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ABSTRACT

The effects of certain linguistic dimensions on auditory blending performance and training were examined. Dimensions included type of phonological context, consonant-vowel or vowel-consonant (CV or VC); units to be blended, syllables or phonemes (S or P); and size of units, single or double. Six ordered 96-word training blends were administered to six groups of 20 preschool children each over a 4-day period. Two days after completion of training the children were given a 32-word random-ordered test consisting of four test words for each of the eight kinds of blends. Results of analysis of variance showed the following: (1) syllables were easier to blend than phonemes, (2) CV breaks were more difficult than VC breaks for phoneme blending, (3) length increased blending ease only in phonemes, (4) VC training was better than CV training, and (5) syllable blending training did not transfer to phoneme blending performance. It was concluded that phoneme and syllable blending involve separate concepts and that easy to hard training within one concept area should produce optimal results on both tasks. Tables and references are included. (Author/MS)

Some Linguistic Dimensions in Auditory Blending

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Abstract

This experiment sought the effects of certain linguistic dimensions in blending performance and in blending training. The linguistic dimensions examined were: Type of phonological context for the break, consonant-vowel or vowel-consonant (CV or VC); Units to be blended, syllables or phonemes (S or P); Size of units to be blended, single or double. Six ordered 96 word training blends were administered to six groups of 20 preschool children each over a four day period. Two days after completion of training the children were given a 32 word random ordered test consisting of four test words for each of the eight kinds of blends.

Effects in Blending. Syllables were easier to blend than phonemes. CV breaks were more difficult than VC breaks for both sizes of phoneme blending words, but only slightly so for syllable blending words. Increased size of unit corresponded to increased ease of phoneme blending, but not of syllable blending.

Effects in Blending Training. VC training was better for teaching VC blends; it was no worse than CV training for teaching CV blends. Syllable blend training did not transfer well to phoneme blend performance. Thus, easy to hard order training; where the first half of the training set consisted of syllable blends, the second of phoneme blends, did not

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attain the high results expected. Random order training actually produced higher performance especially in phoneme blending.

Apparently phoneme and syllable blending seem to involve different linguistic blending concepts and therefore different tasks. The child was not only required to perform a task; he was also required to determine which task to perform. Optimal training can probably be achieved by training from easy to hard within one concept area. However, if training is to optimize performance in a combination of concept areas such as syllable and phoneme blending presented in the final test here, the interspersed training of the two will probably be necessary. Future studies will focus on order, optimal numbers of presentations, and interspersal as a function of these and other linguistic blending concepts.

Some Linguistic Dimensions in Auditory Blending[1]

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This experiment compared six approaches to training preschool children in eight types of blends. Previous experiments (Laumbach (2), Coleman (1)) gave information as to the linguistic dimensions of blending words. These studies indicated that words can be blended more easily when broken between the vowel and the consonant (VC) than when broken between the consonant and the vowel (CV). It was observed in initial training sessions of the Laumbach and Coleman studies that from the start nearly all children could blend four-syllable words such as macaroni (SS/SS) and most could blend two-syllable words such as baby (S/S). Yet few could blend most two-phoneme words (P/P). It was reasoned therefore that among the one-syllable words, those which have two phonemes on either side of the break (PP/PP) would be easier to blend than those consisting of only one phoneme on either side (P/P). The purpose of this experiment was twofold. It sought the effects of these linguistic dimensions in blending performance and it sought the effects of these linguistic dimensions in blending training.

Procedures

Subjects

The 120 subjects were preschool children aged 56 to 80 months. Approximately the same numbers of boys and girls were tested in each group.

The children tested represented a cross-section of local preschools and included 36 children from a preschool at Ft. Bliss which represented a cross-section of the country and of socioeconomic class.

Stimuli

Each child was asked to blend 24 different words on each of four testing days and to take a final test on a fifth day of 32 words. The words were drawn largely from Rinsland's (3) list of most frequently used words for first graders. Additional words and a nonsense syllable were added to effectuate a balance in word categories.

The words were arranged into three groups according to presentation orders for each the VC and CV list as shown in Table 1. The presentation order, then, for Groups 1 and 4 was easy to hard; for Groups 2 and 5, hard to easy; and for Groups 3 and 6, mixed. The words for a given day and a given group were randomized separately into four word orders. These orders were given to equal numbers of the 20 subjects in each group.

The final day of testing was the same for all subjects and included four words belonging to each of the eight categories: VC--SS/SS, VC--S/S, VC--PP/PP, VC--P/P, CV--SS/SS, CV--S/S, CV--PP/PP, and CV--P/P. The list was arranged in 20 different random orders, one for each subject within each treatment group.

The words themselves were balanced in such a way that the proportion of the phoneme types was constant across the eight blending groups.

Presentation

Six experimenters conducted this experiment, and with few exceptions, each experimenter tested an equal number of children in each of

Table 1. Presentation orders of six treatment groups

Groups	List	Order	Day 1	Day 2	Day 3	Day 4
1	CV	E-H	SS/SS	S/S	PP/PP	P/P
2	CV	H-E	P/P	PP/PP	S/S	SS/SS
3	CV	A random mix across all days				
4	VC	E-H	SS/SS	S/S	PP/PP	P/P
5	VC	H-E	P/P	PP/PP	S/S	SS/SS
6	VC	A random mix across all days				

the six groups. Extenuating circumstances made it necessary for much of Group 6 to be distributed between two of the experimenters.

Individual testing was conducted in five 10-minute sessions. The four stimulus lists for a child were given as much as possible on consecutive days, or on four days in a five-day school week. The fifth session was final testing and was given as much as possible on the Monday following the other sessions. Where absences made it necessary to deviate drom this basic format, two days were always allowed to intervene between the fourth session and final testing.

Testing was done in rooms apart from the classrooms. Disruptive noises and stimuli were kept at a minimum. The subject and experimenter generally sat opposite one another at a table. The experimenter began by giving the following instructions: "We are going to play a game with words. Every time you give me a right answer, I will put a chip in this cup, and when you get all these chips (8) in the cup, you'll get a prize. I am going to say two little words (or sounds) to you, and I want you to put them together to make one big word. I'll do one for practice so you'll see what I mean: I say RAIN---BOW, and you would say back to me RAINBOW. Now you may put these sounds together even if you don't know the sounds and the words." The experimenter then proceeded with the task, saying each word in order and allowing about one second between the first and second parts of each word. Each time the child blended correctly, the experimenter complimented him and the child put a chip in the cup. When the child had accumulated eight chips in the cup, he chose a prize from the bag of small toys. Then, the procedure was repeated until all the words for the day were completed. Any chips left in the cup at the end of a day's session were used as a headstart for the next session. When a child gave an incorrect answer, the experimenter recorded the response and instructed the child in the correct answer. When a child was doing very poorly, the experimenter gave the child an opportunity for a success by asking a multiple choice question on a word he missed, e.g., for "SHE", he would ask, "Should you have said 'SH' or 'SHE' or 'E'?" If the child then responded correctly, he put a chip in the cup but the experimenter scored the response as incorrect. By repeating this procedure as often as necessary each child won at least one prize in each day of testing. On the fifth day of testing, the final test was given and neither were chips used nor feedback given the child as to whether his answers were correct or incorrect. The child was allowed to choose a prize at the end of the session. The experimenter explained the procedural variation at the onset.

Results

The data were analyzed in terms of number of words blended correctly for each of the eight stimulus groups of four items each. Thus, for each subject there was a maximum score of four for each stimulus set, a minimum score of zero. The results of the analysis of variance performed on the scores are summarized in Table 2.

Table 2--Summary of Analysis of Variance for Blending of Various Word Types after Training

SOURCE	df	MS	F
Between Ss	119		
List for training (L)	1	18.70	2.26
Order of presentation for stimulus types (O)	2	14.65	1.77
L x O	2	7.25	.88
$error_1$	114	8.28	
Within Ss	840		
Type of break for test item (T)	1	47.70	54.08**
L x T	1	14.02	15.89**
O x T	2	.68	.77
L x O x T	2	2.93	3.32*
$error_2$	114	.88	
Unit between which break is made for test item (U)	1	129.07	104.72**
L x U	1	.34	.27
O x U	2	8.88	7.20**
L x O x U	2	6.41	5.20**
$error_3$	114	1.23	
Size of units to be blended in test (S)	1	.06	.08
L x S	1	1.50	2.03
O x S	2	1.21	1.64
L x O x S	2	.28	.38
$error_4$	114	.74	
T x U	1	16.54	23.81**
L x T x U	1	2.02	2.91
O x T x U	2	.46	.67
L x O x T x U	2	.43	.62
$error_5$	114	.69	
T x S	1	.94	1.63
L x T x S	1	.27	.47
O x T x S	2	.09	.15
L x O x T x S	2	.63	1.10
$error_6$	114	.57	

U x S	1	13.07	16.58**
L x U x S	1	1.20	1.53
O x U x S	2	.03	.04
L x O x U x S	2	.40	.51
$error_7$	114	.79	
T x U x S	1	4.54	8.52**
L x T x U x S	1	.60	1.13
O x T x U x S	2	.26	.49
L x O x T x U x S	2	.31	.59
$error_8$	114	.53	

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

$error_1$ = Ss + SsxL + SsxO + SsxLxO
$error_2$ = SsxT + SsxLxT + SsxOxT + SsxLxOxT
$error_3$ = SsxU + SsxLxU + SsxOxU + SsxLxOxU
$error_4$ = SsxS + SsxLxS + SsxOxS + SsxLxOxS
$error_5$ = SsxTxU + SsxLxTxU + SsxOxTxU + SsxLxOxTxU
$error_6$ = SsxTxS + SsxLxTxS + SsxOxTxS + SsxLxOxTxS
$error_7$ = SsxUxS + SsxLxUxS + SsxOxUxS + SsxLxOxUxS
$error_8$ = SsxTxUxS + SsxLxTxUxS + SsxOxTxUxS + SsxLxOxTxUxS

The main effects of Type of test item break, CV-VC, and linguistic Unit between which there was a break, Syllable-Phoneme, were significant. Those main effects for the Size of units to be blended, Single or Double syllable or phoneme, training List of CV or VC training items, and Order of presentation for stimulus types were not significant. Of the first order interactions training List x Type of test item break, Order of presentation x Unit blended, and Type of test item break x Unit blended were significant. Significant second order interactions were List x Order x Type of test item break, List x Order x Unit blended, and Type of test item break x Unit blended x Size of unit blended. The remaining first and higher order interactions were not significant sources of variance. Summaries of the significant effects are presented in Fig. 1, 2, and 3.

Figure 1 presents percent blended correctly as a function of unit blended, type of test item, and size of units blended (T x U x S). Inspection of this figure suggests that the difference in performance on syllable blends and phoneme blends was greater for CV type items than VC type test items. Furthermore, for the CV type test items the difference in performance on syllable blends and phoneme blends was greater for single units. Therefore, the greatest difference occurs between CV type S/S and P/P words, the least difference between VC type SS/SS and PP/PP words.

The significant interaction of type of test item break and unit blended (T x U) can be inferred from Figure 1. While percentage of syllables blended was only 4.6% lower for CV test items than those for VC test items, the percentage for phonemes was 17.7% lower.

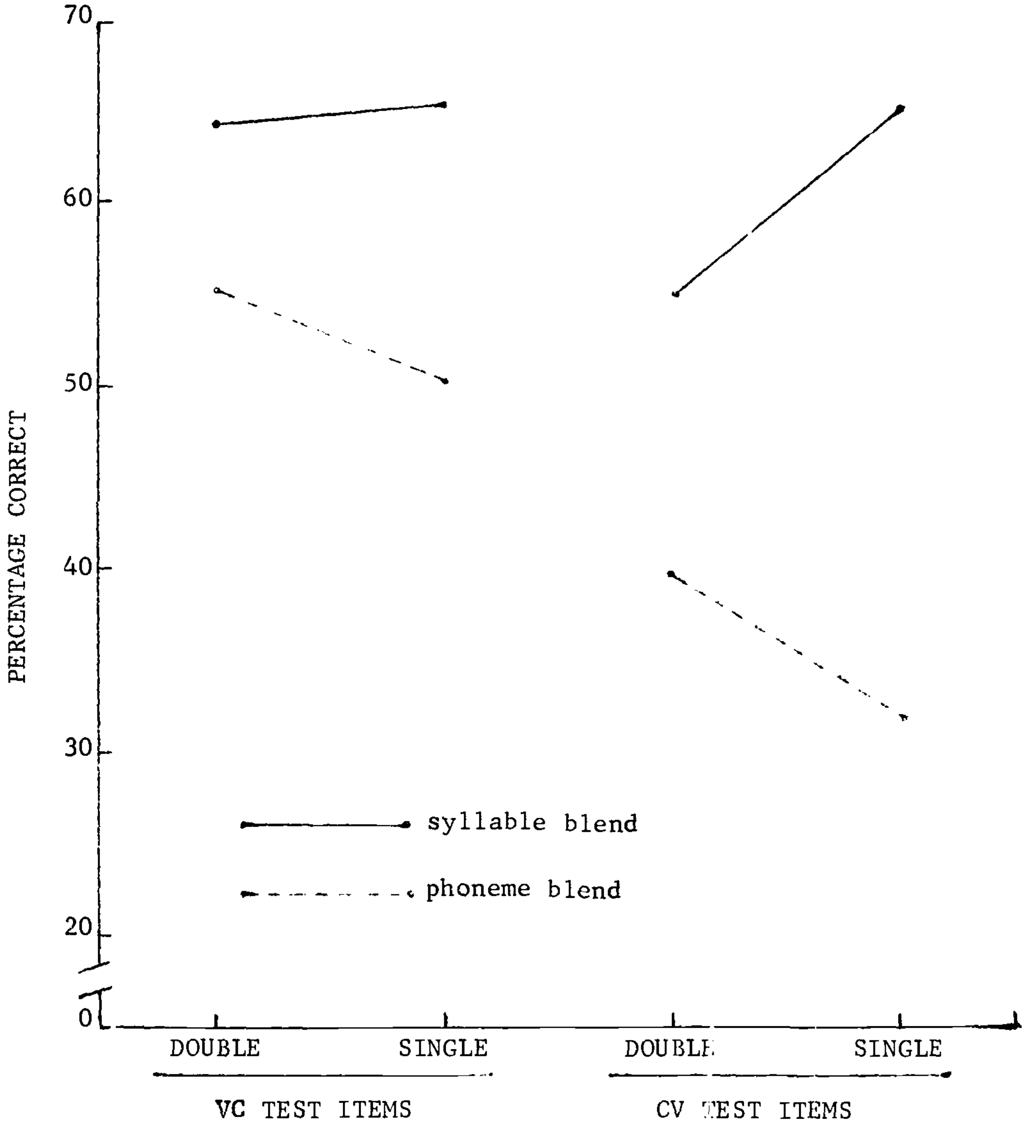

Fig. 1. Percent blended correctly as a function of unit blended, type of test item, and size of units blended (T x U x S).

The significant main effects of unit blended (U) and type of test item break (T) may also be inferred from Figure 1. The percentage blended correctly was 62.7% for syllable blends, 44.4% for phoneme blends. Percentage blended correctly was 48.0% for CV words, 59.1% for VC words.

Figure 2 presents percent blended correctly as a function of test item type, training list, and presentation order (L x O x T). Examination of the figure reveals that percent VC test items blended correctly increases as one proceeds from easy-hard order to hard-easy order on to random order for both training lists CV and VC. However, the percent of CV test items blended correctly does not vary across order for the CV training list; it increases across the levels of order for the VC training list.

The significant training list by type of test item break (L x T) may also be inferred from Figure 2. Collapsing across order the percent correct for VC test items is essentially the same for CV and VC training, 47.5% and 48.4% respectively, while the percent of correct responses to VC test items after VC training, 65.6%, is 17.0% greater than that for VC test items after CV training, 52.6%.

Figure 3 presents percent blended correctly as a function of unit blended, training list, and presentation order (L x O x U). The figure shows a recency effect for the easy-hard and hard-easy training orders for both CV and VC training lists. For the hard-easy groups where syllable blends were presented on the last day before the test (see Table 1), the scores were relatively high for syllable blend test items, low for phoneme blend test items; when the phoneme blends were presented on the last day before the test, the phoneme blend scores were high, the syllable

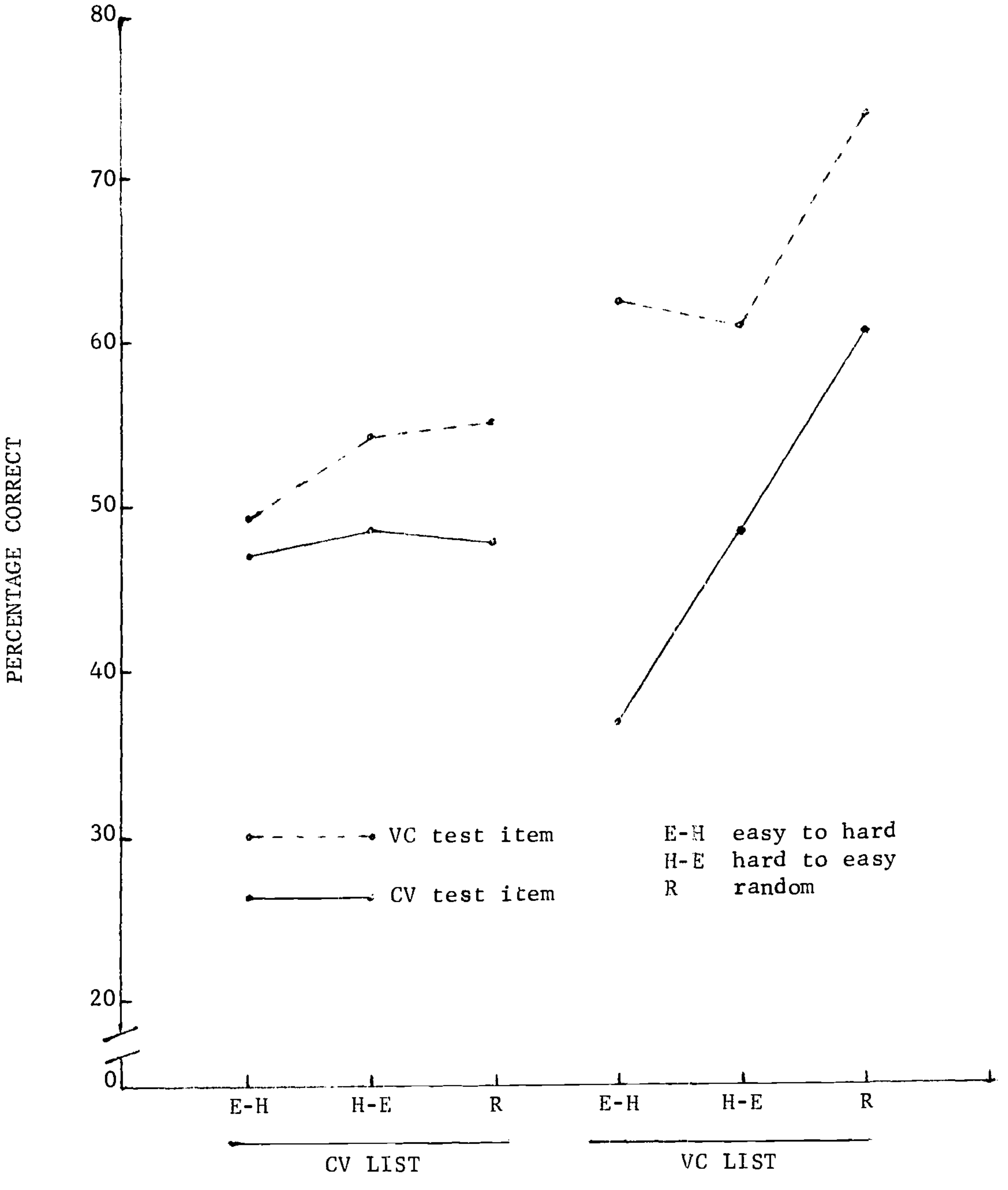

Fig. 2. Percent blended correctly as a function of test item type, training list, and presentation order (L x O x T).

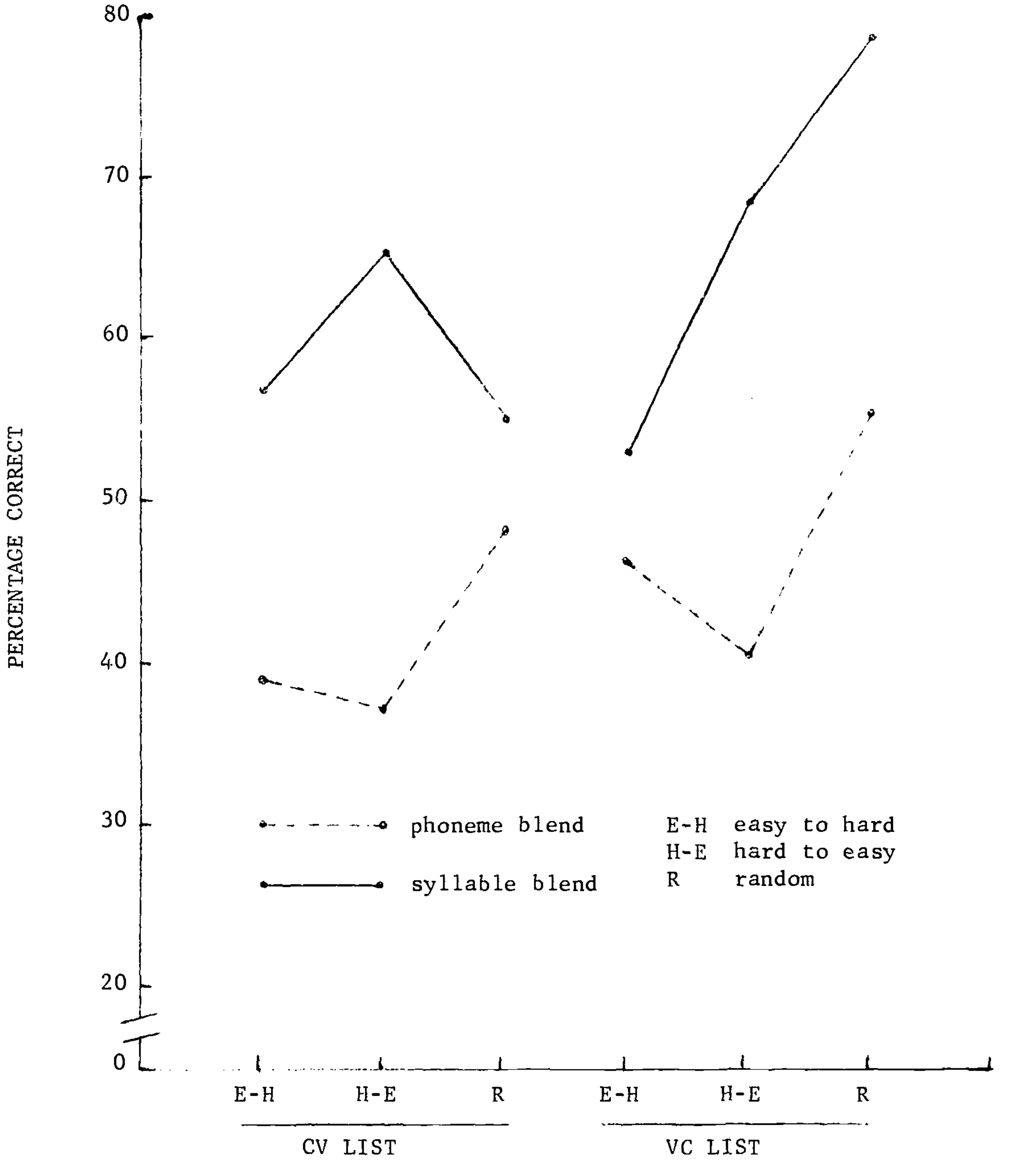

Fig. 3. Percent blended correctly as a function of unit blended, training list, and presentation order (L x O x U).

blend scores low. After random order CV training the number of correct syllable blends was lower than either other order; after random order VC training the number of correct blends was even higher. The phoneme blend scores were substantially higher after both random order trainings than after any of the easy-hard order trainings.

The significant interaction of training order presentation and unit blended (O x U) can be inferred from Figure 3 as well. The same pattern held as in the higher order interaction. Collapsing across lists the mean percent correct for syllable blends after random order training was about the same as for hard-easy training.

Discussion

The results of linguistic dimensions on blending performance were generally as expected. Syllables were easier to blend than phonemes. The findings of previous studies of two-phoneme blending (P/P) (Laumbach (2), Coleman (1)) that VC blends were easier than CV blends have been resubstantiated. In addition, these results can be extended to double phoneme blends (PP/PP). The effect of the CV break type on syllable blending would seem to occur only for the double syllable CV blends (CV: SS/SS).

The increase of length in phoneme blends (P/P to PP/PP) corresponded to a higher number of correct blends, thus reinforcing the earlier contention that greater length of the parts to be blended would contribute to the recognizability of the whole blending word. The single syllable (S) as a unit consisted of several phonemes and as such was even greater in size than the double phoneme unit (PP). Single syllable blends were also easier than the double phoneme blends. The double syllable (SS) was still greater in size, but it was not observed to be easier. It is suggested that the potentially greater recognizability of these longer units was offset by the childrens' lack of familiarity with many four syllable words and the subsequent difficulty of holding them in memory for a correct response.

Neither the linguistic dimension CV-VC break training list, the orders of the groups representing the three other linguistic dimensions, nor any combination thereof had any significant effect on the overall blending score for the test. VC training resulted in slightly higher overall test scores; furthermore random order training seemed to result in slightly higher final test scores. Correspondingly the highest final test scores occurred after random order VC list training.

CV training resulted in similar scores for CV and VC test items; VC training resulted in considerably higher VC test item scores and the same CV item scores. Thus, VC training seemed better for teaching VC blends, it was no worse than CV training for teaching CV blends.

The linguistic units blended (S or P) on the last day before the test increased the scores of the corresponding items on the test and decreased that of the others. For the hard-easy groups where syllable blends were presented on the last day before the test, the scores were relatively high for syllable blend test items, low for phoneme blend test items; when the phoneme blends were presented on the last day before the test, the phoneme blend scores were high, the syllable blend scores low. That is, training for one did not transfer well to performance of the other.

After random order CV training, the number of correct syllable blends was lower than either other order; after random order VC training the number of correct blends was even higher. The phoneme blend scores were substantially higher after both random order trainings than after any of the easy-hard or hard-easy order trainings. Thus, the mixed training on the low transfer types seemed to generalize better to the mixed presentation in the final test.

Apparently phoneme and syllable blending involved different linguistic blending concepts and therefore different blending tasks. The subject was not only required to perform a task; he was also required to determine which task to perform. Optimal training could probably be achieved by training from easy to hard within one concept area. However, if training is to optimize performance in a combination of concept areas such as syllable and phoneme blending as presented in the final test of this study, the training of the two would probably have to be interspersed. Future studies will focus on order, optimal numbers of presentations, and interspersal as a function of these and other linguistic blending concepts.

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[1] Credits

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