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THE KEY VOCABULARY IN ORGANIC READING: AN EVALUATION OF SOME OF ASHTON-WARNER'S ASSUMPTIONS ABOUT BEGINNING READING

by
Stanley Wayne Bennett

A dissertation submitted in partial fulfillment
of the requirements for the degree of
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Doctoral Committee:

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ABSTRACT

THE KEY VOCABULARY IN ORGANIC READING:
AN EVALUATION OF SOME OF ASHTON-WARNER'S
ASSUMPTIONS ABOUT BEGINNING READING

by

Stanley W. Bennett

Chairman: Loren S. Barritt

Sylvia Ashton-Warner believes that words children ask to learn to read (Own words) are retained better than words supplied by someone other than the individual child (Others words). These Own words, she insists, are more "emotional" and more "meaningful" for the individual child. Length of the word is not important if the child really wants to learn it, she asserts. The present study tested each of these assumptions in the context of a relatively controlled laboratory setting.

Fourteen 4-5 year-old girls were asked to learn to read two blocks of 12 words. Each block of 12 words consisted of: 1) four words requested by each child (Own words); 2) four words mentioned by Ashton-Warner as words requested by her students (AW words); and 3) four words from the Scott-Foreman basal reader series (BR words).

Two experiments were included in the study. Experiment I consisted of a single study trial followed by two-minute and 24-hour retention tests. Experiment II (which included the same word stimuli as Experiment I) involved a series of three learning trials on each of three consecutive days following Experiment I and a long-term retention test several days thereafter.

Measures of several word attributes were obtained: 1) the child's rating of each word's emotionality; 2) Galvanic Skin Response (GSR) deflections to each of the Own, AW, and BR words; 3) "Meaningfulness" ("M") of each word using a modification of Noble's continuous free-association method; 4) Thorndike-Lorge word frequency; and 5) word length.

The data revealed that equivalent performance occurred for Own, AW, and BR words during learning trials of Experiment II and on the two-minute retention test of Experiment I. However, 24 hours (Experiment I) and several days later (Experiment II), Own words were read significantly more often than BR words. On the long-term retention test of Experiment II, Own words were also superior to AW words.

Significantly greater arousal (as measured by GSR deflections) and more continuous free-associates ("M") occurred to Own words than to either AW or BR words. Children also rated Own words as significantly more emotional than BR words, but <u>not</u> AW words. Own words were of significantly <u>lower</u> word frequency and longer word length than BR words, but AW and Own words were not different on these dimensions.

High rated emotionality was associated with better performance for AW+BR words on both the learning trials and long-term retention test of Experiment II. High "M" was also related to better learning of these words, but <u>not</u> to better long-term retention. Low frequency Own words and high frequency, short AW words were acquired most rapidly during original learning; however, on the long-term retention test, word length/word frequency effects disappeared, with the exception that performance on long Own words was significantly better than for short Own words.

Evidence was presented which strongly suggests that of the two factors--"emotionality" and "meaningfulness"--which Ashton-Warner says account for the superiority of learning Own words, "emotionality" (i.e., arousal) is probably the most important variable. Implications are discussed for the teaching of reading and the make-up of reading materials.

ACKNOWLEDGEMENTS

Acknowledgements should, I suppose, be the easiest part of the dissertation scene. But for me they are not. There are so many people who have contributed so much to this study. There are simply no words which can capture my appreciation for them as persons and for what they did for me at the many critical stages. But I will try to thank a few of them.

From the beginning of work on this dissertation I strongly felt that two fellow graduate students should participate in all phases of this experience. Why? Because students are members of the academic community as much as are faculty members. Because I was convinced that students have important contributions to make to such a study and that they in turn could learn much from the research topic studied. Because the experience of being on such a committee I hoped would help them develop greater empathy for the plight of the graduate student doing a dissertation. And, most importantly, because I feel that we are all learners in the academic community--faculty and students alike--and the sooner we consider each other as colleagues rather than as adversaries the more healthy the academic community will be.

The four faculty members on the committee readily agreed that full student participation on the dissertation committee would be acceptable to them.

Subsequently, I chose two graduate students (who had passed preliminary examinations) to serve on the committee--Elliot Stern (Developmental Psychology) and Judy Agard (Education and Psychology). These people were approved by the committee and work on the dissertation began shortly thereafter.

Elliot and Judy participated in all phases of the dissertation process: the meeting to discuss the proposal, reading and commenting on various drafts, participating in the oral examination, etc. At the end of the oral examination, the issue came up as to whether or not they should be allowed to sit in on the committee's deliberations about the acceptability of the dissertation, but the faculty members quickly agreed that Elliot and Judy should be included. Then the faculty members asked Judy and Elliot to sign the graduate school form indicating successful completion of the dissertation and also requested that they too write formal evaluations of the dissertation and the oral examination.

Elliot Stern's expertise in cognitive development and his extensive research experience provided innumerable insights during various stages of the study. Elliot was ever-ready to discuss the latest design problem or the most recent data find. These insights were a very significant contribution to the completed study. But sometimes Elliot helped by merely inviting me over to listen to his much-acclaimed record collection; it did much to sooth the brow of the harried researcher. When several details had not been completed prior to my leaving Ann Arbor, Elliot readily insisted that he would do them (getting the study zeroxed, delivering it to the graduate school, distributing copies to the other committee members, etc.).

Seldom have I met a person so warm, so kind, so bright as Elliot Stern. He has helped so many people in so many ways; I wish there were something I could do for you, Elliot, to express what our friendship means to me, but alas, I am left with words and a few minor deeds which hardly express what I feel.

I always seemed to have a draft of the proposal or the dissertation at some inopportune time for Judy. Yet, she readily agreed to take time out to discuss the latest brainstorm. One night she spent several hours with me going over the results of the data analyses. The comments on the first draft of the dissertation were both insightful and helpful in the re-write. Judy's bouncy friendliness and good sense of humor never failed to pick me up when the going was tough.

Loren "Biff" Barritt was magnificent throughout the work on the dissertation. "Biff's" enthusiasm and honesty with people is terribly rare in academe and terribly valuable to a struggling graduate student. His encouragement and willingness to go out of his way to help me through the design and to support me right through to the final traumatic stages of the dissertation re-writes were things I shall never forget. The feedback he gave me at various points during formulation of the problem, analysis of the data, and the write-up stage were of immeasurable value. "Biff" has given me the freedom to explore a variety of interests; at no time have I felt other than as a fellow colleague, which it seems to me is the way education should be--an experience of mutual learning under conditions of maximal freedom and feedback between each other.

I repeatedly had to ask Bob Dixon to read the design or write-up of the study under some kind of pressing time deadline. His

willingness to read things rapidly and thoroughly was much appreciated. Bob has a way of helping reformulate statements that need tightening up and a genuine interest in helping one through the rough spots.

Rachel and Steve Kaplan took a very keen interest in the study from the very beginning. Rachel spent a multitude of hours with me discussing the design, giving me suggestions for data analysis, etc. Her care in reading the first draft of the study and the "final" (pre-oral) version was remarkable. But beyond all this, I will always remember the long hours we spent talking about the problems of the world and the warm hospitality I always felt when I visited the Kaplan's home.

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Bonnie Carlson--who was the "teacher"--did a truly magnificent job of helping the children learn to read the words. The two weeks during which the children learned the words was a grinding schedule for everyone, especially Bonnie. Her attention to detail added much to the study.

DeAn McDaniel typed the final draft of the dissertation you see before you. Her work certainly speaks for itself. Thanks so much, DeAn, for doing it on such short notice.

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CHAPTER 1

REVIEW OF THE LITERATURE

Introduction

In her work with Maori and New Zealand children, Sylvia Ashton-Warner (1963) has developed an approach to beginning reading which is essentially a variation on the language experience method. Ashton-Warner begins reading instruction by asking each child for words he would like to learn to read and write. These are one-word sentences for beginning readers, she insists. She writes the words, one-by-one, on stiff cards and gives them to the child to learn. Once the child had learned approximately 40 words (the "key vocabulary") she assists him in writing his own stories and books. She also encourages children to read each other's books, and eventually, standard published materials. Ashton-Warner passionately explains the importance of this approach to reading:

> First words must have intense meaning for a child. They must be part of his being....They must be made out of the stuff of the child itself. I reach a hand into the mind of the child, bring out a handful of the stuff I find there, and use that as our first working material. Whether it is good or bad stuff, violent or placid stuff, coloured or dun. To effect an unbroken beginning. ....In this dynamic material....the Maori finds that words have intense meaning to him, from which cannot help but arise a love of reading. For it's here, right in this first word, that the love of reading is born, and the longer his reading is organic the stronger it becomes, until by the time he arrives at the books of the new culture, he receives them as another joy rather than as a labour. (p. 30-32)

Ashton-Warner found that key vocabulary words children asked for tended to be highly emotional words of "intense meaning", frequently centering around the emotions of "fear" (e.g., "spider", "fight", "alligator") and "sex" (e.g., "kiss", "darling", "together"). She feels that there is a world of difference between these words and the typical basal reader fare ("Janet, John, come look and see the boats.").

Ashton-Warner believes that the number of letters in a word has no relationship to the difficulty in learning to read the word. Several "backward" readers in the class, she notes, had trouble learning short, basal reader type words like "come" or "look", yet rapidly learned much longer words like "skellington" (sic), "frightened" or "together".

Given Ashton-Warner's assertions about learning "first words", the following general predictions seem appropriate:

1) The child's Own words should produce significantly better reading performance than Others words (basal reader words or words supplied by someone other than the individual child).
2) Own words should be more "emotional" and more "meaningful" than Others words.
3) Word length should not be an important variable in learning to read words.

Some research pertinent to these predictions will now be reviewed.

Emotional Components in Reading and Learning/Memory

The proposition that highly "emotional" words are learned more rapidly than those with neutral arousal properties has been tested by

Olson and Pau (1966). They asked first and sixth graders to classify 46 nouns, verbs and adjectives of high Thorndike-Lorge (1944) word frequency as "Words I love," "Words I hate," and "Words that don't matter." "Love" or "hate" words were termed "emotional", whereas "words that don't matter" were assigned to the "non-emotional" category. Three words rated by the child as "emotional" and three as "non-emotional" were subsequently selected for the learning trials.[1] In two separate experiments (one in which form class of the stimuli was controlled and one in which it was not) Olson and Pau found that first graders learned to read "emotional" words significantly more rapidly than "non-emotional" words.

Hildreth (1935) followed the progress of a 5-year-old child in learning to read 48 words. She reported that "pleasant" words (e.g., "ice cream", "candy", "pony") were more easily learned than "unpleasant" or "neutral" words (e.g., "street"--which had an apparent unpleasant association for the child--and "three").

For indirect evidence on the importance of "emotion" in reading, we can turn to basic research on learning and memory. Weiner (1966) has recently reviewed evidence on the relationship between affect and recall. Although the studies in this area are replete with contradictory results, Weiner concludes that intensity of affect occurring at the time of original stimulus presentation is positively related to subsequent recall.

The effect of arousal [measured by Galvanic Skin Response (GSR)] on memory has been the focus of a series of studies pioneered by

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[1] Experiment I "emotional" words: "gold", "burn", and "kill"; "non-emotional" words: "high", "many", "hall".

Kleinsmith and Kaplan (1963, 1964). They discovered that after one presentation of the word stimuli, paired-associates eliciting high arousal showed inferior immediate recall when compared to pairs eliciting low arousal. However, when retention was measured 45 minutes or one day or one week after original learning, high arousal pairs were recalled more frequently than low arousal pairs. There was actually a noticeable increase in the recall of high arousal pairs compared to the number of correct responses occurring at the time of immediate recall (often called "reminiscence"). For low arousal pairs, performance showed the usual forgetting curve--that is, fewer correct responses after long-term delay than for immediate recall.

Two recent studies by Kaplan and Kaplan (1969, 1970) also demonstrated the presence of the reminiscence effect for high arousal pairs. However, forgetting occurred for both high and low arousal pairs by 18 minutes after original learning (but significantly less forgetting of high arousal pairs).

This reminiscence/retention effect has subsequently been reported by a number of other researchers under a variety of conditions (Levonian, 1967; Butter, 1970; Berlyne, Borsa, Craw, Gelman, & Mandall, 1965; McLean, 1969; Batten, 1967; Howarth & Eysenck, 1968). However, Uehling & Sprinkle (1968) and Berlyne, Borsa, Hamacher & Koenig (1966) found no significant difference in immediate recall of words accompanied by white noise vs. no white noise presentation,[2] but superior long-term retention of items accompanied by white noise.

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[2]White noise appears to produce reductions in skin resistance, i.e., arousal (Berlyne & Lewis, 1963).

Meaningfulness/Word Frequency in Reading and Verbal Learning

Some definitions and procedures. Over the years the term "meaningfulness" has had a variety of connotations for educators and psychologists. For Hildreth (1935) it seems to have meant that the child has had extensive previous experience with the word. Chall (1967) has noted that the basal reader programs have emphasized "reading for meaning". To assure that children have experienced words used in early primers, vocabularies of these materials have typically been limited to high frequency words in the language. Ashton-Warner stresses that a child should read material having maximal concurrence with his experiences, but she relies on the unique interests and experiences of each child by helping him learn to read and write words that are important to each individual--not words determined by tabulating the words that all children are likely to know and use.

Experimental psychologists have developed a number of procedures for measuring "meaningfulness". Noble (1952a) devised one of the most widely used techniques--essentially a continuous free-association measure. Stimuli (words, nonsense syllables, etc.) are presented to a group of people who are asked to give as many free-associates to each stimulus as possible during a given period of time (e.g., 60 seconds per stimulus). The "meaningfulness" ("M") of each item is the average number of continuous associations given to a particular stimulus. "M" presumably measures the variety of past associations with a particular word--the greater the number of continuous free-associates, the greater the "meaningfulness" of the word.

Psychologists have typically measured the frequency of occurrence of a word in the language by means of the Thorndike-Lorge (1944) word

count. Only low, positive correlations have been found between frequency of word usage and "M". Winnick and Kressel (1965) reported a product moment correlation of +.261 between Thorndike-Lorge word frequency and "M"; Paivio, Yuille & Madigan (1968) and Saltz (1967) both found a correlation of +.33.

Meaningfulness and word frequency in verbal learning. There appears to be a general tendency for "M" to facilitate both serial learning (Noble, 1952b; Braun & Heymann, 1958) and paired-associate learning (e.g., Kothurkar, 1963; Cieutat, 1961; Young, 1961; Martin, Cox, & Boersma, 1965; Hunt, 1959; Hopkins & Schulz, 1969; and the review of Goss & Nodine, 1965). What little research there is on the relationship between "M" and long-term retention suggests that although high "M" does facilitate original learning, it has a slightly detrimental effect on long-term recall (Leeming, 1964; Young, Saegert, & Linsley, 1968).

High Thorndike-Lorge word frequency has been found to facilitate serial learning (Postman, 1961; Sumby, 1963), free recall (Hall, 1954; Bousfield & Cohen, 1955; Murdock, 1960), and--under some conditions--paired-associate learning (Martin, 1964; Winnick & Kressel, 1965; Schwartz, 1965; Saltz & Modigliani, 1967; Hall, 1968; and Shapiro, 1969). However, Keppel (1968) has concluded from his extensive review of the literature that word frequency does not exert a significant impact on long-term retention.

Beginning reading and meaningfulness/word frequency. Athol Packer (1970) has recently compared the vocabularies of basal readers with the key vocabularies of children from four cities around the country. All words were classified into 14 categories (e.g., fear,

locomotion, animals, food, clothing, colors); then the percentage of Own and basal reader words falling into each of the 14 categories was calculated. Non-significant rank-order correlations between Own vs. basal reader vocabularies were the general rule,[3] leading Packer to conclude that "...the children's own key vocabulary is more meaningful than the basal reader vocabulary" (p. 564). The term "meaningfulness" as used here is ambiguous, though apparently the author means the extent of congruence with the child's experiences and needs.

Wiley (1928) investigated the effect of Thorndike word frequency on the word learning of 56 first graders. He reported a correlation of -.20 (not significant) between word frequency and ease of learning to read the words. The correlation between the Gates Reading Vocabulary and ease of learning the words was +.20 (again, not significant). Wiley also asked children to free-associate to the 60 words used in the study. He found a product moment correlation of +.55 between "quickness" of word association and ease of learning to read these words. Words with "richer" associations (like "dinner"), he concluded, are easier for children to learn than words with few associates occurring only after latencies of more than three seconds (e.g., "they").

Wheeler (1938) studied the word learning of 227 first-graders using 72 words frequently found in children's reading material. He too found that frequency of word use in the language[4] had no significant

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[3]However, in one city--Jacksonville, Florida--the correlation between Own and basal reader words was 0.677 (Sig <.01).

[4]As measured by such word counts as Thorndike (1931), International Kindergarten Union list (1928) and Fitzgerald's (1934) list.

correlation with the ease of learning to read words. Gates (1936) Reading Vocabulary for the Primary Grades (widely used for constructing primary reading material) also was not related to the difficulty in learning to read the 72 words in the Wheeler study.

Rickard (1935) measured the word recognition skills of first, second and third graders (without training them to read the words) using 119 words from the Horn (1927) list. The rank order correlation between the frequency of oral usage in the vocabularies of children (Horn, 1927) and word recognition was +.39--suggesting a significant but no "predominant" role of word frequency in learning to read, according to Rickard.

One of the very real problems with the foregoing studies suggesting a low positive relationship between word frequency and ease of word learning is their reliance on stimulus words of rather restricted frequency range. The statistical attenuation resulting thereby makes these studies something less the conclusive.

The Effect of Word Length on Beginning Reading

The relationship between the number of letters in a word and the difficulty in learning to read that word has received scant experimental attention over the years. Gates and Boeker (1923) were two early people to investigate the effect of word length on beginning reading. They had kindergartners learn to read words of 3-10 letters in length. The results showed a tendency for longer words to be more difficult to learn than shorter words.

Wiley (1928) had first graders learn words (nouns, pronouns, etc.) of 2-7 letters in length. He reported that more errors were made on shorter words (2-4 letters) than longer words (5-7 letters).

Finally, Rickard (1935)--using nouns, verbs, adjectives, adverbs, etc.--found that the average number of letters in the 30 most easily recognized words was 3.25 letters per word; for the 30 most difficult words, the mean was 4.25 letters per word. Rickard concluded that length of word is clearly an important factor in recognition.

Some Revised Hypotheses

Based on the foregoing review of the literature, it now seems appropriate to refine the predictions made earlier about the reading performance of children on Own vs. Others words. For one thing, if Own words elicit higher GSRs than Others words, it may be that the potential superiority of Own words will be masked during original learning of the words or within two minutes thereafter. It is on a test of long-term ability to read Own words that their superiority should be revealed. This effect should definitely occur for one-trial learning, but perhaps also under multi-trial conditions.

Secondly, children should rate Own words as significantly more emotional than Others words (using the Olson & Pau definition). Also, the "M" of Own words should be significantly higher than that of Others words (i.e., more continuous free-associates should be given to Own words).

Rated emotionality and "M" should be positively related to learning of Others words. Thorndike-Lorge word frequency should not be an important variable in learning to read Own words, though high

word frequency may facilitate learning of Others words.[5] Long and short Own words should be equally easy for children to learn to read; short Others words, however, may be learned more easily than long Others words.

These hypotheses were tested by asking 4-5 year-old girls to learn to read words requested by each child (Own words), words mentioned by Ashton-Warner as "one look" words for particular children (AW words),[6] and Scott-Foresman (1962) basal reader words (BR words). The study consisted of two experiments. Experiment I (the "one look" portion of the study) evaluated Ashton-Warner's assertion that one-trial learning is more common for Own words. Experiment II (which included the same word stimuli as Experiment I) involved a series of three learning trials on each of three consecutive days and a long-term retention test several days later. The aim of this second experiment was to determine whether differences in learning/retention of Own vs. AW/BR (Others) words would be present after a number of learning trials on the words.

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[5]The rationale of this prediction is that since word frequency counts measure frequency across individuals, frequency should predict performance on Others words more often than Own words--the latter being more accurately predicted by the individual's own frequency of contact with the word.

[6]Own words of Ashton-Warner's students.

CHAPTER II

METHODOLOGY

Subjects

A total of fourteen 4-5 year-old white, middle-socioeconomic-class girls from a local nursery school participated in this study. These children comprised the entire population of such girls in the school who agreed to participate in the study and who could not already read. Mean Peabody Picture Vocabulary Test (PPVT) IQ score across all 14 children was 109.21 (SD = 7.81); mean chronological age was 61.71 months (SD = 6.90).

The school is a day-care facility designed primarily for children having only one parent residing in the home. Prior to the start of the study, children in one class had learned to read a few words, but during the time the experiment was in progress, no formal reading instruction was under way except for practice in recognizing each other's names.

Word Selection

Children learned to read two blocks of 12 words. Each block consisted of: 1) four words asked for by each child (Own words); 2) four words mentioned by Sylvia Ashton-Warner (1963) as "one look" words for individual children (AW words); and 3) four words from the Scott-Foresman (1962) New Basic Reading Program (BR words).

In selecting the AW and BR words (i.e., Others words) a pool of

such words was first constructed using words mentioned by Ashton-Warner in her book Teacher and from the vocabulary list of the Scott-Foresman pre-primers. Only words which can be used as nouns and/or verbs in connected discourse were included in the AW/BR word pool. Words in the AW/BR master word pool were also limited to those of three letters or more in length.[1] The common proper names used in the BR series (e.g., Dick, Sally) were not included in the word pool because of the contact children were experiencing with these words in their classrooms.

With the exception of four words,[2] a stratified random sampling procedure was used in selecting the actual AW and BR stimulus words-to-be-learned from the master word pool. One of the requirements for inclusion in the study was that both Block #1 and Block #2 AW and BR words contain two words which can be used as nouns and two as verbs.[3] Another stipulation was that where possible sound and semantic similarities within the AW and BR categories should be minimized (e.g., book and look were not placed in the same block, nor were kiss and darling). The following set of AW and BR words resulted from

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[1]Based on the experimenter's previous experience with "organic reading", it seemed likely that Own words would be of at least three letters in length. In order to make the three categories of words more comparable, the minimum number of letters for AW and BR words was set at three. As it turned out, only one of the Own words requested by the 14 children was a two-lettered word.

[2]Two AW words--"kiss" and "ghost"--and two BR words--"come" and "look"--included because Ashton-Warner mentions them as examples of Own and basal reader words.

[3]Had the selection been completely random, AW words would have been predominately nouns and BR words mostly verbs.

this selection process:

	AW words	BR words
Block 1	kiss	come
	thunder	ball
	spider	look
	hit	mother
	AW words	**BR words**
Block 2	sing	can
	ghost	get
	darling	did
	kill	book

The words remaining in the master word pool after completion of this selection process were randomly assigned to: 1) a Filler Word category; or 2) an auxillary pool of words to be used in case a child knew how to read one of the AW or BR words prior to the learning trials. (See Appendix A for a complete listing of these.) Filler words were used in the long-term retention test at the conclusion of the study. None of the words included in the auxillary pool was in fact needed, since no child could ready any Block 1 or 2 AW/BR words prior to the beginning of the learning trials.

Own words were also limited to nouns and verbs, though because of the relatively small number of verbs requested and the difficulty which some children had in requesting Own words, it was not possible to restrict Own words to two nouns and two verbs per block of words. In each of the two blocks the first four words requested were used as the Own words, the remaining two being placed in the Filler Word category for use in the long-term retention test at the conclusion of Experiment II. (See Appendix B for a complete listing of Own words learned and the Own words used as fillers.)

Some children experienced difficulty in generating Own words, especially the 5th and 6th words requested. In a few instances it was necessary to encourage a child to talk about school/home activities and then to pick out a word said with particular feeling by the child for possible use as an Own word. In some instances the child did not want to learn the word suggested. Several children looked around the room and requested a word which was obviously the name of some readily visible object in the immediate environs (e.g., "kleenex", "clock", "paper clip", etc.) Some attempt was made to indicate that this was not necessary, that Own words could be any words they wanted to learn, but some children still persisted. This tendency to request names of objects in the environment may have been partially due to asking for so many Own words in such a short span of time.

Procedure

Children were seen individually in a quiet room of the school normally used as a storage area. The room was purposely made as barren as possible. The child was seated at a long, low table--directly across from the "teacher". The experimenter sat behind a screen monitoring the GSR equipment on both Thursdays of the study. Other days the experimenter served as recorder of the child's responses, so as to facilitate interaction between "teacher" and child. The "teacher" was a graduate student in education who had no previous contact with these children. She was told nothing about the hypotheses being tested in this experiment.

Table 2.1 provides a calendar of events describing the various components of the experimental design. Experiment I (the data from

TABLE 2.1
CALENDAR OF EXPERIMENTAL EVENTS

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				Week 1, Experiment I BLOCK #1 WORDS		
				a) 1 study trial b) Pegboard task c) 2-minute retention test	a) 24-hour retention test b) Continuous free-association ("M") c) Rated emotionality	
	Week 1, Experiment II BLOCK #1 WORDS			Week 2, Experiment I BLOCK #2 WORDS		
	a) Pre-test b) 3 study (S) trials alternating with 3 test (T) trials (S-T-S-T-S-T)	a) Pre-test b) 3 study (S) trials alternating with 3 test (T) trials (S-T-S-T-S-T)	a) Pre-test b) 3 study (S) trials alternating with 3 test (T) trials (S-T-S-T-S-T)	a) 1 study trial b) Pegboard task c) 2-minute retention test	a) 24-hour retention test b) Continuous free-association ("M") c) Rated emotionality	
	Week 2, Experiment II BLOCK #2 WORDS					
	a) Pre-test b) 3 study (S) trials alternating with 3 test (T) trials (S-T-S-T-S-T)	a) Pre-test b) 3 study (S) trials alternating with 3 test (T) trials (S-T-S-T-S-T)	a) Pre-test b) 3 study (S) trials alternating with 3 test (T) trials (S-T-S-T-S-T)			
	Week 3 Experiment II LONG-TERM RETENTION TEST Block 1 + Block 2 + Filler words (12 + 12 + 12 - 36 words					

Thursday and Friday of both weeks) involved a 2-minute and 24-hour retention test following only one study trial on each word. This study trial consisted of asking the child to trace each letter of the word with her finger while the teacher sounded out the word; then the child was instructed to say the word aloud. Two minutes after the "one look" each child was asked to read as many of the words as she could; then 24 hours later she was asked to try to read the words again. In both the 2-minute and 24-hour retention tests the words were presented to the child one-by-one for attempted recall.

Experiment II (which included the same words as Experiment I) consisted of alternating study trials (the child traced the letters of each word as the teacher sounded out the word--as in Experiment I) and test trials (the teacher laid down all 12 words on the table and the child pointed to any she knew and said them if she could). For the long-term retention test of Experiment II, the 24 words learned by each child during the experiment were randomly interspersed with the 12 Filler Words.

Each word included in the study was written on a separate 5" x 8" lined card using large, lower-case letters.[4]

The specific events taking place each day were as follows:

Thursday, Week 1 a) Each child was asked for six words she would like to learn to read. Six AW and six BR words were also presented orally. For each word the child was asked to say the word and then sit quietly

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[4]Though for three words--"Donald Duck", "Snow White", and "Casper"--the first letters were capitalized.

and think about it during a 15 second delay interval included so as to provide sufficient opportunity for a Galvanic Skin Response (GSR) deflection to occur.

These 18 words[5] were then shown to the child to assure that none of the words could already be read. (Four Own words could be read at this point; these were replaced by requesting more Own words from the child.) One study trial followed immediately thereafter on the 12 words of Block 1 (i.e., the 18 words minus the six Filler Words).

b) Next, the child was asked to place wooden pegs in a pegboard for two minutes.

c) Finally, the word cards were again presented one-by-one and the child asked to read the words (the 2-minute retention test). For all retention tests in the study the teacher only informed the child as to whether her response was correct or not; no prompting was provided.

Friday, Week 1 a) The twelve Block 1 words were presented and the child again was asked to read those words she could (the 24-hour retention test).

b) Children were next asked to give up to five free-associates to each of the 12 words so as to obtain an estimate of "M" (Noble, 1952a). Each child

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[5]Four Own words, 2 Own Filler Words; 4 AW words, 2 AW Filler Words; 4 BR words, 2 BR Filler Words.

then classified the 12 words as "liked", "hated", or "don't matter" words (Olson & Pau, 1966). These two measures are more fully explained later in this chapter.

Monday/Tuesday/Wednesday, Week 1 a) A pre-test on the 12 words from Thursday/Friday of Week 1.

b) Three alternating study/test trials on these 12 words (see the earlier description of what study/test trials consisted of).

Thursday/Friday, Week 2 --- Identical to Thursday/Friday, Week 1, except with a second set of 12 words (4 Own, 4 AW, 4 BR). Six words were again assigned to the Filler Word category.

Monday/Tuesday/Wednesday, Week 2 --- Same as Monday/Tuesday/Wednesday of Week 1, except with the second set of 12 words from Thursday/Friday, Week 2.

Monday, Week 3 --- Long term retention test

Five days after completion of learning the second block of 12 words, and 12 days after completion of Block 1 learning, a long-term retention test was given. This consisted of presenting one-by-one the 24 words in Blocks 1 and 2 plus the 12 Filler Words. Order of presentation of the 36 words was randomized using a table of random numbers. Midway through the presentation of the 36 words, a 1-minute rest period was provided.

The time required to complete each day's tasks varied. Thursday's activities invariably took longest (usually about 30 minutes for each child); other days about 15-20 minutes were required per child. (NOTE: For exact instructions to children for all components of the study, see Appendix C.)

Word Attributes

Measures of emotionality/arousal, "M", word frequency and word length were obtained in the following ways:

1) Individual child's rating of word emotionality

Each word to-be-learned was presented on Friday of each week and the child was asked to indicate whether the word was one she "liked", "hated", or "one that doesn't matter" (as described by Olson & Pau, 1966). If the child did not know what "doesn't matter" means, it was explained to her. "Liked/hated" words were coded as "emotional" and "don't matter" words as "non-emotional".

2) Percent GSR deflection

Skin resistance was recorded by means of the Kaplan and Fisher (1964) modifications of Lykken electrodes. The recording apparatus consisted of a wideband, constant current system designed by Kaplan and Hobart (1965). One electrode was fastened to the child's thumb and one to the palm. GSR recording took place only on Thursday of Weeks 1 and 2.

A 15-second period for GSR deflection was allowed in scoring the GSR tracings. GSR deflections up to

five seconds prior to the utterance of an Own word were included since GSR deflections sometimes predated utterance of a requested word. The percent GSR deflection used was the difference (in ohms) between the greatest resistance after the beginning of the 15-second period and the lowest skin resistance during that time span. If several deflections occurred, the difference between greatest and least resistance was used. There were a number of cases where there was no deflection during the 15-second period, and some other cases where relaxation (not arousal) was occurring during the 15-second interval. In both of these instances zero GSR deflections were recorded for these children on these words.

3) Noble's "Meaningfulness" ("M")

The 12 words in each block were presented one-by-one on Friday of each week and the child was asked to indicate what word each made her think of. Five different free-associates per stimulus word were requested, or until the child indicated she could think of no more. In some instances, the child gave several words as a free-associate to the stimulus word; each of these phrases was treated as one free-associate. The number of different free-associates was used as the estimate of "M" for each word of each child (Possible range = 0 to 5).

4) Word frequency

The Thorndike-Lorge (1944) estimate of word frequency was used in this study. Words with Thorndike-Lorge ratings of AA (100 or more occurrences per million words) were coded as "3"; words with rating of A (between 50 and 100 occurrences per million) were coded as "2", and words with 49 or fewer occurrences per million were given a code of "1". For the few Own words (like "kleenex") not included in the Thorndike-Lorge count, the least frequent code (i.e., "1") was used.

5) Word length

The number of letters in each word was the score used. In the case of the five Own words which were actually two words in length, the space between the words was counted as one letter.

CHAPTER III

RESULTS

Experiment I[1]

Figure 3.1 portrays the relative recall of Own, AW and BR words 2-minutes and 24-hours after "one look" at the words. One-way repeated effects analyses of variance (see Table 3.1) showed no significant differences between Own, AW and BR words on the 2-minute retention test. However, 24 hours later significant differences were found between the three types of words.[2] Tukey tests done to compare pairs of means indicated that only Own and BR words were significantly different on the 24-hour retention test (see Table 3.2). As can be seen in Figure 3.1, no forgetting occurred for Own words over the interval from two minutes to 24 hours; both AW and BR words showed forgetting.

In an attempt to evaluate the relationship of these results to the arousal/retention effect, the Experiment I data were analyzed by

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[1]Three of the 14 children were not available for the 24 hour retention test of Experiment I; therefore the analysis of Experiment I data was limited to the 11 subjects completing both the 2-minute and 24-hour retention tests (N = 11).

[2]Two one-way analyses were done on these data instead of one 2-way because children could read relatively few of the 12 words after only "one look". It was felt that the 2-way analyses should be reserved for Experiment II, where correct responding was frequent enough to assure more stability.

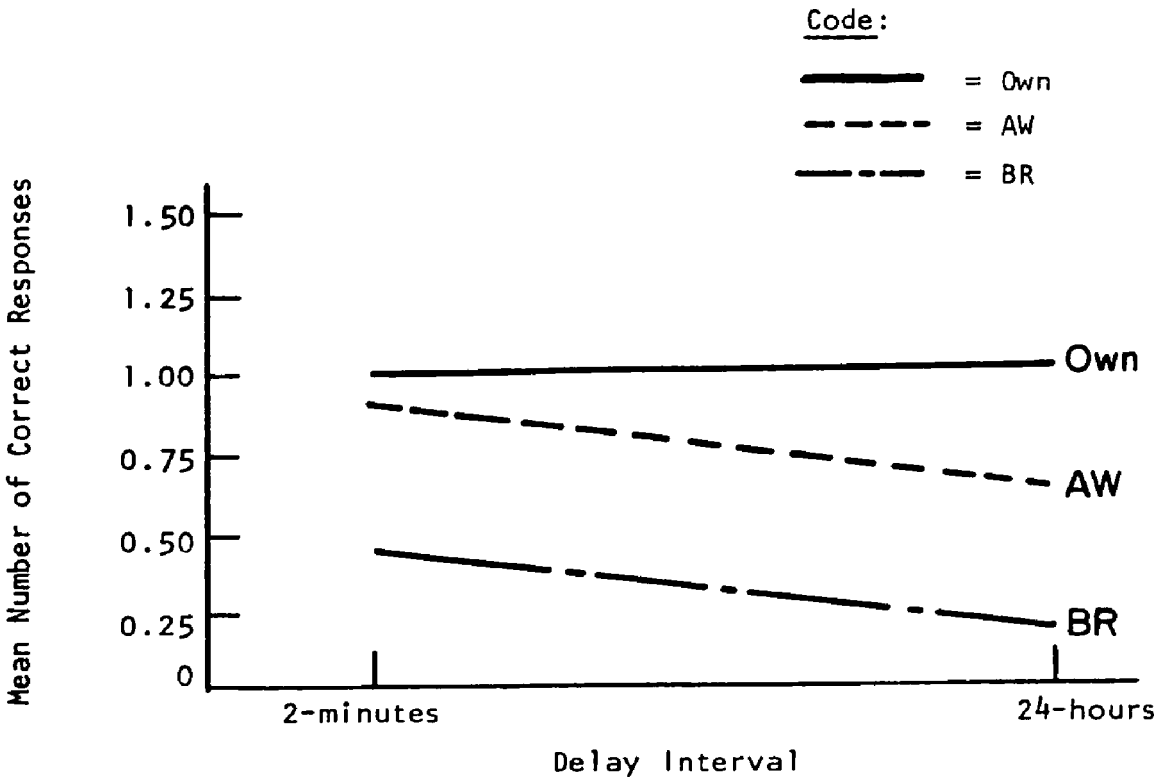


Figure 3.1: Mean recall of Own, AW, and BR words 2-minutes and 24-hours after "one look" (Experiment 1).

TABLE 3.1

Summary of Analyses of Variance for 2-minute and 24 hour Retention Tests (Experiment I)

2-minute Retention

Source	SS	df	MS	F
Between Subjects	7.52	10		
Within Subjects	12.00	22		
Word type (O-AW-BR)	1.88	2	0.94	1.84 (N.S.)
Residual	10.12	20	0.51	

24-hour Retention

Source	SS	df	MS	F
Between Subjects	6.45	10		
Within Subjects	11.33	22		
Word type (O-AW-BR)	3.60	2	1.80	4.62**
Residual	7.73	20	0.39	

**Sig $<.025$ level

TABLE 3.2

Tukey Tests for Word Types
on the 24 Low Retention
Test of Experiment I

Word Type	Mean	SD	Comparison	Sig. level
Own words	1.00	0.73	Own and BR words	Sig. < .05
AW words	0.63	0.78	Own and AW words	N.S.
BR words	0.18	0.38	AW and BR words	N.S.

collapsing across Own-AW-BR words and then dividing the words into those eliciting high (7% or greater) and low (6% or less) GSR deflections. Words producing high vs. low GSR deflections were not significantly different on the 2-minute retention test, though words yielding high GSR deflections were better recalled 24 hours after the "one look" ($F = 5.71$; 1, 10 df; $p < .05$).

Experiment II[3]

Learning/Retention of Own/AW/BR Words

A 2-way repeated effects analysis of variance was done to evaluate the significance of differences between the total number of correct responses for each word type and each day of Experiment II learning trials (collapsing across the three test trials each day--Monday, Tuesday, and Wednesday of Weeks 1 and 2). The results of this analysis (see Table 3.3) showed only a main effect of days; the main effect of word type (Own/AW/BR) was not significant, nor was the interaction between days and word type. Figure 3.2 depicts the similar performance occurring for Own-AW-BR words during learning trials of Experiment II.

Figure 3.3 represents mean Day 3 performance on the Own-AW-BR words of Experiment II compared with long-term retention of these three types of words.[4] A 2-way repeated effects analysis of variance

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[3]One of the 14 children was not present for the long-term retention test of Experiment II and was thus excluded from the analysis of Experiment II data (N = 13).

[4]Mean Day 3 performance for Own, AW, and BR words was computed because the long-term retention test consisted of only one test trial.

TABLE 3.3

Summary of Analysis of Variance
for Days 1-2-3 and Word Type
(Experiment II)

Source	SS	df	MS	F
Total	4249.92	116		
Subjects	1640.14	12		
Word type (O-AW-BR)	21.15	2	10.57	<1
Day (1-2-3)	1530.53	2	756.26	75.32***
Word type x Day	3.78	4	0.94	<1
Error for word type	621.30	24	25.89	
Error for day	243.91	24	10.16	
Error for word type x day	189.11	48	3.94	

***Sig. < .01 level

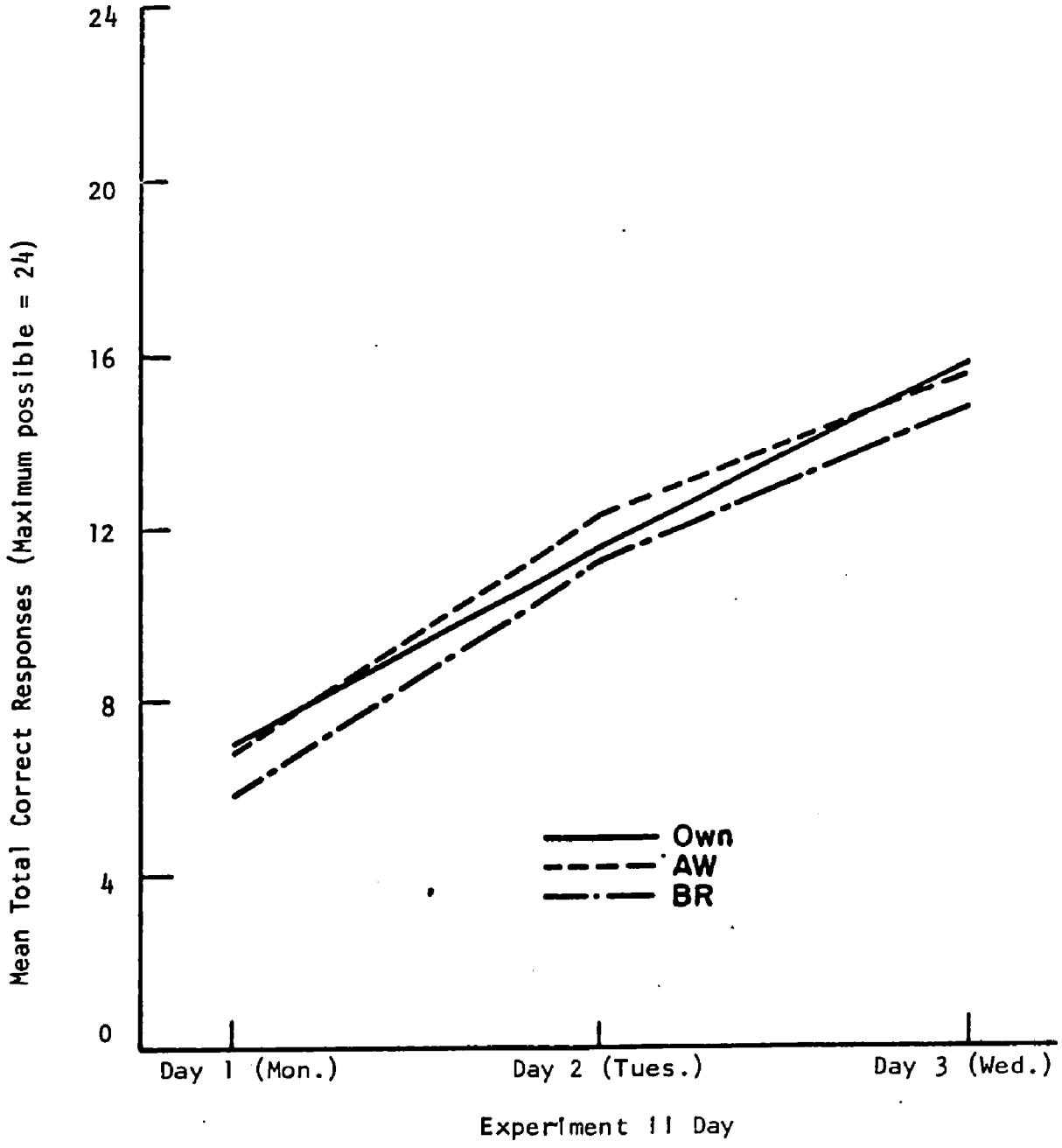


Figure 3.2: Mean total number of correct responses for Days 1, 2 and 3 (Monday/Tuesday/Wednesday) of Experiment II.

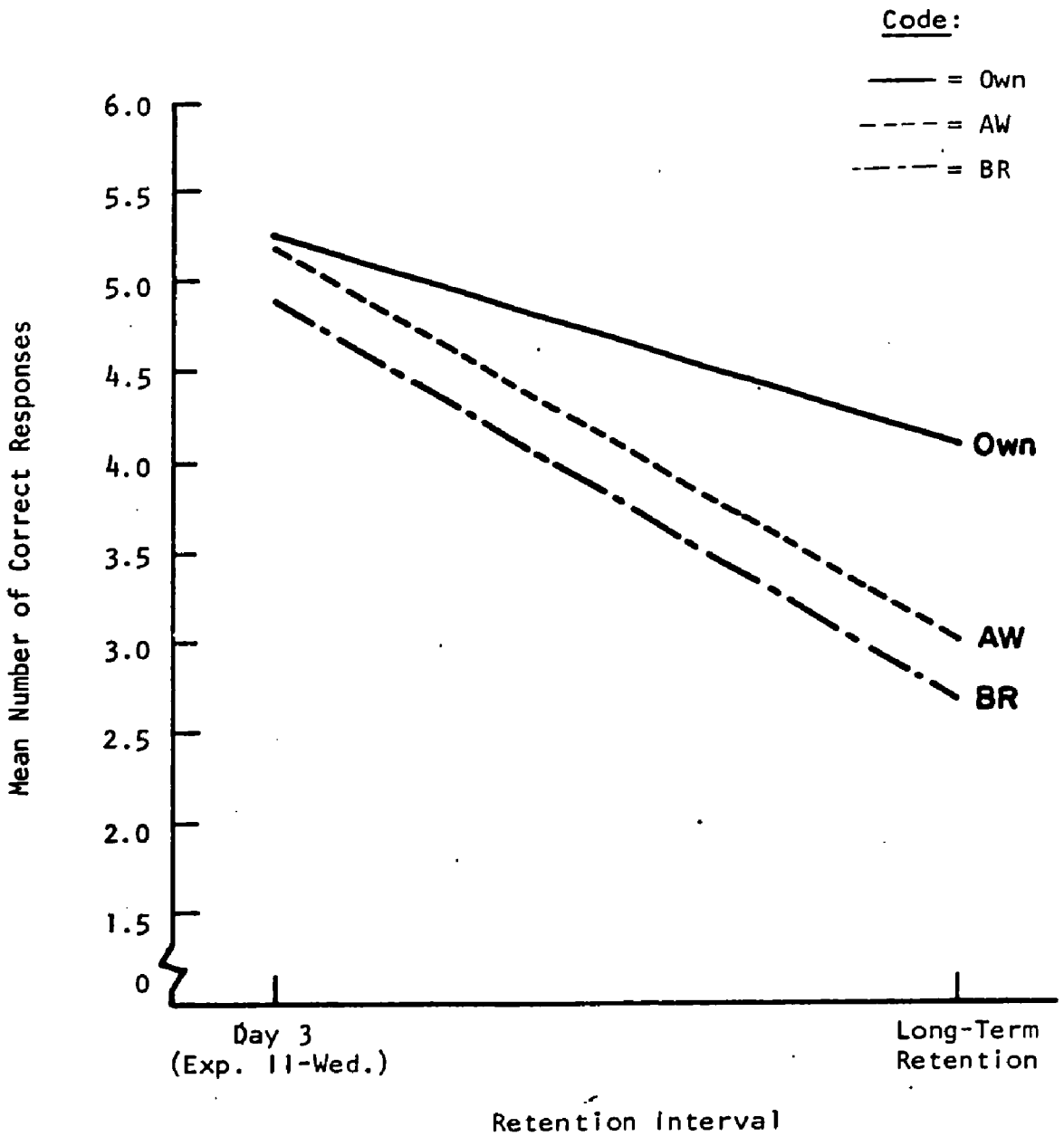


Figure 3.3: Relative forgetting of Own, AW, and BR words comparing Day 3 of Experiment II with Long-Term Retention

on these data (see Table 3.4) indicated a significant main effect of retention interval and a significant interaction between word type (Own/AW/BR) and retention interval. An analysis of the interaction effect (Bruning & Kintz, 1968, p. 120-122) revealed that the forgetting curve for Own words was significantly ($p < .025$) shallower than the curves for AW and BR words (Own vs. AW: $F = 6.48$, 1,24 df, $p < .025$; Own vs. BR: $F = 6.82$, 1,24 df, $p < .025$; AW vs. BR: $F = 0.02$, 1,24 df, N.S.). The AW and BR curves were remarkably parallel, as they were throughout the study. A one-way repeated effects analysis of variance was also done on the data from the long-term retention test (see Table 3.5). Tukey tests on the significant effects of word type showed that Own words were significantly more often read then BR words ($p < .05$) and marginally better than AW words ($p < .058$). BR and AW words were read about equally often (see Table 3.6).

Attributes of Own vs. AW vs. BR Words

Mean "M", rated emotionality, GSR, word length and word frequency for Own, AW, and BR words are shown in Figure 3.4. One-way repeated effects analyses of variance were done in order to evaluate the significance of differences between means for "M", rated emotionality, and GSR (see Table 3.7). These analyses revealed that Own/AW/BR words were significantly different on "M", GSR and rated emotionality. Tukey tests on the "M" and GSR attributes indicated that Own words were significantly higher than AW or BR words on both of these variables; AW and BR words were not significantly different on "M" or GSR (see Table 3.8). For rated emotionality, only Own and BR words were significantly different.

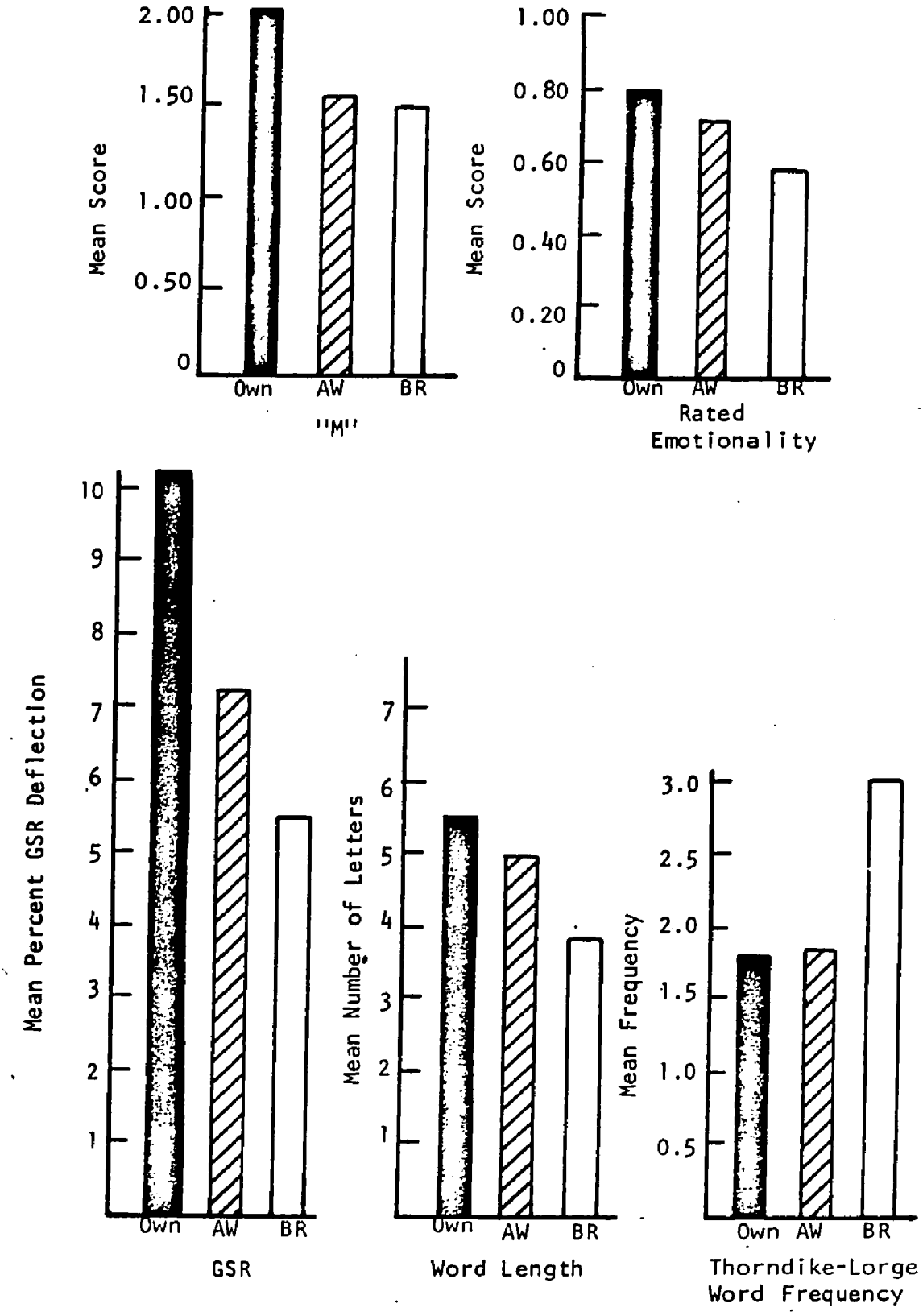


Figure 3.4: Mean scores on selected word attributes.

TABLE 3.4

Summary of Analysis of Variance for
Day 3 vs. Long-Term Retention

Source	SS	df	MS	F
Total	292.85	77		
Subjects	126.45	12		
Retention Interval (Day 3--LTR)	67.05	1	67.05	51.58***
Word type (O-AW-BR)	10.24	2	5.12	2.15
Word type x retention interval	4.44	2	2.22	4.44**
Error for retention interval	15.56	12	1.30	
Error for word type	57.13	24	2.38	
Error for retention interval x word type	11.98	24	0.50	

**Sig. < .025
***Sig. < .01

TABLE 3.5

Summary of Analysis of Variance for
Word Types on Long-Term Retention

Source	SS	df	MS	F
Between Subjects	45.44	12		
Within Subjects	44.00	26		
Word type (O-AW-BR)	13.74	2	6.87	5.45**
Residual	30.26	24	1.26	

**Sig. < .025

TABLE 3.6

Tukey Test[a] Comparisons
of Own, AW and BR Words
on Long-Term Retention

Word Type	Mean	SD	Comparison	Sig. level
Own words	4.08	1.16	Own and BR words	Sig. < .05
AW words	3.00	1.75	Own and AW words	Sig. < .058
BR words	2.69	1.20	AW and BR words	N.S.

[a]See Winer (1962)

TABLE 3.7

Summary of Analysis of Variance for "M"/Emotionality/GSR and Word Type

"M"

Source	SS	df	MS	F
Between Subjects	15.19	12		
Within Subjects	5.60	26		
Word type	2.16	2	1.08	7.56***
Residual	3.44	24	0.14	

***Sig. < .01 level

Rated Emotionality

Source	SS	df	MS	F
Between Subjects	1.22	12		
Within Subjects	1.08	26		
Word type	0.32	2	0.16	5.33**
Residual	0.76	24	0.03	

**Sig. < .025 level

GSR

Source	SS	df	MS	F
Between Subjects	472.97	12		
Within Subjects	336.00	26		
Word type	151.13	2	75.56	9.81***
Residual	184.87	24	7.70	

***Sig. < .01 level

TABLE 3.8

Tukey Test Comparisons for
"M"/GSR and Word Type

"M"

Word Type	Mean	SD	Comparison	Sig. level
Own words	2.01	0.67	Own and BR words	Sig. $<$ .01
AW words	1.54	0.72	Own and AW words	Sig. $<$ .01
BR words	1.49	0.69	AW and BR words	N.S.

GSR

Word Type	Mean	SD	Comparison	Sig. level
Own words	10.23	4.72	Own and BR words	Sig. $<$ .01
AW words	7.23	4.33	Own and AW words	Sig. $<$ .05
BR words	5.46	3.08	AW and BR words	N.S.

Rated Emotionality

Word Type	Mean	SD	Comparison	Sig. level
Own words	0.80	0.18	Own and BR words	Sig. $<$ .01
AW words	0.71	0.20	Own and AW words	N.S.
BR words	0.58	0.28	AW and BR words	N.S.

In the case of word length and frequency it was necessary to use the Median Test (Siegel, 1956) to determine if Own, AW and BR words were significantly different on these variables[5] (see Table 3.9). As may be seen, Own words were significantly longer than BR words, but they were not longer than AW words; AW and BR words were not significantly different in word length. For Thorndike-Lorge word frequency, only Own words were significantly lower in frequency than BR words.

Three fairly clear patterns emerged from these word attribute analyses:

1) Own words were high on "M"; rated emotionality; arousal (GSR deflections); longer in word length; and of low word frequency.
2) BR words were low on "M", rated emotionality, and GSR arousal; of short word length and rather high word frequency.
3) AW words usually fell somewhere between Own and BR words on these attributes.

The Relationship Between Word Attributes and Performance Within Word Types

Two types of analyses--ipsative and normative--were used in an attempt to identify which of the word attributes contributed significantly to performance on Own, AW, and BR words. The normative analyses involved determining the median value for each word attribute across all 13 subjects of Experiment II; then a one-way analysis of

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[5]Non-homogeneity of variance for the three word types on the word length and word frequency dimensions precluded use of analysis of variance.

TABLE 3.9

Summary of Median Tests for Word Length/Frequency and Word Type

Word Length

Word Type	Median	Comparison	Sig. level
Own words	4.31	Own and BR words	Sig. < .01
AW words	4.50	Own and AW words	N.S.
BR words	3.25	AW and BR words	N.S.

Thorndike-Lorge Frequency

Word Type	Median	Comparison	Sig. level
Own words	1.05	Own and BR words	Sig. < .05
AW words	1.00	Own and AW words	N.S.
BR words	3.00	AW and BR words	N.S.

variance was done for each word attribute to determine if total number of correct responses was significantly better for words high vs. low on that variable. For the ipsative analyses, each individual child's word attribute scores were divided at the median (or as close to that as possible). Mean performance for each child was then computed for words high vs. low on the various word attributes; finally, one-way analyses of variance were performed on these data.

Perhaps an example will help clarify these two types of analyses. The AW word "thunder" had a high "M" rating across all children and thus was placed in the high "M" normative category; however, for a particular child "thunder" might be low in "M" and thus be included in the low "M" ipsative category. Because word length and word frequency are the same for all AW and BR words, the ipsative and normative analyses are necessarily the same for these words. Normative analyses are not possible for Own words because each child received different words.

The performance measures used in these analyses were: 1) the mean total number of correct responses over the three days of the learning trials (Day 1+2+3); and 2) the mean total number of correct responses on the long-term retention test. An attribute by attribute discussion of the results of these analyses follows.

"M" ("Meaningfulness"). The ipsative analyses showed no significant effects for high vs. low "M" over the three word types (see Table 3.10). The normative analyses revealed that high "M" was associated with better Day 1+2+3 learning of: 1) BR words; and 2) AW + BR words combined (see Table 3.11). No differences in performance on the long-term retention test were noted for high vs. low

TABLE 3.10

The Relationship Between "M" and Day 1+2+3 Learning/Long-Term Retention (Ipsative Analysis)

	Word Attribute	Word Type					
		Own		AW		BR	
Learning Trials (Day 1+2+3)	High "M"	Mean 5.40 SD 2.09	N.S.	Mean 5.14 SD 0.98	N.S.	Mean 4.08 SD 2.22	N.S.
	Low "M"	Mean 3.93 SD 2.08		Mean 4.20 SD 1.72		Mean 3.46 SD 1.50	
Long-Term Retention	High "M"	Mean 0.54 SD 0.28	N.S.	Mean 0.50 SD 0.19	N.S.	Mean 0.34 SD 0.19	N.S.
	Low "M"	Mean 0.52 SD 0.27		Mean 0.38 SD 0.29		Mean 0.28 SD 0.24	

TABLE 3.11

The Relationship Between "M" and Day 1+2+3 Learning/Long-Term Retention (Normative Analysis)

	Word Attribute	Word Type					
		AW + BR		AW		BR	
Day 1+2+3 Learning	High "M"	Mean 4.55 SD 1.69	Sig. diff. <.05 F = 4.81 1,12 df	Mean 4.17 SD 2.02	N.S.	Mean 4.92 SD 1.60	Sig. diff. <.005 F = 18.29; 1,12 df
	Low "M"	Mean 3.73 SD 1.70		Mean 4.46 SD 2.06		Mean 3.00 SD 1.78	
Long-Term Retention	High "M"	Mean 0.79 SD 0.18	N.S.	Mean 0.40 SD 0.23	N.S.	Mean 0.38 SD 0.16	N.S.
	Low "M"	Mean 0.63 SD 0.21		Mean 0.35 SD 0.30		Mean 0.29 SD 0.19	

"M" words on either the ipsative or normative analyses.

GSR. The ipsative data indicated no significant differences in either Day 1+2+3 learning or long-term recall for words eliciting high vs. low GSR's (see Table 3.12). For the normative analyses (see Table 3.13) BR words yielding low GSR's were associated with better long-term retention. (However, it should be noted that "high" GSR's in the BR category were still considerably lower than high Own word GSR's.)

Rated emotionality. Because each Own/AW/BR word was either coded as "1" (word was liked/hated by the child) or "0" (word didn't matter to the child), ipsative analyses were not feasible since for each child typically only a couple of Own and AW words (at most) were rated as non-emotional. Under these conditions, dividing words into those high vs. low on emotionality would have produced spurious results, for in many cases performance on "low" emotionality words would have been based on two words or less.

Normative analyses for AW and BR words were done since they involved collapsing across rated emotionality for all words and all subjects. A normative analysis for AW + BR words (combined) would appear to be a close approximation to the Olson and Pau (1966) study. By thus collapsing across AW and BR words it was possible to assure a greater range of rated emotionality for a set of words determined by the experimenter. (Recall that Olson and Pau did not include an Own word category in their experiments.) The one-way repeated effects analyses of variance for AW + BR words on rated emotionality (see Table 3.14) indicated that highly emotional words were more thoroughly learned than low emotional words during the learning trials of

TABLE 3.12

The Relationship Between GSR and Day 1+2+3 Learning/Long-Term Retention (Ipsative Analysis)

	Word Attribute	Word Type					
		Own		AW		BR	
Day 1+2+3 Learning	High GSR	Mean 4.44 SD 1.72	N.S.	Mean 4.71 SD 2.04	N.S.	Mean 3.65 SD 1.69	N.S.
	Low GSR	Mean 4.09 SD 2.08		Mean 3.81 SD 2.17		Mean 4.18 SD 1.98	
Long-Term Retention	High GSR	Mean 0.42 SD 0.22	N.S.	Mean 0.41 SD 0.24	N.S.	Mean 0.27 SD 0.28	N.S.
	Low GSR	Mean 0.48 SD 0.18		Mean 0.40 SD 0.29		Mean 0.36 SD 0.26	

TABLE 3.13

The Relationship Between GSR and Day 1+2+3 Learning/Long-Term Retention (Normative Analysis)

	Word Attribute	Word Type					
		AW + BR		AW		BR	
Day 1+2+3 Learning	High GSR	Mean 4.09 SD 1.88	N.S.	Mean 4.33 SD 1.87	N.S.	Mean 3.94 SD 1.97	N.S.
	Low GSR	Mean 4.19 SD 1.50		Mean 4.31 SD 2.28		Mean 3.98 SD 1.74	
Long-Term Retention	High GSR	Mean 0.35 SD 0.23	N.S.	Mean 0.37 SD 0.25	N.S.	Mean 0.25 SD 0.28	Sig. diff. <.05 F = 5.00; 1,12 df
	Low GSR	Mean 0.37 SD 0.14		Mean 0.38 SD 0.29		Mean 0.42 SD 0.15	

TABLE 3.14

The Relationship Between Rated Emotionality and Day 1+2+3 Learning/Long-Term Retention (Normative Analysis)

	Word Attribute	Word Type							
		AW + BR			AW			BR	
Day 1+2+3 Learning	High Emotionality	Mean 4.72 SD 1.83	Sig. diff. <.005 F = 12.49; 1,12 df		Mean 3.95 SD 2.00	N.S.		Mean 4.18 SD 1.46	N.S.
	Low Emotionality	Mean 3.63 SD 1.56			Mean 4.80 SD 1.79			Mean 3.59 SD 2.12	
Long-Term Retention	High Emotionality	Mean 0.39 SD 0.17	Sig. diff. <.05 F = 6.00; 1,12 df		Mean 0.41 SD 0.30	N.S.		Mean 0.31 SD 0.13	N.S.
	Low Emotionality	Mean 0.30 SD 0.20			Mean 0.35 SD 0.22			Mean 0.38 SD 0.26	

Experiment II, and what's more, this facilitating effect of highly emotional words was also present on the long-term retention test. No significant differences were found for normative analyses of either AW or BR words high vs. low on rated emotionality.

Word length and word frequency. As noted earlier, a normative word length/frequency analysis for Own words is not possible to do (subjects learned different words); furthermore, ipsative and normative analyses for AW and BR words are identical (since all words were the same for all subjects). Consequently, for purposes of comparing performance on Own, AW, and BR words, the word length and word frequency analyses in this study will be considered ipsative.

Within the AW word category, short/high frequency words were learned more rapidly during the learning trials (see Tables 3.15 and 3.16). However, for Own words, low frequency words were learned best. On the long-term retention test, long Own words were recalled better than short ones; no other significant long-term retention differences occurred (again, see Tables 3.15 and 3.16).

Qualitative Analyses for Specific Words

Performance was evaluated for specific words within the AW and BR word categories (see Table 3.17). Four words mentioned by Ashton-Warner as typical of "organic" vs. "inorganic" vocabularies ("kiss"/"ghost" vs. "come"/"look") will be discussed first. On the Day 1+2+3 learning trials and long-term retention test, the mean percent of these words recalled was:

TABLE 3.15

The Relationship Between Word Length and Day 1+2+3 Learning Long-Term Retention (Ipsative Analysis)

	Word Attribute	Word Type: Own		Word Type: AW		Word Type: BR	
Day 1+2+3 Learning	Long Word Length	Mean 4.54 SD 2.07	N.S.	Mean 3.44 SD 1.97	Sig. diff. <.025 F = 7.04; 1,12 df	Mean 4.50 SD 1.75	N.S.
	Short Word Length	Mean 3.76 SD 2.41		Mean 5.19 SD 2.39		Mean 3.41 SD 2.06	
Long-Term Retention	Long Word Length	Mean 0.68 SD 0.24	Sig. diff. <.025 F = 9.57; 1,11 df	Mean 0.31 SD 0.26	N.S.	Mean 0.31 SD 0.13	N.S.
	Short Word Length	Mean 0.34 SD 0.21		Mean 0.44 SD 0.31		Mean 0.38 SD 0.26	

TABLE 3.16

The Relationship Between Word Frequency and Day 1+2+3 Learning/Long-Term Retention (Ipsative Analysis)

		Word Type				
		Own		AW		BR
Day 1+2+3 Learning	High Thorndike-Lorge Frequency	Mean 3.29 SD 2.43	Sig. diff. <.025 F = 9.08; 1,11 df	Mean 5.11 SD 2.39	Sig. diff. <.05 F = 5.98; 1,12 df	All 8 BR words were of the highest coded Thorndike-Lorge word frequency
	Low Thorndike-Lorge Frequency	Mean 5.24 SD 1.65		Mean 3.52 SD 1.96		
Long-Term Retention	High Thorndike-Lorge Frequency	Mean 0.48 SD 0.31	N.S.	Mean 0.44 SD 0.31	N.S.	All 8 BR words were of the highest coded Thorndike-Lorge word frequency
	Low Thorndike-Lorge Frequency	Mean 0.54 SD 0.27		Mean 0.31 SD 0.24		

TABLE 3.17

Mean Rated Emotionality, GSR, "M", and Percent Correct Responses for Specific AW and BR Words (Experiment II)

	AW Words	Mean % Correct Responses Days 1+2+3	Mean % Correct Long-Term Ret.	Mean Emot.	Mean % GSR	Mean "M"
Block 1	kiss	70.94%	69.23%	0.62	8.62%	1.62
	thunder	35.94	23.08	0.69	8.85	1.92
	spider	47.01	23.08	0.92	8.15	1.46
	hit	46.15	15.56	0.69	4.31	1.38
Block 2	sing	53.85	38.62	0.46	1.92	1.31
	ghost	31.62	46.15	0.85	7.85	2.00
	darling	38.46	30.77	0.38	10.62	1.15
	kill	59.83	53.86	0.92	7.23	1.31
	BR Words					
Block 1	come	24.79%	0%	0.31	8.23%	1.38
	ball	48.72	30.77	0.85	5.92	1.62
	look	47.01	30.77	0.62	5.31	1.85
	mother	54.70	30.77	0.46	7.31	1.77
Block 2	can	63.25	69.23	0.38	4.23	1.23
	get	13.68	7.70	0.46	5.00	1.23
	did	31.62	38.62	0.38	5.46	0.85
	book	68.38	61.54	0.62	2.85	1.92

		Days 1+2+3	Long-Term Retention
"Organic"	kiss	70.94%	69.23%
	ghost	31.62%	46.15%
"Inorganic"	look	47.01%	30.77%
	come	24.79%	0%

Thus, more correct responses occurred for "kiss" and "ghost" (combined) than for "look"/"come". However, if one were to examine performance on only those four words, a somewhat distorted picture would result. As may be seen in Table 3.17, children did rather poorly on learning/retention of some AW words--i.e., "darling", "thunder", "spider" (note that these are the longest AW words). There were some BR words that were learned and retained rather well--in particular, "can" and "book". In fact, of the first seven most easily learned words on Days 1-2-3 of Experiment II, four were BR words; on the long-term retention test three out of the first seven were BR words.

Table 3.18 was produced by collapsing over the AW and BR words and then dividing the resulting pool of words into those above and below the median on rated emotionality, GSR and "M". For rated emotionality and GSR, a greater number of AW words fell into the high emotionality group (66.7% of high emotional words were from the AW category; 75% of the high GSR words were AW words). An equal number of AW and BR words appeared in the high "M" category. There was a fair amount of overlap between high vs. low emotionality/GSR/"M". For example, "kiss", "thunder", "spider", and "ghost" were all high on emotionality/GSR/"M", whereas "sing", "can", "get", and "did" were all low on these variables.

TABLE 3.18

AW and BR Words High and Low on Rated Emotionality, GSR, and "M"[a]

	High Emotionality Words (Decreasing Emot.)	Low Emotionality Words (Decreasing Emot.)
Rated Emotionality[b]	spider (AW) kill (AW) ghost (AW) ball (BR) hit (AW) thunder (AW) kiss (AW) look (BR) book (BR)	sing (AW) mother (BR) get (BR) darling (AW) can (BR) did (BR) come (BR)
	High GSR Words (Decreasing GSR)	**Low GSR Words (Descending GSR)**
GSR	darling (AW) thunder (AW) kiss (AW) come (BR) spider (AW) ghost (AW) mother (BR) kill (AW)	ball (BR) did (BR) look (BR) get (BR) hit (AW) can (BR) book (BR) sing (AW)
	High "M" Words (Decreasing "M")	**Low "M" Words (Decreasing "M")**
"M"	ghost (AW) thunder (AW) book (BR) look (BR) mother (BR) kiss (AW) ball (BR) spider (AW)	hit (AW) come (BR) sing (AW) kill (AW) can (BR) get (BR) darling (AW) did (BR)

[a]Rank ordered from highest to lowest scores within high and low rated emotionality, GSR, and "M".

[b]Because of tie scores, it was not possible to divide these words at the median. The 9 high emotionality words/7 low emotionality words division was the closest to an 8/8 break possible, given the data.

Performance as a function of form class of the words. In order to try to determine which words were treated as nouns and which as verbs, each child's free associate responses were consulted. Based on these responses, it was possible to decipher the probable form class which the child was thinking of when he heard the word. Those data are presented in Table 3.19. It should be noted that "can" was consistently treated as a noun by children in this study (for example, as a free-associate to "can" one child said "tin"). The verbs resulting from this analysis were: "kiss", "kill", "sing", "did", "look", "hit", "get", and "come"; the nouns were "can", "book", "ghost", "darling", "mother", "ball", and "spider" ("thunder" seemed to be treated as both a noun and a verb). It can be seen in Table 3.17 that on Day 1-2-3 learning, the three best learned AW words were all verbs, while the best three BR words were nouns. The least well read items were BR verbs, especially "get" and "come".

TABLE 3.19

Rank-ordering[a] of AW + BR Words for Days 1+2+3 and Long-Term Retention (Experiment II)

Days 1+2+3			Long-Term Retention		
AW/BR Words	Word Type	Probable Form Class	AW/BR Words	Word Type	Probable Form Class
kiss	(AW)	Verb	kiss	(AW)	Verb
book	(BR)	Noun	can	(BR)	Noun
can	(BR)	Noun	book	(BR)	Noun
kill	(AW)	Verb	kill	(AW)	Verb
mother	(BR)	Noun	ghost	(AW)	Noun
sing	(AW)	Verb	sing	(AW)	Verb
ball	(BR)	Noun	did	(BR)	Verb
look	(BR)	Verb	darling	(AW)	Noun
spider	(AW)	Noun	look	(BR)	Verb
hit	(AW)	Verb	mother	(BR)	Noun
darling	(AW)	Noun	ball	(BR)	Noun
thunder	(AW)	Noun/ Verb	thunder	(AW)	Noun/ Verb
ghost	(AW)	Noun	spider	(AW)	Noun
did	(BR)	Verb	hit	(AW)	Verb
come	(BR)	Verb	get	(BR)	Verb
get	(BR)	Verb	come	(BR)	Verb

[a]From highest percent correct to lowest percent correct.

CHAPTER IV

DISCUSSION

Introduction

Ashton-Warner's assertion that Own words are more "emotional" and "meaningful" than Others words was clearly supported in this study. Although original learning and 2-minute retention were not different for Own, AW, and BR words, long-term retention of Own words was superior. Long word length had no detrimental effect on retention of words learned. These findings will now be discussed in detail in an attempt to specify the factors contributing to the results obtained.

The Characteristics of Own, AW, and BR Words

The greater "emotionality of Own words as compared with BR words was revealed in both the rated emotionality and GSR data. Though Own words were also accompanied by significantly greater GSR deflections than AW words, this was not true for rated emotionality. Of course there is no reason why rated emotionality and GSR data should be identical. Rated emotionality, you will recall, was the child's subjective judgment of whether the word was "liked", "hated", or "didn't matter." GSR, on the other hand, was an estimate of the extent to which the child actually showned an

arousal reaction to the stimulus word.

An interesting pattern of GSR deflections was noted for many children. It was not uncommon for a child to think for a few seconds before generating an Own word. During this time, GSR deflection would often begin, followed shortly thereafter by a word which the child asked to learn to read. Once the child said the word, additional GSR deflection often occurred. In these instances, generating an Own word seemed to result in double GSR deflections--once in response to the cognitive activity involved in thinking of a desired word and again when the child reacted to the emotional components of the word requested. It should hardly come as a surprise, therefore, that mean GSR deflections for Own words were significantly greater than for either AW or BR words.

As Ashton-Warner predicted, Own words in this study were also more "meaningful" than Others words (as measured by "M"). Presumably, the process of generating an Own word requires the child to draw on past experiences and associations. Child #11 (see Appendix B) is a good example of this. She talked endlessly about her experiences with horses and frequently carried around a picture book depicting various sorts of horses. Two of her Own words were "colt" and "horse". Another child (#10) had just been to the dentist; one of the words she requested was "teeth". Probably the more associations the child has had with the word, the more likely it will be retrieved from memory and requested as an Own word. Note that there is a very important different between requesting an Own word and the reading of a word on a long-term retention test. Requesting an Own word involves

retrieving a desired word from memory under conditions of minimal external stimulus control. Reading a word consists of giving an appropriate response when a specific stimulus is provided; the same may be said for paired-associate learning. "M" may not be a very important variable in long-term reading of words, but it appears to play a role in determining which Own words will be requested by children.

As noted in the review of the literature, basal readers have typically used high frequency words in hopes of assuring that the child has had experience with the word. BR words certainly do occur more frequently in the language than Own words, but the "M" data suggested that AW or BR words do not generally possess the richness of associations for individual children that Own words do.

For both word frequency and word length, Own words were significantly different from BR words; AW and Own words, however, were similar on these dimensions. The author suspects that the most likely explanation for this is that Own and AW words are a more representative sampling of words in the language than are BR words.

Learning and Retention of Own vs. Others Words: Some Possible Contributing Factors[1]

One of the predictions made in this study was that if greater GSR deflections occurred to Own than to Others words the superiority of Own words would be seen only on a test of long-term retention. GSR deflections were significantly greater to Own words and the predicted pattern of results did occur.

Additional evidence that arousal as measured by GSR contributed to these results comes from several sources. In Experiment I, items eliciting high GSR's were not read more frequently on the 2-minute retention test, but they were on the 24-hour retention test. This finding is similar to the arousal/retention studies discussed in Chapter I, where it was noted that the beneficial effect of high arousal items usually has appeared only on measures of long-term retention.

Secondly, the author knows of no research which indicates that "M" or word frequency or rated emotionality could have contributed to the pattern of results found in this study. (Own words, you will recall, were high on "M" and rated emotionality and of low word frequency.) As Keppel (1968) noted, word frequency does typically facilitate original learning, but it has no apparent effect on long-term retention. High "M" also facilitates original learning, but if anything it has a slightly detrimental effect on long-term recall (Leeming, 1964; Young, Saegert, & Linsley, 1968). The research of

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[1] It is probably inaccurate to assert that one of the word attributes "caused" the pattern of results obtained in this study (i.e., no differences between word types within two minutes of original learning, but superior long-term retention of Own words). What can be said is that there was a relationship or association between certain word attributes and learning/retention.

Olson and Pau (1966) in combination with evidence reviewed by Weiner (1966) suggest that both original learning and long-term recall should be facilitated by high rated emotionality. Experiment II of the present study corroborated these earlier findings. "M" and word frequency were in some cases related to performance during original learning, but these positive effects disappeared on the long-term retention test. For AW+BR words, high emotionality was associated with both better original learning and long-term retention.

Thirdly, since Own words were read significantly more often than both AW and BR words on the long-term retention test of Experiment II, but AW and BR words were not different (Own > AW = BR), it would seem logical to look for word attributes showing an identical pattern if we want to explain the probable underlying processes. Only "M" and GSR show such a pattern. "M" can probably be elimminated as a contributor to the superior long-term reading of Own words for reasons mentioned earlier.

When the results of Experiments I and II are considered together with previous studies on meaningfulness, emotionality and arousal, a relatively strong case can be made for the importance of arousal in the present experiments.

There are, of course, some additional word attributes which must be considered as possible contributors to the superior long-term reading of Own words. Three such attributes will be discussed here: word length, form class of the words, and within word category associations.

It is conceivable that Own words (since they were longest of all words) were recognized by children through developing a strategy of

identifying words by means of their length. But if word length can explain away the results of the Experiment II long-term retention test, why is it that AW and Own words (which were not significantly different in word length) were not recalled equally often? If word length were that important, one would have expected that Own and AW words would have produced very similar long-term reading performance--and this was not the case.

A second way in which the effect of word length was evaluated was by collapsing across Own, AW, and BR words, then dividing the words into long and short categories (using an ipsative analysis). When a one-way repeated effects analysis of variance was done for Experiment II original learning and long-term retention, no significant differences in reading performance was obtained for long vs. short words. (Original learning: $F = <1$, 1,11 df, N.S.; Long-term retention: $F = 1.33$, 1,11 df, N.S.)

Another word attribute which might explain the long-term retention data is form class of Own vs. AW/BR words. As a quick glance at the Own, AW, and BR words will show (see Appendix B) many more nouns were requested by children than occur in the AW and BR word categories. Could it be that the superiority of Own words is due to the greater frequency of nouns within the Own word category? Unfortunately, there is no airtight way to answer this, since only a few verbs were requested by children. What we can do is look at the relative long-term retention of nouns and verbs within the combined AW+BR word category (Experiment II). In Table 15 (Chapter 3) we note that of the seven words most frequently read on the long-term retention test, four were verbs and three were nouns; of the first five most often read words,

three were nouns and two were verbs. However, AW verbs were retained better than AW nouns; the converse was true for BR words--BR nouns were more often remembered than were verbs. No very firm conclusion seems possible at this point, although in general verbs seem to be retained at least as well as nouns.

If one examines the list of Own words it is obvious that more semantic similarity is present within Own words than within AW and BR words. Apparently some children have a tendency to free-associate in the process of generating Own words (e.g., three Own words requested by child #11 were: "bluebird", "cardinal", and "robin"). Jenkins and Russell (1952) and Rosenberg (1965), among others, have shown that high association between words facilitates recall; therefore, the importance of this factor in the present study must be evaluated. This was done by having the experimenter and two graduate students independently list those word pairs in the Own word category which each rater judged as commonly associated with each other (e.g., "plate" and "fork" for subject #1). Next, Experiment II long-term retention scores were obtained for each child on both highly associated and non-associated words. Analyses of variance for all three judges revealed no tendency for highly associated Own words (e.g., "plate" and "fork") to be more frequently read than those judged as very infrequently associated (e.g., "airplane" and "cat").[2] It therefore appears that the degree of word association within Own words cannot account for the significantly superior long-term reading of Own words.

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[2]Judge #1: $F = 2.92$, 1, 102 df, N.S.; Judge #2: $F = 1.44$, 1,102 df, N.S.; Judge #3: $F < 1$, 1,102 df, N.S.

The Importance of Word Frequency and Word Length Within Word Categories

It will be recalled that short, high frequency AW words were learned more rapidly than low frequency, long AW words. On the other hand, low frequency Own words were learned more easily and long words retained better on the long-term retention test of Experiment II. This seems to suggest that Ashton-Warner was accurate in her observation that children can read long Own words as well as short ones. However, she may not be correct in implying that long Others words are learned as rapidly as short ones. In fact, for original learning the data from the present study indicate that both Ashton-Warner and the basal reader people may be correct in their assumptions about which words are easier to learn. However, since the facilitating effect of short, high frequency AW words did not occur on the long-term retention test, the long-term importance of using short high frequency words is probably minimal. For Own words, long word length is certainly no handicap in reading words several days after original learning.

Methods of Teaching Reading: Language Experience vs. Basal Readers

Dykstra (1968) reported in his summary of the now-famous cooperative research project in primary reading instruction that no differences in word recognition ability were found between language experience and basal reader programs. However, one very important flaw in these studies has been mentioned by Serwer (1969). She notes that the standardized tests used to evaluate word recognition skills contain a vocabulary bias favoring the basal reader program. As Serwer said about her study:

> What existent instrument could have tested the wide range of idiosyncratic vocabulary elicited in the 24 first-grade Language Experience classrooms which were creating a corpus of stories about such varied experiences as turtles, custodial jobs, dinosaurs, shopping lists for cooking breakfast, etc.? (p. 453)

In the present study, children were tested on precisely the same words they learned, thereby removing the bias of reading achievement tests.

Dykstra has noted that even within any one reading method included in the primary reading studies, there was such a wide range of performance for classrooms and projects that it was impossible to conclude that one method is invariably better than another. He suggested that perhaps evaluating a "method" is not the most fruitful approach to increasing the reading skills of children:

> It is likely that (reading) improvement would result from adopting certain elements from each of the approaches. ....The first step would be to determine the elements within the various approaches most important to the success of that program. (p. 124)

The present experiment represented an initial attempt to look at some "elements" of Ashton-Warner's approach to beginning reading. Much research obviously remains to be done.

Some Suggestions for Future Research

Given the apparent importance of arousal in explaining the superiority of Own word retention, further specification of the arousal effect is warranted. One study that might provide important insights into the relationship between learning/retention and arousal would be a trial-by-trial and word-by-word analysis of GSR effects. Each word could be followed over a series of learning and retention trials. Under these circumstances, will arousal as measured by GSR changes allow

us to predict that on the next trial a particular word will be read? Is there a critical GSR threshold for each child which must be exceeded before the arousal/retention effect occurs? What is the effect of failure on arousal as measured by GSR and what subsequent impact does it have on performance? Does arousal artificially induced (for example, by the use of white noise) also result in the familiar arousal/retention effect?

Some children in the present study learned to read and retained AW and BR words better than Own words. One wonders to what extent GSR, "M", rated emotionality, etc. are differentially important in the learning and retention of individual children. Is the differential learning of Own/AW/BR words similar to the interaction that frequently occurs between learner characteristics and teaching method (Siegel & Siegel, 1967)? Perhaps a comparable interaction occurs between learner traits (e.g., perseveration, distractability) and word attributes like GSR, "M" and rated emotionality.

Neither in the present study or in past research has "M" been found to be very important in long-term retention. This, however, may be partially due to the method used to measure "meaningfulness". Continuous free-associate responding may not be a very accurate way of measuring meaning. Other options are available for future studies, such as some modification of the semantic differential (Osgood, 1952) or a combination of "M" and the semantic differential (Snider, 1967).

Studies are also needed which will evaluate the impact of the mixed-list design of the present experiment (wherein <u>both</u> Own and Others words were learned). It is conceivable that better long-term

retention of Own words was due to the uniqueness of generating Own words in a context in which other words were being provided to the child. In order to determine what effect the mixed-list design had, an experimental group should get only Own words and a control group only Others words.

Filler words were included in the present study not only as distractors, but also in an attempt to evaluate the extent of code-breaking skills acquired in the process of learning the 24 words. It was hoped that the tracing of letters by the child and the sounding out of words by the teacher would facilitate this process. However, only one child got one Filler Word on the long-term retention test; this does not suggest a huge amount of decoding skill. Perhaps though, a pre-post design for knowledge of letter sounds might have revealed more extensive acquisition of the code for Own vs. AW/BR words.

The unit of study in the present experiment was the single word, since it is at that level that Ashton-Warner begins reading instruction. Future studies, however, should investigate learning of Own and Others phrases and sentences. It will be interesting to see if the same original learning/long-term retention pattern develops for sentences and phrases as it did for individual words in the study reported here.

CHAPTER V

SUMMARY AND IMPLICATIONS

Fourteen 4-5 year-old girls learned words that each requested (Own words), words which Ashton-Warner mentions as "one look" words for individual children (AW words), and words from the Scott-Foresman (1962) basal reader series (BR words). Retention of these words was measured: 1) two minutes and 24 hours after "one look" at the words; and 2) during and several days after a series of nine learning trials. Estimates of arousal (as measured by GSR), rated emotionality (Olson & Pau, 1966) and Noble's "M" (number of continuous free-associates) were obtained for each child and each word. Thorndike-Lorge (1944) word frequency and word length were also included in the data analysis.

The results showed that during original learning or within two minutes thereafter, performance was not different for Own, AW and BR words. Twenty-four hours or several days later, however, Own words were more frequently read than BR words. Although performance on Own and AW words was not significantly different on the retention test 24 hours after "one look" at the words, on the long-term retention test following the nine learning trials, Own words were read significantly more often than AW words.

GSR deflections and "M" were significantly greater for Own than AW or BR words; on the other hand, rated emotionality of Own words was significantly higher than BR words but <u>not</u> AW words. Own words were

of significantly lower word frequency and longer word length than BR words, but Own and AW words were not different on these dimensions.

Higher rated emotionality was associated with superior original learning and long-term reading of AW+BR words (combined). High "M" was also significantly related to better original learning of AW+BR words, but it did not exert a significant impact on long-term retention. Low frequency Own words and high frequency, short AW words were acquired most rapidly during original learning; however, on the long-term retention test, word length/word frequency effects disappeared, with the exception that performance on long Own words was significantly better than for short Own words.

The learning/retention data obtained in both the "one look" and multi-trial portions of this study were predicted if GSR deflections were significantly greater for Own words (and they were). Additional evidence was presented which strongly suggests that the pattern of results for Own vs. AW and BR words is probably related to arousal rather than any of the other word attributes included in the study.

Thus, of the two factors--"emotionality" and "meaningfulness"--which Ashton-Warner says account for significantly better reading performance for Own words, "emotionality" (i.e., arousal) is probably the more important.

The "own" words of Ashton-Warner's students (AW words) did not show much better long-term retention than BR words. Thus, having children read other children's "own" words will probably not produce much better reading performance than BR words. Data from this study suggest that if the teacher provides the words to be learned, words children rate as "emotional" will be learned and retained better than

"non-emotional" words. Therefore, publishers of children's reading materials may improving reading performance somewhat by including words which children rate as "emotional". However, it must be emphasized that Own words still appear to produce the best long-term retention of words learned.

Many basal reader publishers have for years used short, high frequency words in their pre-primers and primers, with the apparent hope of facilitating the reading performance of children. In the present study, short/high frequency AW words were in fact learned more rapidly than long/low frequency AW words during original learning, but these variables had no impact on long-term retention. There seems, therefore, to be no basis for the restriction of children's reading materials to such words.

One wonders how many teachers have been misled by reasonably high immediate recall of BR words, only to find on a reading achievement test at the end of the school year that children remembered few of these words. By the same token, it is conceivable that teachers who have tried using some variation on Ashton-Warner's reading approach have been unaware of the equivalent performance to be expected for Own vs. BR words for immediate recall, but the superior long-term memory for Own words.

There is, of course, still the important question of the extent to which children learn to break the grapheme-pheoneme code. The present study really provides no data on this issue, but it may be that Own words are best for learning to break the code. That remains for future research to determine.

In the meantime, it appears that children are rather adept at choosing words which allow them to maximize their reading performance.

APPENDIX A

AW and BR Words

Ashton-Warner (AW)	Basal-Reader (BR)
Block 1 hit thunder spider kiss Block 1 Filler Words yell jet	Block 1 come ball look mother Block 1 Filler Words said jump
Block 2 kill sing darling ghost Block 2 Filler Words cry police	Block 2 get book can did Block 2 Filler Words want ride
Auxillary Word Pool of AW Words fight train dance truck bus alligator crack bull love	Auxillary Pool of BR Words play like work help find run see will

APPENDIX B

Own Words

	Block 1	Block 2	Block 1 Filler Words	Block 2 Filler Words
Child #1	fork cat airplane plate	friend elephant color climb	tiger chair	toys chair[1]
Child #2	stairs clock watch heater	swing home supper spy	table wall	eat checks
Child #3	tree kleenex leaf glasses	color climb games water	beard magic marker	flowers swing
Child #4	elevator banister slide Snow White	fawn dog cub restaurant	turtle paste	monkey bars swing
Child #5	cowboy guns turtle giraffe	dollie tricycle bear climb	cartoons Donald Duck	fox swing
Child #6	corn pen no swing	rope color friends kick	story tree	restaurant uncle
Child #7	paper witch pencil bat	bear dam games sandbox	web broom	beaver robin

[1]"Chair" was also one of the Block 1 filler words, but since it was only used as a filler word, it was allowed to also be a Block 2 filler word for the long-term retention test.

APPENDIX B (con't)

	Block 1	Block 2	Block 1 Filler Words	Block 2 Filler Words
Child #8	lipstick ink eskimo kleenex	bag park glasses names	paper board	ring swing
Child #9	paper clip railing window handle	tack glass wood dirt	hole duck	pencil sharpener cat
Child #10	plane teeth magic marker leaf	pegs board radiator screen	paper blanket	glass window
Child #11	bluebird cardinal robin Casper	baby eat climb tree	trouble swan	turtle sky
Child #12	leaf table bracelet kleenex	bee turkey color Donald Duck	cover sky	basket paint
Child #13	shirt ring necklace pencil	teddy bear outside grass friends	paper shot	Ginger crick
Child #14	colt horse glue ceiling	snore toyshop kitty candy	wall clock	bubble gum lunch

APPENDIX C

INSTRUCTIONS TO CHILDREN

Thursday--Week 1

Part I Oral presentation of the words

General Introduction

"I'm going to help you learn to read some words. Some of the words will be words you ask to learn to read; some will be words I will ask you to learn to read."

A-W and B-R Words

"I'm going to give you a word which I'll show you later. Each time I give you one of these words, I want you to sit quietly and think about the word; please do not talk as you think about each word. Here's the first word."

Own Words

"Now I want you to give me a word you would like to learn to read. I'll show it to you later. After you tell me the word, please sit quietly and think about it; please do not talk as you think about each word. Now tell me a word you would like to learn how to read."
[Randomly vary the order of Own, AW, and BR word sections.]

Part II Visual presentation of the words to check whether children could already read the words

"I'm going to show you some words. See if you can read any of these. Here's the first word."

[If the child can read any of the words, replacements should be obtained from the pool of A-W and B-R words and by asking the child for more "Own" words. Visual equivalents of these replacement words should be shown to the child; if these words cannot be read by the child, oral presentations of the words should be made in order to measure GSR deflection for each word.]

APPENDIX C (con't)

Part III Study trial A

"Remember the words we listened to a few minutes ago? I'm going to help you learn to read the words now. I'll write them out; then we'll sound them out together while you trace the letters."

Part IV The Pegboard

"Now let's play a game with this pegboard. See how many of these pegs you can put in these holes before I say stop."

Part V 2-minute retention test

"Remember the words I helped you learn how to read before we did the pegboard game? Here are the words again. See how many you can read now."

Friday--Week 1

24-hour retention test

"Remember the words I helped you learn to read yesterday? Here they are again. See how many you can read today."

Word-association

"Now let's play another game. I'll say each of the words I helped you learn to read; then you tell me the first word that it makes you think of. What is the first word that _____ makes you think of? What's another word that _____ makes you think of?" (5 trials per word maximum)

Rated Emotionality

"Now I'm going to say each of the words. Then I want you to tell me whether it is a word that you like, a word that you hate, or one that doesn't matter. The first word is _____. Do you like that word, hate it, or is it one that doesn't matter to you? etc."
(Vary the order of "hate", "like", and "doesn't matter.")

APPENDIX C (con't)

Monday--Week 2

Pre-test

"Remember the words I helped you learn to read last week? Here they are again. See how many you can read today?"

Study trials #1, 2, 3

"Now I'm going to help you learn to read all of the words you just saw. I'll sound them out while you trace the letters. Then you say the word."

Test trials #1, 2, 3 (alternating with study trials)

"Here are the words I just helped you learn to read. See how many you can remember. Here is the first one."

(CONTINUE THROUGH THREE STUDY/TEST TRIALS)

Thursday--Week 2

Same as Monday--Week 2.

Wednesday--Week 2

Same as Monday--Week 2.

Thursday--Week 2 through Wednesday--Week 3

Same as Thursday--Week 1 through Wednesday--Week 2, except with a second set of 12 words.

Week 3--Monday

Long-term retention test

"Here are all the words you learned to read. But we have also put some words in here that you didn't learn. See how many words you can read. Here's the first one.

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