INTRALIST STIMULUS SIMILARITY, STIMULUS MEANINGFULNESS,
AND TRANSFER OF TRAINING IN THE A-B, A-C PARADIGM

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The investigation examined the effects of formal and semantic intralist stimulus similarity (ISS) on transfer of stimulus differentiations in the A-B, A-C paradigm. Consonant trigrams (CCCs) with a high degree of letter overlap were used to produce a high degree of formal ISS. Highly meaningful nouns of similar meaning were used to produce a high degree of semantic ISS. The responses were the numbers 1-12. Each S learned two six item lists.

Eighty Ss proceeded to a criterion of three perfect repetitions on the first list. All Ss were then run to a criterion of one perfect repetition or ten anticipation trials, whichever came last, on a second list which contained three A-B, A-C paradigm pairs and three A-B, C-D paradigm pairs.

Significantly less negative and/or more positive transfer was predicted for the A-C paradigm, when compared to the C-D paradigm, under high formal ISS conditions than under low formal ISS conditions. Significantly more negative transfer was predicted for the A-C paradigm, when compared to the C-D paradigm, under high semantic ISS conditions than under low semantic ISS conditions. Also, it was predicted that the highly meaningful stimuli (semantic ISS)

would produce significantly more negative transfer for the A-C paradigm, when compared to the C-D paradigm, than the low meaningful stimuli (formal ISS).

Results failed to indicate a transfer effect due to increases in formal ISS. The failure to obtain a transfer effect due to increases in formal ISS was probably due to the lack of common letters among the stimulus items of the second list. The failure to obtain a transfer effect due to increases in semantic ISS was probably due to the failure of the semantic ISS manipulation as indicated by the fact that there was no significant difference in trials to first list criterion for the high and low semantic ISS conditions. It was found, however, that the highly meaningful stimuli (semantic ISS) produced significantly more negative transfer than the low meaningful stimuli (formal ISS). These results were obtained using two different dependent measures.

Reasons for the failure to find the predicted effects due to ISS were discussed. The finding of greater negative transfer for the high meaningful stimuli, when compared to the low meaningful stimuli, was interpreted using Martin's (1968) encoding variability hypothesis.

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LIST OF TABLES

INTRALIST STIMULUS SIMILARITY, STIMULUS MEANINGFULNESS, AND TRANSFER OF TRAINING IN THE A-B, A-C PARADIGM

In a paired associates (PA) verbal learning task, part of the total learning time is used to establish a consistent and differentiating representation for each stimulus. These stimulus differentiations allow the subject to discriminate among the different stimuli of the list. Once established, these stimulus differentiations should transfer to a second list and facilitate learning when the stimuli of both lists are the same (Gibson, 1940). In the A-B, A-C (A-C) transfer paradigm the stimuli of the two lists are identical. If this transfer of stimulus differentiation effect occurs, then it should counterbalance, at least in part, some of the negative transfer effects typically found with this paradigm.

Since, in the A-B, C-D (C-D) control paradigm, the stimuli of the two lists are unrelated, no transfer of stimulus differentiations can occur. The subjects in this paradigm must establish differentiations among the stimuli of the second list while learning that list. The more difficult to differentiate among the stimuli, the greater should be the advantage of the A-C paradigm over the C-D control paradigm during second list learning.

Increasing the intralist stimulus similarity (ISS) of a PA list increases the difficulty of making differentiations

among the stimuli. Thus, when lists high in ISS are used, less negative transfer should be produced in the A-C paradigm relative to the C-D control paradigm. Kennelly (1968), using lists of nine pairs of items with two syllable nouns as both stimuli and responses, found that increasing the semantic ISS of his lists produced an increase in negative transfer for the A-C paradigm relative to the C-D control paradigm. This was not as had been predicted. Additional analysis of the data indicated that response learning was delayed in the A-C paradigm relative to the C-D control. There was no evidence of an effect due to ISS or an interaction between ISS and paradigms. It was found, however, that the increase in negative transfer with increases in ISS was due to the increased length of the associative learning phase for the A-C paradigm when high ISS lists were used.

Underwood and Ekstrand (1968), using consonant trigrams (CCCs) as stimuli and common three letter words as responses to form lists of six pairs of items, varied the formal ISS of their lists from high to low. Their results supported the transfer of stimulus differentiation hypothesis in a very borderline manner. It was found that the only significant reduction in negative transfer as a function of ISS occurred on the first two trials of the second list. They state, "In general these data indicate that the transfer of stimulus differentiation, established during A-B learning, is so slight

that S essentially 'must start all over again' in learning A-C" (p. 175).

Kennelly (1970), using lists of seven pairs with CCCs as stimuli and highly meaningful nouns as responses, found a significant positive transfer effect under high formal ISS conditions and a nonsignificant negative transfer effect under low formal ISS conditions when intralist response intrusions served as the dependent measure of the transfer of stimulus differentiations. Kennelly concluded that stimulus differentiations are established by the development of a stable representational response to each stimulus and that these stimulus differentiations transfer to second list learning.

Framer (1972), using high ISS CCCs as stimuli and high imagery value nouns as responses, also found evidence of significant positive transfer for the A-C paradigm when compared to the C-D control paradigm. Framer's first list consisted of six pairs of items. First list learning proceeded for a fixed number of trials, i.e. 15. The second list consisted of nine pairs of items formed into a combination of three A-B, A-B pairs, three A-B, A-C pairs and three A-B, C-D pairs. There was a high degree of letter overlap among the stimulus items, in that each stimulus item shared 1, 2, or 3 letters with each other stimulus item in the lists. Framer's results provide powerful evidence for the transfer of stimulus differentiations in the A-B, A-C paradigm.

In the previously cited studies which looked at the effects of ISS on transfer in the A-B, A-C paradigm, Kennelly (1968) found that increasing the semantic ISS of his lists produced an increase in negative transfer. Underwood and Ekstrand (1968), using formal ISS lists, found a slight decrease in negative transfer with increases in the formal ISS of their lists. Kennelly (1970) obtained significant positive transfer by increasing the formal ISS of his lists. Framer (1972) found significant positive transfer using high formal ISS lists. Of the previously cited studies which looked at the effects of ISS on transfer in the A-B, A-C paradigm, none looked at the effects of both formal and semantic ISS in the same study. Further, each of the previously cited studies used different types of materials and lists of different length.

The present investigation is an attempt to study the effects of ISS, both formal and semantic, on transfer in the A-B, A-C paradigm. Consonant trigrams with a high degree of letter overlap were used to provide a high degree of formal ISS. Highly meaningful nouns of similar meaning were used to provide a high degree of semantic ISS. Because the nouns used to form the semantic ISS lists are highly meaningful as opposed to the CCCs used to form the formal ISS lists, the effects of stimulus meaningfulness on transfer in the A-C paradigm was also investigated.

If the stimulus differentiation effect is operative, then stimulus differentiations established during first list

learning should transfer to the stimuli of the second list in the A-C paradigm, but not in the C-D paradigm. The more difficult to differentiate among the stimuli, the greater should be the A-C paradigm's advantage over the C-D paradigm during second list learning. Increasing the ISS of a paired associates list increases the difficulty of differentiating among the second list stimuli, thereby eliminating the A-C paradigm's advantage. The A-C paradigm, then, should produce less negative and/or more positive transfer when ISS is high than when ISS is low.

Based upon the above considerations, significantly less negative and/or more positive transfer is predicted for the A-C paradigm, when compared to the C-D paradigm, under high formal ISS conditions than under low formal ISS conditions. In line with the results of the Kennelly (1968) study, more negative transfer is predicted for the A-C paradigm, when compared to the C-D paradigm, under high semantic ISS conditions than under low semantic ISS conditions.

Merikle (1968), using lists of eight pairs of items with consonant-vowel-consonant (CVC) trigrams as both stimuli and responses, found significant increases in negative transfer with increases in the meaningfulness of the stimulus terms. Weaver, McCann, and Wehr (1970), using lists of eight pairs of items with CVCs as stimuli and five letter words as responses, found no evidence of negative transfer due to the effects of stimulus meaningfulness. Martin (1968), using

lists of six pairs of items with CVCs as stimuli and digits as responses, found evidence of a significant increase in negative transfer with increases in stimulus meaningfulness in the A-B, A-Br (A-Br) paradigm. Martin and Carey (1971), using lists of nine items with CVCs as stimuli and digits as responses, found evidence of significant negative transfer with increases in stimulus meaningfulness in the A-Br paradigm.

Postman and Stark (1971), in an attempt to replicate the Martin and Carey findings, found only slight evidence of negative transfer with increases in stimulus meaningfulness in the A-Br paradigm. Postman and Stark used lists of six items with CVCs as stimuli and two syllable adjectives as responses. It should be noted that all of the cited studies dealing with the effects of stimulus meaningfulness on transfer minimized the ISS of their lists.

More of the previously cited studies have found increases in negative transfer with increases in stimulus meaningfulness than have not. It is, therefore, predicted that the highly meaningful stimuli (semantic ISS) will produce significantly more negative transfer for the A-C paradigm, when compared to the C-D paradigm, than the low meaningful stimuli (formal ISS).

Method

Design and Subjects

The study involved two levels of ISS (high vs low) × two types of ISS (formal vs semantic) × two transfer paradigms (A-B, A-C vs A-B, C-D). A 2 × 2 × 2 factorial design with repeated measures on the third factor (paradigms) was used.

Subjects were assigned to each of the four conditions (high and low formal ISS and high and low semantic ISS) of the experiment in blocks of four, with one subject per experimental condition per block. The running order of conditions in each block was determined by a table of random numbers. Assignment to conditions was on the basis of the subject's order of appearance in the laboratory. There were 80 subjects in the experiment so that 20 subjects learned the low formal ISS lists, 20 subjects learned the high formal ISS lists, 20 subjects learned the low semantic ISS lists, and 20 subjects learned the high semantic ISS lists. The subjects were undergraduate psychology students and received course credit for participation.

Lists

For the lists used in the present study see the appendix. Each list consisted of six pairs formed in the following manner. Two sets of six high formal ISS CCC trigrams were constructed using only three consonant letters to fill 18 letter positions per set. Each letter appeared only once in each trigram. Three different letters were used in each six trigram set. Two sets of six low formal ISS CCC trigrams were constructed using 18 consonant letters to fill 18 letter positions per set. The order of letter assignment was random with the restrictions that each letter appear only once in each trigram and that the two sets have no identical trigrams.

Two high semantic ISS sets were constructed from three sets of three high meaningful nouns of similar meaning

selected from a list by Pavio, Yuille, and Madigan (1968). Two low semantic ISS sets were constructed from nine unrelated high meaningful nouns selected from the same list cited above. The nouns for both the high and low semantic ISS conditions were matched for meaningfulness and imagery values. The mean values for meaningfulness for the two high semantic ISS lists were 5.42 and 6.13; the corresponding mean values for imagery were 5.85 and 5.88. The mean values for meaningfulness for the two low semantic ISS sets were 5.12 and 5.97, and the corresponding mean values for imagery were 5.99 and 6.03. The responses used for all lists were the numbers 1-12. The pairing of the stimuli with the responses was on a random basis.

The transfer task for high and low formal ISS and high and low semantic ISS was constructed as follows. Three of the original stimuli from the first list were re-paired with three new response terms, forming a set of three A-C items. Three items from the other set, bearing no relationship to the first list items, were added to represent the C-D paradigm and to form a list containing three A-C items and three C-D items. For high semantic ISS one of the sets of three nouns with similar meaning was re-paired with three new response terms, forming a set of three A-C items. Three items from the other set, bearing no relationship to the first list items, were added to form a list containing three A-C items and three C-D items. Under the high ISS conditions the A-C paradigm items were all highly similar

among themselves as were the C-D paradigm items. There was, however, no similarity between paradigms. Any one item in the high ISS conditions was similar to only two other items in the second list. All stimuli were typed in capital letters. Four random orders were used to prevent serial learning.

Procedure

Standard PA instructions for anticipation learning were read to the subjects. The lists were presented at a 2:2 sec. rate with a four sec. intertrial interval. A Gerbrands memory drum was used. First list learning proceeded to a criterion of three perfect repetitions or for a maximum of 100 trials. Four subjects were dropped from the experiment for failure to meet this criterion. Each of these subjects was replaced by the next subject appearing in the laboratory. Second list learning followed immediately after first list learning and proceeded to a criterion of one perfect repetition or ten anticipation trials, whichever came last.

Results and Discussion

First List Learning

The means and standard deviations for the number of trials to first list criterion for each of the four conditions in this experiment are presented in Table 1. A comparison of trials to first list criterion between high formal ISS and low formal ISS indicates that the high formal ISS lists were significantly more difficult to learn than the low formal ISS lists ($t = 9.14$, $df = 38$, $p < .01$). A comparison of trials to first list criterion between high

semantic ISS and low semantic ISS conditions indicates no significant differences (t = 1.50, df = 38, p > .05). Due to the failure of the semantic ISS manipulation, no effects due to semantic ISS are expected.

TABLE 1

MEANS AND STANDARD DEVIATIONS (SD) FOR TRIALS TO FIRST LIST CRITERION

Statistic	High Formal ISS	Low Formal ISS	High Semantic ISS	Low Semantic ISS
Mean	49.95	15.85	14.95	10.90
SD	14.44	8.38	11.21	4.59

Comparisons of the effects of stimulus meaningfulness for trials to first list criterion indicated that the highly meaningful stimuli (semantic ISS lists) produced significantly easier first list learning than the low meaningful stimuli (formal ISS lists) for both the high ISS conditions (t = 8.56, df = 38, p < .01) and the low ISS conditions (t = 2.32, df = 38, p < .05).

Second List Learning

As a measure of the transfer effects during second list learning, a 2 × 2 × 2 analysis of variance (degree of ISS × type of ISS × paradigms) with repeated measures on the third factor was run on the number of errors to the second list criterion. The second list criterion was one perfect repetition. The means and standard deviations for this and all other second list measures are presented in Table 2. The

first factor was degree of ISS (high vs low), the second factor was type of ISS (formal vs semantic), and the third factor was transfer paradigm (A-B, A-C vs A-B, C-D). Three items each represented the transfer paradigms A-B, A-C and A-B, C-D in the second list.

TABLE 2

MEANS AND STANDARD DEVIATIONS (SD) FOR THE SECOND LIST DEPENDENT MEASURES

Paradigm	High Formal ISS	Low Formal ISS	High Semantic ISS	Low Semantic ISS
Errors to Second List Criterion				
A-C mean	15.70	8.10	8.40	7.65
SD	7.18	7.89	6.89	8.01
C-D mean	15.60	8.35	6.25	4.25
SD	9.44	8.46	5.30	3.35
Total Number Correct on Trials 1-3				
A-C mean	3.80	3.25	4.60	4.85
SD	1.74	2.25	1.90	2.39
C-D mean	3.70	4.15	5.60	5.80
SD	2.36	2.43	1.31	2.07

Results of the analysis of variance indicate that, collapsing across paradigms, the high ISS conditions produced significantly more errors than did the low ISS conditions ($F = 8.7020$, $df = 1/76$, $p < .01$). The formal ISS

conditions produced significantly more errors than did the semantic ISS conditions (F = 12.6270, df = 1/76, p < .01). The interaction between degree of ISS (high vs low) and type of ISS (formal vs semantic) was also significant (F = 4.1134, df = 1/76, p < .01). The high formal ISS conditions produced significantly more errors than did the low formal ISS conditions (F = 12.3702, df = 1/76, p < .01). There was no significant difference in errors between high semantic ISS conditions and low semantic ISS conditions, F < 1. The formal ISS lists (low meaningful stimuli) produced significantly more errors than did the semantic ISS lists (high meaningful stimuli) under high ISS conditions (F = 15.5772, df = 1/76, p < .01), but not under low ISS conditions (F = 1.1633, df = 1/76, p > .05).

The A-C paradigm produced significantly more errors than did the C-D paradigm (F = 4.2054, df = 1/76, p < .01). The interaction between type of ISS (formal vs semantic) and paradigms (A-C vs C-D) was also significant (F = 4.6856, df = 1/76, p < .01). There were significantly more errors for the A-C paradigm than for the C-D paradigm under semantic ISS conditions (high meaningful stimuli) (F = 8.8845, df = 1/76, p < .01), but no significant difference in errors under the formal ISS conditions (low meaningful stimuli), F < 1. The findings of significant negative transfer under semantic ISS conditions (high meaningful stimuli) and no evidence of transfer effects under formal ISS conditions (low meaningful stimuli) indicates that, as predicted, the high meaningful stimuli (semantic ISS) produced significantly more negative transfer than the low meaningful stimuli (formal ISS).

The expected interaction between degree of ISS (high vs low), type of ISS (formal vs semantic), and paradigms (A-C vs C-D) was not found, $F < 1$. There was no evidence to indicate that the formal ISS conditions produced significantly less negative transfer under high ISS conditions than under low ISS conditions, or that semantic ISS conditions produced significantly more negative transfer under high ISS conditions than under low ISS conditions. This was not as had been predicted.

As a measure of the transfer effects during the early trials of second list learning, the number of correct anticipations during trials 1-3 was used. An analysis of variance for this measure indicated that the semantic ISS conditions produced significantly more correct anticipations than the formal ISS conditions ($F = 8.5187$, $df = 1/76$, $p < .01$). The effect of ISS (high vs low) was not significant ($F = 1.3630$, $df = 1/76$, $p > .05$). The interaction between degree of similarity (high vs low) and type of similarity (formal vs semantic) was not significant, $F < 1$. The difference between paradigms was not significant for this measure, either ($F = 1.6229$, $df = 1/76$, $p > .05$). The interaction between type of ISS (formal vs semantic) and paradigms (A-C vs C-D) was, however, significant ($F = 6.4918$, $df = 1/76$, $p < .01$). There were significantly fewer correct anticipations for the A-C paradigm than the C-D paradigm under the semantic ISS conditions (high meaningful stimuli) ($F = 7.3032$, $df = 1/76$, $p < .01$),

but no significant difference in the number of correct anticipations under formal ISS conditions (low meaningful stimuli), $F < 1$. The finding of significant negative transfer under the semantic ISS conditions (high meaningful stimuli) and no evidence of negative transfer under formal ISS conditions (low meaningful stimuli) indicates that for the trials 1-3 measure, as for the total errors to second list criterion measure, the high meaningful stimuli (semantic ISS) produced significantly more negative transfer than the low meaningful stimuli (formal ISS).

The expected interaction between the degree of ISS (high vs low), type of ISS (formal vs semantic), and paradigms (A-C vs C-D) was not present, $F < 1$. For the trials 1-3 measure, as for the total errors to second list criterion measure, there was no evidence to indicate that the formal ISS conditions produced significantly less negative transfer under high ISS conditions than under low ISS conditions or that the semantic ISS conditions produced significantly more negative transfer under high ISS conditions than under low ISS conditions.

Notable differences between this study and the Kennelly (1968) study on semantic ISS occur in the number of items used to form the lists. Kennelly used nine pairs of items in both the first and second list tasks. The present study used six pairs of items in both the first and second list tasks. Further, Kennelly used a between subjects design

which allowed nine pairs of items each in the A-C and the C-D transfer lists. The present study, because of the within subjects design, had three A-C paradigm items and three C-D paradigm items each in the second list.

Notable differences between this study and the Underwood and Ekstrand (1968) study occur in the number of items used to represent each paradigm in the second list. Because of the between groups design, Underwood and Ekstrand had six pairs of items each in the A-C transfer list and the C-D transfer list. The present study, because of the within subjects design, had three items each representing the A-C and the C-D paradigms in the second list. Further, each stimulus item in the second list of the Underwood and Ekstrand study was similar to each other stimulus item in the second list. Each stimulus item in the present study was similar to only two other stimulus items in the second list.

In the Kennelly (1970) study seven pairs of items were used in both the first and second list tasks. The present study used six pairs of items in both the first and second list tasks. Further, Kennelly used a between groups design which allowed seven pairs each in the A-C and the C-D paradigm transfer tasks. The present study, because of the within subjects design, had three items each representing the A-C and the C-D paradigms in the second list. Each stimulus item in the second list in the Kennelly study was similar to each other stimulus item. Each stimulus item in the present

study was similar to only two other stimulus items in the second list.

In the Framer (1972) study, which used only high formal ISS items, three items each represented the A-B paradigm, the A-C paradigm, and the C-D paradigm in the second list. The present study did not carry over any A-B paradigm items into the second list. Also, each stimulus item in Framer's second list had one or more letters overlapping with each of the other eight items in the list. Each stimulus item in the second list of the present study was similar to only two other stimulus items in the second list.

The most likely explanation for the failure to find less negative transfer under high formal ISS conditions than under low formal ISS conditions probably lies in the nature of the second list. Any one stimulus item in the second list of the present study had letters in common with only two other stimulus items. The three A-C stimulus items all had common letters, as did the three C-D stimulus items. However, there were no common letters between the two paradigms. In other words, letters used in forming the stimuli of the A-C paradigm did not appear in the C-D paradigm. All of the previously cited studies on formal ISS had common letters among all the stimulus items in the list. It might also be argued that the failure to find less negative transfer under high formal ISS conditions than under low formal ISS conditions in this study is due to the within subjects design. However,

Framer (1972) found evidence of significant positive transfer with high formal ISS items using a within subjects design. There was a high degree of letter overlap among all nine of the stimulus items in Framer's second list. The lack of common letters among the six second list stimulus items used in this study probably effectively reduced the amount of ISS in the high ISS condition, as compared to the previously cited studies. This reduction accounts for the failure to find less negative transfer under high formal ISS conditions than under low ISS conditions. The failure to find more negative transfer under high semantic ISS conditions than under low semantic ISS conditions is probably due to the failure of the semantic ISS manipulation in the present study.

The finding of greater negative transfer under high meaningful conditions (semantic ISS) than under low meaningful conditions (formal ISS) replicates the findings of Merikle (1968) and supports the encoding variability hypothesis advanced by Martin (1968). The encoding variability hypothesis assumes that there is variation in the manner in which the subject encodes the stimuli of a list. The amount of this variation is inversely related to the meaningfulness of the stimuli so that high meaningful stimuli develop a relatively stable encoding, compared to low meaningful stimuli. Thus, highly meaningful stimuli continue to be encoded in the same way as the subject moves from first to second list learning;

consequently, the original encodings must be suppressed in the transfer phase. Less meaningful stimuli, encoded less stably in the first place, are more easily recoded when a new task is introduced, so that interference from prior associations is minimized. Thus, the opportunity for multiple encodings in the A-C paradigm is less with high than with low meaningful stimuli. The amount of negative transfer is, then, directly related to the level of stimulus meaningfulness.

Of the previously cited studies which found increases in negative transfer with increases in stimulus meaningfulness, Martin (1968) and Martin and Carey (1971) used numbers as responses, as did the present study. Merikle (1968), using CVCs as responses, also found significant increases in negative transfer with increases in stimulus meaningfulness. Since CVCs tend to be perceived, as are numbers, as a single unit, it is possible that the failure of the Postman and Stark (1971) and the Weaver, McCann, and Wehr (1970) studies to find increases in negative transfer with increases in stimulus meaningfulness is due to their use of responses which are more easily recoded into multiple units, two-syllable adjectives in the case of Postman and Stark, five letter words in the case of Weaver, et al.

Summary

The investigation examined the effects of formal and semantic intralist stimulus similarity (ISS) on transfer of stimulus differentiations in the A-B, A-C paradigm. Consonant

trigrams (CCCs) with a high degree of letter overlap were used to produce a high degree of formal ISS. Highly meaningful nouns of similar meaning were used to produce a high degree of semantic ISS. The responses were the numbers 1-12. Each S learned two six item lists.

Eighty Ss proceeded to a criterion of three perfect repetitions on the first list. All Ss were then run to a criterion of one perfect repetition or ten anticipation trials, whichever came last, on a second list which contained three A-B, A-C paradigm pairs and three A-B, C-D paradigm pairs.

Significantly less negative and/or more positive transfer was predicted for the A-C paradigm, when compared to the C-D paradigm, under high formal ISS conditions than under low formal ISS conditions. Significantly more negative transfer was predicted for the A-C paradigm, when compared to the C-D paradigm, under high semantic ISS conditions than under low semantic ISS conditions. Also, it was predicted that the highly meaningful stimuli (semantic ISS) would produce significantly more negative transfer for the A-C paradigm, when compared to the C-D paradigm, than the low meaningful stimuli (formal ISS).

Results failed to indicate a transfer effect due to increases in formal ISS. The failure to obtain a transfer effect due to increases in formal ISS was probably due to the lack of common letters among the stimulus items of the second list. The failure to obtain a transfer effect due

to increases in semantic ISS was probably due to the failure of the semantic ISS manipulation as indicated by the fact that there was no significant difference in trials to first list criterion for the high and low semantic ISS conditions. It was found, however, that the highly meaningful stimuli (semantic ISS) produced significantly more negative transfer than the low meaningful stimuli (formal ISS). These results were obtained using two different dependent measures.

Reasons for the failure to find the predicted effects due to ISS were discussed. The finding of greater negative transfer for the high meaningful stimuli, when compared to the low meaningful stimuli, was interpreted using Martin's (1968) encoding variability hypothesis.

APPENDIX

THE TRAINING LISTS USED IN THIS STUDY

High Formal ISS		*List 1, n = 10*		
	BGN-5		BGN-4	
	BNG-11		BNG-8	A-C
	NBG-7	A-B	NBG-3	
	NGB-9		HPF-6	
	GNB-12		HFP-2	C-D
	GBN-1		FHP-10	
		List 2, n = 10		
	HPF-5		HPF-6	
	HFP-11		HFP-2	A-C
	FHP-7	A-B	FHP-10	
	FPH-9		BGN-4	
	PHF-12		BNG-8	C-D
	PFH-1		NBG-3	
Low Formal ISS		*List 1, n = 10*		
	FGJ-5		HDQ-4	
	KCP-11		ZRW-8	A-C
	ZRW-7	A-B	FGJ-3	
	BSX-9		TML-6	
	HDQ-12		QCK-2	C-D
	NYV-1		DXS-10	
		List 2, n = 10		
	TML-5		TML-6	
	KCP-11		QCK-2	A-C
	QCK-7	A-B	DXS-10	
	BSX-9		HDQ-4	
	DXS-12		ZRW-8	C-D
	NYV-1		FGJ-3	

High Semantic ISS

List 1, n = 10

MISERY-5		MISERY-4	
GRIEF-11		GRIEF-8	A-C
SADNESS-7	A-B	SADNESS-3	
MAIDEN-9		PROFESSOR-6	
WOMAN-12		TEACHER-2	C-D
DAMSEL-1		INSTRUCTOR-10	

List 2, n = 10

PROFESSOR-5		PROFESSOR-6	
TEACHER-11		TEACHER-2	A-C
INSTRUCTOR-7	A-B	INSTRUCTOR-10	
MAIDEN-9		MISERY-4	
WOMAN-12		GRIEF-8	C-D
DAMSEL-1		SADNESS-3	

Low Semantic ISS

List 1, n = 10

MIRAGE-5		MIRAGE-4	
GRAVITY-11		GRAVITY-8	A-C
SILENCE-7	A-B	SILENCE-3	
MEETING-9		PHYSICIAN-6	
WINDOW-12		THICKET-2	C-D
DOLLAR-1		INDUSTRY-10	

List 2, n = 10

PHYSICIAN-5		PHYSICIAN-6	
THICKET-11		THICKET-2	A-C
INDUSTRY-7	A-B	INDUSTRY-10	
MEETING-9		MIRAGE-4	
WINDOW-12		GRAVITY-8	C-D
DOLLAR-1		SILENCE-3	

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