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Joint Book Reading as a Multiple Vocabulary Acquisition Device

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This study investigated serial effects in recurrent ostensive definitions of words in the context of joint picture-book reading by 20 mother–infant dyads. Content analysis revealed a number of labeling formats, among them simple labeling by the mother or by the infant, elicitation of labeling by "what-questions," elicitation of pointing by "where-questions," and elicited and spontaneous imitation by the infant. The dyads applied a mixture of labeling formats to the same referent on its successive occurrences. Imitation was more likely following previous error in labeling than were correct labeling and pointing by the infant. No difference was found in the correct labeling rate following production, comprehension, and imitation. Mothers tended to follow errors and no responses with simple labeling of the same referent on its next appearance, whereas they followed correct responses with attempts to elicit labeling or pointing from the infant. The results imply that imitation, comprehension, and productive responses to words by vocabulary-learning infants do not represent different levels of word knowledge, and also that the respective vocabularies are overlapping at a given point in time.

Joint attention of mother–infant dyads to representational materials such as picture books constitutes a context that is especially appropriate for the acquisition of the first lexicon (e.g., Werner & Kaplan, 1963). The core process through which vocabulary teaching and practice occurs seems to be the so-called "ostensive definition," in which a name is matched to a representation of its referent (e.g., a picture), the latter in joint attention of the participants.

The realization of this core process in actual mother–infant interaction might take various forms. One of the participants might simply label the picture after bringing it to the attention of the other. The second participant might subsequently imitate that label, either spontaneously or in response to a demand to do so. Participants might demand labeling by asking a question of the type, "What is this?" or demand the provision of the matching picture by a question of the type, "Where is (label)?" The occurrence of these formats as well as some others in mother–infant interaction has been documented by many investigators, including Moerk (1972), Ninio and Bruner (1978), Ninio (1980), Snow and Goldfield (in press).

Participating in these various forms of ostensive definition places different demands on the child's ability to comprehend and to produce the relevant words. However, observing the occurrence of a given labeling format in natural interaction and one in which the child has successfully played his or her part does not by itself provide an unambiguous measure of the child's level of knowledge. The choice of a particular format is not in the complete control of the child but, on the contrary, is mostly determined by the adult participant. It is impossible for the child to answer a "what-question" if it is not asked; it is impossible for him or her to label spontaneously if the mother labels the picture first. Thus, an understanding of the rules governing the mother's choices of vocabulary-teaching formats is also necessary for understanding the significance of such naturally occurring child behaviors as comprehension, imitation, and production of labels.

This study investigates vocabulary-teaching formats occurring in the context of joint picture-book reading by mother–infant

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dyads. The study focuses on repeated discussions of the same words occurring within a single bookreading session of 15-minutes duration. The questions asked here concern the relation between the various forms of the child's responses, the mother's choice of formats, and the level of the child's knowledge. Do imitation, comprehension, and production represent different levels of word knowledge, or is there overlap between them? Do mothers choose consistently the same vocabulary-teaching format for the same word, and how do they modify their choice in view of the child's response, correct or erroneous?

On the question of the overlap between children's imitative and spontaneously productive vocabularies, the claim in the literature is that for lexical items, imitation occurs prior to spontaneous production, on the verge of the word being acquired. Imitation is said to precede spontaneous production and cease with it. The cause for temporal nonoverlap, according to these sources, is that imitation represents a lower level of word knowledge than does spontaneous production and that it functions as practice of a word only partially comprehended (Bloom, Hood, & Lightbown, 1974; Ramer, 1976; Snow & Goldfield, in press). However, the previous findings do not seem to fully warrant these generalizations. In Bloom et al.'s (1974) data, only 15.8% of words on the average showed a biased distribution between imitative and spontaneous use, and the trend for the proportion of imitative tokens of words to decrease over time was extremely weak.

Ramer (1976) offered evidence that the majority of imitated words appear with a very low frequency in language corpora collected prior to the occurrence of imitation. However, she does not present data on the degree of overlap of imitation with spontaneous use or on the previous frequency of spontaneously produced words.

Snow and Goldfield (in press) showed that a child's imitation at an earlier discussion of a word is followed by spontaneous naming at discussions that take place several days or weeks later. However, they do not provide data on the fate of words that the child had spontaneously produced; therefore, it is unknown whether these were ever imitated following a previous spontaneous production.

In summary, it seems that imitation is statistically more likely to occur at a period prior to spontaneous production, but there is no hard evidence for a temporal nonoverlap of these two responses. Moreover, Nelson (1973) has shown that elicited imitation is more likely if the relevant word is in the child's productive vocabulary. Apparently, imitation does not necessarily indicate a lower level of word knowledge than does spontaneous production.

A similar claim of asynchrony has been made regarding comprehension responses to words and their production. Goldin-Meadow, Seligman, and Gelman (1976) found that all children who produced a given word also exhibited comprehension of that word, but the opposite was not true. However, the criteria for correct comprehension was extremely lenient in this study. Benedict (1979) listed the first 50 words children showed comprehension of and the first 50 words they produced spontaneously. She found that comprehension development began earlier and reached the 50-word level earlier than production development. However, children's comprehension responses are often heavily situation dependent and reflect the successful application of "comprehension strategies" rather than full understanding of the linguistic input (Bever, 1970; Chapman, 1977; Clark, 1974; Ervin-Tripp, 1973).

Regarding maternal labeling strategies and their relation to the children's behavior, very little information exists in the literature. In general, adult interlocutors react differently to imitation than they do to spontaneous production (Bohannon & Marquis, 1977; Lieven, cited in Ryan, 1973). As Lotz and Bohannon (Note 1) demonstrated, adults seem to interpret imitation as a sign of noncomprehension or of pragmatic difficulty in the child. On the basis of these findings, we might expect that imitation is followed in later discussions of the same referent by a different pattern of maternal choices of labeling formats than spontaneous or elicited production by the child.

Method

Subjects

Twenty middle-class Israeli mother–infant dyads participated in the study. The sample is identical to the

middle-class group used by Ninio (1980). The sample was obtained through three urban well-baby clinics. The infants were 17 to 22 months old (M = 19 months, SD = 1.77), Jewish, all first born. Half of the infants were males, half females. One subject was eventually excluded from the sample because he did not emit any correct responses during the entire observational period.

Instruments and Procedure

Each dyad was observed once at home. Mothers were provided with three picture books and asked to look at the books with their infants. The books were "Things in My House" by Joe Kaufman, "Heavy and Light" by Philip Thomas, and "Le Coffre a Jouets" by K. B. Jackson. For the third book, the mothers were instructed to try to elicit from the infants a demonstration of "all the words he knows which are shown in the book." The sessions were recorded by audiotape and also by hand. The records were transcribed according to the framework of Ninio and Bruner (1978). All utterances by mother and child were recorded in full, as well as several nonverbal behaviors: for the child, all vocalizations that were not frets or crying (e.g., smiles, gestures at the book, direction of gaze—at the book, at the mother, away, searching for specified object); for the mother, gestures at the book and laughter.

Content analysis of the transcriptions has been reported in Ninio (1980). The analysis revealed the existence, in the corpus, of five major labeling formats: (a) spontaneous production of labels by the child, (b) production of labels by the child elicited by maternal "what-questions," (c) comprehension responses by the child elicited by maternal "where-questions," (d) labeling by the mother, spontaneously imitated (or not imitated) by the child, and (e) imitation by the child elicited by maternal requests of the type, "say X."

The following coding system was set up to identify the maternal and child behaviors.

Maternal Behaviors

1. *What-questions* about the name of objects, persons, attributes, and actions depicted (e.g., "What is this?").
2. *Where-questions* asking for the whereabouts in the picture of objects and persons mentioned in the question (e.g., "Where is the doll?").
3. *Labeling statements* naming depicted objects, persons, and so on (e.g., "This is a doll"). Repetitions of labels previously uttered by the child were excluded.
4. *Imitation-eliciting requests* for the child to imitate a modeled word (e.g., "Say 'doll' ").

Children's Behaviors

1. *Production*

• Spontaneous labeling: (a) *correct*—the child correctly named a depicted object, person, and so on, without a previous prompt from the mother; (b) *incorrect*—for a given picture, the child used an inappropriate label (e.g., the child said "teddy" when shown a picture of a doll); (c) *misapplied*—for a given word, the child used that word to label an inappropriate picture.

• Elicited labeling: (a) *correct*—the child correctly named the picture after being asked a maternal what-question; (b) *incorrect*—the child answered a what-question with a wrong label for a particular picture or gave no answer; (c) *misapplied*—the child used a given label for an inappropriate picture as an answer to a maternal what-question.

2. *Comprehension:* (a) *correct*—the child pointed to the picture specified in the mother's where-question; (b) *incorrect*—the child pointed to a picture other than the one specified in the mother's where-question or did not respond.

3. *Imitation*

• Spontaneous: (a) *imitation*—the child repeated the label in a maternal-labeling statement or in a maternal where-question (e.g., the child responded by saying "doll" to the question, "Where is the doll?"); (b) *non-imitation*—the child did not repeat the label in a maternal-labeling statement.

• Elicited: (a) *imitation*— the child complied with the mother's request to imitate, as in, "Say 'doll' "; (b) *non-imitation*—the child did not imitate after being requested to do so.

Self-repetition by mother or child in the same conversation turn was regarded as a single occurrence of the relevant behavior.

Content Analysis

The audiotape recordings were transcribed by one experimenter who also added to the transcript the nonverbal behaviors she recorded during the observational period. Content analysis of the transcripts and the identification of various maternal and child behaviors were done by two independent coders. The intercoder reliability ranged between 87% and 100%, with a mean of 97%.

Results

Repeated discussions of the same labels were identified in the corpus of each dyad. The mean number of different labels discussed for each dyad was 50.0 (SD = 27.4). An average of 24.2 labels (SD = 15.1) was discussed repeatedly. The mean number of pairs of repeated discussions of the same labels was 138.1 (SD = 91.0), considering all possible pairing of repetitions.

To obtain a measure of the level of linguistic knowledge represented by the child's correct spontaneous and elicited labeling, by correct pointing and by imitation, I computed the overall correct response rate in all discussions of the same labels preceding and following these child behaviors. Correct response rate was computed as the percentage of correct responses out of the sum of correct and erroneous responses in spontaneous and elicited labeling and in responding to where-questions and imitation-eliciting requests. Table 1 presents the average correct response

Table 1
Percentage of Correct Responses Preceding and Following Different Correct Labeling Responses by the Child

Child's response	% correct					
	Preceding response			Following response		
	n	*M*	*SD*	*n*	*M*	*SD*
Production						
Spontaneous	17	78.3	20.5	18	75.4	28.0
Elicited	17	73.7	20.0	17	67.0	35.0
Comprehension	15	65.7	35.9	12	74.3	32.1
Imitation						
Spontaneous	13	43.4	34.4	12	66.1	32.8
Elicited[a]	4	—	—	4	—	—

[a] Percentages could not be computed due to low number of instances.

rate in discussions preceding and following the various correct labeling responses by the child.

There was no significant difference among pointing, spontaneous, and elicited labeling as to the correct response rate on previous or subsequent occurrences of the same labels. The correct response rate was significantly higher before spontaneous and elicited labels and pointings than before imitation: for spontaneous labels, $t(11) = 4.68$; for elicited labels, $t(10) = 4.90$; for pointing, $t(8) = 4.08$ ($ps < .01$ for all three tests). The correct response rate following imitation did not differ significantly from the rate following other responses.

Because I was looking for evidence of the degree of overlap between the various productive, imitative, and recognition child vocabularies, I computed the probability that in pairs of correct responses concerning the same words, the two responses would be identical in form. Of all pairs of correct responses, including spontaneous labels as at least one member of the pair, an average of 25.9% consisted of two spontaneous labels ($SD = 15.8$). In pairs including elicited labeling, 34.3% were both elicited labels ($SD = 25.1$). For pointing, the percentage was 17.6% ($SD = 27.0$); for imitation, 8.9% ($SD = 11.1$). When spontaneous and elicited labeling were considered jointly as productive in 61% of pairs in which one member was productive, both were productive ($SD = 29.1$).

Another prediction of the developmental-stage hypothesis is that if a word is imitated, it would more likely be incorrectly produced and comprehended than correctly, and if a word is recognized in a comprehension mode, it would more likely be incorrectly produced than correctly. To test these possibilities, I compared the frequencies of the relevant pairs of children's behaviors. There was no significant difference between the frequency of pairs of discussions consisting of imitation and correct production on the one hand and imitation and incorrect production on the other. Similarly, no difference was found between the frequency of imitation and correct comprehension versus imitation and incorrect comprehension, or between comprehension and correct production versus comprehension and incorrect production. Wilcoxon's matched-pairs signed-ranks test was used, and none of the differences was significant at the .05 level.

To measure the degree of consistency in maternal choice of labeling formats for the same word in its repeated discussions, probabilities were computed for the second of a pair of games to be identical to the first game. The average probability was .466. For specific formats, the probability of the second of a pair of games being the same as the first was .365 for what-questions, .396 for where-questions, and .385 for labeling statements.

The next question is whether the choice of a particular label-eliciting or imparting format is influenced by the child's behavior on previous discussions of the same referent. The first hypothesis to be tested is that mothers regard the child's errors and lack of responses as indicating the child's lack of knowledge and would tend to follow these with further teaching of labels rather than attempt to elicit the labels from the child. For what-questions, where-questions, and labeling statements, the proportion of correct child responses preceding these maternal behaviors on previous discussions of the same labels were computed. Labeling statements were preceded by a significantly lower proportion of correct responses than either what-questions or where-questions. The proportions were 20.8% for labeling statements ($SD = 17.6$); 67.4% for what-questions ($SD = 23.9$), and 51.0% for where-questions. The difference between where-questions and what-

questions was not significant. Maternal choice of formats following earlier labeling events of various kinds are presented in Table 2.

To summarize the results presented in Table 2, the following should be noted: (a) Mothers followed three categories of children's behaviors with significantly more labeling statements than with either kind of eliciting question. These categories were wrong spontaneous labeling, wrong or no elicited labeling, and no imitation of labeling statements. (b) Mothers followed correct spontaneous labels equally frequently with questions of either type, but much less often with labeling statements. (c) Misapplied spontaneous labels and correct and misapplied elicited labels were followed by more what-questions than where-questions or labeling statements. (d) Correct and wrong or no pointing were followed by more demands for further pointing than by demands for labeling or by imparting of labeling information. (e) Finally, imitation of a label was followed with equal frequency by the two types of questions and by labeling statements.

Discussion

The present study examined the labeling behavior of children at the early stages of language acquisition, between 17 and 22 months. At this stage, correct responses appear intermixed with errors, implying that labeling games concentrate on words in the process of being acquired rather than with fully mastered vocabulary items. By a measure of cor-

Table 2
Average Conditional Probabilities of Maternal What-Questions (WQ), Where-Questions (WhQ), and Labeling Statements (L) on Later Occurrences of Labels, Given the Children's Behaviors on Earlier Occurrences of the Same Label

Child behavior on early occurrence of label X	Conditional probabilities of maternal behaviors on later occurrences of label X[a]				
Child behaviors that increase probability of maternal labeling					
Incorrect spontaneous labeling	L	>	WQ	=	WhQ**
	.745		.136		.098
Incorrect or no elicited labeling	L	>	WQ	=	WhQ**
	.605		.204		.183
Nonimitation of L	L	>	WQ	=	WhQ*
	.384		.371		.213
Child behaviors that increase probability of maternal eliciting questions					
Correct spontaneous labeling	WQ	=	WhQ	>	L**
	.579		.282		.157
Misapplied spontaneous labeling	WQ	>	WhQ	=	L*
	.473		.133		.231
Correct elicited labeling	WQ	>	WhQ	=	L**
	.569		.267		.186
Misapplied elicited labeling	WQ	>	WhQ	=	L**
	.671		.065		.264
Correct pointing (comprehension)	WhQ	>	WQ	=	L*
	.635		.132		.221
Incorrect or no pointing	WhQ	>	WQ	=	L**
	.458		.246		.291
Child behaviors that do not bias the probabilities of maternal behaviors					
Spontaneous imitation of L or WhQ	WQ	=	WhQ	=	L
	.272		.279		.340

Note. Wilcoxon matched-pairs signed rank test was used to determine the significance of differences. The Wilcoxon test was corrected for differences in the overall frequencies of the three maternal behaviors.
[a] A greater than sign (>) signifies significantly higher probability of maternal behaviors on the left side of the equation over maternal behaviors on the right side. An equal to sign (=) signifies no significant difference between the probabilities of the two maternal behaviors on either side of the equal sign.
* $p < .05$. ** $p < .01$.

rect-response rate preceding their occurrence, comprehension and production of labels represent the same level of word knowledge—about 70% correct. Imitation seems to occur at a slightly lower level of knowledge—about 43% success rate. However, this difference does not warrant the conclusion that imitation reflects noncomprehension or that it occurs in a distinct developmental stage of its own. Rather, words that are imitated are slightly less well-known by the child than others but seem only to need a minimal amount of further rehearsal before reaching the same level of mastery. Imitation occurs literally on the threshold of acquisition because, following imitation, the success rate in producing and comprehending the same items approaches the 70% level.

Examination of repeated discussions of the same referent showed no evidence for the existence of nonoverlapping imitative, productive, and comprehension vocabularies. Rather, children exhibited a mixture of labeling modes toward the same vocabulary items. In addition, the occurrence of imitation did not predict more errors than correct responses in comprehension and production of the same items, nor did correct comprehension predict more errors than successes in production. In summary, no evidence for three nonoverlapping developmental stages was found in this study. Rather, production, comprehension, and imitation represent alternative forms of rehearsal, with imitation more likely to occur for less well-learned, but already comprehended, items. This generalization, however, should be taken with the reservation that it might not be true for other contexts in which speech does not have a strict vocabulary-rehearsal function. For instance, imitating a request for action might well be a sign that the child did not comprehend the previous utterance (Ramer, 1976; but see Shipley, Smith, & Gleitman, 1969, who suggested that imitation increases the probability of complying).

The mixture of labeling modes exhibited by the children in this study is a direct consequence of the mothers' tendency to initiate different labeling formats on repeated discussions of the same referent. An examination of the rules governing the mothers' choice of particular formats revealed that mothers exhibited a high degree of sensitivity to signals of word knowledge or lack of it in their children and chose their subsequent move accordingly. In general, mothers seemed to be motivated to impart labeling information only if the children appeared not to know the word; otherwise, they attempted to elicit production or recognition of the word from the children. Errors in production as well as nonimitation seem to function as diagnostics of a nonspecifically low level of word knowledge, because they uniformly decrease subsequent eliciting and increase labeling. In contrast, correct spontaneous labeling seems to be taken as indicative of a nonspecifically high level of word knowledge, one that makes possible the elicitation of both production and comprehension responses from the child and makes further maternal labeling superfluous.

Other forms of word production by the child (e.g., correct elicited labeling as well as misapplied labels) selectively increased the probability of production-eliciting questions on subsequent discussions of the same word, because mothers were apparently satisfied that the children could produce the relevant label, even if they might not know the precise meaning of the words well enough to pass a test of comprehension. Very few where-questions were asked on these words. Similarly, correct pointing (i.e., comprehension) was followed by more where-questions than by production-eliciting questions by further labeling.

Finally, imitation by the child was equally likely to be followed by all three forms of maternal behavior. If we take differential questioning or labeling as indicative of the mothers' imputing knowledge or the lack of it to the children, nondifferentiation of strategy seems to indicate that imitation is anamolous: It does not convey an unambiguous signal either of lack of knowledge or of knowledge but is interpreted as showing some limited, nonspecific knowledge of the relevant word.

The sensitivity of the mother to the child's apparent level of knowledge turns the joint book-reading interaction into a highly integrated system in which the probability of occurrence of each behavior is influenced by events that had sometimes occurred many

turns previously. These results demonstrate the operation of maternal fine-tuning in the teaching of the first lexicon.

Reference Note

1. Lotz, E. A., & Bohannon, J. N. *Imitation, interactions, and language acquisition.* Paper presented at the Regional Conference of the Society for Research in Child Development, Alexandria, Virginia, April 1980.

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