SEMANTIC GENERALIZATION

BETWEEN LANGUAGES

by

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INTRODUCTION

When two physically unrelated stimuli become associated through learning, a response conditioned to one of them may also occur in the presence of the other. This phenomenon, known as mediated generalization, has become a useful method for studying meaning, certain types of learning, and other central processes. Most investigators of mediated generalization (see Osgood, 1953, for review) infer that some "generalizing" or "mediating" process links the two stimuli, and hence a response conditioned to one of them tends to become "linked" to the other by this process.

A special case of mediated generalization occurs when the stimuli are words or symbols which are semantically related to one another. This type of study, known as <u>semantic generalization</u>, assumes that the semantically related items have been mediationally linked at some point in the subject's history, and therefore they should tend to evoke common responses.

In a typical study of semantic generalization, Razran (1939) conditioned human subjects to salivate when certain words were presented. After conditioning, the subjects were tested with synonyms of the original words, and their salivation responses generalized to the synonyms. More recently, Branca (1957) conditioned his subjects to give a galvanic skin response (GSR) to certain words which were accompanied by electric shock. After a number of training trials, a synonym of the

shock word was presented, and (under some conditions) a similar GSR was found to occur.

Although several studies of semantic generalization have used synonyms as stimuli, synonyms often have subtle differences in meaning which can be important semantically. A case of true semantic identity, however, should occur for bilinguals, since they must be able to express the same concept with two different words. This hypothesis was investigated by Lambert, Havelka, and Crosby (1958) with rather interesting results. They found that bilinguals who had learned and used their languages in the same context showed semantic generalization in a two language retroactive inhibition paradigm, while those subjects with a history of separate acquisition and usage did not generalize. It seems, then, that bilinguals perform differentially on a test of semantic generalization between languages, suggesting that such a test could be used in the study of bilingual language systems.

The present study introduces two new tests of semantic generalization, which are somewhat similar to those of Branca, and Lambert, et.al. These tests are used with a twofold purpose: (a) to further investigate the phenomenon of semantic generalization between languages, and (b) to continue the exploration of bilingual language systems, using semantic generalization as a tool.

The study of bilingual language systems began with linguists who were concerned with the fact that some bilinguals do not always behave as though their two languages were equivalent. Weinreich (1953) mentions the case of German Switzerland where Schwyzertütsch is the informal, everyday language of the people and Standard German the

official, oratorical one. The Swiss apparently have great trouble in expressing themselves when one of the languages appears in the normal context of the other, for Weinreich writes "When technicians converse informally about machinery for which there is no adequate Schyzertütsch terminology or when a formal speech (requiring Standard German) is made about a homely topic which is more easily discussed in Schwyzertütsch, interference of the two languages is quite marked" (p.81).

On the other hand there are cases of bilingualism where the two languages are exact equivalents of each other. Scerba (1926) reports that the bilingual Sorbians have two equivalent ways of expressing each of their concepts. According to Weinreich "they possess one set of signifieds with two signifiers each" (p.9).

Other linguists too have noted that translated equivalents for some bilinguals have the same connotative meaning, while for other bilinguals such is not the case. This difference is reflected, respectively, in Schuchardt's (1928) separation of the "sprachen können" and the "sprachen kennen," a distinction later paralleled by Robert's (1939) analysis of "subordinative" and "coordinative" bilingualism. Scerba (1945) speaks of "pure" bilingualism (exemplified by the Sorbians as mentioned above) in contrast to the "mixed" bilingualism of German Switzerland. The reports of Saer (1931) and Geissler (1938) add further evidence that linguists recognize two types of bilingualism.

More recently, psychologists have become interested in linguistic processes and have provided further evidence that there are various forms of bilingualism. Ervin (1955) reports that English-French bilinguals

who have learned their languages in different countries give strikingly different stories to the same TAT pictures when tested in English at one time and in French at another. The work of Lambert, Havelka, & Crosby (1958) has already been described, and in a more recent study, Lambert & Fillenbaum (1959) have analyzed the literature on polygot aphasics and have observed cases of bilingual aphasia to determine whether this disease differentially affects bilinguals whose languages are functionally independent (Scerba's "mixed" bilingualism) as opposed to those bilinguals whose languages are functionally integrated ("pure" bilingualism). Their results are consistent with a two category theory of bilingualism. Jakobovits (1960) administered a test of cross-language verbal satiation to a group of bilinguals, and found a significant difference between those subjects who had learned and used their languages interchangeably and those who had a history of separated learning and independent usage. Thus there seems ample evidence from both psychologists and linguists to support the hypothesis that bilingualism is composed of at least two sub-categories.

A theoretical model to account for these two bilingual systems has been advanced by Ervin & Osgood (1954) and is diagrammed in Figure 1. In the case of the compound ("pure") bilingual, there is only one central meaning process for a particular concept. Input to and output from this process may be in either language, but the meaning process itself is the same for both languages. For example, the English word "school" and its French equivalent "école" elicit the same meaning process, and consequently the meaning of the words is identical. Compound bilingualism develops either because the referent and acquisition context

for both words is the same, or because the meaning of one of the words has been directly conditioned to the other, as is the case in vocabulary drill language learning (e.g. "école means school").

On the other hand if translated equivalents actually have different referents, separate meaning processes will develop for the words in the two languages, and the translated equivalents will consequently have different meanings. This coordinate language system is also diagrammed in Figure 1. For the coordinate bilingual who learns the word "ecole" in France, associating with it a building of a particular structure and function, the word "school" learned in Canada represents a building of a different structure and even a distinct function. The connotative meaning of "school" and "école" is not the same for the coordinate bilingual, even though he may later learn that "school" is the translation of "école."

The work of Lambert and associates (1958, 1959) has given some experimental support to the Ervin & Osgood hypothesis, but certain difficulties remain in testing it. The hypothesis itself is explicit and well formulated, but when one is faced with the task of classifying real bilinguals as compound or coordinate, the decision is often an arbitrary one. In many cases a bilingual's history is so involved and his experiences so mixed that positive classification is impossible. Even the basis of classification is far from explicit; Lambert et.al. (1958) found bicultural experience to be a necessary condition for obtaining semantic separation on one task, but not on another which presumably was measuring a highly related phenomenon. Furthermore, classification as compound or coordinate assumes a dichotomy which may not

in fact exist. Weinreich (1953) notes that a bilingual's history may contain both compound and coordinate elements. Perhaps compound and coordinate are merely the ends of a continuum with most cases falling in between; hence a quantitative measure rather than a dichotomous one may be necessary for an operational definition of these attributes.

In spite of these difficulties, a dichotomous classification on the basis of language acquisition and usage has yielded two groups of bilinguals which do differ on a number of behavioral tests (Lambert et.al., 1958; Jakobovits, 1960), but there was considerable overlap of scores between the two groups, and some predictions failed to materialize.

It is the purpose of this study to use tests of semantic generalization in an attempt to find an objective, quantifiable basis for differentiating compound and coordinate bilinguals, and thus further investigate the implications of the Ervin & Osgood hypothesis. It is apparent that the results of such a study will also contribute to our understanding of semantic generalization, and will perhaps help to define some of the parameters of this phenomenon.

STATEMENT OF THE PROBLEM

Semantic generalization studies (see Introduction) have shown that a response conditioned to a particular word will generalize to a word of the same or similar meaning. Under these circumstances, the Ervin & Osgood hypothesis would predict that compound bilinguals (for whom translated equivalents have the same meaning) should demonstrate semantic generalization from one language to the other. For example, if a response were conditioned to the French word "école", it should generalize to the English equivalent "school" since "school" and "école" have the same meaning for the compound. For the coordinate bilingual, however, translated equivalents do not have the same meaning. He has two separate meaning systems, and semantic generalization from one language system to the other would not be expected.

Specifically, the present investigation tests the hypothesis that compound bilinguals will show more semantic generalization between languages than coordinate bilinguals.

METHOD

Subjects

The subjects (Ss) were French-English bilinguals, mostly university students, who were paid for their services. Since it was felt that the hypothesis under consideration would be most clearly tested if only bilinguals who were equally proficient in both languages were used, Lambert's automaticity test (Lambert, 1955, 1959) was administered to each S. This test measures reaction times to a series of key-pressing instructions which may appear in either French or English. In the course of the series, an instruction to press each key appeared once in French and once in English; thus reaction times to the same instruction presented in both languages can be noted and compared. Any S who had a consistently faster reaction to instructions in French than he did to the same instructions in English was discarded as being dominant in French, and vice versa. If no consistent differences in reaction times were found, the S was assumed to be proficient in both languages and was included in the experiment. Thirty-four Ss who met this criterion of bilingual balance were used in the study.

In order to classify the Ss as compound or coordinate, each was interviewed by a bilingual psychology student.[1] The interviewer obtained detailed information as to how, when, and where the S had acquired and used his two languages, and this information was summarized on a 3 x 5 in. filing card. When all Ss had been interviewed, the

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[1]The author wishes to thank Mr. Leon A. Jakobovits for conducting these interviews.

filing cards were combined into a single deck, and four bilingual judges read through the cards and separated them into two piles. One pile consisted of those cards which, in the opinion of a judge, contained histories of compound bilinguals; the other pile contained cards with histories of coordinate bilinguals. As a basis for classifying the cards, each judge was given a précis of the method and criteria that Lambert, et.al. (1958) had found to be important in classifying bilinguals as compound or coordinate. (A form of this précis and also of the questionnaire used by the interviewer are included in the Appendix.)

The judges were quite consistent in their classifications; all four judges agreed on 21 of the 34 Ss, and in only two cases did a majority of the judges fail to agree. An S was classified as compound or coordinate according to the majority opinion of the judges, but in addition a quantitative measure of compound-coordinateness was obtained. It was assumed that the more compound (or coordinate) S's history was, the more the judges should agree on his classification; if however S's history was composed of both compound and coordinate elements, the judges should divide about equally in their opinions. Using this rationale, S could be given a quantitative score of compound-coordinateness according to the number of judges who agreed in his classification. For example, if all judges agreed that a certain S was coordinate, he could be given a score of 1.00, whereas a completely compound S could be scored as 2.00. If three quarters of the judges classified an S as compound, he would be scored as 1.75, and so on.

Thus two measures of compound-coordinateness were taken; the

quantitative measure just described, and the dichotomous classification (compound or coordinate) expressed by the majority of the judges.

The quantitative measure of compound-coordinateness yielded eight 1.00's (Ss whom all the judges agreed were coordinate), thirteen 2.00's (Ss whom all judges agreed were compound), and thirteen other Ss who were classified as 1.25, 1.50, or 1.75. The dichotomous measure yielded 11 coordinates and 21 compounds, with two Ss (on whom a majority of the judges could not agree) remaining unclassified. This rather uneven distribution of compounds and coordinates was fully intended, for it was the compounds who were expected to show semantic generalization, while the coordinates were merely a control group and fewer of them were needed.

Just after the experiment began, Jakobovits (1960) reported that his cross-language verbal satiation measure correlated rather well with compound-coordinateness. Briefly, Jakobovits' procedure was to have a bilingual rapidly repeat a word for 15 seconds (verbal satiation). The intensity of meaning of the word, as measured by the semantic differential (Osgood, Suci, and Tannenbaum, 1957), significantly decreased after this treatment, i.e., the word became less meaningful. It was noted, however, that for compound bilinguals the translation of the satiated word also lost meaning, while for coordinates the opposite effect was found to occur. Satiation scores and compound-coordinateness were significantly related (biserial $r = .549$) at beyond the 1% level.

Since verbal satiation correlates with compound-coordinateness, and since the hypothesis under test in the present experiment predicts that semantic generalization between languages should also be related

to compound-coordinateness, it seemed advisable to compare results obtained by both these procedures. Accordingly, an attempt was made to use as many Ss as possible for whom verbal satiation scores were available. Some 23 Ss who had earlier participated in Jakobovits' (1960) study also participated in the present one.

At the end of the experiment each S was asked to guess the purpose of the proceedings and to make any comments he wished. One S (a psychology student) did correctly state the purpose of one of the semantic generalization tests, and his results were dropped from the analysis of that test. The other Ss seemed unaware of the purpose of the investigation and were usually surprised and interested when it was explained to them.

Materials

Since the parameters of semantic generalization are still undefined, both a gross and a sensitive measure of generalization were used in this study. The gross measure, a modification of Branca's (1957) method, was an ordinary avoidance conditioning procedure using English and French words as the conditioned stimuli, a strong electric shock as the unconditioned stimulus, and key pressing as the conditioned response. An S conditioned to press the key whenever a conditioned stimulus word appeared would show semantic generalization between languages if he also pressed the key when the translation of a conditioned stimulus word was presented.

The stimuli were eight English and eight French words, all of which (when translated into English) appeared in the Thorndike-Lorge (1944)

list of the 500 most frequently occurring English words. Three of these 16 words (GREEN, AUTRE, GARDEN) were used as conditioned stimuli, three were translations of the conditioned stimuli, and the remaining 10 were used as "spacers" (i.e., were never accompanied by shock). The words were printed on paper, mounted in Kodak Redi-Mounts, and were presented one at a time through a 2 x 2 in. opening in a wooden screen. (A complete list of the words used is included in the Appendix.)

The apparatus was designed so that the exposure of a word automatically closed a microswitch in series with both the shock source and a chronoscope. Another switch (a telegraph key) was also in series with this circuit, and permitted S to avoid shock whenever he pressed the key. A pneumatic connection linked the key with the recording pen of a chart drive so that each key press was recorded. In order to determine which words would be accompanied by shock, and also to delay the onset of the shock long enough for S to avoid it if he wished, a control button was placed in series with the circuit connecting the shock source and S. (A diagram of the wiring circuits is included in the Appendix.)

The apparatus, then, operated in the following manner: If the experimenter (E) wished to present one of the conditioned stimulus words, he placed the word in the exposure apparatus. This started the chronoscope and activated the shock source. Approximately one quarter of a second later, E pressed the control button which delivered a shock to S unless S had already pressed the telegraph key. If he had, the shock was never generated, the press was recorded on a moving chart, and S's reaction time was recorded on the chronoscope. To present a

word which was not accompanied by shock, the same procedure was followed, except that the control button (which delivered the shock) was never pressed.

The second and presumably more sensitive measure of semantic generalization was a memory-recognition task, in which the S partially learned List A, then performed an interpolated task, and finally was presented with a longer List B. The S was asked to identify those items in List B which had also appeared in List A. Under normal circumstances this procedure would simply measure recognition, but if the two lists contained both English and French words, and if some of the words on List B were translations of List A words, S could show semantic generalization between languages by incorrectly "recognizing" a translation word on List B (i.e., identifying it as though it were a word which had actually appeared on List A). For example, if S learned the word DOOR on List A and then later (on List B) identified its translation PORTE as being the word that had appeared on List A, he would have shown semantic generalization between languages.

List A consisted of 10 English and 10 French words, all of which (when translated into English) appeared in the Thorndike-Lorge (1944) list of the 500 most frequently occurring English words. Familiar words were used because it was assumed that semantic generalization would occur more readily between commonly used words than between less commonly used (and hence more distinct) items.

List B contained 32 words (16 English and 16 French), and was composed in the following manner: 10 words (5 English; 5 French) were simply reproduced from List A (thus half the words on List A also appeared

unchanged on List B). The remaining 10 words of List A (half English; half French) were respectively translated, and these 10 translations appeared on List B. Finally, the rest of List B consisted of six English and six French words which were unrelated to any words on List A. The words of both List A and List B were selected (in their English form) from the Thorndike-Lorge (1944) list of the 500 most frequently occurring English words. (Both lists appear in the Appendix.)

Procedure

The experiment was conducted in five steps: (1) the conditioning task; (2) the learning of List A; (3) Lambert's automaticity measure; (4) presentation of List B; and (5) a short interview. During the entire procedure the S was comfortably seated at a table on which the exposure and recording apparatus was placed. About three feet in front of him was a wooden screen, with an opening in the center for presenting the stimuli.

Conditioning task. The S was told that he would be shown a long series of English and French words, and that the words would appear over and over again, although never in the same order. The S was informed that a few of these words would always be followed by "an unpleasant shock," and that he could avoid the shock by quickly pressing his key whenever one of these special words appeared. The electrodes were attached to S's left forefinger, and his right hand was supported so that it rested lightly on the telegraph key. Questions were answered, and the shock intensity was raised to the level which S declared was the most he could stand. All Ss subsequently reported that they found the

shock most unpleasant, and they quickly learned to press the key to avoid it.

The 13 word series (three conditioned stimuli and ten neutral "spacers") was shown repeatedly, but the words were randomly shuffled for each repetition, and thus never appeared in the same order. Each word was presented for four seconds with a ten second interval between presentations, and there was no pause or change in routine between repetitions of the series. The S, then, viewed what was apparently an endlessly and randomly repeating series of English and French words. On the average, a conditioned stimulus word appeared once in every four trials, and it was followed by shock approximately 250 miliseconds after appearing in the opening. This short avoidance interval was used so that conditioning would become virtually automatic, and it forced the S to pay close attention to the stimuli.

After two or three repetitions of the series, E turned on the chart drive and the chronoscope, and reaction times to the conditioned stimuli were recorded from this point onward. Once S had become fully conditioned (always pressing the key when conditioned stimuli were presented and never pressing it when they were not) tests of semantic generalization were made. Without changing the routine in any way, one of the conditioned stimulus words was replaced by its translation in the other language. This translation stimulus was not followed by shock and did not have the same physical structure as the conditioned stimulus it replaced; thus responding to it would be a clear instance of semantic generalization between languages.

The appearance of a given translation stimulus was separated from

the appearance of any other translation stimulus by at least one "normal" run of the series. Furthermore, each translation stimulus appeared only once; in all subsequent runs of the series the usual conditioned stimulus word appeared. There was, then, opportunity for three conditioning responses to be made on the basis of semantic generalization. The S was scored as 0, 1, 2, or 3 depending on the number of such responses made, and the conditioning procedure was halted. Electrodes were removed, and S was asked to relax while E removed some of the apparatus from the table.

Learning of List A. In this task S was asked to memorize a list of 20 English and French words (List A). He was told that the list would be presented for 30 seconds, during which he was to memorize as much of it as possible. At the end of this 30 second study session, he would be asked to recall (orally) as many of the words as he could. He would then be given the list for another 30 second study session, followed by a recall session, and so on until he could recall all of the words in a single recall session.

Actually, to keep S from becoming too familiar with the list items, the procedure was stopped when he had correctly recalled 15 words in a single recall session. When this 75% criterion had been reached, S was told that he had learned as much of the list as was necessary. No mention was made of List B, which would be presented after the automaticity test.

Lambert's automaticity test. This measure (briefly described in the Subjects section above) was used to determine bilingual "balance" or relative proficiency in the two languages. There were 16 practice trials,

followed by 16 English and 16 French test trials. The entire procedure took about six minutes, and any Ss who were found to be dominant were dropped from the statistical analysis.

Presentation of List B. Once the automaticity apparatus had been removed, S was presented with List B, and was asked to place a mark beside every word on this list that had also appeared on the list he had studied earlier (List A). Occasionally Ss would ask if translations of List A words should be marked, and they were told to mark only those words which, so far as they could remember, had actually appeared on List A. There was no time limit for this test, but most Ss finished in about a minute. There were 10 possible recognition errors (since 10 words of List A appeared in their translated form on List B) and Ss were scored between 0 and 10 depending on the number of such errors made. Once the list had been scored, S was asked to relax while the E asked him some questions about his linguistic history.

Interview. Each S was given a short written paragraph introducing him to the notion of compound and coordinate bilingualism. The paragraph defined a compound as "a bilingual for whom translated words have identical meaning," while the coordinate was "a bilingual for whom translated words do not mean exactly the same thing, but differ slightly in their meanings." The S was then asked to classify himself as compound or coordinate, and these self-classifications are included in the data analysis.

The S was invited to guess the purpose of the experiment (or any of the tests in it), and was asked if he had any questions or comments. These were dealt with, and then E asked him a series of questions

concerning the acquisition and use of his two languages. This information was used to supplement and confirm the questionnaire information obtained independently by another interviewer (see Subjects section). Finally, the purpose of the experiment was explained, and S was dismissed with the request that he tell no one about the proceedings.

RESULTS & DISCUSSION

The results of the investigation are relevant to two areas of inquiry: the study of semantic generalization, and the study of bilingual language systems. Discussion, then, falls rather naturally into these two parts.

Semantic generalization. Results of the two tests of semantic generalization are summarized in Table 1. In the memory-recognition test, 17 Ss made a total of 28 semantic errors, i.e., they incorrectly "recognized" 28 translations of List A words. However, only two non-semantic recognition errors occurred (i.e., two Ss incorrectly "recognized" a word on List B which was unrelated to any words on List A). Thus it seems that the memory-recognition test is a measure of semantic generalization, for the error scores it yielded were due almost entirely to recognition errors involving semantically related stimuli.

Responses to semantically unrelated stimuli were not recorded in the conditioning procedure, but the high correlation between it and the memory-recognition test suggests that both these procedures measure semantic generalization, at least to some extent. However, the number of instances where semantic generalization actually did occur is rather trivial when compared with the number of theoretically possible instances. On the memory-recognition test, some 340 semantic recognition errors were possible (for 34 Ss combined), but only 28 actually occurred. On the conditioning test there were 99 possible instances of generalization, but only 14 occurred, and more than half the Ss gave no evidence of generalization at all. Apparently, then, the tests used in this study

were only rough measures of semantic generalization between languages.

To summarize, both the memory-recognition and the conditioning procedures seem to be useful as measures of semantic generalization, and they both have provided additional evidence that this phenomenon does occur between languages under certain circumstances. The tests, however, detected relatively few cases of semantic generalization compared with the number theoretically possible, and they should be regarded only as rough indices of this phenomenon.

Compound-coordinateness. Results relevant to the compound-coordinate distinction are summarized in Table 2. For purposes of classification, it seems to make little difference whether compound-coordinateness is regarded as a dichotomy or as a continuum, for both types of classification are highly related (r_{bis}=.959).

On the basis of Jakobovits' (1960) study, it was anticipated that cross-language verbal satiation scores would furnish an independent but related measure of compound-coordinateness. In the present study, however, satiation scores were only slightly related to the judges' classifications, although in the predicted direction. If satiation scores had correlated well with semantic generalization performance, it would have been tempting to conclude that satiation and semantic generalization were operational measures of compound-coordinateness, and that the judges' classifications were only a poor approximation to the objectively determined state of affairs. However, the correlations between satiation and semantic generalization are much too low to warrant such a conclusion, and for purposes of this discussion the judges' classifications will be used as the best available index of compound-coordinateness.

When semantic generalization performance is related to compound-coordinateness, the correlations are in the predicted direction but they fail to reach significance. Likewise, t-tests between the mean scores of compounds and coordinates are non-significant for both the conditioning test and for the memory-recognition procedure. It seems, then, that compounds and coordinates do not differ significantly in their performance on these tests, although a significant difference would be predicted by the Ervin & Osgood hypothesis.

One could argue that the Ervin & Osgood hypothesis is invalid, but such an argument is more than offset by several studies which support it (see Introduction). The results could perhaps be better explained by referring to the fact that very few instances of semantic generalization actually occurred, when compared with the number that were theoretically possible. Thus it could be argued that the two tests were only rough indices of semantic generalization and were not sensitive enough to detect a difference between compounds and coordinates. In addition, the tests did show small differences in the direction predicted by Ervin & Osgood. This explanation agrees with the facts rather well, but it forces the theorist to explain why these tests showed so little semantic generalization between languages when other similar tests (Razran, 1936; Lambert, et.al., 1958) have detected considerable amounts of it.

It is interesting to note, however, that the Lambert, et.al. study (which did differentiate compounds and coordinates on a test of semantic generalization) used a slightly different experimental procedure than the one used in this study. On Lambert's test of semantic generalization, the S was dealing with only one language at a time, i.e., all the words

in List A were in one language while all List B words were in the other. In the present study, however, languages were continually mixed in both semantic generalization tests, so that Ss were constantly switching from one language to the other.

Perhaps, in this situation, the compounds switch languages so regularly that they must temporarily "distinguish" between words in the two languages in order to avoid complete linguistic confusion. When an S learns List A, for instance, he must remember (at least temporarily) which words appear in which language, for if he fails to do this he can never learn the list. Thus in this situation, the compound must function somewhat like a coordinate.

On the other hand, coordinates should theoretically experience no linguistic confusion in learning List A or in learning which words are conditioned stimuli in the conditioning procedure, since separate meaning processes are involved for each language. However, in the testing situation, they must differentiate between certain words and their translations; an unusual situation for coordinates because they do not generally think in terms of translations. Thus in the testing situation, coordinates must function somewhat like compounds.

Theoretically, then, the coordinates might have become partially compound and the compounds partially coordinate, thus creating a situation in which little semantic generalization would occur between languages, and certainly one in which compounds and coordinates would not differ significantly on tests of semantic generalization between languages. This hypothesis is indirectly supported by the Lambert, et.al. (1958) study, which found differences between compounds and coordinates on a

semantic generalization test where the languages were dealt with separately, but no difference between the same two groups when the languages were mixed in a speed of translation test. Furthermore, in Jakobovits' (1960) study where compounds and coordinates performed differently on a cross-language verbal satiation test, the languages were always dealt with separately.

It seems, then, that if languages are continually mixed in the experimental procedure, compounds and coordinates tend to perform alike, whereas in procedures where the two languages are kept relatively separate, the opposite is true. It is worthwhile noting that if this is indeed the case, the present study would not have differentiated compounds and coordinates on the basis of semantic generalization between languages, even if more sensitive tests were used. Further research on the effect of mixing languages is clearly needed.

In conclusion, the two tests of semantic generalization used in this study do not seem to differentiate between compound and coordinate bilinguals; but in searching for an explanation of this result, a new facet of compound-coordinate behaviour has been noted. Quite possibly, the compound-coordinate distinction breaks down when a bilingual rapidly switches languages, and if so, this finding would be of great importance to all work concerned with the functioning of bilingual language systems. Before the Ervin & Osgood formulations can be investigated with tests of semantic generalization between languages, further research on the effect of language mixing will have to take place.

SUMMARY

This study was conducted with a twofold purpose: (a) to further investigate the phenomenon of semantic generalization, and (b) to continue the exploration of bilingual language systems, using semantic generalization as a tool. Two new tests of semantic generalization between languages were administered to compound and coordinate bilinguals. Both tests were found to be rough indices of semantic generalization between languages, and they detected small amounts of this phenomenon. However, compounds and coordinates did not significantly differ in their performance on these tests, apparently contradicting the Ervin & Osgood hypothesis of bilingual language systems. Two possible explanations of this discrepancy were presented, and a new parameter of compound-coordinateness was isolated for further research.

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TABLE I

Semantic Generalization Scores

and

Interrelationships Among Tests of Semantic Generalization

	Mem.-Recog.	Condit.
# Ss showing semantic generalization between languages	17	13
Total # of errors due to semantic generalization	28	14
Total # of errors not due to semantic generalization	2	not recorded

	Mem.-Recog. Test (a)	Mem.-Recog. Test (b)
Conditioning Test (a)	$\phi = .639$ *	$r_{ptbis} = .603$ *
Mem.-Recog. Test (a)		$r_{bis} = .841$ *

(a) indicates that test scores are dichotomized. If an S shows one or more instances of semantic generalization between languages he is scored 1; Ss who do not generalize are scored 0.

(b) indicates that the test score for a given S is the number of times he demonstrated semantic generalization between languages.

* indicates significance beyond the 1% level; two-tailed test.

TABLE 2

Correlation-Matrix of Compound-Coordinate Measures

and

Tests of Semantic Generalization Between Languages

MEASURES	MEASURES						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Judges' Classif. (Quant. Score)		.959**	.076	.004	.128	.004	-.190
(2) Judges' Classif. (Majority Opinion)			.068	.004	.111	.004	-.030
(3) S's Classif. of himself				.228	.009	.147	-.420*
(4) Conditioning Test (a)					.639**	.602**	-.032
(5) Mem.-Recog. Test (a)						.841**	-.032
(6) Mem.-Recog. Test (b)							-.165
(7) Satiation Scores							

NOTE: In Measures (2) and (3), subjects were scored 0 if they were coordinate and 1 if they were compound.

(a) indicates that test scores are dichotomized. If an S shows one or more instances of semantic generalization between languages he is scored 1; Ss who do not generalize are scored 0.

(b) indicates that the test score for any given S is the number of times he demonstrates semantic generalization between languages.

* indicates significance beyond the 5% level; two-tailed test.

** indicates significance beyond the 1% level; two-tailed test.

TABLE 3

Comparison of Compound and Coordinate Performance

On Tests of Semantic Generalization Between Languages

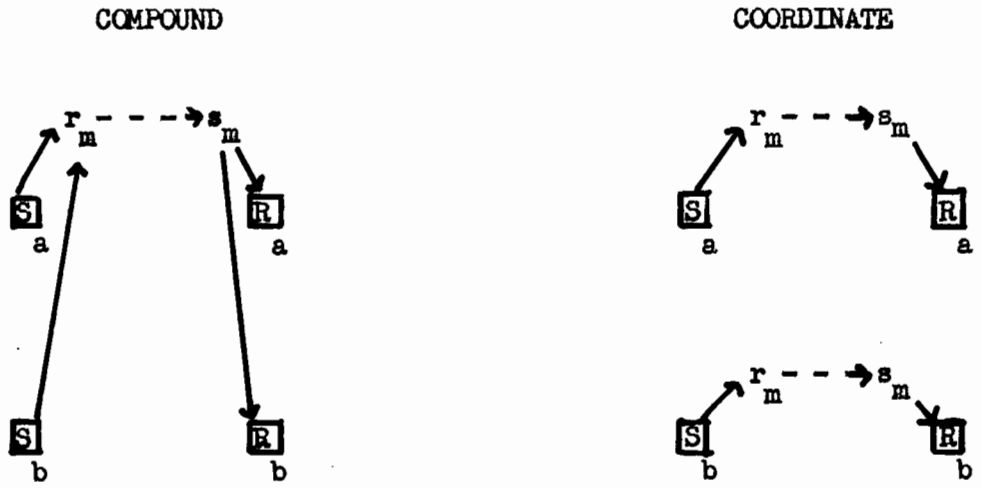
	Comp.	Coord.	Comp. vs. Coord.
Mean # of semantic errors on Memory-Recognition Test	1.66	1.60	t=.17 (n.s.)
Mean # of semantic errors on Conditioning Test	1.22	1.00	t=.43 (n.s.)

FIGURE 1

Schematic Representation

of

Compound and Coordinate Language Systems



In the compound system, the signs in Language A (S_a) and the signs in Language B (S_b) are associated with the same meaning process ($r_m - - - s_m$) which in turn is associated with two sets of linguistic responses (R_a) and (R_b).

In the coordinate language system, different meaning processes are associated with the signs in the two languages.

(Reproduced from Ervin & Osgood, 1954, Fig. 16, p.140)

APPENDIX

LANGUAGE ACQUISITION-USAGE QUESTIONNAIRE

1. Where did you learn your French? English?

   country, province_____home_____school_____

   street_____work_____trips_____other_____

2. How did you learn these languages?

   through another language_____directly_____other_____

3. Under what circumstances have you used these languages?

   exclusively, for how long_____at home only_____

   at work only_____in school only_____on trips only_____

   other_____

   both languages in the same situation (home, work, etc.)_____

   for how long_____

CLASSIFICATION CRITERIA

A subject is to be classified as a coordinate if:

1. he has learned the two languages in two different cultural contexts (provinces or countries);

2. he has learned the two languages in separate settings (e.g. one at home and the other at work);

3. he has used either language exclusively for a period of at least one year;

4. he habitually uses one language in one setting (e.g. at work), and the other in a different setting (e.g. at home).

A subject is to be classified as a compound if:

1. he has learned the second language through the intermediary of the first (the so called "indirect" method);

2. he has learned both languages in the same setting (e.g. at home);

3. he has used both languages indiscriminately in the same setting for a period of at least one year.

A bilingual who is a coordinate through language acquisition may still be classified as a compound if he has had "compound" or fused experiences. Similarly, a bilingual who is a compound through language acquisition may be classified as a "coordinate" if he has had coordinate or separate experiences.

SEMANTIC GENERALIZATION TEST ITEMS

CONDITIONING TEST

Conditioned stimuli: GREEN; AUTRE; GARDEN

Translation stimuli: VERTE; OTHER; JARDIN

Spacers: ÉCOLE; HOUSE; FLEUVE; JEUNE; TREE; VIEUX; ROOM; PAPER; NUIT; PRICE

MEMORY-RECOGNITION TEST

List A

EARLY	CHAPEAU	QUATRE	BRIDGE
TRUE	RUE	STRONG	WINDOW
AVANT	ONLY	APRÈS	PETIT
BELONG	CHEVAL	DOOR	STORY
KNEW	HARD	AMI	CHAMBRE

List B

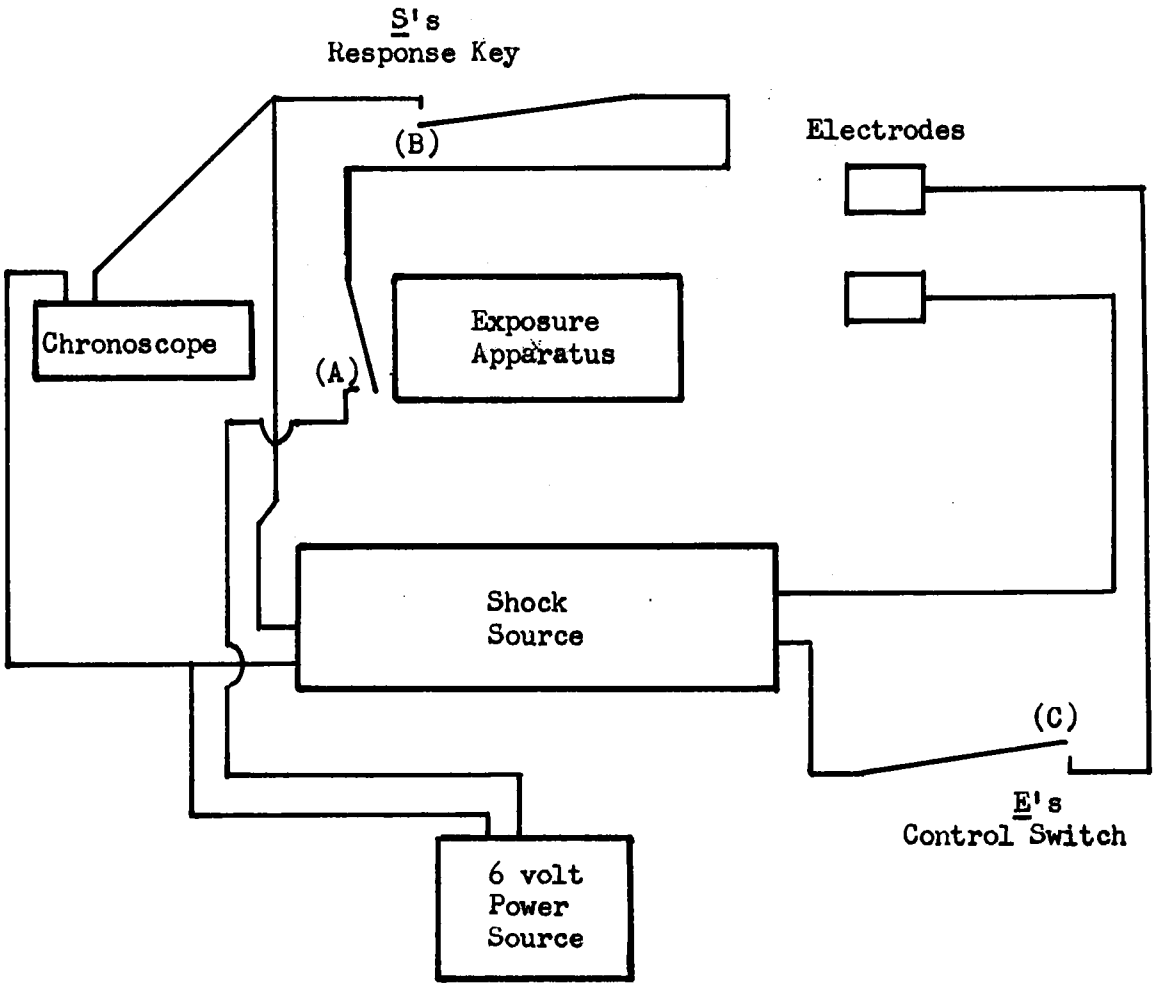
AVANT *	REASON	PONT **	CHIEN
EARLY *	ANNÉE	HORSE **	STREET **
FOUR **	FRIEND **	HEURE	HISTOIRE **
SOLEIL	BELONG *	JOYEUX	HARD *
HAT **	BLANC	KNEW *	FENÊTRE **
VRAI **	ONLY *	PORTE **	BECAUSE
STRONG *	TEMPS	THROUGH	JOUR
PETIT *	BOOK	APRÈS *	CHAMBRE *

*Words also appearing on List A
**Translations of List A words

WIRING DIAGRAM

of

CONDITIONING APPARATUS



When a word was exposed, the switch at (A) was closed by the Exposure Apparatus, activating the Shock Source and starting the Chronoscope. If S pressed the key at (B), he stopped the Chronoscope and neutralized the Shock Source. By closing the Control Switch at (C), E could determine whether or not a word would be accompanied by shock.