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STIMULUS MODES AND LANGUAGE MEDIA--A STUDY OF BILINGUALS.

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ELEVEN ENGLISH-SPANISH BILINGUAL COLLEGE STUDENTS PARTICIPATED IN A WORD-ASSOCIATION STUDY. EACH SUBJECT WAS PRESENTED 35 STIMULI IN EACH OF FOUR CONDITIONS--PRINTED ENGLISH WORDS FOR ENGLISH RESPONSES, PICTURES FOR ENGLISH RESPONSES, PRINTED SPANISH WORDS FOR SPANISH RESPONSES, AND PICTURES FOR SPANISH RESPONSES. THE SPANISH-PRINTED WORDS WERE THE COMMON EQUIVALENT TRANSLATION OF THE ENGLISH WORDS. THE PICTURES WERE SIMPLE LINE DRAWINGS OF THE OBJECTS NAMED BY THE 35 PRINTED WORD STIMULI. EACH SUBJECT WAS RANDOMLY ASSIGNED THE ORDER OF PRESENTATION OF EACH OF THE FOUR CONDITIONS. THE RESULTS, CATEGORIZED INTO SENSE-IMPRESSION AND NON-SENSE-IMPRESSION RESPONSES, INDICATED THAT IN BOTH ENGLISH AND SPANISH THE PROPORTION OF SENSE-IMPRESSION RESPONSES DID NOT VARY SIGNIFICANTLY ACROSS THE TWO STIMULUS MODES (WORDS AND PICTURES), NOR DID THE PROPORTION OF SENSE-IMPRESSION RESPONSES VARY SIGNIFICANTLY ACROSS THE TWO LANGUAGES, WHETHER STIMULI WERE PRESENTED IN THE WORD OR PICTURE MODE. HOWEVER, A TREND SEEN IN THE DATA TENDS TO INDICATE THAT WORDS RATHER THAN PICTURES EVOKE MORE SENSORY REACTIONS AND THAT ONE LANGUAGE (SPANISH) ELICITS MORE SENSE-IMPRESSION RESPONSES THAN ANOTHER (ENGLISH). A LARGER STUDY IS NEEDED. ONE OF SEVERAL IMPLICATIONS OF THE STUDY IS THE NEED TO CAREFULLY EVALUATE AUDIOVISUAL INSTRUCTIONAL METHODS IN LANGUAGE TEACHING. TABLES OF THE STIMULUS WORDS, THE RESPONSE CATEGORIES, AND CONCLUDING DATA ARE INCLUDED WITH A LIST OF REFERENCES. THIS PAPER WAS READ AT THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION CONFERENCE (CHICAGO, FEBRUARY 1966). (AUTHOR)

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Stimulus Modes and Language Media: A Study of Bilinguals*

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Traditional approaches in the study of concepts fall into two categories: (a) linguistic analysis, which investigates the already formed concepts of the subjects through verbal definition of their contents while ignoring the dynamics of concept formation, and (b) psychological analysis, which is concerned with the study of the psychological processes leading to formation of concepts while disregarding the role played by the verbal symbol in the process. However, there has been a trend in recent research towards integration of the aspects studied independently in the traditional categories. This psycholinguistic analysis no longer separates verbal symbols from the perceptual process in concept formation. Carroll (3), Vygotsky (17), and Underwood (14), among others, have presented theoretical discussions of psycholinguistics, while Goss (5,6), Staats (12), and Underwood and Richardson (15, 16) have provided some examples of the psycholinguistic research dealing with concept formation.

Numerous applications are feasible of such an approach to educational problems, most of which involve the formation and transmission of concepts via the medium of language. One example is the recent studies on the relationships between the stimulus modes (aural, visual, etc.) and the association responses (2,8,10,13,16) which seem to have a direct bearing on, among other things, the audio-visual instructional methods.

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Otto's earlier studies (8, 9) seemed to support the generally accepted principle that pictures have more sensory appeal than do printed words. However, a later, more systematic investigation by Otto and Britton (10) revealed that the verbal (printed) mode of presentation evoked a significantly higher proportion of sense-impression responses than did the pictorial mode. A replication study by Bourisseau, Davis and Yamamoto (2) supported the Otto-Britton results and suggested a further examination of the influence of stimulus modes in teaching-learning processes.

The fact that the mode of presentation of the same information seems to elicit different responses immediately invites the question whether such findings are a function of a specific language used as the transmission medium. If the same results, namely, the verbal (printed) mode eliciting a higher proportion of sense-impression responses than the pictorial mode, are obtained across different languages, the phenomenon obviously involves some central processes transcendent of the particular carriers of information. The present study tried to explore this possibility by employing bilinguals as subjects.

Procedure

Subjects

Eleven English-Spanish bilinguals participated in the study. The small number of subjects was due to absence in the area of such bilingual individuals at the particular educational level desired for this study. The subjects were to be college students who were at least beyond their second year. Such a level of educational achievement was selected because of the findings of Arsenian (1) that the older the subject and the higher his level of educational attainment, the smaller the discrepancy between

monoglots and bilinguals on verbal tests of intelligence, and that language deficiency, usually evident in bilinguals at the elementary school level, becomes stabilized by the first year of college. In other words, the bilinguals in the present study were selected so as to have as nearly as possible a matched repertoire in English and Spanish ("balanced" bilinguals).

Checking college scholastic records, observing group discussions and interviewing the students, as well as several of their instructors, produced evidence that these subjects possessed in both English and Spanish that level of excellence entitled "superior" as set forth in the Modern Language Association of America's set of qualifications for secondary school teachers of modern foreign languages (11), the criterion for the selection of bilinguals in this study. All these subjects had Spanish as their first language in the home, while seven also used English in the home from early childhood. Four of the students spoke, read, and wrote one other language besides English and Spanish, this third language having been learned from early childhood along with Spanish. Although English was the language most frequently used by all subjects in school and other places outside of the home, all subjects had formally studied both English and Spanish in school. The subjects represented the middle socio-economic class, including several from the upper level of the middle class.

Materials and Collection of Data

The materials for this study replicated as nearly as possible the materials used by Bourisseau, Davis and Yamamoto (1965). The basic stimulus words were chosen because of their demonstrated (8, 16) feasibility in the preparation of stimulus pictures and their effectiveness in evocation of sensory responses. A list of the 35 concrete nouns, English and Spanish

common equivalent translation, is given in Table 1.

Insert Table 1 about here

The 35 stimuli were presented in four conditions. In condition I (W_E -E), the subjects responded in English to English printed words (verbal stimuli); in condition II (P - E), they responded in English to simple line drawings (pictorial stimuli); in condition III (W_S - S), they responded in Spanish to Spanish printed words (verbal stimuli); and finally in condition IV (P - S), they responded in Spanish to the same simple line drawings (pictorial stimuli) used in condition II. Black-and-white slides were made for the presentation of the four conditions.

Each subject was individually administered all four conditions. The order of presentation of these conditions was randomized for each subject, although the 35 stimuli were presented in a fixed order within each condition. Intercondition (rest) interval was five minutes.

When he entered the testing room, the subject was given an answer sheet asking for general identification information. Space was provided for each to respond to 35 words in addition to several practice words. Each subject was instructed to respond with the first word that came to his mind when the slide was flashed upon the screen. In addition, for the P conditions, each subject was told to respond with a word other than the name of the picture.

The slide projector was timed at seven seconds per stimulus to prevent the subjects from intentionally selecting responses. A practice period preceded the presentation of the experimental stimuli. The subject was shown stimulus slides slowly at first and responses were suggested which included both sensory and nonsensory words. Then the subject was given

an opportunity to respond to a few words at a rapid rate to gain practice. During the actual experiment no comments or verbalization were made as the slides were flashed on the screen.

Analysis of Responses

Evaluation of the free association responses of this study was made by using the 40 sense-impression categories determined by Underwood and Richardson (16) in their hierarchial arrangement of responses to verbal stimuli. Any response not included in these categories, presented in Table 2, was classified as non-sense impression or non-sensory.

Insert Table 2 about here

Findings

As in several previous studies (2, 9, 10) subjects gave many more non-sensory responses than sense-impression responses to the stimuli presented. Of the 1540 responses over the four conditions and eleven subjects, only 99 (6.43 percent) were sense-impression responses. This proportion was much smaller than the 26 percent reported by Otto and Britton (10), and slightly less than the 7.92 percent figure reported by Bourisseau, Davis and Yamamoto (2). This may be due to the fact that the subjects in this study were older (college students) whereas those in the previous studies were younger, namely, grades 8 - 10 in the former study (10); and grades 10 - 12 in the latter study (2).

All of the eleven subjects gave sense-impression responses at some time during the four conditions. The total number of subjects, the number who did not give any sense-impression responses, and the percentage

of sense-impression responses are summarily presented in Table 3 for each condition.

Insert Table 3 about here

It is observed from Table 3 that (a) a higher proportion of sense-impression responses was elicited by the W mode than by the P mode in both languages (5.97 vs. 5.19 in English; 8.31 vs. 6.23 in Spanish), and (b) a higher proportion of sensory responses was recorded in Spanish than in English in both modes (8.31 vs. 5.97 in the W mode; 6.23 vs. 5.19 in the P mode).

The observed differences, however, did not attain any statistical significance. Thus, when the two stimulus modes were compared, $\underline{X}^2$ of .16 ($\underline{p} < .70$ for $\underline{df} = 1$) was obtained for English, while the value for Spanish was 1.29 ($\underline{p} < .30$ for $\underline{df} = 1$). Likewise, when the two languages were compared within each mode, $\underline{X}^2$ values were 2.19 ($\underline{p} < .20$ for $\underline{df} = 1$) and .62 ($\underline{p} < .50$ for $\underline{df} = 1$) for, respectively, the W and P modes.

It therefore should be concluded that, for these bilingual subjects, neither the stimulus modes nor the language media affected their performance on the association task when judged by the proportion of sense-impression responses.

Discussion

The results of this study did not lend support to an earlier observation (2, 10) that a higher proportion of sensory responses was elicited by a verbal mode of stimulus presentation than by a pictorial mode, nor did it provide any clear answer to the question of primacy of stimulus mode vs.

language medium in information transmission. The extremely small sample size did not help much in clarifying these problems and replication studies are obviously required. It should, nevertheless, be noted that the trend seen in the data tends to agree with both the idea that words rather than pictures evoke more sensory reactions and that one language (in this case, Spanish) elicits more sense-impression responses than another (English in this study).

The idea that concepts are verbal habit-families (12) complements the belief that language molds thinking. If the observed trend for Spanish to elicit more sensory responses than English is replicated in future studies, two different sets of thinking patterns may be suspected, one each for the two languages of a bilingual. On the other hand, the English and Spanish languages, selected in the present study, might have been too close in the sense of structuring thinking along two distinctly varying lines. It may be possible, in such a case, that the two languages of a bilingual act to form one common set of thinking patterns involving both languages in the hierarchy of verbal habit-families.

Here, in this context, the distinction suggested by Ervin and Osgood (4) between "compound" and "coordinate" bilinguals, or that proposed by Lambert, Havelka and Crosby (7) between "fused" and "separate" bilinguals, takes on a special meaning. The subjects of the present study would appear to belong to the compound or fused group of balanced bilinguals who are expected (4) to have a bilingual system in which the two languages constitute simply two different ways of encoding the same set of referential meanings. Whether the observed results may be replicated in a study with coordinate or separate bilinguals is a question for future inquiry since, for these

individuals, the referential meanings encoded in two languages are expected to differ to a considerable extent. Various combinations of bilingual subjects (types and levels) with particular languages involved (e. g., Spanish in the Southwest, Orientals in Hawaii, and the like) will yield valuable information when examined in a controlled situation such as the one utilized in the present study.

Further efforts to explore and experiment with variations in pictorial stimuli (involving greater complexities, addition of colors, etc.) in relation to verbal stimuli which also might be varied from that employed in this study, should provide valuable information. In addition to the change in the stimulus characteristics, variations in the receivers (involving age, socio-economic status, ethnic grouping, etc.) would also yield meaningful results.

Another potentially rich lode for investigation would seem to be the relationship of different stimulus modes and language media to the nature of responses in continued foreign language study and developing competence in a second language. Particularly as audiovisual materials are being used more and more to promote the learning of a second language through the aural-oral approach to language instruction, such data might be particularly important to selection of types of instructional materials most useful at various stages of language mastery. In addition, variations in the age level of the subjects studied might provide valuable information as to the type of instructional materials most useful at various age levels at which a foreign language may be introduced. Other variations in the subjects studied (involving socio-economic status, ethnic grouping, first language, etc.) might provide other useful results. Too, such research might yield another means of assessment of second language ability.

Table 1

List of Stimulus Words Employed in the Study[1]

No.	English	Spanish	No.	English	Spanish
X1.	shoe*	zapato*	16.	goat	cabra
X2.	cup*	taza*	17.	bone	hueso
X3.	balloon*	globo*	18.	barrel	barril
X4.	monkey*	mono*	19.	grasshopper	saltamonte
X5.	drum*	tambor*	20.	pillow	almohada
			21.	cigarette	cigarillo
1.	camel	camello	22.	forest	bosque
2.	skunk	mofeta	23.	pear	pera
3.	rabbit	conejo	24.	rattlesnake	serpiente de cascabel
4.	knife	cuchillo			
5.	elephant	elefante	25.	armour	armadura
6.	cigar	cigarro	26.	tack	tachuela
7.	dandelion	diente de león	27.	sheep	oveja
8.	hog	puerco	28.	tomato	tomate
9.	cradle	cuna	29.	telephone	teléfono
10.	kitten	gatito	30.	wheel	rueda
11.	eye	ojo	31.	diamond	diamante
12.	teeth	dientes	32.	apple	manzana
13.	pail	cubo	33.	anchor	ancla
14.	scissors	tijeras	34.	snail	caracol
15.	mouse	ratón	35.	needle	aguja

[1] English and Spanish equivalents. The assistance of Dr. Alberto N. Pamies, Department of Romance Languages and Classics, Kent State University, in the selection of Spanish equivalents is gratefully acknowledged.

*Practice stimuli.

Table 2

Sense-Impression Response Categories

English	Spanish	English	Spanish
round	redondo	dark	obscuro
small	pequeño	sour-bitter	agrio, amargo
white	blanco	hairy-furry	peludo, cabelludo
hard	duro	wet-moist	mojado
smelly	oloroso	woody	de madera
soft	blando, suave	sharp, strong, tangy	picante
shiny	brillante, lustroso	heavy	pesado
big	grande	greasy	grasiento
long	largo	dirty	sucio
yellow	amarillo	deep	hondo
brown	pardo, castaño	cold	frío
metallic	metálico	noisy	ruidoso
green	verde	fuzzy	velloso
sweet	dulce	light (not heavy)	ligero
red	rojo	square	cuadrado
sharp	agudo	clear	claro, límpido
pointed	puntiagudo	sticky	pegajoso
slimy	viscoso, muscoso	narrow	estrecho
black	negro	rough	áspero
smooth	liso, terso	flat	plano, llano

Table 3

Total Number of Subjects (N), Number of Those Not Giving Any Sense-Impression Responses (N*), Total Number of Sense-Impression Responses Given (R), and Percentage of Sense-Impression Responses Given (P), by Condition

Condition			Subject[1]		Sense-Impression Response[2]	
No.	Stimulus	Response	N	N*	R	P
I	English word (W_E)	English (E)	11	2	23	5.97
II	Picture (P)	English (E)	11	3	20	5.19
III	Spanish word (W_S)	Spanish (S)	11	3	32	8.31
IV	Picture (P)	Spanish (S)	11	2	24	6.23

[1]The same eleven subjects responded under all four conditions. The order of the conditions was randomized for each subject.

[2]Each subject gave 35 responses under each condition. Accordingly, the total number of responses for each condition was 385.