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THE ROLE OF NEW AND OLD INFORMATION IN THE VERBAL EXPRESSION OF LANGUAGE-DISORDERED CHILDREN

ELIZABETH SKARAKIS
University of California, Santa Barbara

PATRICIA M. GREENFIELD
University of California, Los Angeles

The present study used an experimental method to investigate the marking of new and old information in the verbal expression of language-disordered children beyond the one-word stage. The results showed that language-disordered children selectively mark new information in verbal communication, just as normal children do. Language-disordered and normal children, furthermore, manifest the same developmental sequence of strategies for deemphasizing old information—children at an MLU level of 3 tend to omit it, whereas children at an MLU level of 5 tend to pronominalize it. Although both normal and language-disordered children demonstrated the same verbal strategies, a subgroup of language-disordered subjects (over half) pronominalized old information more frequently than normal subjects. These language-disordered subjects demonstrated a proportionately different combination of language features than would be expected at their MLU level.

Recently, the pragmatic level of child language has received a great deal of attention in the literature on normal language acquisition (Bates, 1976; Dore, 1973; Keenan, 1974). A variety of pragmatic abilities have been investigated, including the development of speech acts, conversational participation, and politeness forms.

Encoding new and old information received particular attention in the work of Greenfield and her colleagues (Greenfield, 1978; Greenfield & Smith, 1976; Greenfield & Zukow, 1978). Greenfield proposed a "principle of informativeness" to predict which element of a situation a child at the one-word stage will verbalize. The principle states that the new or changing element in a situation will be selectively verbalized whereas the old or given information will be taken for granted. Greenfield believed that this distinction between new and old information is the psychological basis for verbal presupposition. Greenfield and Zukow (1978) demonstrated that the principle of informativeness predicts successfully which element in a situation a normal child at the one-word stage will verbalize.

Miller (1975) and Weisenberger (1976) studied the same phenomenon in children's 2-4-word utterances. They found that words which are least redundant of the situational context are most likely to be verbalized. A nonredundant element would be new information; a redundant element or one present in the recent past would be given or old information.

Gordon (Note 1) investigated the role of new versus old information in the grammatical structures of children aged 2–6. She used three stimulus sets containing two series of action pictures per set. Each series depicted a different ongoing event. The first two pictures of one series of each set focused on an inanimate object, whereas the first two pictures of the other series centered on an agent. The final pictures of the two series in each set were identical. In them the agent and object were brought together. Thus, in one series the object was the new information in the final picture and the agent was the old information, and in the other series the relations were reversed. Subjects were required to describe the final pictures. Results indicated a tendency for younger children to omit old information and for older children to pronominalize it, regardless of whether it was the agent or the object.

Studies of pragmatic abilities in the language-disordered child have subsequently appeared in the literature on language disorders (Gallagher & Darnton, 1978; Prinz, 1977; Watson, 1977). Snyder (1978), particularly, studied the verbal encoding of new and old information in language-disordered children. She hypothesized that language-disordered children make faulty presuppositions; that is, that they do not selectively verbalize the new information in situations where action remains constant and objects change. Her subjects were 15 language-disordered children aged 20–30 months with mean length of utterance (MLU) ranging from 1.0 to 1.12. These subjects were matched to a control group of normal children for MLU but not for chronological age. The experimental task involved a series of activities in which the object was varied while the action patterns remained constant.

Snyder's results indicated that when verbal and nonverbal (e.g., pointing) expression were considered together, both normal and language-disordered children selectively identified the changing objects. That is, they provided the new information. However, when verbal encoding alone was examined, a statistically significant difference was found between the normal and language-disordered groups. The language-disordered group in Snyder's study did not encode new information verbally at a level greater than could be expected by

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chance. She concluded that the language-disordered group demonstrated deficits in forming verbal presuppositions. Snyder's results might also be explained by the paucity of the language-disordered child's lexicon or by that group's relative inexperience with linguistic coding. Language-disordered children may not initiate speech even when they have a linguistic repertoire. This appears to be particularly true when they can successfully communicate nonverbally.

To determine if language-disordered children indeed have deficits in their ability to encode new and old information, children with larger verbal repertoires and more linguistic experience than Snyder's subjects must be studied. A pilot study conducted by Skarakis (Note 2) suggested that language-disordered children beyond the one-word stage could encode the new or informative element in a situation verbally.

The purpose of the present study was to investigate further the marking of new and old information in the verbal and nonverbal expression of language-disordered children, particularly in children at more advanced stages of development than Snyder's subjects. Specifically, the following questions were investigated:

1. Do language-disordered children who are beyond the one-word stage selectively verbalize the new information in a situation as normal children do?
2. Do language-disordered children use the same linguistic strategies as normal children for differentiating new and old information?

METHOD

Subjects

Two groups each composed of 12 language-disordered children served as subjects. Group I children had an average mean length of utterance (Brown, 1973) of 3.56, with a range of 2.8 to 4.3. Their ages were between 4:0 and 6:7 years. Group II children had an average MLU of 5.68, with a range of 3.2 to 6.0, and were between the ages of 5:0 and 6:2 years. There were 8 girls and 15 boys in the two groups combined. Assignment to each group was based on linguistic levels suggested by Morehead and Ingram (1970). These subjects came from the Los Angeles County School Communicatively Handicapped Program and from two speech clinics in the Los Angeles area. All were from middle-class families. To be considered language-disordered, subjects met the following criteria:

1. Productive language delay of at least one year beyond normal developmental levels suggested by Prutting (1979) as measured by a spontaneous language sample.
2. Normal hearing acuity as indicated by an audiological evaluation (pure-tone and speech reception testing).
3. A 1-2-year delay in language comprehension as measured by the *Test for Auditory Comprehension of Language* (Carrow, 1973).
4. Speech intelligible 75% of the time when the referent was known to the listener.
5. Intellectual functioning within normal limits as measured by *The Stanford Binet Intelligence Scale* (Terman & Merrill, 1960) and *The Leiter International Performance Scale* (Arthur, 1952).
6. English as the subject's primary language.
7. No known history of neurological impairment.

These children were identified as meeting these criteria by a credentialed or licensed speech-language pathologist.

Two groups each composed of 12 normal children were matched for language level to the two groups of disordered children. Group I children had an MLU of 3.28, range 2.4–3.6; Group II children had an MLU of 5.08, range 3.4–6.2. Group I children's ages varied from 1:11 to 2:5 years and Group II children, from 2:0 to 2:10 years. There were 11 girls and 13 boys in the two groups combined. These subjects were located in daycare centers and recreation programs in the Los Angeles area. These normal children were also from middle-class families. Language level of the normal subjects was determined by taking a spontaneous language sample prior to the experiment.

Design

The methodology was modeled on the work of Gordon (Note 1). Stimulus materials included three paired sets of pictures. An example of a practice stimulus set and sample responses for Series A are given in Figure 1. In each set the first two pictures of one series depict the object (i.e., the ball), and the first two pictures in the other series depict the agent (i.e., the boy). The last picture is

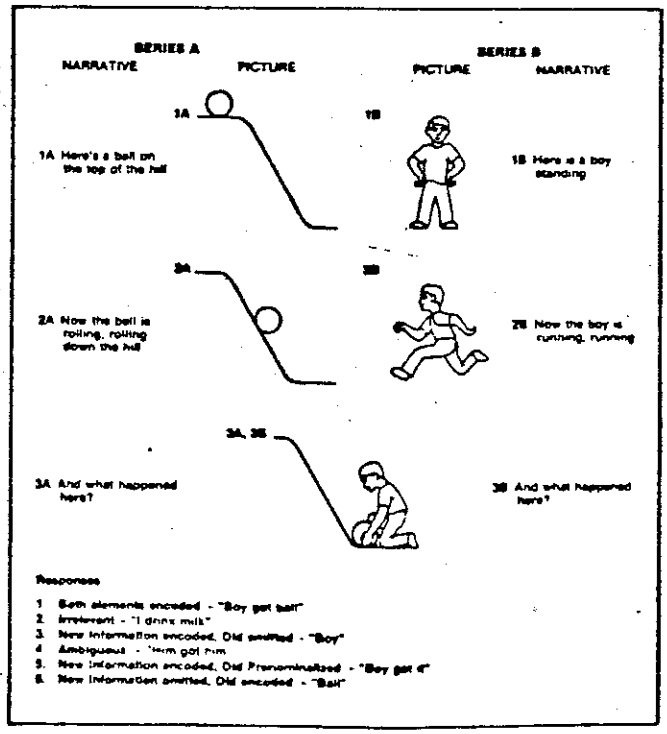

FIGURE 1. Example of one set of visual stimulus materials (Gordon, Note 1) accompanying narratives and sample responses for Series A pictures representing each coding strategy.

the same in both series; in it the agent and the object are brought together. In this example the boy picks up the ball.

Thus, within a paired set, the first two pictures in one series establish the object as old information (Series A), and the first two pictures in the contrasting series establish the agent as old information (Series B). The first two pictures in the series, 1A and 2A or 1B and 2B, determine whether the object or agent is new information in the final picture, 3A, B. In Series A the boy or agent is presented as new information in the last picture; in Series B the ball or object is the new information. The action also changes in the last picture of each series and hence would also be considered new information for both members of a pair. As the figure shows, the stimulus also includes a narrative accompaniment to the first two pictures of each series. Thus, the given information is presented in two modalities, visual and verbal. The verbal component of each stimulus sequence used is presented in the following description:

	Series 1A	Series 1B
Pic #1	Here is a boy.	Here is an apple tree.
Pic #2	Now the boy is walking.	The apples are falling down.
Pic #3	Now tell me what's happening. (picture of boy eating apple)	

	Series 2A	Series 2B
Pic #1	Here is a train.	Here is a car.
Pic #2	The train is coming down the track.	The car is driving on the street.
Pic #3	Now tell me what's happening. (picture of train and car crashing)	

	Series 3A	Series 3B
Pic #1	Here is a teddy bear.	Here is a girl.
Pic #2	Uh oh the bear fell down.	Now the girl has her pajamas on.
Pic #3	Now tell me what's happening. (picture of girl holding bear)	

Subjects were required to respond to both the A and B sequence for each of the three sets. This resulted in a total of six responses per subject. Order of presentation began with Series 1A and continued to 2A and 3A. After running through one sequence in each pair, the contrasting sequence was presented in the same order: 1B, 2B, 3B.

The dependent variables were the subject's verbal and nonverbal descriptions of the new and old information in the final picture of each series, as well as the linguistic strategies used in the verbal description.

This design allowed us to compare descriptions of the same stimulus picture under two different conditions: (a) object has been established as the old information (e.g., Series 1A); and (b) agent has been established as the old information (e.g., Series 1B). In this way, the design maximized experimental control in the testing of our hypotheses. Small sample sizes prevented varying the orders of presentation; however, the results, to be presented, make it clear that order of presentation was not a major factor.

Procedure

A pretask vocabulary screening was conducted to ensure that the subjects knew the vocabulary necessary to complete the experimental task. This was done by having each child verbally identify single pictures of the entities serving as agents and objects in the stimulus materials.

The experimenter then presented each of the subjects with a practice stimulus set to familiarize them with the required task. An example taken from Gordon (Note 1) is depicted in Figure 1. The experimental task was then introduced.

Measurement

Responses were either verbal or a verbal/pointing combination. All verbal responses were audiotape-recorded and then orthographically transcribed. A verbal response consisted of the first utterance in the child's description to be considered a syntactic unit. A single word or series of single-word utterances were also considered verbal responses. The only nonverbal response which occurred during the experimental procedure was that of pointing to one of the objects pictured. When such a response occurred, the experimenter made a written record that the subject pointed to a particular object in the stimulus item. This pointing response occurred infrequently and therefore was easily identified for recording purposes. The number of informative responses—that is, those responses selectively emphasizing new information—were tallied for all groups. Responses were then categorized into one of the following strategies:

1. *Both elements encoded, full form:* Both the new and old information were encoded using full noun or verb forms and/or gestures.
2. *Irrelevant:* The response was not related to the event depicted in the stimulus picture.
3. *New information encoded, old omitted:* A new element or elements were encoded using the full noun or verb form or a gesture; the old element was not encoded verbally or nonverbally.
4. *Ambiguous:* Response included a pronoun for which the referent could not be established definitively.
5. *New information encoded, old pronominalized:* Some new element was encoded using the full noun or verb form; the old element was encoded using a pronoun.
6. *New information omitted, old encoded:* No new element was encoded verbally or nonverbally; the old element was encoded using the full noun form or a gesture.

Examples of each strategy for Series A pictures are presented in Figure 1.

Reliability

Data from 12% of all the subjects (both normal and language-disordered) were selected randomly to determine the reliability of the transcription and strategy categorization procedures. A trained research assistant transcribed and categorized the data independently. Percentages of agreement for transcription of the au-

diotapes and categorization of the data by strategies were calculated separately. Interjudge reliability was 97% for transcription and 91% for strategy categorization.

RESULTS

Both inferential statistical and descriptive analyses were performed on the data. The mean number of responses encoding new information (Strategies 1, 3, and 5), responses encoding old information (Strategy 6), and irrelevant/ambiguous responses (Strategies 2 and 4) for both groups at each MLU level are depicted in Table 1. It can be seen that both normal and disordered children predominantly encode new information. A 2 × 2 (language group × MLU level) analysis of variance was performed. Encoding of new versus old information and specific strategies for achieving the differentiation of old and new information constituted the dependent variables. The analysis of variance revealed no significant difference between normal and language-disordered children in the ability to construct informative messages ($F = .081$; $df = 1, 44$; $p < .77$). Nor was the difference between MLU levels significant ($F = .733$; $df = 1, 44$; $p < .39$). All groups selectively marked the new or changing element; overall, this occurred in 93% of all responses.

TABLE 1. Mean frequency for type of information represented—new, old or irrelevant/ambiguous—for both language groups and levels.

Type of Information	*Disordered*		*Normal*	
	Group I	*Group II*	*Group I*	*Group II*
New information	5.58	5.66	5.50	5.67
Old information	.08	.0	.33	.17
Irrelevant/ambiguous	.33	.33	.17	.17

The frequency with which gestural responses occurred was calculated separately. Language-disordered subjects in Group I made gestural responses in 10% of the total 72 responses, whereas Group II language-disordered subjects made no gestural responses. Normal subjects in both Groups I and II used slightly higher percentages of gestural responses than their language-disordered counterparts, 15% and 4% respectively. However, the overall occurrence of gestural pointing responses was not greater than 15% for any language group or level. Generally, the frequency of gestural responses decreased with increase of MLU, and this trend was essentially the same for both the language-disordered and normal children.

Comparing mean values for the strategies used between Group I and Group II children (regardless of whether they were normal or disordered) revealed notable differences. Table 2 shows that Group I children, those at the lower MLU level, used the *new information encoded, old omitted* strategy twice as often ($\bar{x} = 3.21$) as the Group II children ($\bar{x} = 1.63$). A 2 × 2 (language group × language level) analysis of variance showed this difference to be significant at the .01 level ($F = 13.24$; $df = 1, 44$). Conversely, Group II children used the *new information encoded, old pronominalized* twice as often ($\bar{x} = 2.25$) as the Group I children ($\bar{x} = 1.00$). This difference was also statistically significant, according to an analysis of variance ($F = 6.88$; $df = 1, 44$; $p < .05$).

TABLE 2. Mean frequency of strategy use between two language levels and two language groups.

Strategy	*Group I*	*Group II*	*Language Disordered*	*Normal*
New information encoded Old omitted	3.21	1.63	2.25	2.58
New information encoded Old pronominalized	1.00	2.25	2.04	1.20
Both elements encoded	1.33	1.79	1.30	1.70
New information omitted Old encoded	.21	.08	.04	.25
Ambiguous	.13	.13	.20	.42
Irrelevant	.17	1.25	.12	.16

This analysis also revealed no statistically significant difference in the strategies used between the two language groups, normal and disordered, regardless of MLU level ($F = 3.10$; $df = 1, 44$; $p < .08$). Yet further examination of the mean values for both language groups revealed information of interest. The mean values are highly similar for all strategies except the most sophisticated *new information encoded, old pronominalized* (Strategy 5). This strategy was used approximately 1.75 times more often by the language-disordered children than the normal children.

Further analysis was conducted to describe the proportional distribution of subjects using Strategy 5. Each of the subjects made six responses in which they could use any one of several strategies for differentiating new and old information. Table 3 represents the number of and percentage of total subjects in each language group using Strategy 5 in their six opportunities to respond. For example, four language-disordered children, or 16% of disordered subjects, used Strategy 5 five times,

TABLE 3. The proportional distribution of percentage of subjects using Strategy 5, *new information encoded, old pronominalized*.

Subjects	*Number of possible opportunities to use Strategy 5*						
	0	*1*	*2*	*3*	*4*	*5*	*6*
Language-disordered $N = 24$	29%	16%	16%	12.5%	8%	16%	0
Normal $N = 24$	45%	25%	12.5%	4%	4%	8%	0

whereas two, or 8%, of the normal subjects used it five times. Examination of the distribution revealed that disordered subjects were more evenly distributed across the possible opportunities for Strategy 5 to be used than were the normal subjects. Collapsing the number of opportunities to use Strategy 5 into two categories, 0 or 1 usages and greater than 1 usage, revealed that only 30% of the normal subjects used Strategy 5 more than once. In comparison, over half the language-disordered subjects, 55%, used Strategy 5 more than one time. This indicates a tendency for the language-disordered subjects to use the *new information encoded, old pronominalized* strategy more frequently than normal subjects at the same language level.

DISCUSSION

The primary result of this study was the indication that both language-disordered and normal subjects constructed informative messages, in that both groups selectively marked new or changing elements. It is appropriate to conclude that this encoding was primarily accomplished verbally, because no more than 15% of the total responses for any language group and level included a pointing response. Results also confirmed a developmental progression in the strategies used in the linguistic marking of new and old information by both groups.

The language-disordered children in this study demonstrated neither deficient verbal marking of presupposition nor difficulty in making the cognitive distinction between new and old information. Further, when language-disordered children with larger linguistic repertoires than exist at the one-word stage are considered, it is evident that they use their available linguistic means for marking new information.

The language-disordered subjects in this study were 3–4 years older than the normal children matched for MLU level, but encoded new information using the same strategies. This suggests that language-disordered children are delayed in the production of verbal presupposition relative to their chronological age. However, it would be inappropriate to conclude that these language-disordered children were simply 5 or 6 year olds with the language skills of a 2 year old. Although it was shown that both groups of children (disordered and normal) used the same strategies for differentiating new and old information, over half the language-disordered subjects used the *new information encoded, old pronominalized* more often than the normal subjects. These language-disordered children appeared better able to use a more subtle means—pronouns—to achieve the pragmatic differentiation of new and old information.

The greater number of language-disordered subjects using this strategy cannot be accounted for by the fact that both language levels were collapsed to form the distribution. The 2 × 2 analysis of variance revealed no significant difference when comparing the interaction of language groups and levels. This means that there were subgroups of language-disordered subjects at both MLU levels who used Strategy 5 more frequently than their normal counterparts. Once again the heterogeneity of the language-disordered population is demonstrated. Although all subjects, both normal and language-disordered, had similar strategies available to them, a subgroup of the language-disordered subjects used those strategies in a proportionately different manner.

Previous research supports the notion that language-disordered children use their available linguistic repertoire in different proportions than normal children at the same MLU level. Morehead and Ingram (1970) also found the language-disordered children used significantly more pronouns than normal children matched for MLU level. This again indicates a proportionately different use of available linguistic forms by language-disordered subjects. Gallagher and Darnton (1978) looked at the language-disordered child's responses to contingent queries and found that they revise linguistic forms just as normal children do. However, as in the current study, the language-disordered subjects demonstrated a proportionately different distribution of revision strategies. Although the same strategies were demonstrated by both groups, the language-disordered subjects used more phonetically changed and reduced response revisions and less substitution of elements than the normal children.

There is no evidence in our study or in Gallagher and Darnton's work for pragmatic deficit—that is, the absence of appropriate linguistic forms and strategies, or the presence of unique forms in the language-disabled child. Results of these studies, as well as Morehead and Ingram's (1970), suggest that a group of language-disordered children use appropriate linguistic forms in distinctively different proportions than normal children at the same MLU level.

In summary, this study both provides information concerning the normal process of producing verbal presuppositions and identifies a group of language-disordered children with a proportionately different combination of language features than would be expected for their language level. First, the data support Greenfield's hypothesis about the role of informativeness in the verbal communication of normal children and extends it to the verbal communication of language-disordered children. In addition, it confirms Gordon's finding that a developmental sequence exists for the verbal strategies to encode new information. The sequence was also demonstrated in the language-disordered child. Further, this study indicates that language-disordered children and normal children (at the same MLU level) use language informatively. Both groups selectively mark the new element in a situation and use the same strategies to do so. However, a subgroup of language-disordered children was identified as using available structures in a proportionately different combination than would be expected for their MLU level.

The principle of informativeness proposed by Greenfield and demonstrated in this study has implications for clinical intervention. Because old information is

likely to be omitted in early stages of language development, the speech-language pathologist will want to program materials and situations so that the target linguistic structures will represent a new element, thus increasing the likelihood that the desired structure will be verbalized. For example, when teaching a new lexical item, the object or action to be verbalized should be introduced as new or changing in the treatment activity. Conversely, in work with pronoun acquisition, the element to be pronominalized should be presented as old information, to increase the likelihood of it being encoded as a pronoun. That is, the materials used to elicit pronoun forms should be those objects in the treatment activity which, by virtue of their presence, could be taken for granted. Thus: one could exploit the pragmatic competence of language-disordered children in strengthening specific areas of linguistic deficit.

The present study has several implications for future research. First, further research is needed to explore the pronominalization of old information in greater numbers of language-disordered children. This would further delineate the subgroup of language-disordered children identified in this study. Second, the identification of an area of greater syntactic sophistication relative to MLU in a subgroup of language-disordered children adds a new dimension to our current knowledge of child language disorders. In the 1970s, research in this area focused on the linguistic description of language-disordered children. This research demonstrates that these children do not use unique or unusual linguistic forms, but rather those characteristic of younger normal children (Johnston & Schery, 1976; Leonard, Bolders, & Miller, 1976; Morehead & Ingram, 1970). The results of the current study, along with those of Gallagher and Darnton (1978), confirm that general finding. In addition they indicate that a subgroup of language-disordered children demonstrate a distinct combination of language features which would not be predicted by MLU level. At this time, the function and communicative effectiveness of such patterns are unknown. Indepth investigation of these distinctive combinations of language features is warranted in the research of the 1980s and is essential to our understanding of language disorders.

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Requests for reprints should be sent to Elizabeth Skarakis, Department of Speech, University of California, Santa Barbara, Santa Barbara, CA 93106.