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ABSTRACT

Children and adults speaking English, Hungarian, and Italian were asked to describe sets of pictures which manipulated the pragmatic category of givenness. The working hypothesis was that there exist rule-governed relations between the perception of certain categorical aspects of the communicative situation and the use of certain conventional linguistic devices. A set of predictions regarding the use of eight linguistic devices was derived from Prague School functionalist theory. The results indicated: (1) very early learning of the pragmatic function of the devices, (2) differentiation with age in the absolute level of use of the devices, (3) differences in the relations of the various devices to the manipulation of givenness, and (4) baseline effects in the use of the devices. (Author/CLK)

A Cross-Cultural Study of Child Discourse

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Abstract

Children and adults speaking English, Hungarian, and Italian were asked to describe sets of pictures which manipulated the pragmatic category of given-ness. A set of predictions regarding the use of 8 linguistic devices was derived from Prague School functionalist theory. The results indicated a) very early learning of the pragmatic function of the devices, b) differentiation with age in the absolute level of use of the devices, c) differences in the relations of the various devices to the manipulation of givenness, and d) baseline effects in the use of the devices.

A Cross-Cultural Study of Child Discourse

In the last five years, psycholinguists have developed an increasing interest in the relations between the structure of sentences and aspects of the communicative situation (Glucksberg, Krauss, & Higgins, 1974; Osgood, 1971). This development, although new to psycholinguistics, feeds upon a well-developed tradition of pragmatics in philosophy that has been articulated by Austin (1962), Frege (1970), Searle (1969), Wittgenstein (1958), and many others. A second influence on this recent development in psycholinguistics has been the functional sentence perspective of Prague School linguistics (Firbas, 1964; Halliday, 1967; Mathesius, 1939; Sgall, Hajicova, & Benesova, 1973). This school of linguistics argues that the structure of formal devices like word order cannot be explained without reference to pragmatic-communicative factors. Moreover, generative grammarians in this country have been forced to examine some of the relations that might adhere between the "surface" structure of sentences and the communicative context in which they are uttered (Chomsky, 1971; Jackendoff, 1972; Katz, 1972; Linde & Labov, 1975).

The basic thesis of this "new" development can be stated in either a weak or a strong fashion. The weak version is that there exist rule-governed relations between the perception of certain categorical aspects of the communicative situation and the use of certain conventional linguistic devices. This weak version also holds that, in comprehension, certain linguistic devices serve to direct the listener's attention toward specific aspects of the communicative situation. The strong version (Osgood, 1971) contends that the structure of sentences is a direct reflection of the perception (Gibson, 1966) of the communicative context.

The present study confines itself to a test of the weaker hypothesis. As matters now stand, even this weaker version rests on a narrow empirical base. So far, only one categorical aspect of the communicative situation has been studied in any detail. This is the contrast between information that is given and information that is new (Halliday, 1967). Consider, for a moment, the following discourse fragment: the man bought some bourbon and then he walked home. In the first clause the man is new information and is lexicalized as a specific noun with a definite article. However, in the second clause, the man is no longer new, but given. This is the reason why the pronoun he is used in the second clause. In other words, the device called pronominalization is used when information is given. Such interclausal relations involve problems in discourse analysis.

When a sentence is the first sentence of a discourse, it often happens that all of its information is new. However, after an initial sentence, utterances can contain one piece of new information embedded in a matrix of given information. If the structure of the given information in such a clause matches the structure of the given information of the previous clause, there is a case of "second instance" (Bolinger, 1952). In such cases of "second instance" the new information can be called contrastive information. An example of contrastive information is the donkey in this sequence: the peasant fed his chickens and then he fed his donkey. In this sentence, all the elements of the second clause are given because they were mentioned in the first clause. Only the donkey is contrastive.

Information in sentences is either given or new. Furthermore, new information is either contrastive or non-contrastive. Along the dimension of givenness, the starkest opposition is between givenness on the one hand and contrastive

newness on the other. The present paper focuses on this opposition between givenness and contrastive newness. The initial thesis of the functionalist perspective offered in this paper is that, when contrastive information is embedded in given information, it will be treated differently from the given information. Table 1 lists certain specific predictions for ways in which 8 functional devices will be treated differently when they are either given or contrastively new. The 8 devices are: ellipsis, pronominalization, primary stress, contrastive stress, use of the indefinite article, use of the definite article, postposing, and preposing. Although many other factors may be involved in use of these devices, the present study manipulates only the opposition between givenness and contrastiveness. The primary sources for the predictions in Table 1 are Halliday (1967) and Sgall, Hajicova, and Benesova (1973).

Insert Table 1 about here

It is important to avoid reading these hypotheses too simplistically. Both Halliday and the Prague School group recognize that linguistic devices are usually determined by several categorical aspects of the communicative situation. In this regard, MacWhinney (1977) has shown how the starting point of a sentence usually codes not just one but four functions: attentional focus, perspective, agency, and informational givenness. There exist sentences in which these functions are dissociated. However, in most sentences, choice of a starting point is determined by several factors at once. Ideally, a model should reduce the contributions of these various factors to a multiple-regression formula. Given the present state of the art, however, all we can ask of a model is that its predictions regarding the role of individual determinants be supported by

statistically significant effects. For example, if pronominalization is related to givenness, elements that are given should be pronominalized significantly more often than elements that are contrastive. The present examined the determination of the 8 devices by the dimension of givenness, while recognizing that all such devices are, in fact, multiply determined.

We were particularly interested in the ways in which children learning various languages acquire ability to utilize the 8 discourse devices. There are two very different approaches that could be taken to the development of the relation between givenness and the various formal devices which reflect givenness. One approach would suggest that the pragmatic function is secondary to the syntactic form (Chomsky, 1971), so that children may acquire syntactic devices before they master the various communicative uses of these devices. This approach would suggest that any of the 8 devices studied here could be used by young children before they control the underlying dimension of givenness these forms are designed to express. A second approach is that taken by Bates (1976) and Greenfield and Smith (1976). These authors contend that the distinction between given and new information actually predates syntactic development and is reflected in the first one-word utterances of the child. This approach suggests that, as soon as a syntactic device is acquired, it will be assimilated to the existing system of pragmatic functions. This second approach suggests that study of the emergence of pragmatic devices should examine as young a subject population as is possible. Because pilot testing indicated that 2-year-olds could not respond to the present task, testing began at age 3.

A second developmental issue involved the notion of differentiation during socialization. Differentiation has figured prominently in a number of major developmental theories (Gibson, 1969; Werner, 1948). In fact, differentiation

is so closely identified with the developmental approach, that it is not clear how a developmental theory can reject the principle of differentiation and remain developmental. Nonetheless, it is possible that a given behavior would fail to undergo differentiation due to its intense canalization (Waddington, 1957) or the absence of environmental pressures for differentiation. The present study provides a way of examining the differentiation hypothesis in a cross-linguistic comparison. If children begin language learning with a common set of dispositions and hypotheses (Chomsky, 1965) and, if languages differ markedly in their use of the various pragmatic devices, then development should follow a course of differentiation in which children learning a given language begin to diverge from children learning another language as they learn more and more of their language. Figure 1 presents an idealized version of such differentiation.

Insert Figure 1 about here

The present study was also concerned with providing experimental support for a number of naturalistic developmental observations. There have been several reports (deLaguna, 1963; Greenfield, 1975; Veneziano, 1973) which have claimed, on the basis of naturalistic observations, that ellipsis may be used by 2-year-olds to mark givenness. Weiman (1974) has also found that 2-year-olds assign contrastive stress to contrastive items more than to given items. Baroni, Fava, and Tirondola (1973) and Dezsö (1970) have claimed that focused items tend to be preposed in the sentences of 2-year-olds. However, none of these studies linking ellipsis, contrastive stress, and preposing have achieved experimental control of givenness. In all cases, givenness has been inferred in an ad hoc fashion by the participant-experimenter.

A study by Hornby and Hass (1970) on the use of contrastive stress by 4-year-olds shows how givenness may be controlled experimentally. Children were asked to describe pairs of pictures in which the second picture contrasted with the first in terms of either the Agent, the Verb, or the Object. Hornby and Hass found that children tended to place stress on contrastive elements rather than given elements. The present study builds on this method, but expands the analysis to 8 devices, 4 age groups, and 3 linguistic communities. Moreover, it seeks to extend the sampling of materials to a wider range of basic sentence types than the AVO form studied by Hornby and Hass. There are two basic goals in this research. The first goal is an elucidation of the development of these 8 devices in pre-school children and an examination of their differentiation and functional or formal determination. The second goal is the testing of the various predictions of the functionalist model as given in Table 1.

The three languages studied--English, Hungarian, and Italian--differ in fundamental structural ways that are relevant to the use of the eight devices. These differences are summarized in Table 2. Given the nature of this comparison, a confirmation of the predictions in Table 1 would indicate that the underlying functional model may have validity beyond one language type.

Insert Table 2 about here

Method

Stimuli. Table 3 describes the pictorial stimuli in simple sentences. For example, Series 1 consisted of these three pictures:

A monkey is eating a banana.

A squirrel is eating a banana.

A bunny is eating a banana.

In this example, the contrasting element is the Agent. Of course, this element is only contrastive in the second and third frames of the series. In Table 3 and throughout these abbreviations are used for the constituents of a sentence:

A = Agent (Series 1 to 10)

V = Verb (Series 1 to 10)

O = Object (Series 1, 3, 4, 8 and 9) and Locative (Series 5 and 6)

D = Dative (Series 3 and 4)

In the second column of Table 3 the contrastive element in each series is italicized.

Insert Table 3 about here

Subjects. There were 120 subjects in this experiment: 40 Americans, 40 Hungarians, and 40 Italians. Within each language community, there were 10 3-year-olds, 10 4-year-olds, 10 5-year-olds and 10 adults. The children were enrolled in nursery schools in Budapest, Denver, and Rome.

Procedure. Subjects were examined individually. Each subject was first seated next to the experimenter at a table. Each subject was told that he would be asked to tell about what he saw in some pictures. Adults were told to describe the pictures in a simple, direct fashion. The order of presentation of the ten series was randomized across the subjects in a given group. The order of the three frames within a series was also randomized. Between each set of three frames, the experimenter inserted a picture of some common object

like a bottle or a sailboat to break up any set (Einstellung) effects. The experimenter then showed the pictures to the subject in sequence. Two probes were used: Tell me about this picture? and What's happening in this picture? Use of the two probes was also randomized. Each session was tape-recorded in its entirety.

Results and Discussion

For each response to each probe, 27 dependent variables were tabulated. These 27 variables are listed in the left hand columns of Tables 4, 5, and 6. There are a few cases where a device could not be used on a given element. For example, verbs cannot be pronominalized or modified by articles. Also, Datives cannot be further postposed nor Agents further preposed beyond the neutral sentence order which begins with the Agent and ends with the Dative. The first 21 variables were dichotomous. That is, an element either had, say, an indefinite article attached to it or it did not. Postposing and preposing, however, varied from 0 to 3, according to this scheme:

0 = element in its neutral position

1 = element displaced one position

2 = element displaced two positions

3 = element displaced three positions

Tables 4, 5, 6, and 7 summarize the results of 196 analyses of variance upon the data. Each of these analyses is a three-way completely crossed factorial design with 3 levels of Language, 4 levels of Age, and 3 levels of Frame. Language and age levels are between subjects factors, frame is a within subjects factor. Because there are so many significant results, it would be extremely tedious to report F-values for each test. Rather, Tables 4, 5, 6, and 7 summarize the results in a way that is meaningful for our present purposes. In those tables, empty cells indicate non-significant results. The numbers .001,

.01, and .05 indicate the significance level of the other results. Cells with a dash occur when a variable is not relevant to a given series.

Insert Table 4 about here

Language effects. Table 4 indicates that the three languages differ significantly at the $p < .001$ level in the absolute amount of use of most of the variables on most of the series. These differences are direct reflections of the structural differences listed in Table 2. Examination of the cell means indicates that Italian uses more Agent ellipsis than English and that Hungarian uses more than Italian. On the other hand, Italian makes the least use of Object or Dative ellipsis. In regards to Verb ellipsis, no consistent pattern emerges between the 10 series. Because English and Italian cannot easily delete the Agent, they tend instead to use more pronominalization. However, this pattern reverses for the Object where Hungarian makes the most use of pronominalization. Because of the saliency of various patterns in sentence intonation, Italian makes less overall use of primary stress. However, Hungarian makes the least use of contrastive stress, probably because Hungarian can express such focusing through word order variation. Hungarian obviously makes less use of the indefinite article, since it has no indefinite article. However, it makes relatively more use of the definite article to refer to information that is asserted, as well as information that is given. Quite consistently, English makes the least use of the definite article. Finally, Hungarian and, to a lesser degree, Italian make more use of both postposing and preposing than does English. This last finding reflects the well known fact that Hungarian and Italian permit more word order variation than English.

These results confirm experimentally the various functionalist descriptions of these languages (Dezsö, 1972; Firbas, 1966; Halliday, 1967). Such confirmation is valuable in its own right. However, these results also provide a background for further analysis. Using three languages that differ so fundamentally, any test of the predictions given in Table 1 is highly conservative. Moreover, positive results on age and frame effects would indicate that the predictions have relevance to languages of markedly different structures.

Age effects. The first major goal of this study is the elucidation of the development of the 8 functional devices. In order to examine this development, it is first necessary to distinguish three possible outcomes that would be developmentally significant.

The first possible outcome, for a given variable, would be a significant main effect for Age. This would indicate that the absolute level of use of a given device, across all frames, changes as children in all languages grow older.

The second possible outcome would be a significant Age X Language interaction. Here, the most likely type of interaction is the pattern of linguistic differentiation schematized in Figure 1. In such a pattern, children in various language communities show a similar initial base-line level of use of a given device (Device X). On the other hand, adults in these various communities differ markedly in their use of this device. Differentiation of this initial uniformity occurs throughout childhood resulting in adult diversity.

A third possible outcome of developmental importance would be a significant Age X Frame interaction. Such an interaction would indicate that use of the various devices becomes more appropriate (i.e., correct) with age. If such an interaction occurred, there would be evidence that, when children first used these devices, they did not know what they really "meant." Only later, perhaps

as a result of additional cognitive development, could the child fully control [redacted] communicative context. This would be evidence in support of the [redacted] mentioned earlier which holds [redacted] orms can be acquired before the function they express is acquired.

The data provide evidence for only the first two outcomes. Table 5 summarizes the main effects of Age. Table 6 summarizes the interaction effects of Age X Language. The adult data was excluded from the analyses summarized in these two tables, since the primary concern here is with development in childhood.

Table 5 shows a significant developmental trend for nearly every variable on at least one series. The variables which show significant effects across more than half of the series are the following: Agent ellipsis (1), Verb ellipsis (2), Object ellipsis (3), Agent pronominalization (5), Agent indefinite article (16), Object indefinite article (17), Object definite article (20), and Object postposing (24). The most consistent developments involve decreased use of ellipsis of all elements and increased use of both articles. These can be explained without recourse to functionalism. The decreased use of ellipsis can be viewed as a concomitant of an increase in mean length of utterance. The over-all increased use of articles could be viewed as simply a case of word learning.

Insert Table 5 about here

The data summarized in Table 6 indicate significant Age X Language interactions for many of the variables. These differences are significant even within the narrow age range between 3 and 6. In particular, ellipsis of all elements decreases with age. However, this decrease is most marked in English.

Pronominalization increases with age. Here, again, the increase is most marked in English. The kind of interaction occurring here is the differentiation without cross-over schematized in Figure 1. As children grow older, their use of each of the devices approximates adult use. Moreover, adults speaking different languages differ more in their use of these devices than do children speaking different languages. This differentiation is the source of these significant interactions.

Insert Table 6 about here

For the two article devices and the two word order devices, a similar pattern of differentiation emerges. Three-year-olds are alike in that they make little use of either article. Five-year-olds make more use of articles, although at the different levels specified by their language communities. Also, 3-year-olds in all three communities are alike in using a similar amount of preposing and postposing. Since they use so much ellipsis, their sentences often have fewer elements than those of older children. Because there are fewer elements, there is less opportunity for preposing and postposing. However, 5-year-old Americans have adopted a fairly rigid AVOD order, while 5-year-old Hungarians use a variety of word orders.

Only in the case of primary stress and contrastive stress is there little differentiation. Table 4 shows clearly that the three languages differ markedly in their use of stress. However, Table 5 suggests that changes with age in the use of stress are less marked than changes in the use of other devices. It seems, then, that children approximate adult patterns of stress usage quite early on.

The third outcome that would have been of developmental interest did not occur. There were only 6 significant Age X Frame interactions. Given the number of analyses, this number of significant interactions does not exceed the number expected for chance. Even when the adult data are included, there are few Age X Frame interactions. Language X Age X Frame interactions and Language X Frame interactions were also rare. However, as we will see in the next section, there were a number of significant main effects for Frame. Therefore, it appears that the functional values the various devices have for 3-year-olds are not markedly different from those they have for adults.

In general, it appears that 3-year-olds have already grasped the functional value of these 8 devices within this experimental situation. However, they have not yet developed enough of the structural system of their language for their use of the devices to match adult usage.

Frame effects. The second major goal of this study is a testing of the various predictions of the functionalist model given in Table 1. These predictions do not state specifically how use of a device will change from frame to frame. However, an examination of the data in Table 7 indicates that, for some variables (i.e., Agent ellipsis), significant frame effects occur only for the given element. However, for other variables (i.e., Verb ellipsis), significant frame effects occur only for the contrastive element.

Insert Table 7 about here

Figure 2 illustrates schematically the relation between Agent ellipsis (Variable 1) and Verb ellipsis (Variable 2). This schematization shows how significant frame effects occur only when use of a variable rises from a floor

(Variable 1) or descends from a ceiling (Variable 2). The predictions given in Table 1 do not take into account possible baseline (i.e., ceiling and floor) effects. However, without considering baseline effects, it is difficult to say why significant frame effects occur where they do. Our data suggest that for certain sentential elements, such as the Agent, children and adults tend to include that element in their description of the first frame, before any manipulations of newness or givenness have taken place. By contrast, in the first frame, children and adult tend not to talk about the Verb. This means that we cannot induce subjects to increase their use of Agents, although we can influence them to decrease their use of Agents. By contrast, we can induce subjects to increase their use of Verbs, although we cannot bring about a decrease in the use of Verbs through the use of the manipulation of givenness used in this study.

Insert Figure 2 about here

Taking into account the presence of these baseline effects, the predictions of Table 1 can be restated. These rephrased predictions are given in the fourth column of Table 8. It is important to note that some of these are predictions about effects on given information and others are predictions about effects on contrastive information. This is to say that some devices are moved away from their baseline by givenness and that others are moved away by contrast. Moreover, there are differences in this regard between the various elements (Agent, Verb, Object, Dative) subject to a given device. The fact that there is no way, at present, to derive the direction of these effects in a fully a priori manner, indicates a major weakness in the functionalist account.

These restatements of the functionalist predictions can be tested by an analogy with signal detection theory. If these predictions are accurate, they should correctly "hit" all the significant frame effects for all the series and "correctly reject" all the non-significant effects. Moreover, there should be no "misses" or "false alarms." Table 8 summarizes the performance of the predictions on these criteria. Hits and correct rejections are indicated with a plus sign and misses and false alarms are indicated with a minus sign. Blank cells occur where a variable is not relevant to a given series.

Insert Table 8 about here

It is clear that the predictions performed much better for some devices than for others. Use of ellipsis, primary stress, contrastive stress, and the indefinite article seems to be closely and reliably tied to manipulation of the given-new dimension. Because there are so few Age X Frame Interactions, we can also conclude that the relation of these devices to givenness and contrast is established before age 3. Therefore, these results constitute experimental verification of the naturalistic observations of Baroni et al., deLaguna, Greenfield, Dezsö, Veneziano, and Weiman. On the other hand, use of pronominalization, the definite article, and word order variations is not clearly related to givenness or contrast. For three of these devices, the predictions of the functionalist account were wrong as often as they were right. Preposing stands somewhat in between the devices that are clearly related to givenness and those that appear to have a more oblique relation.

Within the context of this experiment and its limited sampling of languages and materials, it appears that givenness and contrastiveness are coded by a

relatively small set of pragmatic devices: ellipsis, stress, and the definite article. Considered from a certain viewpoint, this finding should not be at all surprising. If the child wishes to achieve clear marking of a basic pragmatic dimension, there is no reason to use more than a bare minimum of devices to achieve this marking. MacWhinney (1977) characterizes this tendency to minimize the acquisition of superfluous devices by stressing the child's attempts to maximize the applicability of the forms he does possess. Perhaps what is most interesting here is that givenness and contrastiveness can be expressed through four different devices, rather than the fact that it is not clearly expressed through four other devices. Ellipsis is closely related to givenness in that, for most elements, ellipsis increases with givenness. Contrastive stress is directly related to contrastiveness. It provides the single most unambiguous marking of focusing that is available to the child. Use of the indefinite article is also related to contrastiveness, but it also encodes information on number, genericality, and assertion. Primary stress seems to be involved in syntactic-intonational patterning, as well as marking of givenness.

The finding that the other four devices bear little direct relation to contrast or givenness disconfirms a number of functionalist proposals. Prague School linguists have stressed the relation between givenness and word order even in languages like English. Both pronouns and definite articles have been generally assumed to encode both deixis and givenness. However, as Chafe (1976) has noted, the importance of givenness in the semantics of the definite article can certainly be questioned.

Conclusion

The study of pragmatic factors in communication has been an area where theoretical discussions and naturalistic observations far outnumber empirical

investigations (Linde & Labov, 1975). The experiment reported here provides an empirical base for several aspects of the current theoretical discussion.

First, these data indicate that the functions underlying certain linguistic forms are present as soon as the child acquires the forms. The absence of significant Age X Frame interactions indicates that the ability to express changes in givenness does not develop past age 3. This finding confirms the general approach to language development advocated by Bates (1976).

Second, these data reveal a pattern of differentiation with age in the absolute level of use of various formal devices. Children in different communities start out much alike in their approach to language communication. As they are socialized into the structural systems of their various languages, their use of formal devices begins to diverge. However, the underlying functions expressed by these devices appear to remain constant.

Third, the role of baseline effects in this study has placed new constraints on functionalist theories of language structure. These theories must not only account for the relation between givenness and use of a device. They must also show how use of some device never falls below a floor or rises above a ceiling.

Fourth, the analysis of the main effects of Frame has shown that ellipsis, primary stress, contrastive stress, and use of the indefinite article are more closely linked to givenness than are pronominalization, word order variation, and use of the definite article. This is not to say that the last four devices are totally unrelated to givenness. Rather, givenness has a weaker, less direct, role in their determination. These findings are in accord with the multi-factor approach to pragmatic analysis currently being espoused by Chafe (1976) and others. These findings also confirm the earlier finding by Hornby, Hass, and Feldman (1970) that stress is a more effective indicator of givenness than word order.

Because of the complex nature of situational determination, all accounts of pragmatic abilities will have to be supported by converging operations. This study has attempted to draw an empirical sketch of the relations between situations, languages, sentence types, formal devices, and speakers of different age groups. Within this area sketched out in this study, we still have much to learn.

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Table 1

Initial Predictions

Device	Prediction	Example
Ellipsis	Given > Contrastive	A man bought some bourbon and then walked home.
Pronominalization	Given > Contrastive	A man bought some bourbon and then he walked home.
Primary Stress	Given < Contrastive	A man bought some bourbon and then a woman bought some.
Contrastive Stress	Given < Contrastive	A man bought some bourbon and then a dog bought some.
Indefinite Article	Given < Contrastive	A man bought some bourbon and then the man walked home.
Definite Article	Given > Contrastive	A man bought some bourbon and then the man walked home.
Postposing	Given > Contrastive*	The gorilla chased the lion and then a rhino was chased by the gorilla.
Preposing	Given < Contrastive*	The gorilla chased the lion and then a rhino was chased by the gorilla.

*If theme-rheme ordering predominates over expressive ordering, these predictions would be reversed.

Table 2

Structural Features of the Three Languages

	English	Hungarian	Italian
Basic Word Order	SVO	SOV	SVO
Flexibility of Word Order	Low	High	Medium
Agent Deletion	Rare	Frequent	Frequent
Definite Article	Yes	Yes	Yes
Indefinite Article	Yes	No	Yes
Clear Primary Stress	Yes	Yes	No

Table 3

Stimuli

Series	Structure	Contents
1	A V O	A monkey (squirrel, bunny) is eating a banana.
2	A V	A boy is running (swimming, skiing).
3	A V O D	A cat is giving a flower to a boy (bunny, dog).
4	A V O D	A lady is giving a present (truck, mouse) to a girl.
5	A V L	A cat is on a table (bed, chair).
6	A V L	A dog is in (on, under) a car.
7	A V	A flower is red (yellow, blue).
8	A V O	A girl is eating an apple (cookie, ice cream).
9	A V O	A boy is kissing (hugging, kicking) a dog.
10	A V	A bear (mouse, bunny) is crying.

Table 4

Main Effects for Language (all subjects)

Significance Levels d.f. = 2, 108

Variable Number	Device	Element	Series 1 AVO	2 AV	3 AVOD	4 AVOD	5 AVL	6 AVL	7 AV	8 AVO	9 AVO	10 AV
1	Ellipsis	A			.001	.05	.001	.001			.001	
2		V		.001	.001	.001	.01	.001		.01	.001	.001
3		O	.01	-	.01	.01			-		.001	-
4		D	-	-		.001	-	-	-	-	-	-
5	Pronominalization	A	.001	.001	.01	.05	.001	.001	.001	.001	.001	.001
6		O	.001	-			.01	.001	-			-
7		D	-	-	.001	.001			-	-	-	-
8	Primary Stress	A	.001	.01	.001	.001	.001	.001	.001	.01	.001	.001
9		V	.001	.001	.001	.001		.001	.001	.001	.001	.001
10		O	.001	-	.001	.001	.001	.001	-	.001	.001	-
11		D	-	-	.001	.001	-	-	-	-	-	-
12	Contrastive Stress	A	.001						.001			.001
13		V		.001				.001	.001		.001	.05
14		O		-		.001	.001		-	.001		-
15		D	-	-	.001		-	-	-	-	-	-
16	Indefinite Article	A	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001
17		O	.001	-	.001	.001	.001	.001	-	.001	.001	-
18		D	-	-	.001	.001	-	-	-	-	-	-
19	Definite Article	A	.001	.001	.001	.001	.001	.001		.001	.01	.001
20		O	.001	-	.001	.001	.001	.05	-	.001	.001	-

Table 4 (Cont.)

Main Effects for Language (all subjects)

Significance Levels d.f. = 2, 108

Variable Number	Device	Element	Series 1 AVO	2 AV	3 AVOD	4 AVOD	5 AVL	6 AVL	7 AV	8 AVO	9 AVO	10 AV
21		D	-	-	.001	.001	-	-	-	-	-	-
22	Postposing	A	.001	.001		.001	.05	.001	.001	.001	.001	.001
23		V	.001	-	.001	.001	.001	.001	-	.001	.001	-
24		O	-	-	.001	.05	-	-	-	-	-	-
25	Preposing	V	.001	.001	.01	.05	.001	.001	.001	.001	.001	.001
26		O	.001	-	.001	.001	.001	.001	-	.001		-
27		D	-	-	.001	.01	-	-	-	-	-	-

empty cell = nonsignificant results

dash = variable not relevant to the series

Table 5

Main Effects for Age (Children only)

Significance Levels d.f. = 2, 81

Variable Number	Device	Element	Series 1 AVO	2 AV	3 AVOD	4 AVOD	5 AVL	6 AVL	7 AV	8 AVO	9 AVO	10 AV
1	Ellipsis	A	.01	.001	.001	.001	.01	.001	.001	.001	.001	.01
2		V	.001	.001	.001	.001	.001	.001		.001	.001	.001
3		O	.01	-	.001	.001	.01	.001	-	.001	.001	-
4		D	-	-		.001	-	-	-	-	-	-
5	Pronominalization	A	.01				.001	.01	.001			
6		O		-				.001	-		.01	-
7		D	-	-	.001		-	-	-	-	-	-
8	Primary Stress	A							.001			
9		V		.05				.05	.01		.001	.05
10		O		-	.05		.01		-			-
11		D	-	-	.001		-	-	-	-	-	-
12	Contrastive Stress	A							.05			
13		V		.001				.001				
14		O		-		.01			-			-
15		D	-	-			-	-	-	-	-	-
16	Indefinite Article	A	.001	.001	.001	.001	.001	.001	.001	.001		.001
17		O	.01	-	.001	.001	.001		-			-
18		D	-	-	.01		-	-	-	-	-	-
19	Definite Article	A			.01	.001			.001		.001	

Table 5 (Cont.)

Main Effects for Age (Children only)

Significance Levels d.f. = 2, 81

Variable Number	Device	Element	Series 1 AVO	2 AV	3 AVOD	4 AVOD	5 AVL	6 AVL	7 AV	8 AVO	9 AVO	10 AV
20		O	.001	-	.01			.01	-		.001	-
21		D	-	-		.001	-	-	-	-	-	-
22	Postposing	A					.05			.001		
23		V		-	.05			.001	-			-
24		O	-	-	.001	.001	-	-	-	-	-	-
25	Preposing	V					.001	.01		.05		.05
26		O		-				.001	-	.01		-
27		D	-	-			-	-	-	-	-	-

empty cell = nonsignificant results

dash = variable not relevant to the series

Table 6

Interaction Effects for Age X Language (children only)

Significance Levels, d.f. = 4, 81

Variable Number	Device	Element	Series 1 AVO	2 AV	3 AVOD	4 AVOD	5 AVL	6 AVL	7 AV	8 AVO	9 AVO	10 AV
1	Ellipsis	A		.01	.01		.001	.001			.001	
2		V	.05	.001	.001	.001	.001	.01		.001	.001	
3		O	.01	-	.001	.001			-	.01		-
4		D	-	-			-	-	-	-	-	-
5	Pronominalization	A	.05		.05		.001		.01	.05		.05
6		O		-				.05	-		.05	
7		D	-	-			-	-	-	-	-	-
8	Primary Stress	A	.05			.001			.05			
9		V				.001						
10		O		-	.001	.05	.01		-			-
11		D	-	-	.001		-	-	-	-	-	-
12	Contrastive Stress	A							.05			
13		V		.001				.001				
14		O		-		.05			-			-
15		D	-	-			-	-	-	-	-	-
16	Indefinite Article	A	.001	.05	.05	.05	.05		.001	.05		
17		O	.05	-	.01	.001			-			-
18		D	-	-	.001	.001	-	-	-	-	-	-
19	Definite Article	A	.01		.001					.05		.05

Table 6 (Cont.)

Interaction Effects for Age X Language (children only)

Significance Levels, d.f. = 4, 81

Variable Number	Device	Element	Series 1 AVO	2 AV	3 AVOD	4 AVOD	5 AVL	6 AVL	7 AV	8 AVO	9 AVO	10 AV
20		O		-				.05	-		.05	-
21		D	-	-	.01		-	-	-	-	-	-
22	Postposing	A	.01		.01			.05		.01	.001	.05
23		V	.05	-	.05		.001	.01	-	.05		-
24		O	-	-	.001	.001	-	-	-	-	-	-
25	Preposing	V	.01		.001	.05				.05		.05
26		O		-				.05	-		.05	-
27		D	-	-	.001		-	-	-	-	-	-

empty cell = nonsignificant results

dash = variable not relevant to the series

Table 7

Main Effects for Frame (all Subjects)

Significance Levels d.f. = 2, 108

Variable Number	Device	Element	Series 1 AVO	2 AV	3 AVOD	4 AVOD	5 AVL	6 AVL	7 AV	8 AVO	9 AVO	10 AV
1	Ellipsis	A		.001	.001	.001	.05	.001	.01	.001	.001	
2		V						.001	.001		.001	
3		O		-	.01	.01			-			-
4		D	-	-		.001	-	-	-	-	-	-
5	Pronominalization	A						.05	.001		.01	
6		O		-					-			-
7		D	-	-			-	-	-	-	-	-
8	Primary Stress	A			.001	.001	.001	.001			.01	
9		V						.01			.01	
10		O	.01	-				.01	-			-
11		D	-	-		.05	-	-	-	-	-	-
12	Contrastive Stress	A	.001						.05			.05
13		V		.001				.001	.001		.001	
14		O		-		.001	.001		-	.001		-
15		D	-	-	.001		-	-	-	-	-	-
16	Indefinite Article	A		.01	.001	.001	.01	.001		.001	.001	
17		O		-			.01	.01	-		.001	-
18		D	-	-		.001	-	-	-	-	-	-
19	Definite Article	A			.05			.01				

Table 7 (Cont.)

Main Effects for Frame (all Subjects)

Significance Levels d.f. = 2, 108

Variable Number	Device	Element	Series 1 AVO	2 AV	3 AVOD	4 AVOD	5 AVL	6 AVL	7 AV	8 AVO	9 AVO	10 AV
20		O		-					-	.01		-
21		D	-	-			-	-	-	-	-	-
22	Postposing	A						.001	.01	.05		
23		V		-	.001				-			-
24		O	-	-	.05	.01	-	-	-	-	-	-
25	Preposing	V							.01			
26		O		-	.01			.001	-		.05	-
27		D	-	-	.01	.01	-	-	-	-	-	-

empty cell = nonsignificant results

dash = variable not relevant to the series

Table 8

Predictions of the Functionalist Account

Variable Number	Device	Element	Prediction	Series 1	2	3	4	5	6	7	8	9	10
1	Ellipsis	A	Given Increases	+	+	+	+	+	+	+	+	+	+
2		V	Focused Decreases	+	-	+	+	+	+	+	+	+	+
3		O	Focused Decreases	+		-	+	-	+		-	+	
4		D	Focused Decreases			+	+						
5	Pronomin-alization	A	Given Increases	+	-	-	-	-	+	+	-	+	+
6		O	Given Increases	-		-	+	+	-		+	-	
7		D	Given Increases			+	-						
8	Primary Stress	A	Given Decreases	+	-	+	+	+	+	+	-	+	+
9		V	Focused Increases	+	-	+	+	+	+	-	+	+	+
10		O	Given Decreases	+		-	+	+	+		+	-	
11		D	Given Decreases			+	+						
12	Contrastive Stress	A	Focused Increases	+	+	+	+	+	+	-	+	+	+
13		V	Focused Increases	+	+	+	+	+	+	+	+	+	+
14		O	Focused Increases	+		+	+	+	+		+	+	
15		D	Focused Increases			+	+						
16	Indefinite Article	A	Given Decreases	+	+	+	+	+	+		+	+	+
17		O	Given Decreases	-		-	+	-	+		+	+	
18		D	Given Decreases			+	+						
19	Definite Article	A	Given Increases	+	-	+	-	-	+	-	-	-	+
20		O	Focused Decreases	+		+	-	-	+		+	+	
21		D	Given Increases			+	-						

Table 8 (cont.)

Predictions of the Functionalist Account

Variable Number	Device	Element	Prediction	Series 1	2	3	4	5	6	7	8	9	10
22	Postposing	A	Given Increases	+	-	-	-	-	+	+	+	-	+
23		V	Given Increases	-	+	+	-	-	+	+	-	+	-
24		O	Focused Decreases			-	+						
25	Preposing	V	Focused Increases	+	-	+	+	+	-	+	+	-	+
26		O	Given Decreases	-		+	+	+	+		+	+	
27		D	Given Decreases			+	-						

Figure 1

Language-Age Interactions

Idealized Differentiation Pattern

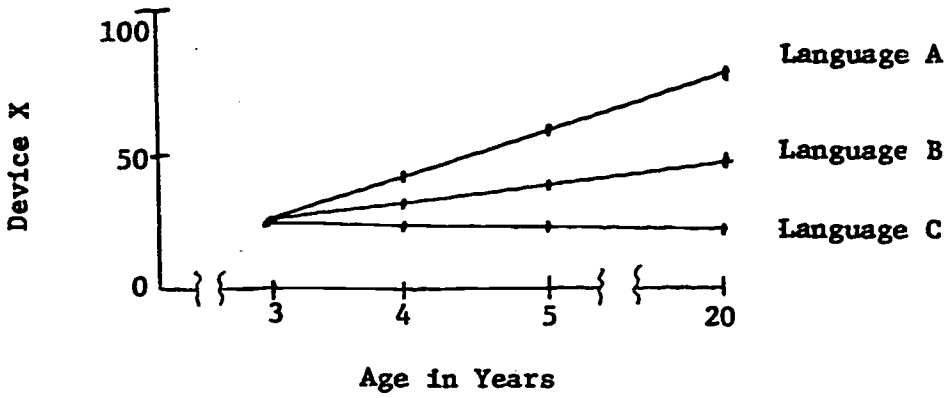

Figure 2

Schematization of

Ceiling and Floor Effects in Variables 1 and 2

(Agent Ellipsis and Verb Ellipsis)