Lessons from Television: Children's Word Learning When Viewing

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RICE, MABEL L., and WOODSMALL, LINDA. *Lessons from Television: Children's Word Learning When Viewing.* CHILD DEVELOPMENT, 1988, **59**, 420–429. The study investigated if preschoolers can learn novel words when viewing television and if the learning is influenced by age or type of word. 61 preschoolers, ages 3 and 5, were assigned to either an experimental or control group. They viewed a 15-min television program, featuring 20 different novel words, 5 each in the 4 categories of object, action, attribute, and affective-state words. Comprehension was tested before and after viewing. The experimental group performed better than the controls for object, action, and attribute words. 5-year-olds were more accurate than 3-year-olds and gained relatively more from the experimental condition. The easiest words to learn were object and attribute words. The results are relevant for studies of media effects and accounts of preschoolers' "fast mapping" of new words.

Television viewing is a favorite activity of young children. Contemporary models of viewing characterize the child as an active processor of the medium, one who selectively attends, searches for comprehensible content, and retains new information from viewing (see Rice, Huston, & Wright, 1982). A number of possible consequences of viewing have been explored, most predominantly changes in social behavior and concept learning. One area of potential consequence that has yet to be investigated is language learning. This article is a report of an experimental study of children's word learning in a laboratory viewing situation.

During the preschool years, children quickly acquire an extensive vocabulary. Between the ages of 1½ and 6 years, children learn to comprehend over 14,000 words (Templin, 1957), or an average of about nine new words per day. Obviously, children manage to do so without explicit word-by-word tutoring. Instead, they seem to absorb new meanings as they encounter them in conversational interactions. The exact nature of the word-learning process is not clear. Current models are sketchy and rely heavily on simplifying assumptions. For example, Pinker's model (1984, p. 30) assumes that children rely on situations where a single unfamiliar word is isolated or surrounded by known linguistic contexts, and the situation provides a clear meaning for the word. In some unspecified manner the child infers the matchup between word and meaning.

The context for learning words that is emphasized in the language-acquisition literature is that of a dyadic interchange between an adult and a child. Television as a possible source of language learning is generally overlooked or summarily dismissed (see Clark & Clark, 1977, p. 330; Hoff-Ginsberg & Shatz, 1982), even though by age 3 years, American children are frequent television viewers, averaging more than 2½ hours of viewing daily (Huston et al., 1983). Furthermore, young children's viewing is attentive. In the home situation, when the TV is on children increase the percentage of time looking at the screen from 6% at age 1 to 67% at age 3–4, and 70% for 5–6-year-olds (Anderson, Lorch, Field, Collins, & Nathan, 1986).

Some popular educational programs—"Sesame Street" and "Mr. Rogers's Neighborhood"—offer dialogue that is simplified,

The study was supported by a University of Kansas General Research Allocation no. 3798-20-0038 awarded to Mabel L. Rice. Preparation of the manuscript was supported by NICHHD training grant no. HD07255. Support for video editing was supplied by the Center for Research on the Influences of Television on Children, supported by funding from NIMH to Aletha Huston and John C. Wright. We would like to thank Aletha Huston, Susan Kemper, and Catherine Snow for helpful comments, along with three anonymous reviewers. We also appreciate the participation of children and their parents at the following preschools: Edna A. Hill Child Development Lab, Hilltop Child Development Center, and Regents Center Child Development Lab, all of the University of Kansas, and the Highlawn Montessori School in Shawnee Mission, Kansas. Requests for reprints should be sent to the first author, Child Language Program, University of Kansas, 1043 Indiana, Lawrence, KS 66044.

[*Child Development*, 1988, **59**, 420–429. 0009-3920/88/5902-00012$01.00]

much like mothers' speech to children. The dialogue has a simple grammar, refers to immediately present referents, explicitly focuses on key words, and involves frequent repetitions of form and content. Furthermore, the content expressed in key terms is often supported by close-ups and other salience-enhancing visual production techniques (Rice, 1984; Rice & Haight, 1986).

In home settings, parents intuitively respond to the medium as a language-teaching device for their toddlers who view. Parents use television, particularly "Sesame Street," as a talking picture book (Lemish & Rice, 1986). Overall, when embedded in supportive parental interactions, educational television viewing appears to be a situation well suited to language acquisition.

Recent longitudinal evidence is also supportive (Rice, Huston, Truglio, & Wright, in preparation). A sample of 325 children, approximately half of whom were 2½ years and half 4½ years at the beginning of the study, were followed for 2 years. The Peabody Picture Vocabulary Test—Revised (Dunn & Dunn, 1981) was given to the children at the beginning and the end of the study. Home viewing diaries were collected at intervals during the 2 years. Viewing educational television programs, primarily "Sesame Street," predicted final PPVT scores for the younger children (spanning 2½–4½ years of age), whereas initial PPVT was not a significant predictor of final viewing. This effect was not apparent for other kinds of viewing, such as cartoons, nor was it evident for the older children.

How could young children learn about language when viewing television? One possibility is that young children "fast map" new words when viewing. Fast mapping consists of a quick, initial partial understanding of a word's meaning, involving a restructuring of the lexicon and restructuring of the underlying conceptual domain, that can be accomplished on the basis of a single exposure (Carey, 1978). Carey and Bartlett's (1978) first informal study of fast mapping was followed by experimental studies (Apel, Kamhi, & Dollaghan, 1985; Dickinson, 1984; Dollaghan, 1985) demonstrating fast mapping for children ranging in age from 2 years to sixth grade. In these studies, targeted words were either nouns (object names) or object attributes (color, weight); the total number of new words presented was limited to no more than three, and the total number of presentations was limited to a few (e.g., once or twice).

The fast-mapping studies are limited in three respects: First, a single exposure is a very conservative, minimal learning situation, unlike many naturalistic settings such as television and live interactions where key vocabulary items tend to appear several times. Second, the limited kinds of words sampled—object and object-attribute words—constrain the generalizability of the findings. Given that there are differences in the kinds of words that children find easy to learn (Benedict, 1979; Nelson, 1973), it may be that some word categories are more amenable to fast mapping than are others. Furthermore, the process of fast mapping may be clarified by differences between different kinds of words. Finally, in the previous studies there was no attempt to investigate developmental trends within the preschool age range, the years between 3 and 5 when rapid vocabulary acquisition occurs.

The purposes of this study were to explore whether preschoolers can learn new words when viewing television, if some kinds of word meanings are more amenable to TV modeling than others, and if there are developmental differences in the effectiveness of television as a source of language information.

Method

Design.—A three-way mixed design (2 [age] × 2 [viewing condition] × 4 [word]) was followed. Age and condition were the between-group factors, with predicted advantages for higher age (5's > 3's) and for the experimental condition (experimentals > controls). The within-group repeated factor was the kind of word meanings depicted: object words, action words, attribute words, and affective-state words. The four kinds of word meanings were chosen because they indicate ontogenetic trends in acquisition: object words appear first, followed by actions, and then modifiers (Benedict, 1979; Nelson, 1973). Affective-state words, such as *sad* or *angry*, appear later (Bretherton, McNew, & Beeghly-Smith, 1981). This ontogenetic sequence has been ascribed to children's conceptual understanding (Benedict, 1979; Nelson, 1973) and to patterns of syntactic structures (Gentner, 1982). It may be that television viewing is well suited to the presentation of some meanings, such as objects, actions, and attributes, insofar as the camera can focus attention on targeted objects or actions and targeted information can be reiterated. On the other hand, some meanings, such as affective-state words, may require presentation in an immediate, interpersonal situation. It was predicted that order of word difficulty,

from easiest to most difficult, would be: object, action, attribute, and affective-state words.

Subjects.—The subjects were 61 normally developing children, 27 3-year-olds and 34 5-year-olds, with equal distribution of sexes across age level. The subjects were randomly assigned to experimental (N = 35) or control (N = 26) groups. Each subject tested within or above normal range on the Peabody Picture Vocabulary Test—Revised (Dunn & Dunn, 1981) and did not have a history of hearing loss. Subjects were drawn from students enrolled in local day-care or preschool centers that serve predominantly Caucasian middle-class children.

Materials.—Two 6-min animated television programs (one with a bug as a central character and the other with a mole as the lead) were selected as the stimuli because they met the following characteristics: no narration or dialogue, clearly depicted actions and characters, a combined length not exceeding 15 min, and a series of actions amenable to a story narration. To differentiate the programs, a 10-sec animated bit was edited and inserted between the programs.

The programs were broadcast on a children's cable channel. Unlike Saturday morning cartoons, these animated programs do not have high hype and high violence, yet they are appealing to young viewers. Furthermore, many of the bits are produced without dialogue. In an 8-hour sample, 40% of the bits did not have dialogue and 18% had voice-over narration.

Both of the selected bits featured animal characters. One story was about a little bug who breaks his violin while playing hooky from his violin lesson. A helpful carpenter fixes his violin for him by using wood from a beautiful tree with singing birds. The tree loses its leaves and the birds because of worms eating the tree. The little bug plays his violin and entices the worms to leave the tree and fall into a pond, where they are eaten by a fish. The little bug plays the violin, the tree recovers, and all are happy. In the second story, a little mole's records are accidentally broken. The mole watches birds sing and, with the help of his mouse friend, collects the notes coming from their mouths and makes a new record from the musical notes. The mole and mouse are happy as they listen to their new record.

Voice-over narration was added to each program. The narration was a story containing 20 target words, five from each of the four word-meaning categories. Words were selected that afforded equivalent meanings in experimental and control pairings. Determination of words within categories was straightforward for names of objects and actions. Attributes included person attributes and object attributes, in order to match a script to the program content. Affective words described emotional states. As Bretherton, Fritz, Zahn-Waxler, and Ridgeway (1986) note, clear theoretical criteria for emotion-denoting words are not available, and clear precedents for selection are not evident in the literature. The words are listed in Table 1.

The experimental words were ones that did not appear in adults' spontaneous conversations with 4½-year-old children (Hall, Nagy, & Linn, 1984) and were not known by children ages 3 and 5 in pilot testing. The control words were similar in meaning and familiar to preschoolers. With two exceptions, each targeted word appeared five times within a 6–7-min period, a rate consistent with the rate of targeted words presented in educational programs (Rice & Haight, 1986). Because of script demands, there were seven tokens of *artisan* and 14 of *viola*. Within the programs, the targeted words were presented in the following manner. They were (*a*) nested within a single program (i.e., a given

TABLE 1

TARGETED LEXICAL ITEMS IN TV DIALOGUE

Experimental	Control
Objects:	
Gramophone (M)	Record player
Cleaver (M)	Knife
Vessels (M)	Bowls
Artisan (B)	Carpenter
Viola (B)	Violin
Actions:	
Surge (M)	Blow
Sever (M)	Cut
Waft (M)	Fall
Trudge (B)	Walk
Fabricate (B)	Make
Attributes:	
Makeshift (M)	Pretend
Malicious (B)	Bad
Withered (B)	Sick
Radiant (B)	Pretty
Nurturant (B)	Kind
Affective state:	
Altruism (M)	Helpful
Dejection (M)	Sad
Contentment (M)	Feeling good
Jubilation (B)	Happy
Smug (B)	Proud

NOTE.—M = Mole bit; B = Bug bit.

word appeared only in one program), (*b*) they were used in a story context, and (*c*) they were repeated as recasts of earlier contexts. The programs containing the control words were identical to the experimental programs except for the substitution of the control words for the experimental words.

Samples of the story scripts with descriptions of accompanying visual information are provided in the Appendix. The samples are the beginning few minutes of each program. The narration was timed to provide as much coincidence as possible of verbal and visual content, without interfering with natural speaking rhythms. Inflectional patterns, rhythms, and rates were naturalistic. There was no attempt to draw attention to individual words by means of pause or exaggerated stress, nor was there any attempt to draw attention to targeted content by such means as imperatives ("Look at the viola!") or manipulation of visual content. The edited programs were very similar to the narrated stories that appear on the children's cable channel.

Procedure.—The research procedure consisted of three 15-min sessions for each subject. In the first session two measures were collected. One was the PPVT-R (Dunn & Dunn, 1981) to serve as an index of vocabulary acquisition. The other was a pretest on the comprehension test to determine if there were unintended differences between the experimental and control groups in initial comprehension of the targeted words. The comprehension test followed the format of the PPVT-R. Four pictures were arrayed on a page and children were asked to point to the picture depicting the word named. The pictures were taken of the word content within the television programs as they were played on a video screen. Each four-picture array contained pictures from the same program. Each word was tested once, for a total of 20 items.

Children viewed the video stimuli in Sessions 2 and 3 at least 1 day and no more than 1 week apart. Each child viewed individually, with an experimenter in the room. The child was told to watch carefully because the experimenter would ask questions about the TV programs later. If the child initiated conversation, the experimenter was nonresponsive, except for encouraging the child to view carefully. Immediately following the second viewing, the posttest was presented, consisting of the same comprehension tests and procedures as the pretest.

Results

The cell means and standard deviations for the control and experimental 3- and 5-year-olds for the pre- and posttest total scores (possible of 20), posttest individual word-category subtotals, and PPVT-R standard scores are reported in Table 2.

Preliminary analyses.—Univariate ANOVAs indicated no condition, age, or sex effects for the comprehension pretest and PPVT-R scores, indicating that the groups were equivalent for initial comprehension of the experimental words and overall vocabulary-acquisition level. Univariate ANOVAs (age × group × order; age × group × sex) indicated no order or sex effects for the posttest scores (total and individual word categories).

Group comparisons.—In order to determine condition, age, or word effects, a three-way mixed analysis of covariance was run, with condition and age as between-subjects factors and word as a within-subjects factor, controlling for general vocabulary level (PPVT-R standard scores) and initial comprehension levels (pretest total score). The PPVT-R was a significant covariate, $F(1,55) = 9.10$, $p < .01$, whereas the pretest total score was not. There were significant condition effects, $F(1,55) = 46.04$, $p < .001$, age effects, $F(1,55) = 14.41$, $p < .001$, word effects, $F(3,170) = 10.17$, $p < .001$, and an age × condition interaction, $F(1,55) = 6.859$, $p = .01$. The experimental group had higher scores than the controls; the 5-year-olds' scores were higher than the 3-year-olds'. The 5-year-olds benefitted more from the experimental condition than did the 3-year-olds. The word means were as follows: attribute, 2.49; object, 2.38; action, 1.62; affective state, 1.36. Pairwise comparisons yielded a significant difference between attribute and affective-state words, $p = .05$, with a one-tailed t test.

A multivariate analysis of covariance (age × condition), with PPVT-R as covariate, was run on the four word categories' postviewing subtotal comprehension scores in order to take into account the interrelation among the individual word categories. There were main effects for condition, $F(4,53) = 13.03$, $p < .001$; age, $F(4,53) = 4.397$, $p < .01$; and an age × condition interaction, $F(4,53) = 2.525$, $p = .05$. Univariate ANOVAs for the individual word categories indicate condition effects (experimentals > controls) for object, $F(1,56) = 25.02$, $p < .001$, action, $F(1,56) = 5.79$, $p < .05$, and attribute, $F(1,56) = 8.82$, $p < .01$, words; age effects (5's > 3's) for object,

TABLE 2

CELL MEANS AND STANDARD DEVIATIONS: AGE BY GROUP

	3-YEAR-OLDS		5-YEAR-OLDS	
	Experimental	Control	Experimental	Control
Pretest total[a]	6.00	5.63	5.84	6.33
	(1.67)	(1.36)	(2.16)	(1.67)
Posttest total[a]	7.62	5.18	10.68	6.46
	[7.56]	[5.60]	[10.71]	[6.18]
	(1.92)	(1.83)	(2.16)	(1.72)
Object words[b]	2.25	1.27	3.52	1.87
	[2.22]	[1.44]	[3.54]	[1.75]
	(.86)	(1.27)	(1.12)	(1.06)
Action words[b]	1.44	1.18	2.32	1.27
	(1.09)	(.98)	(1.20)	(1.10)
Attribute words[b]	2.56	1.45	3.11	2.40
	[2.53]	[1.62]	[3.12]	[2.29]
	(1.26)	(1.04)	(1.10)	(1.18)
Affective words	1.38	1.27	1.74	.93
	(1.26)	(.90)	(1.05)	(.96)
PPVT-R	115.69	107.36	113.95	119.40
	(9.22)	(10.28)	(14.63)	(14.04)

NOTE.—Standard deviations are in parentheses. Means in brackets are adjusted for significant PPVT covariate.
[a] Total possible = 20.
[b] Total possible = 5.

$F(1,56) = 9.67$, $p < .01$, and attribute, $F(1,56) = 3.99$, $p = .05$, words; and no age × condition interactions for any of the individual word categories. Unlike the univariate ANCOVA, PPVT-R was not a significant covariate in the MANCOVA, $F(4,53) = 2.31$, $p < .10$, although in the associated univariate ANCOVAs for object and attribute words PPVT-R was significant, $F(1,56) = 4.76$, $p < .05$, and $F(1,56) = 3.79$, $p = .05$, respectively. Overall, the findings indicate experimental effects in the predicted direction for the object, action, and attribute words; superiority for 5-year-olds for object and attribute words, independent of overall vocabulary level (PPVT-R); and an advantage for attribute words relative to affective-state words. The only interaction with age was a greater advantage for 5-year-olds in the experimental condition.

Word item analyses.—Item analyses were conducted on the postviewing comprehension scores of the experimental group to determine the coherence of the word groupings and the relative acquisition levels of individual items. The zero-order correlations of individual items with word group totals, controlling for age, are reported in Table 3. In general, the patterns of correlations indicate internal cohesion within each of the four categories. The only cross-category correlations are between two of the attribute words and the object word total, indicating a relation between attribute and object words. Neither of the two attribute words were used as modifiers of any of the target objects, ruling out a possible syntagmatic effect (see Nelson, 1982). Therefore, the association appears to be at a more abstract level of modifier-modified. None of the action or affective-state words are associated with the overall total, indicating relatively low contributions to the total score.

The accuracy level of the words was determined by the percentage of subjects who were correct. For the word groups, the percentages and ranges were as follows: object, 59%, 34%–94%; action, 38%, 31%–46%; attribute, 57%, 34%–83%; affective, 32%, 20%–49%. The easiest individual words were the same for both age groups. When combined with the absence of an age × word interaction in the earlier ANCOVA, these findings indicate no developmental effects for the word groups for the age range sampled. The easiest words are as follows, with their respective total percentage correct: *gramophone*, 94%; *nurturant*, 83%; *viola*, 71%; *makeshift*, 69%; *malicious*, 66%; *artisan*, 57%. *Fabricating*, 46%, was also in the top 10 words for both ages. Otherwise, the relative rankings within the bottom 10 words varied for the two age groups, with the exception that *altruism* (23% combined) and *contentment* (20% combined) were at the bottom for both. The easiest words were object or attribute words, lending support to the correla-

TABLE 3

ITEM CORRELATIONS WITH AGE PARTIALED OUT

	Total Object	Total Action	Total Attribute	Total Affective	Overall Total
Object words:					
Viola	.51***	−.12	.41**	−.16	.33*
Gramophone	.35*	−.03	−.04	.23	.27
Artisan	.63***	−.17	.17	−.04	.29*
Vessels	.36*	.07	.08	.16	.35*
Cleaver	.51***	.24	.15	−.12	.41**
Action words:					
Trudging	−.11	.53***	−.04	−.05	.20
Severing	.08	.08	.21	−.20	.10
Wafting	.11	.66***	−.23	−.05	.26
Surging	−.04	.51***	−.06	−.27	.08
Fabricating	−.05	.63***	−.07	−.19	.19
Attribute words:					
Malicious	.33*	−.07	.71***	−.17	.43**
Nurturant	.23	−.11	.42**	−.10	.24
Makeshift	−.02	−.00	.33*	.09	.23
Radiant	.29*	−.18	.52***	−.16	.25
Withered	.10	.13	.62***	−.18	.37*
Affective state:					
Jubilant	−.16	−.27	−.01	.57***	.08
Smug	.09	−.18	−.15	.61***	.20
Dejection	.14	−.01	−.25	.62***	.27
Contentment	−.19	−.22	−.21	.28*	−.18
Altruism	.04	−.12	.11	.38***	.23
Post object	...	.00	.35*	−.02	.68***
Post action			−.08	−.32*	.34*
Post attribute				−.20	.59***
Post affective					.25

* $p < .05$.
** $p < .01$.
*** $p < .001$.

tions suggesting close relations between object and attribute words. Given the same frequency of occurrence for all words but *viola,* a frequency effect would not account for the differences between words, nor was there any evidence of a primacy or recency effect.

Discussion

The findings indicate that young children are able to learn something about novel object, action, and attribute words in a viewing situation. Furthermore, the viewing effects were evident when the children's overall vocabulary levels were controlled, indicating that possible effects are not limited to children with relatively advanced vocabularies. For object and attribute words, 5-year-olds benefitted more from the viewing situation than the 3-year-olds, suggesting possible influences of accumulated linguistic knowledge and/or prior viewing experience.

Given the nature of the stimuli and the viewing circumstances, the findings suggest a robust initial word-acquisition mechanism. In contrast to the carefully focused and limited scope of earlier fast-mapping studies, the experimental stimuli presented 20 novel words in a relatively brief time, in a format that allowed for minimal parsing support or time for reflection. The novel words appeared a total of 114 times in a 12-min program, a dense rate of new information. Furthermore, the same carrier phrase was not used for individual tokens of a targeted word. Compared with the earlier studies, these findings indicate that in order to be learned the targeted word is not restricted to a single "new" item, surrounded by the familiar; the new word need not be introduced in exaggerated referent-matching situations; the new word is not limited to novel objects or members of a limited semantic class (such as color terms); nor is it necessary to provide the same linguistic context for each presentation of the new word. In short, a minimum of overt salience-enhancing support is adequate for children to parse a new word and arrive at an initial at least partial

comprehension of meaning. The simplifying assumptions of contemporary explanatory models are not requirements for young word learners.

These conclusions must be qualified in several ways. First, the effects are more evident for the older children. The 5-year-olds gained an average of 4.87 words (adjusted for initial PPVT), and the 3-year-olds gained a more modest adjusted average of 1.56 words. Given the relatively brief viewing period and the challenging nature of the stimuli, however, the gains are not trivial, especially for 5-year-olds. Second, the measure of acquisition was an immediate recognition test. The extent to which the words are later recalled or incorporated into a child's productive repertoire remains to be determined. A third limitation is the viewing situation, in which attention is controlled. As Hornik (1981) has pointed out, there is a difference between the question of what television viewing *can* do versus what it *does* accomplish. In a new area of investigation, as in this study, the question is that of *can*. If effects are established, then further studies can explore the representativeness of the laboratory findings. There is supportive evidence that naturalistic viewing does influence vocabulary development in the positive findings of Rice et al. (in preparation).

A final limitation is that some kinds of word meanings are more readily mapped than others. As predicted, based on developmental sequences, object, action, and attribute words were amenable to quick comprehension. On the other hand, affective-state words were relatively resistant to quick interpretation. The word effects were the same across both age groups, suggesting similar patterns within the age range studied. Given the limited learning of the 3-year-olds, however, the comparison of word effects for the two age groups is inconclusive.

Contrary to acquisition accounts that attribute a heavy role to conceptual input (Nelson, 1985), the relative difficulty of affective words does not appear to be solely attributable to the conceptual domain labeled. This conclusion is suggested by the fact that the experimental attribute words *nurturant* and *malicious* seem to have conceptual similarities with the affective words *altruism* and *dejection*, yet the former were easy to learn and the latter were difficult. They were not correlated with each other and indicated differential effectiveness in the experimental situation. The difference may be attributable to grammatical context. *Malicious* and *nurturant* always appeared in the following grammatical pattern: article, optional modifier, *malicious worm(s);* article, optional modifier, *nurturant artisan*. This grammatical regularity, with the cues provided by the article at the beginning of the phrase and the optional initial modifier, would help a child identify the grammatical role, and putative meaning, of the unfamiliar adjective and noun, according to a structure-dependent distributional learning model (Carey, 1982; Maratsos & Chalkley, 1981). In contrast, *dejection* and *altruism* appeared in several grammatical contexts. For example, *dejection* appeared in the following structures: "looks/feels *dejected*," "the *dejection*," and "look of *dejection*." Because words describing emotional states can appear in a variety of grammatical roles (Bretherton et al., 1986; Johnson-Laird, 1983) and we wished to minimize overlaps with the attribute and action categories, the rule used in writing the scripts was to avoid the modifier and verb positions for affective words as much as possible. The result was a variety of mostly noun uses. The combination of grammatical variability and conceptual abstraction in the case of affective words may have been too challenging for a fast mapping in the viewing situation.

Overall, these young viewers were able to engage in rapid on-line processing of the narration that involved noting the presence of a new word and arriving at an instantaneous attribution of meaning. It is not possible to unambiguously isolate the features of the stimuli that accounted for this quick learning. A prime candidate, however, is the number of repetitions, coupled with clear, although not exaggerated, depiction of putative meanings. The repetitions were similar to what Baker and Nelson (1984) describe as recasts and Hoff-Ginsberg (1986) describes as a self-repetition (i.e., they involved repetition of targeted words in similar but not identical grammatical contexts). Baker and Nelson (1984) report that preschoolers who heard recasts of the experimenter's utterances acquired targeted new syntactic forms. Likewise, Hoff-Ginsberg (1986) reports that one of three significant predictors of young children's syntactic growth was mothers' self-repetitions, most of which were partial or modified repetitions.

The findings are consistent with the everyday observation that preschoolers can "pick up" new words with a minimum of exposure and a minimum of tutorial assistance. The results support the prediction that young viewers can learn new words when watching

television, given an appropriate script. What remains to be determined is how children attend to the stream of words presented, identify a novel item, enter it provisionally into their available lexicons, assign it a tentative meaning, and store it for immediate or later use, all on the basis of a few fleeting presentations. Video stimuli promise a means of disentangling the multivariate influences evident in a naturalistic communicative setting. As we identify the factors that contribute to the effectiveness of a video presentation, we will also determine the features that contribute to children's language learning. These features can then be incorporated into broadcast programming or special tutorial videocassettes, a possibility to gladden the heart of the many parents who wish the appeal of the medium matched its value for their children's development.

Appendix A

Sample Story Scripts

PARTIAL SCRIPT FOR BILLY BUG ANIMATED STORY[a]

Visual	Narration
1. Billy in doorway with his mother.	His mother tells Billy Bug to go to his *viola* (violin) lesson.
2. Billy looks down at the ground and walks down the road.	Billy is sad. He takes his *viola* (violin) and *trudges* (walks) down the road. He *trudges* (walks) until he sees a ball in the air.
3. Billy stops to watch a ball being thrown into the air.	"What fun to play ball," Billy thinks.
4. Billy looks down at the ground and walks down the road.	Billy keeps *trudging* (walking) down the road. He *trudges* (walks) and *trudges* (walks) until he reaches the stairs.
5. Billy looks in a window and sees his viola lesson.	"My *viola* (violin) lesson has started," thinks Billy.
6. Billy turns around and sees the ball.	"Oh, there's the ball again." Billy feels *jubilant* (happy).
7. Billy kicks the ball and follows it over the hill.	"Oh boy, a soccer game!"
8. The ball breaks Billy's viola.	Uh, oh.
9. A carpenter comes down the road.	An *artisan* (carpenter) comes down the road.
10. The carpenter stops to listen to Billy and puts Billy on his wheelbarrow.	The *artisan* (carpenter) is a kind, *nurturant* (———) man. "Come with me," says the *nurturant* (kind) *artisan* (carpenter). "We must *fabricate* (make) a new *viola* (violin) for you."
11. Billy smiles as he rides in the wheelbarrow.	Ah. Billy feels *jubilant* (happy) again.
12. The carpenter stops the wheelbarrow and motions to Billy to wait.	"Wait here," says the *nurturant* (kind) *artisan* (carpenter).
13. The carpenter returns with some tools and takes Billy's hand.	"Come with me," says the *nurturant* (kind) *artisan* (carpenter).

[a] Italics indicate experimental words. Alternate control words are in parentheses. A (———) indicates an omission in the control script.

PARTIAL SCRIPT FOR MATHEW MOLE ANIMATED STORY[a]

Visual	Narration
1. Mathew Mole is lying down and resting as he listens to music on his record player.	Our friend Mathew Mole *looks contented* (feels good) as he listens to the *gramophone* (record player). "*Contentment* (feeling good), ah *contentment* (feeling good). It is wonderful. Feeling *contentment* (good) is great!"
2. Mathew's doorbell rings.	His *contentment* (feeling good) is interrupted.
3. Mathew opens the door and the wind blows Morty Mouse inside.	It's his friend Morty Mouse.
4. The wind blows Morty, the record, and the record player against the wall.	The wind is so strong that it blows the *gramophone* (record player), Mathew's favorite record, and even Morty against the wall.
5. Morty sees that Mathew's record is broken.	"Oh, no." Mathew's favorite record breaks.
6. Mathew picks up the broken record.	"Now I can't play this on my *gramophone* (record player)!" Mathew looks *dejected* (sad).
7. Mathew is seen sitting outside.	Oh, he still feels *dejected* (sad).
8. Morty brings Mathew objects that look like records.	"Maybe this will work for a record." "No," says Mathew with a sad look of *dejection* (———).
9. Morty brings two more objects that look like records. Mathew shakes his head no.	"How about these two?" asked Morty. Mathew slowly shakes his head no, still feeling *dejected* (sad).
10. Mathew hears a note of music.	Suddenly the *dejection* (sadness) goes away.
11. Mathew watches music blowing out of the bird's flute and falling to the ground.	Mathew seeks music *surging* (blowing) out of the bird's flute. He watches the music *wafting* (falling) to the ground.

[a] Italics indicate experimental words. Alternate control words are in parentheses. A (———) indicates an omission in the control script.

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