

**CROSS-CULTURAL INVESTIGATION
OF SOME FACTORS IN
PERSUASION AND ATTITUDE CHANGE**

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VERBAL ASSOCIATION BY CHINESE
AND AMERICAN STUDENTS AS A
FUNCTION OF WORD FREQUENCY AND
MODE OF PRESENTATION

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INTRODUCTION

The utility of number of associations as a predictor of other characteristics of verbal learning has been well established by Noble and his associates (cf Noble, 1963), and it seems reasonable to suppose that a number of these functional relationships will be general across various language communities. However, it is also clear that certain aspects of associational structure differ across cultural settings (Rosenzweig and Miller, 1966).

Based on the finding that Japanese students were more influenced by written than by spoken arguments, McGinnies (1965) has suggested that a given mode of communication may be more effective in one language than in another due, in part, to language structure. These results contrasted with findings previously reported with American students in which live speakers, recorded speakers, and print were effective in roughly that order (Hovland, 1954; Klapper, 1961). Exceptions to this general finding, for example those of Kower (1935, 1936), have also been reported. Of some relevance to this general problem are experiments by Williams and Derks (1963) and by Schulz and Kasschau (1966) who found, respectively, that visual and aural presentations influenced paired-associate and serial learning rates. Further, Vicory and Asher (1966) suggested that stimulus mode of presentation may be an important parameter of associations, but they did not report association values across modalities nor did they make comparisons across cultural groups.

McGinnies suggested as a partial explanation for his findings that Japanese is primarily a visual language, in contrast to English which

is more an auditory language. That is, word for word a greater wealth of meaning may be conveyed by printed or written Japanese than by printed or written English. For one thing, the Japanese language makes use of three types of characters: hiragana, a system of phonetic symbols; katakana, used in writing foreign words and words of foreign derivation; and kanji, an adaptation of Chinese ideographic script. Both Japanese and Chinese children spend relatively more time in school learning to read and write their own languages than do American school children. University students, according to some reports, depend more upon library resources than upon lectures. Consequently, both tradition and the structural features of the printed language may combine to lend greater meaning as well as greater credibility to visual media as opposed to auditory media of verbal communication.

It seemed important to examine one aspect of this generalization within an experimental design where the number of verbal associations could be measured as a function of presentation medium. However, rather than comparing English with Japanese, where alternative ideographic representations of a word could be made, we chose the Chinese system of kanji for our purposes. The Ss were drawn accordingly from students attending National Taiwan University, and for the English data, from the University of Maryland.

It is evident that the question of meaning as such is not dealt with by associational measures, (Noble, 1963; Osgood, Suci, and Tannenbaum, 1957). However, some dimension of meaningfulness is probably

measured appropriately by Noble's procedures. With these considerations in mind, we focused our experimental questions on the variations in number of associations as a function of (a) mode of stimulus presentation (written vs. oral), (b) two strikingly different language systems (Chinese and English), and (c) the frequency of occurrence of the units in the written language--a variable found to be highly correlated with number of associations for American Ss (cf Noble, 1963).

Method

Subjects and Materials. A total of 30 stimulus words, shown in Tables 1 and 2, were selected as follows. The 15 high-frequency (HF) words are described by Lee (1965) as (a) appearing more than 4 times in 20 issues of the Central Daily News, a newspaper published in Taipei, and (b) having an \bar{m} value (Noble, 1952) of greater than 5.00. Although Lee also presented words that occurred only one time in his sample, only a few of these met our criterion that the low-frequency (LF) words have \bar{m} values of 3.00 or less. Therefore, the 15 LF words shown in Table 1 were selected from lists published by Noble (1952) to meet this \bar{m} criterion. The median "L" count values (Thorndike and Lorge, 1944) for the HF and LF words, respectively, were 353 and 13. When these words were translated into kanji, they still preserved the HF and LF distinction according to the estimates of a native speaker of Chinese. According to Howes' (1966) count of spoken English, the median frequency of occurrence in 250,000 words was 7.0 for our HF words and 0.2 for our LF words.

In each country, 8 females and 2 males were unsystematically assigned in groups averaging 3 in number to one of the four experimental conditions: (a) HF words, oral or printed; (b) LF words, oral or printed. Thus, our basic design was a 2 X 2 factorial.

Procedure. For both modes of presentation, the Ss were provided with 15 small booklets, each containing 12 pages. In the visual mode, each page of a given booklet had the same stimulus word printed at the top. In the auditory mode, the pages were all blank, but E enunciated the same stimulus word once for each of the 12 pages. The Ss were allowed 5 sec. to write a single association and then were asked to turn the page on signal. We hoped that this procedure (a) would lessen the tendency of the Ss to give chain associations by redirecting their attention to the stimulus on each trial, and (b) would reduce any associational advantage resulting from differences in stimulus duration due to mode of presentation. Standardized instructions were read verbatim by E in the appropriate language and were the same for all Ss. A trial word (lesson) was first presented to accustom all Ss to the procedure. The twelve 5-sec. periods used for each stimulus word appeared sufficient to "exhaust" the number of associations generated by the Ss, and each 5-sec. period seemed long enough to preclude partial responses due to lack of time, which might be especially critical for Chinese Ss.

In Taiwan, the experimental sessions were conducted by a female graduate student in psychology. At Maryland, the data were collected by two female undergraduate psychology majors. The Chinese data were trans-

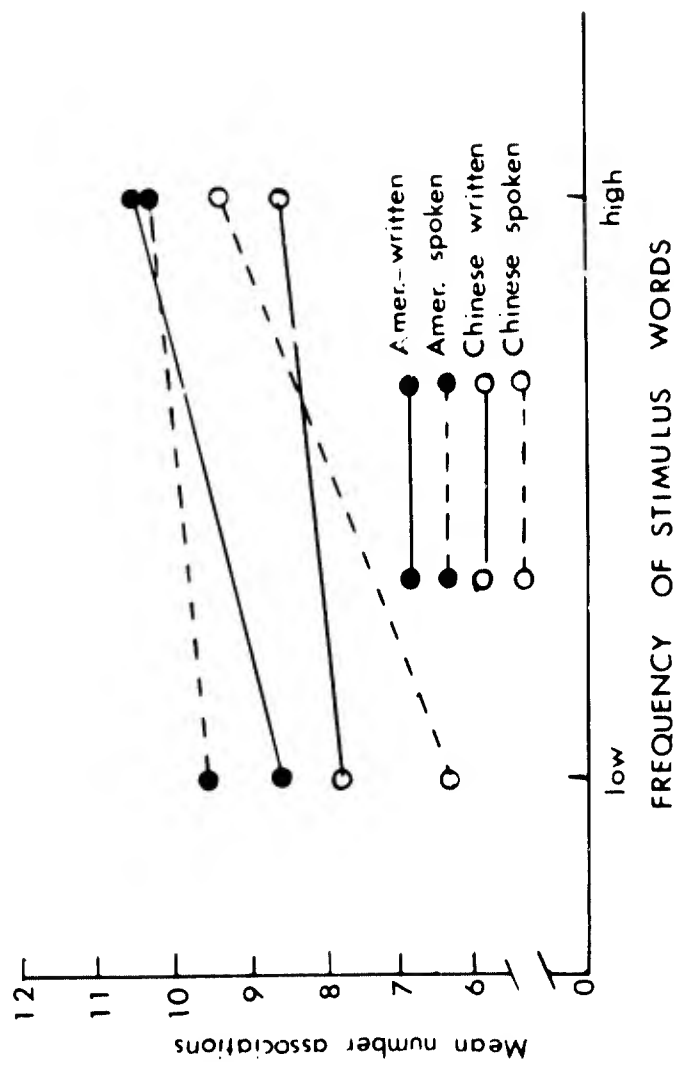
lated and scored before being returned to the United States, where the translated associations were subsequently verified and enumerated by an English-speaking Chinese student at Maryland.

Results

Number of associations. It had been hypothesized that mean number of associations by Chinese and American students would vary as a function both of word frequency and mode of presentation. There was presumptive evidence that number of associations in Chinese would be favored by visual presentation of the stimulus words, and that the reverse would be found with English. We had no basis for predicting what directions the interactions between mode and frequency might take in the two languages.

Figure 1 presents the mean numbers of associations of the subjects in the two countries under each of the experimental conditions. An analysis of variance of these general results showed that both Frequency, $F(1,72) = 22.1, p < .01$, and Language, $F(1,72) = 24.7, p < .01$, were significant main effects. Mode of Presentation was not a significant main effect, $F(1,72) < 1.00$, but it did interact significantly with both Language and Frequency, $F(1,72) = 6.3, p < .05$, as shown in Fig. 1. None of the remaining interactions reached the .05 level of significance, $F_s(1,72) < 1.00$. We will now consider each of the three significant results in turn.

Main effects. First, so far as word frequency is concerned, it is reassuring to find that more common words in both Chinese and English



evoke more associations on the average than do uncommon words. The generalization that meaningfulness and frequency of usage are positively related seems to hold in both Chinese and English.

The significant main effect due to language is less readily explained. It is clear in the data that the American Ss generated more associations under both frequency conditions and both modes of presentation than did the Chinese Ss. Whether this is due to some undetected differences in experimental procedures, to characteristics of the two languages, or to differences in "test-wiseness", we cannot say for certain. However, since care was taken to standardize both instructions and procedures in the two cultural settings, we are inclined to the conclusion that the results are not artifacts but are due to language characteristics such as (a) differences in "associative fluency" of the Chinese and American students, or (b) differences in the actual number of verbal associations available in Chinese and in English, due to the more restricted meanings contained in kanji characters.

Interaction effects. Before attempting to interpret the apparent differences between the means of the various experimental conditions, shown in Fig. 1, we used Duncan's multiple range test (Edwards, 1960) to determine whether the differences in number of associations between the written and spoken modes were significant for either of the language samples. The four comparisons of particular interest here were between the mean associations to written and spoken stimuli at a given frequency level for each language. Of these four differences, the only signifi-

cant one ($p < .05$) was between the mean associations in Chinese to LF words when written and when spoken. Thus, written presentation favored association to the LF words, but vocal presentation did not reliably favor associations to the HF Chinese words, despite the reversal in Fig. 1. For the American Ss, presentation mode did not differentially influence number of associations to either LF or HF words, although there is a trend ($p < .10$) for LF words to be favored in the vocal medium.

The overall main effect of an increase in number of associations with increasing frequency counts and m-values holds for both languages. This, together with the greater number of English associations and the advantage of written Chinese in the LF condition, accounts for the significant triple interaction.

Content of associations. The associations by the Chinese subjects were translated into English and tallied for frequency of occurrence. The American data were also tallied so that we might detect any differences in the kinds of associations given by subjects in the two countries. Tables 1 and 2, which present the most frequently occurring associations in each language to the LF and HF frequency words, reflect the fact that associations differed not only in number but also in kind across the two language groups.

One useful comparison here is of the commonality of associations given during written and vocal presentation of a given stimulus word. For example, village whether written or spoken in English evokes the

Table 1. Low Frequency Stimulus Words and Their Associates for the Various Experimental Conditions

STIMULUS WORDS	MODE OF PRESENTATION			
	WRITTEN	WRITTEN		SPOKEN
	MOST FREQUENT CHINESE ASSOCIATE	MOST FREQUENT AMERICAN ASSOCIATE	MOST FREQUENT CHINESE ASSOCIATE	MOST FREQUENT AMERICAN ASSOCIATE
LOGIC	Reason (8)	Math (5)	Philosophy (7)	Math (6)
ASSET	Property (7)	Good (6)	Property (6)	Money (6)
MAGIC	Skill (8)	Rabbit (9)	Cheating (3)	Magician (7)
STATUS	Humble (6)	Money, Position (4)	Degree (6)	Money (5)
ZENITH	Stars (7)	Television (TV) (7)	Sky (5)	Top (5)
MATRIX	Model (7)	Mathematics (6)	Printing, Lead (6)	Math (5)
PIGMENT	Red (6)	Color (10)	Color(s) (13)	Skin (6)
PALLOR	Old Age, Blue (4)	Color(ing) (8)	Cloudy, Sadness, Dull, Grief (3)	White (4)
RAMPART	Defend (5)	Sons (4)	War (5)	War (3)
ENDIVE	Cabbage, Vegetable (7)	Lettuce (6)	Delicious, Meadow, Plant (3)	Vegetable (4)
ROSTRUM	Medical (7)	Speaker (5)	Physician, Experiment (5)	Speaker (4)
QUOTA	Limit (3)	Amount (5)	Examination (4)	Amount, Business, Enough, Limit, Number (4)
SEQUENCE	Order (12)	Order (7)	Rules (5)	Order (6)
PALLET	Clean (6)	Paint (6)	Rock, Gigantic, Stone, Marvelous, Cliff (3)	Paint(er) (ing) (8)
BOULDER	Rock(s) (7)	Dam(s) (6)	Stone(s), Cliff (5)	Rock (3)

^a Incorrectly translated into Chinese as forceps.

Table 2. High Frequency Stimulus Words and Their Associates for the Various Experimental Conditions

STIMULUS WORDS	MODE OF PRESENTATION			
	WRITTEN		SPOKEN	
	MOST FREQUENT CHINESE ASSOCIATE	MOST FREQUENT AMERICAN ASSOCIATE	MOST FREQUENT CHINESE ASSOCIATE	MOST FREQUENT AMERICAN ASSOCIATE
High-frequency words				
TRAFFIC	Plane, Car ^d (7)	Car(s) (10)	Automobile (7)	Car(s) (3)
VILLAGE	Paddyfield (6)	Town (3)	Farmer(s) (3)	Town (7)
COLOR	Red (6)	Yellow (3)	Green (6)	Red (7)
UNCLE	(see footnote c)	Aunt (3)	Aunt (3)	Aunt (7)
CAPTAIN	Sailor (8)	Ship (7)	Sailor(s) (10)	Ship, Army (6)
PRODUCT	Machine (4)	Store (6)	Factory, Loyalty (6)	Clothes, Food (3)
KITCHEN	Cooking (7)	Sink (7)	Stove, Bowl, Food (4)	Cook(ing) (7)
MISSION ^a	Boss (5)	Church (7)	Manager, Chairman Animal (3)	Church (3)
MONEY	Crime (5)	Bank (7)	Crime, Happiness (3)	Clothes (4)
TYPHOON ^b	Flood (1)	Wind(s) (9)	Rain, Fallen Trees (7)	Wind(y) (3)
LANDLORD	Tenant (6)	Rent (10)	Tenant (7)	Rent (3)
INSECT	Worm (5)	Bug (9)	Mosquito (6)	Bug(s) (8)
REGION	Place (6)	Area (6)	Motherland (5)	Area, Mountain(s) (6)
NECKTIE	Suit (7)	Shirt, Man (4)	Suit, Gentleman (5)	Shirt (4)
EFFORT	Work (6)	Try(ing) (10)	Success (3)	Try (6)

^a Quite similar in meaning to occupation in Chinese.

^b Although infrequent in English, this word occurred quite frequently in Lee's (1965) Chinese norms.

^c Includes all of the specific familiar denotations, e.g., father's older brother, mother's younger brother, etc.

^d Numbers in parentheses are \$s giving associate.

response town. In Chinese, however, village when written evokes paddy field and when spoken evokes farmers. In English, the identical association occurred for both stimulus modes about three times more often than in Chinese. For the HF stimulus words, such patterns occurred 11 times with the American Ss and only 5 times with the Taiwanese Ss. In the case of LF words, identical associates were given in both modes 7 times by the Americans and only once by the Taiwanese. Thus, it appears that frequently used words in both Chinese and English are more likely than infrequently used words to evoke the same associations when printed and when spoken. This effect, however, is markedly greater in English.

Discussion

At the outset of this paper, we raised the possibility that printed material utilizing kanji and read by Japanese students have greater persuasive impact than material delivered vocally because of an "increment" in meaningfulness obtained with the printed mode. We attempted in limited fashion to test this hypothesis by determining the number and kinds of associates given by students familiar with kanji or with English to HF or LF stimulus words presented vocally or in print. The results suggested that no differences in number of associations under the two modes of presentation are to be expected with American students, although HF stimulus words produced a significantly greater mean number of associates in general.

Students in Taiwan associating to the same words in kanji, a

Chinese system of ideographs, generated significantly more associates to LF words when written than when spoken. A similar advantage was not conferred on written HF words, where mean number of associates was slightly less than for vocal presentation. These findings taken together, necessitate a qualification of our original assumption. It appears that meaningfulness, as reflected in free associations, is a function of mode of presentation only in the case of relatively infrequent Chinese words. Unfortunately, we do not have word counts for Chinese analogous to those developed by Thorndike and Lorge (1944) for printed English, or by Howes (1966) for spoken English. But it is likely that the average person using either language selects less erudite expressions when speaking than when writing, which would have a bearing on our results.

Extent of one's vocabulary in any literate country is a measure of one's education and general verbal facility, and this is perhaps even more true in Chinese than in English. In everyday speech, only the more common kanji forms would be rendered vocally, with the more elegant characters being reserved for writing and printing. We obtained some data supporting this assumption by asking 13 Chinese Ss in this country and 18 American Ss to make ratings on a 5-point scale of how frequently they had encountered our stimulus words when printed or when spoken. The Chinese Ss rated the LF words as seen more often than heard (3.32 vs. 3.01) and the HF words as heard more often than seen (4.32 vs. 3.99). The interaction of Mode of Encounter and Frequency was highly significant,

$F(1,16) = 20.10$, $p < .01$. This finding is consistent with the association findings as well as with our interpretation of them. The American Ss rated both the LF words and HF words as being heard more often than seen. The respective means were 3.29 vs. 2.96 and 4.19 vs. 3.84. However, neither the effect of Mode of Encounter nor its interaction with Frequency, $F_s < 1.69$, was significant. Frequency was, of course, a significant main effect, $F(1,16) = 268.83$, $p < .01$. Thus, in agreement with our association data, these ratings indicate that meaningfulness does not vary with mode of stimulus presentation for American Ss.

In view of the fact that LF words in Chinese are judged more frequently encountered in writing, whereas HF words are more often encountered in speech, it becomes somewhat more apparent why written presentation favored association to LF words for Chinese Ss, since ratings of frequency of encounter are related to m (cf Underwood and Schulz, 1960). However, at this point we would like to consider an additional factor; viz., the Chinese system of ideographs seems to contain more characters that differ in meaning but sound the same when spoken than is the case in English. It is difficult, for example, to distinguish in English between raise and raze, presented vocally, and there are relatively more such phonetically indistinguishable words in Chinese.¹ It is common practice for one Chinese (or Japanese) to ask another to indicate how his name is written, even after hearing it

¹This generalization is based upon the judgments of several of our Chinese consultants. Exact data, unfortunately, are lacking.

pronounced, so as to differentiate it from other phonetically similar but ideographically different forms. This is occasionally done by inscribing the characters in question with a finger in the palm of the hand. This means that a LF kanji character, which is already less meaningful than a HF character, has its capacity to evoke relevant associations impaired even further when it is spoken and, thereby, rendered somewhat ambiguous. The written stimulus, on the other hand, is more readily comprehended, and the association process is facilitated. Is there any confirmation for this line of reasoning in the content of the associations?

The data in Tables 1 and 2 show that for the LF stimulus words, there is only one association in Chinese that is identical for both the written and spoken modes, whereas five identical responses occur across modes to the HF words. This difference suggests that a common meaning is more likely to be conveyed by both the written and spoken forms in the case of HF words than is the case of LF words. This effect is not present to nearly as great an extent in the data for the American subjects, where even in the LF condition nearly half of the associates in the two modes are identical. We are inclined, therefore, to interpret the results as suggesting that greater ambiguity is introduced in the case of LF words by spoken Chinese than by spoken English, and that this serves to depress the number of associations available to Chinese Ss under this condition. HF words in both languages convey sufficiently unambiguous meanings as to render the written and spoken modes roughly equivalent in their capacities to evoke free associates.

The implications of these findings and interpretations for the learning in different media of persuasive materials varying in meaningfulness are, perhaps, obvious. For example, the fact that meaningfulness varies as a function of mode of presentation for Chinese Ss suggests that differential learning rates would be encountered according to the method of presentation. Of course, such an effect on learning has been found for American Ss (Shultz and Kasschau, 1966). However, the particular configuration of means might be quite different from that for American Ss. Other implications in the area of social psychology include the requirement that one assess the influence of the medium of communication as it interacts with degree of familiarity of the material for the particular culture in which persuasion may be attempted.

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13. ABSTRACT Associations were obtained from 40 <u>Ss</u> each at National Taiwan University and the University of Maryland to words presented either vocally or in writing. The words varied in frequency of occurrence for both languages. American <u>Ss</u> produced more associations than the Taiwanese <u>Ss</u> under all conditions. In both samples number of associations increased with frequency of the stimulus words. Printed Chinese enjoyed a significant advantage over spoken Chinese in evoking associations to infrequent words. This finding, which did not obtain for the English words, was attributed in part to a relatively greater degree of ambiguity introduced by the spoken mode for the infrequent Chinese words. An analysis of the associations tended to support this hypothesis, as did ratings by Chinese and American <u>Ss</u> of frequency of contact with the words in writing and in speech.		

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