SWRL

SOUTHWEST REGIONAL LABORATORY
TECHNICAL NOTE

DATE August 6, 1971

NO TN-2-71-18

TRANSFER OF MIXED WORD IDENTIFICATION TRAINING TO A READING CONTEXT

John Koehler, Hattie Coatney, Patricia Valdivia, and Gary Verna

ABSTRACT

Sight word (SW) and phonics-based or rule word (RW) learning were investigated in kindergarteners under conditions varying list structure, amount and order of list practice, and the distinctiveness of list contents. Effects of training were assessed by having subjects read (no corrective feedback) and learn sentences containing the SWs, RWs, and new RWs containing the previously trained phonics components.

Some facilitation of sentence reading was found when RWs, SWs, and a list having both kinds of words (mixed) were acquired in that order. Replacing the mixed list with a sentence format for the SWs and RWs in the practice order, or using a background cue to distinguish SWs from RWs had little influence on transfer performance.

These findings were interpreted as indicating the importance of subword acoustic feature recognition on transfering mixed word identification strategies to reading.

TRANSFER OF MIXED WORD IDENTIFICATION TRAINING TO A READING CONTEXT

Tne present study is concerned with the problem of retrieving word identification materials during reading when the reading instruction involves teaching words by the sight method (SW) and concurrently developing the reader's phonics decoding skills through discrimination-identification training on the components of selected regularly-spelled words (RW). As noted elsewhere (Koehler, 1971, Koehler, Bennett & Mineo, 1971), a phonics word attack can conflict with whole word learning because the subword responses taught the reader in the phonics instruction may generalize to words having spelling characteristics similar to the RW item. These generalization tendencies can be expected to affect SW content when SWs are identified during recall on the basis of a single letter or some other superficial feature of the word; and studies have demonstrated that young children tend to associate whole word pronounciations to printed words in just this fashion (Marchbanks & Levin, 1965; Williams and others, 1970).

The research reported here was designed to examine a number of factors that findings from verbal learning studies indicate should affect the recall and transfer of word identification materials. The treatment groups listed in Table 1, therefore, address a variety of hypotheses regarding the operation of retention and transfer under mixed word identification instructional conditions. Groups 1 through 4 embody two factors: (1) the form of transition from SW and RW practice to reading--mixed list vs. sentence practice, and (2) the amount of SW learning prior to RW practice. Interest in the mixed list vs. sentence practice comparison

TABLE 1

TRAINING SEQUENCES AND SUBJECTS PER WORD SET

Group	Training Sequence	SW Cueing in Training[a]	Number of Subjects Set 1	Number of Subjects Set 2
1	SW_1[b] → RW → Mixed	None	4	4
2	SW_1 → RW → Sentences	None	4	4
3	SW_3 → RW → Mixed	None	4	4
4	SW_3 → RW → Sentences	None	4	4
5	RW → SW_1 → Mixed	SW, Mixed	4	4
6	RW → SW_1 → Mixed	Mixed	4	4
7	RW → SW_1 → Mixed	None	4	4
8	RW → SW_3 → Mixed	SW, Mixed	4	4
9	RW → SW_3 → Mixed	Mixed	4	4
10	RW → SW_3 → Mixed	None	4	4
11	RW → SWs in sentences	Sentences	4	4
12	RW → SWs in sentences	None	4	4
13a	SWs (u)[c] → RW (u) → mixed	SW, Mixed	2	2
13b	RW(u) → SW_3(u) → Mixed	SW, Mixed	2	2
14a	SW_3(u) → RW(u) → Mixed	None	2	2
14b	RW(u) → SW_3(u) → Mixed	None	2	2

[a]Groups receiving cueing during training also had the SWs cued in the retention-transfer task.

[b]Subscripts 1 and 3 denote the learning criterion on the SW list, i.e., one or three successive errorless trials. Other lists were learned to a one errorless trial criterion.

[c]The u in parentheses signifies that these groups were trained with words and phonics materials unrelated to the content covered in the subsequent mixed list and retention-transfer task.

comes from raising question with the current form of sequencing reading instruction. Usually separate instruction is given on SW and RW materials prior to practice on reading sentences containing these materials and words previously learned. In many instances, practice on these word materials will not be carried to complete acquisition before reading practice begins so that word learning continues during reading. A consequence of this instructional practice is that the grammatical and sematic cues of the prose content may detract the reader from forming the requisite discrimination that would curb competing effects arising from mixing SW and RW items. A more appropriate transition from list practice to reading therefore might be intervening practice on a mixed list containing both types of words since this form of list practice should direct the reader's attention toward the relevant word contrasts without interference from context forms and meanings.

Variation in the amount of SW learning prior to RW practice is considered in the present work because better learning of the SW materials can be expected to make them less vunerable to competition from RW contents. Moreover, since interference phonema in verbal learning suggest that this relation depends on the order in which list contents are learned, the interaction between practice amount and list order is examined with Groups 1, 3, 7, and 10 in the present study.

Groups 5 through 10 deal with the effects of varying SW cueing during training and transfer. Making SWs more distinctive from RWs by pairing an extrinsic cue with SWs should counteract competing tendencies between SW and RW contents when these contents occur together, i.e., in

mixed list and sentence practice and reading. Furthermore, a considerable body of experimental work shows that appropriate cueing tends to aid recall of categorized items (for example, Tulving & Pearlstone, 1966). In the present work, the SWs are "categorized" through the use of a light blue patch appearing underneath each SW during different stages of learning. The appearance of the tinted SWs retention and transfer should promote the retrieval of items in the SW list and indirectly facilitate the transfer of phonics decoding responses to novel RWs and the recall of old RWs since words not coded as SWs belong to the RW class by exclusion.

In addition, if SW cueing is an effective mechanism for combating intereference between SW and RW contents and for aiding the recall of specific contents, it is questionable whether both mixed and unmixed list practice is needed. One of the purposes for giving practice on SWs and RWs in separate lists is to make the cues associated with these contents as distinctive as possible during acquisition so that they will be stored in separate memory files and thus easier to retrieve later. But if cueing SWs achieves much the same effect, practice on separate lists may be somewhat inefficient in terms of training time devoted to word learning. To explore this possibility, reduction in SW and RW list practice is treated in Groups 9 through 14. Groups 11 and 12, however, represent a special case of the interaction between SW cueing and amount of unmixed list practice. The RW materials contain features which would appear to require instructional handling apart from SW learning, i.e., letter-sound paired-associate learning and blending practice, and SW learning may be facilitated when SWs are presented in a sentence context (cf. Koehler, Bennett, & Mineo, 1971). The Groups 11 and 12 treatments were therefore devised to investigate these possibilities.

Method

Design

The design of the study is given in Table 1. Following completion of the training sequences specified in the tables all groups received testing and training on a retention-transfer sentence list that contained previously learned SW, RWs and new RWs formed from letter-sound correspondents of RW training. On the first three trials with this test, called the test trials, the S received no feedback regarding the correctness of his response. Starting on the fourth trial, sentence list practice was given until criterion was reached.

Subjects

The Ss were 112 kindergarteners who ranged in age from 59 months to 79 months, with a mean age of 69.5. The Ss were enrolled in two local public schools and did not receive any reading instruction prior to and during the experimental period. The Ss were assigned to the treatment groups unsystematically, but with the restriction that approximately an equal number of each sex were assigned to each group.

Apparatus and Materials.

The study was conducted in a two-cubical trailer set up on the school grounds where Ss were enrolled. Word materials were projected by means of slides on the rear of a screen centered in a vertical panel. The S sat approximately 2 feet from the panel. The speech counterparts of the word materials were presented by a tape recording The Ss run early in the study received the sound through earphones. The sound was presented to later Ss with a small speaker positioned in the upper left corner of the panel since many children had objected to the earphones.

Visual and sound presentations were automatically sequenced with an inaudible signal on another channel of the recording tape. The signal triggered the slide mechanism approximately 2 seconds after the sound terminated. The sound associated with each slide was presented from 4 to 10 seconds after the slide mechanism was activated--the delay in sound feedback varied with the training and testing formats used with different lists. The E could also operate a manual switch to delay the presentation of the second. The items of each list were shuffled on successive presentations of the list.

The word materials were selected from lists of single syllable words that had been compiled from published lists and reading materials used in the early grades. Table 2 lists the two sets of materials that were applied to an equal number of Ss in each treatment group. The words underlined in the transfer lists are new RWs containing the phonemes of the words in the RW lists. While some effort was made to construct sentences that would be familiar to kindergarten children, the table indicates that this objective was met only partially.

Words and sentences were centered on the slides. All words appeared in caps that were uniform stroke block letters. A RW appeared with either its letters spaced (D O G) or together (DOG). For the SW cueing condition the SW would appear on a blue tinted background. Words and sentences used for screening Ss and demonstrating the training routines were

TABLE 2

WORD MATERIALS[1]

Set 1		Set 2	
RW[2]	SW[2]	RW	SW
SAT	SHE [ši]	TELL	THEM [ðɛm]
HAT	BY [bay]	SELL	YOU [yu]
HID	ME [mi]	SID	WILL [wil]
TOM	YOUR [yur]	PAM	MAY [me]

Sentence	Sentence
SHE HID YOUR HAT	SID WILL SELL THEM
TOM SAT BY ME	YOU MAY TELL PAM

Retention-Transfer List	Retention-Transfer List
Tom hit me	Did you tell Sam?
Tim had your hat	You may pass Sid
She hid it	Ted will miss them
Mom sat by me	Let Pam sell them

Phoneme symbols for RWs

S → /s/	T → /t/
A → /æ/	E → /ɛ/
T → /t/	LL → /l/
H → /h/	S → /s/
I → /ɪ/	I → /ɪ/
D → /d/	D → /d/
O → /a/	P → /p/
M → /m/	A → /æ/
	M → /m/

[1] The mixed list was constructed by combining RW and SW lists

[2] RW designates a phonics-based or rule word. SW represents a sight-learned word. Phonemic equivalents for SWs are given in brackets.

Procedure

The kindergarteners were preliminary selected for the study by testing their reading knowledge of words from the alternate word set. Any child knowing more than one word of the set was not used in the study.

Each S was trained individually over a series of days, with training per day limited to 30 minutes. To complete the entire sequence Ss took from 3 to 13 days with a mean of 7.0 days. The retention-transfer task was administered about 24 hours after the training sequence was completed.

The paired-associate anticipation method was used exclusively in training Ss on word materials. Rule word training took the form of learning to sound out the word and to give its blended or whole word pronounciation. The S was required to pronounce each grapheme unit when the slide with the spaced RW letters was displayed and to pronounce the whole word when the next slide displayed the RW letters in normal spacing. This sequence was followed for each RW presentation in RW lists. The S saw only the spaced RW when the words of sentences were presented singly. In this case, the S anticipated the sounded out feedback and then was required to give the whole word pronounciation after the feedback event.

Words presented in list format were learned first as pairs and then as a list. Each pair was practiced until 8 in 10 correct pair identification were obtained. After reaching criterion on the final pair, the S learned the items of the pairs in a nonpaired order as a list. In the case of mixed list practice where the 4 SWs and 4 RWs were combined, the S learned two pairs of SW-RW combinations and then a four-word list of these items. This was followed by learning the remaining two pairs the same way.

After criteria were achieved on each pair and each sublist, the eight words were practiced for an additional ten trials as a whole list.

Sentence list practice procedure involved responding first to each word of the sentence singly in the normal reading sequence and then to the whole sentence as a unit. Separate slides were used for presenting the single words and sentence. Each sentence was made up of 2 RWs and 2 SWs, the former being presented in spaced format when displayed singly. The S was required to pronounce the RW as a whole immediately after the sounded-out version was presented on the tape. Criterion was achieved on each sentence separately and then both sentences were practiced as whole units in a list for an additional 10 trials.

Sentence list practice in the retention-transfer task consisted of presenting the sentences as whole units in list format on the first 3 test trials and then training to criterion on the whole list on the subsequent training trials. During sentence list training, the presentation sequence was the same as described in the previous paragraphs for single sentences except that all four sentences were covered on each practice trial.

The SWs presented in list format were learned to a criterion of 1 or 3 errorless, consecutive trials. The RW lists, the sublists of the mixed list, the single sentence and the retention-transfer sentence list were carried to 1 errorless trial. Criterion for RWs always applied to the whole word pronunciation only. Any S who did not achieve criterion on a word pair within 30 trials or on a list within 50 trials was terminated from the study and replaced with another S. Criterion failures involved 38 children in the study: these are listed by treatment group in Table 3.

TABLE 3

NUMBER OF SUBJECTS FAILING TO ACHIEVE CRITERION VALUES

Group	Failure
1	7
2	2
3	3
4	5
5	2
6	1
7	3
8	4
9	0
10	0
11	2
12	4
13	3
14	2
Total:	38

The Ss were required to repeat the correct response on error or omission trials during practice on item pairs. To ensure that the Ss would attend to the feed back information, the S pointed to letter and whole words while feedback was occurring. Instructions and demonstrations of procedures were always given just prior to the relevant task. Before practice on any given list, the E explained to the S how the items would appear on the screen, how the S was to respond to the displays and that he should respond before the feedback from the machine occurred. For RWs, the E emphasized in the instructions that the whole word and sounded-out version contained the same sounds. This was further reinforced by practice on a sequence using the word DOG in spaced and unspaced formats. Similar demonstrations were given for the cued SW condition (displayed the word THE on blue-tinted background) and before practice on sentences (displayed the THE DOG RAN as single word and then as a whole sentence).

Before the retent on transfer sentence list test, the E told the S to figure out the new words in the sentences on the basis of words and [illegible] learned. The E was also informed that the sound [illegible] would not give the correct answers this time.

The Ss were given [illegible] for participating each day of the experiment. These [illegible] were redeemed for small trinkets. The Ss [illegible] reinforcement from the E. That is very [illegible] improvements in performance.

Results and Discussion

[illegible] of the study are shown in Table [illegible]. The values [illegible] word and sentence lists are based on the [illegible]

[illegible]

TABLE 4

MEANS AND STANDARD DEVIATIONS FOR EACH GROUP ON MIXED SENTENCE LIST PRACTICE AND THE RETENTION-TRANSFER TASKS

Group	Mixed-Sentence List: Word Type Errors			Feedback Retention-Transfer: Word Type Errors			Retention-Transfer Training: Trials to Criterion
	List		SW	RW	SW	RW	New RW	
1	Mixed	$\bar{X}$	8.87	14.38	4.84	6.50	14.25	4.12
		S.D.	6.86	11.03	4.62	3.59	1.39	2.17
2	Sentence	$\bar{X}$	7.00	6.25	4.35	5.13	14.52	3.25
		S.D.	6.65	7.98	5.05	3.80	2.26	1.67
3	Mixed	$\bar{X}$	9.75	14.00	2.13	4.25	13.99	2.88
		S.D.	10.29	10.25	3.77	4.10	2.28	1.13
4	Sentence	$\bar{X}$	4.37	4.88	5.75	6.38	14.31	3.12
		S.D.	4.24	3.92	4.44	3.46	1.03	2.23
5	Mixed (c)[1]	$\bar{X}$	5.25	10.00	1.38	4.12	14.40	2.38
		S.D.	4.12	8.73	1.11	2.53	1.54	0.92
6	Mixed (c)	$\bar{X}$	6.75	10.75	3.69	5.13	13.98	4.62
		S.D.	6.32	7.00	3.92	2.03	1.66	2.13
7	Mixed	$\bar{X}$	3.63	8.25	.46	1.50	13.90	4.87
		S.D.	4.72	6.98	.86	1.69	2.82	2.85
8	Mixed (c)	$\bar{X}$	[illegible]	10.75	1.63	4.75	14.06	4.12
		S.D.	[illegible]	7.00	2.07	3.62	1.39	2.03
9	Mixed (c)	$\bar{X}$	4.25	7.75	1.19	4.00	15.00	3.00
		S.D.	4.63	6.46	2.04	2.88	0.00	1.93
10	Mixed	$\bar{X}$	4.25	7.75	2.62	3.13	14.24	4.87
		S.D.	2.90	6.00	5.29	3.87	1.85	3.23
	Sentence (c)	$\bar{X}$	5.13	8.88	4.46	5.38	14.56	3.50
		S.D.	6.31	6.62	2.36	3.29	.90	1.41
12	Sentence	$\bar{X}$	4.38	5.38	5.75	5.00	14.30	4.25
		S.D.	2.78	4.69	3.32	3.66	2.71	3.49
13	Mixed (c)	$\bar{X}$	13.25	21.87	4.19	5.00	14.56	5.00
		S.D.	7.98	8.80	4.65	3.70	0.65	3.78
14	Mixed	$\bar{X}$	9.25	14.50	3.31	4.38	13.67	3.25
		S.D.	3.53	6.95	3.63	4.53	2.10	1.04

[1] Mixed sight words.

separate list practice on these contents may impede their further mastery since sentence meaning and syntax may interfere with individual word learning.

The retention-transfer task results in Table 4 give mild support for this expectation only for those groups required to learn the SW list to three successive errorless trials (Group 4, the sentence practice condition, was inferior to Group 3, the mixed list condition). However, in tests of the interaction between SW list acquisition level and the format for mixing SW and RW contents, the F values were less than one for both the test and training phases of the retention-transfer task.

But despite the failure to find reliable effects for mixed content practice, there is good indication in Table 4 that the sentence practice condition is misleading with regard to its effectiveness and learning. An analysis showed that by comparison to the mixed list practice condition, fewer word errors were made, $F(1,24) = 4.58$, $p < .05$, and without regard to word type, $F(1,24) = 9.57$ $p < .01$, during sentence practice. Yet the retention-transfer task results described above and also the results for Groups 11 and 12 in the table would imply that these word learning effects were largely limited to the sentence practice task. This finding is further supported by the results of a previous study (Koehler, Bennett, & Mineo, 1971) where it was found that word learning in a sentence or reading context had not special advantage over the list practice format.

Mixed list practice effects are also indicated in the results of Groups 1, 3, 7, and 10. These groups were included in the study to allow examining how the order of practice on the SW and RW contents may interact

with SW acquisition level. The findings of verbal learning studies indicate that competition from RW materials should vary inversely with the amount of SW learning, but it is uncertain whether this competition would be indifferent to the order in which the individual contents are practiced.

As Table 4 shows, the retention-transfer task results do not convey any simple relationships for the factors treated in these groups. On the no-feedback test, a marginal significant effect was found for list practice order, $F(1,24) = 3.84$, $p < .10$, signifying that the RW to SW practice order of Groups 7 and 10 was more beneficial than the reverse sequence of Groups 1 and 3. Practice order, however, interacted in a marginal manner with SW acquisition amount, $F(1,24) = 3.29$, $p < .10$. Under the SW to RW practice order, more SW learning led to better performance, whereas the reverse was the case under the RW to SW order. Sentence learning in the retention-transfer task failed to show any of these effects however, which, again, probably reflects the insensitivity of sentence training to individual word learning.

The complexity of the retention-transfer task results regarding list practice order effects notwithstanding, it is evident without statistical confirmation in Table 4 that all the groups receiving the RW and SW practice sequence, i.e., Groups 5 through 10, were performing better on the mixed list than the groups trained with the SW to RW sequence, i.e., Groups 1 and 3; and this same relationship seems to hold on the average for these groups on the no-feedback test of the retention-transfer task.

It would appear that the superiority of the RW to SW list practice order can be attributed in some degree to facilitation of SW list learning from practice on RW materials. Comparisons involving Groups 1, 3, 7, and 10 showed that SW learning speed in terms of trials to criterion was reduced by about one half when the list was learned after practice on the RW list (an average of 4.88 trials for RW to SW vs. 8.62 trials for SW to RW) whereas SW learning had little affect on RW learning rate, (an average of 2.81 trials for SW to RW vs. 2.50 trials for RW to SW).

Findings from other related studies suggest a possible mechanism for RW facilitation on word learning. Jeffrey and Samuels (1967) found that children given letter sound training identified and learned a list of words containing the training materials better than children who were sight trained on other words containing the same training materials. Moreover, other investigators have found that training prereaders and early readers on highly similar words improves the recognition and learning of other words more than training on dissimilar words (Samuels & Jeffrey, 1966; McCutcheon & McDowell, 1969; Otto & Pizillo, 1970). But more recently at the Southwest Regional Laboratory, it has been revealed in a study on the effects of letter pattern discrimination on word learning (Koehler et al., 1971) that the similarity among words on the visual side may play a less important role in word learning than implied by the studies cited above on word similarity effects. Rather, the present study's results and findings from the Jeffrey and Samuels study (1967) would suggest that word learning performance benefits considerably from training that stresses the acoustic component of word

learning. This kind of training is probably more successful in countermanding the initial tendencies that beginning readers have to learn words on the basis of single letters (Marchbanks & Levin, 1965) than visual discrimination of letter sequence differences alone because the production of individual letter sounds of words will tend to draw the reader's attention to all the letters as well as how letter sequences relate to the acoustic differences of words.

Groups 5 through 10 served to determine whether SW cueing would facilitate learning and retention of word materials. It was posited that cueing should be effective since clearly labeling words to be learned and recalled as whole units would tend to reduce competition from phonics decoding responses. During the course of the study it became apparent that cueing was having the opposite effect, namely, a source of interference. A search of the literature revealed the other investigators (Peterson & Peterson, 1957; Berry & Baumeister, 1970) had encountered a similar problem in paired-associate learning. Two treatment groups, Groups 6 and 9, were therefore added to the study in attempt to reduce this interference. These groups receiving the cueing condition after SW list practice. It was reasoned that the interfering associations involving the cueing stimulus might be considerably weaker than the associations made with the printed word if the primary associations were established first.

The results in Table 4 for these groups reveal that cueing introduced at either stage of acquisition was generally ineffective when compared to the noncued condition (Groups 7 and 10). Neither testing or training scores of the retention-transfer tash showed any reliable effect from cueing; $F(2,36)$, $p > .10$ and $F(2,36 = 1.95, p > .10$

respectively. If anything, Table 4 reveals that cueing may have caused some interference during mixed list practice and on the no-feedback test.

The comparison that was concerned with how SW cueing might interact with the amount of separate SW and RW practice given prior to sentence or mixed list practice can be omitted here since SW cueing did not facilitate retention-transfer task performance. Besides, it is clearly apparent in Table 4 that the performance of Groups 9 through 14 was unrelated to SW cueing.

In summarizing the findings of this study, it can be said that the sequence in learning SW and RW contents tends to play an important role in further practice of these contents and on the word identification process during reading. Categorizing these contents by the use of an extrinsic cue or practicing the contents in a reading-like context, on the other hand, does not appear to have any affect on SW and RW acquisition or reading performance.

APPENDIX I

SUMMARY TABLES OF ANOVA RESULTS

Groups 1-4: Errors on the Retention-Transfer Test

Source	df	MS	F
Between Subjects	31		
1. SW practice amount	1	7.76	
2. Mixed vs. sentence list	1	17.42	
3. Word set	1	9.44	
1 X 2	1	33.02	1.47
1 X 3	1	21.38	
2 X 3	1	3.72	
1 X 2 X 3	1	70.56	3.13
S/1 X 2 X 3	24	22.53	
Within Subjects	64		
4. Word type (SW, RW, New RW)	2	928.32	429.98[a]
1 X 4	2	1.10	
2 X 4	2	6.37	
3 X 4	2	4.94	
1 X 2 X 4	2	7.91	1.08
1 X 3 X 4	2	13.36	1.83
2 X 3 X 4	2	10.89	1.49
1 X 2 X 3 X 4	2	3.98	
4 X S/1 X 2 X 3	48	7.31	
Total	95		

[a] $p < .01$ (2/48) = 5.08

Groups 1-4: Trials-To-Criterion on Retention-Transfer Task

Source	df	MS	F
1. SW practice amount	1	3.78	1.17
2. Mixed vs. sentence list	1	.78	
3. Word set	1	3.78	1.17
1 X 2	1	2.53	
1 X 3	1	11.28	3.48
2 X 3	1	2.53	
1 X 2 X 3	1	.78	
Error	24	3.24	
Total	31		

Groups 1-4: Errors on the Mixed and Sentence Lists

Source	df	MS	F
Between subjects	31/		
1. SW practice amount	1	12.25	
2. Mixed vs. sentence list	1	600.25	4.58[a]
3. Word set	1	3.06	
1 X 2	1	20.25	
1 X 3	1	280.56	2.14
2 X 3	1	280.56	2.14
1 X 2 X 3	1	68.06	
S/1 X 2 X 3	24	130.95	
Within subjects	32/		
4. Word Type (SW, RW)	1	90.25	8.64[b]
1 X 4	1	0.00	
2 X 4	1	100.00	9.57[b]
3 X 4	1	68.06	6.51[a]
1 X 2 X 4	1	6.25	
1 X 3 X 4	1	68.06	6.51[a]
2 X 3 X 4	1	5.06	
1 X 2 X 3 X 4	1	1.56	
4 X S/1 X 2 X 3	24	10.45	
Total	63		

[a] $p < .05$ (1/24) = 4.26

[b] $p < .01$ (1/24) = 7.82

Groups 1, 3, 7, & 10: Errors on the Retention-Transfer Test

Source	df	MS	F
Between subjects	31		
1. SW practice amount	1	.81	
2. List practice order	1	68.01	3.84
3. Word set	1	9.13	
1 X 2	1	58.28	3.29
1 X 3	1	68.01	3.84
2 X 3	1	17.34	
1 X 2 X 3	1	22.81	1.29
S/1 X 2 X 3	24	17.71	
Within subjects	64		
4. Word type (SW, RW, New RW)	2	1285.12	224.40[a]
1 X 4	2	.30	
2 X 4	2	18.54	3.25
3 X 4	2	11.61	2.03
1 X 2 X 4	2	10.00	1.75
1 X 3 X 4	2	23.31	4.07[b]
2 X 3 X 4	2	6.37	1.11
1 X 2 X 3 X 4	2	6.16	1.08
4 X S/1 X 2 X 3	48	5.73	
Total	95		

[a] $p < .01$ (2/48) = 7.31

[b] $p < .05$ (2/48) = 4.06

Groups 1, 3, 7, & 10: Trials-To-Criterion on Retention-Transfer Task

Source	df	MS	F
1. SW practice amount	1	3.12	
2. List practice order	1	15.13	2.47
3. Word set	1	4.50	
1 X 2	1	3.12	
1 X 3	1	18.00	2.94
2 X 3	1	2.00	
1 X 2 X 3	1	0.00	
Error	24	6.13	
Total	31		

Groups 5-10: Errors on the Retention-Transfer Test

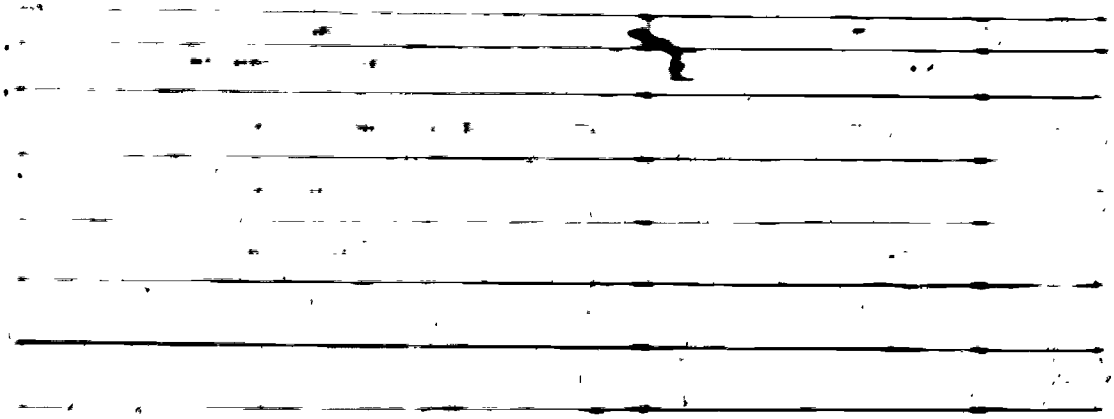
Source	df	MS	F
Between subjects	47		
1. SW practice amount	1	1.89	
2. SW cueing	2	17.30	1.97
3. Word set	1	29.07	3.31
1 X 2	2	15.10	1.72
1 X 3	1	26.27	2.99
2 X 3	2	5.22	
1 X 2 X 3	2	1.09	
S/1 X 2 X 3	36	8.78	
Within subjects	96		
4. Word type (SW, RW, New RW)	2	2147.92	429.60[a]
1 X 4	2	.60	
2 X 4	4	6.74	1.35
3 X 4	2	18.85	3.78[b]
1 X 2 X 4	4	8.24	1.65
1 X 3 X 4	2	14.75	2.96
2 X 3 X 4	4	3.23	
1 X 2 X 3 X 4	4	7.58	1.52
4 X S/1 X 2 X 3	72	4.99	
Total	143		

[a] $p < .01$ (2/72) = 4.94

[b] $p < .05$ (2/72) = 3.14

Groups 8-10: Trials-To-Criterion on Retention-Transfer Task

Source	df	MS	F
1. SW practice amount	1	.02	
2. SW cueing	2	10.90	1.95
3. Word set	1	.19	
1 X 2	2	11.40	2.04
1 X 3	1	1.02	
2 X 3	2	4.56	
1 X 2 X 3	2	5.65	1.01
Error	36	5.58	
Total	47		



[illegible] a self-criterion on Retention-Transfer Task

Source	df	MS	F
[illegible] Se and Re practice format	2	.27	
[illegible] Se cue ng	1	1.02	
[illegible] word set	1	9.19	1.27
[illegible]	2	13.77	1.90
[illegible]	2	4.69	
[illegible]	[illegible]	[illegible].52	2.42
[illegible]	2	4.52	
[illegible]	36	[illegible].24	

References

Berry, F. M., & Baumeister, A. A. Partial redundancy and cue selection. *Psychological Reports*, 1970, 26, 171-173.

Jeffrey, W. E., & Samuels, S. J. The effect of method of reading training on initial learning and transfer. *Journal of Verbal Learning and Verbal Behavior*, 1967, 6, 354-358.

Koehler, J. The effects of serial pattern discrimination and mixed word identification training on sight word acquisition and retention. Professional Paper No. 13, July 15, 1971, Southwest Regional Laboratory, Inglewood, California.

Koehler, J., Bennett, R., & Mineo, R. J. The effects of letter pattern training and grammatical context on sight word learning in kindergarteners. Technical Note No. TN-2-71-17, August 6, 1971, Southwest Regional Laboratory, Inglewood, California.

Marchbanks, G., & Levin, H. Cues by which children recognize words. *Journal of Educational Psychology*, 1965, 56, 57-61.

McCutcheon, B. A., & McDowell, E. E. Intralist similarity and acquisition and generalization of word recognition. *The Reading Teacher*, 1969, 23, 103-107, 115.

Otto, W., & Pizillo, C. Effect of intralist similarity on kindergarten pupils' rate of word acquisition and transfer. *Journal of Reading Behavior*, 1970-71, 3, 14-19.

Peterson, L. R., & Peterson, M. J. The role of context stimuli in verbal learning. *Journal of Experimental Psychology*, 1957, 53, 102-105.

Samuels, S. J., & Jeffrey, W. E. Discriminability of words and letter cues used in learning to read. *Journal of Educational Psychology*, 1969, 60, 46-48.

Tulving, E., & Pearlstone, Z. Availability versus accessibility of information in memory for words. *Journal of Verbal Learning and Verbal Behavior*, 1966, 5, 381-391.

Williams, J. P., Blumberg, E. L., & Williams, D. V. Cues used in visual word recognition. *Journal of Educational Psychology*, 1970, 61, 310-315.