children is ultimately to be derived from a model of normal language development, there is evidence to indicate that a pivot grammar is not the model of child speech to use.

TREATMENT OF LANGUAGE DISORDERS

Several conclusions from this discussion may be applicable to planning treatment of language disorders in children. There are necessary limitations in the extent to which the conclusions of this study pertain to all children

learning language, and it would follow that similar limitations apply as well to using these results in evaluating and treating language pathology. Whether or not, and how, the normative data on language development in the literature can or should be directly applied to treating children with delayed language development are important questions (see Bloom, 1967). However, certain observations can be made at this time that should provide hypotheses for research directed toward evaluating procedures for treating language disorders.

First, the results of this study confirmed a conclusion that has been reached in every study of language development of children in the earliest stages of acquiring grammar. Children learn the syntax of language—the arrangements of words in sentences—before they learn inflections of noun, verb, and adjective forms. Although there may be alternation of certain forms from the beginning—“block,” “blocks,” and “sit,” “sits”—the different forms of a word do not occur in contrast. For example, in the early samples, “-s” did not signal a meaningful difference, such as marking reference to more than one block as opposed to reference to only one block without expression of “-s.” Thus, children learn word sequences (for example, “throw block”) before morphological contrasts (as between “block,” singular, and “blocks,” plural).

Second, Kathryn, Eric, and Gia did not produce constructions that were potentially analyzable as noun phrases as their first (or most productive) syntactic structures. Rather, the most productive structures they produced (after utterances with initial /ə/ were those which, in the adult model, express the basic grammatical relations: subject-object, subject-verb, and verb-object strings. Although the grammars of Kathryn and Gia specified a noun phrase constituent (with attributive adjectives in Kathryn’s lexicon only), this structure was far less productive than others which occurred, and Eric did not produce noun phrases at all. Based on these two observations, children appear to learn the expressions “throw block” or “Baby (subject) block (object)” before the expressions “big block,” “red block,” or “blocks.”

Finally, the results of this study indicated that (1) the status of the referent in the context in which an utterance occurs, and (2) the child’s relation to the referent in terms of behavior are critically important as influences on language performance. There were four contextual variables which characterized the occurrence of early syntactic utterances: (1) existence of the referent within the context, (2) recurrence of the referent or addition to the referent after its previous existence, (3) action upon the referent, and (4) nonexistence of the referent in the context where its existence was somehow expected.

The manifestation of the referent in the contexts of speech events was most significant. Utterances most often referred to objects or events which the child was able to see, and functioned as comments or directions, where the referent was manifest or imminent in the context of the speech event, as opposed to reports of distant past or future events. All of the children used a relational term, “more” or “another,” to signal another instance of the referent or recurrence of the referent after previous occurrence. The productivity

of verb-object and subject-object strings reflected the tendency for the children to talk about objects being acted upon. And, finally, as might be expected given the foregoing observations, their first negative sentences signaled the nonexistence of the referent. On the simplest level, children appear to learn to perceive and to discriminate (and, ultimately, to communicate) (1) such aspects of a referent as its existence, recurrence, or nonexistence, and (2) such relational aspects of events as between agent, action, and object before, among other things, such features of objects as relative size, color, or other identifying attributes.

It might be said that children learn to identify particular syntactic structures with the behavior and context with which they are perceived and then progress to reproducing structures in similar, recurring contexts. To use a structure in a new situation, the child needs to be able to perceive critical aspects of the context of the situation. Thus, the sequence in which the child learns syntactic structures may be influenced as much by his ability to differentiate aspects of situational context and to recognize recurrent contexts as by such factors as frequency of exposure to structures or their relative complexity.

Programs for language therapy that present children with linguistic structure (for example, pivot grammar) without attention to content ignore the very nature of language. It appears that learning a linguistic code depends upon the child's learning to distinguish, understand, and express certain conceptual relations. It would follow that children with language disorders need to learn more than simply the permitted cooccurrence of different words in their efforts at the analysis and use of language.

ACKNOWLEDGMENT

The research described in this paper was supported by PHS grant 5-F1-MH-30,001,03 from the National Institute of Mental Health.

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