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A STUDY OF PERCEPTUAL DEFENSE INVOLVING BILINGUALS[1]

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This experiment demonstrates the perceptual defense phenomenon in two languages by children who are bilingual in English and Tagalog.

Recognition thresholds were determined for anxiety-provoking and neutral words which were matched for length and (in the case of English words) frequency of occurrence. Thresholds were measured by presenting words in both languages by means of tachistoscopic exposures of ascending durations. Defense was inferred when thresholds for anxiety-provoking words were higher than thresholds for neutral words.

Defense against anxiety-provoking words was found to be significantly greater in the primary language than in the secondary language of the bilingual.

These findings were interpreted as evidence for perceptual defense in a cross-cultural setting. They suggest that linguistic defense phenomena are partially a function of the learning history of the subject with respect to verbal material.

The class of phenomena which is called perceptual defense has been the object of extensive theoretical scrutiny and experimental investigation. There are several general assumptions upon which an acceptance of perceptual defense is based. These include the postulates that perception is a functional response, and that it can be affected in accordance with the laws of learning. Perceptual responses are also judged to be related to variables of motivation, defense "consisting of a delay in the recognition of an inimical stimulus until such a time as accurate identification was inescapable" (Hall, 1961).

The first experiments from which perceptual defense was inferred were those carried out in the late 1940's and early 1950's by McGinnies (1949, 1952), Postman (1958), Lazarus and McLeary (1951), and Cowen and Beier (1954) among others. The general procedure was to present subjects with two lists of words, one list presumably taboo and anxiety-provoking, and the other neutral in affective quality. The stimuli were presented to subjects under less than optimal conditions, such as low illuminations, brief tachistoscopic exposures, or blurred carbon copies.

Recognition thresholds were determined for the two types of stimuli by using an ascending method of limits and an indicator of total initial accuracy. That is, identification thresholds were measured by improving the viewing conditions in discrete steps until the word exposed was recognized and reported by the subject. Significant differences were found between the average mean thresholds of the two lists.

This study attempts to compare defense in two languages by bilinguals through a demonstration of the phenomenon of perceptual defense using material in two languages.

Previous studies of perceptual defense have been confined to members of a single cultural group, all of whose members have been subject to approximately equivalent language training which is usually not specified in the experimental design.

In this experiment, subjects are members of the same general cultural milieu, but have different histories with regard to language learning.

These histories are independent variables. In

[1]This article was submitted as a Master's thesis in Psychology at the University of the Philippines, 1963.

the past experience of each subject, certain "habits" have been formed. That is, certain responses have become more probable in the presence of specified stimuli, because of the temporal contiguity of stimuli or because the responses have been reinforced. The responses which the subject makes in the experimental situation are, in part, a function of these past experiences.

The dependent variables are the amounts of perceptual defense displayed by the subjects against anxiety-arousing materials in their two languages. The experiment seeks to determine whether perceptual defense is greater in the primary language than in the secondary language. If there is evidence for this hypothesis, it will suggest that perceptual defense is a function of the processes of language learning in the life histories of the subjects.

METHOD

This study consisted of two parts: Experiment A was the initial study, Experiment B was a replication of Experiment A using a second group of subjects and variant stimulus materials.

Subjects

Subjects were forty-five students from the University of the Philippines Elementary School, Grade Five. All were born in the Philippines. Forty were children of native-born Filipinos; five had one Filipino parent (American, Chinese, Indian or Spanish), residing in the Philippines.

The Philippines is a nation of bilinguals and polyglots. In addition to their native dialect or "vernacular", most Filipinos have been exposed to varying degrees of English, Spanish and/or the dialect which, for the subjects in this experiment, is Tagalog. Often a dialect is spoken at home, and English at school or at work.

Subjects were divided into two experimental groups, Tagalog-primary and English-primary. This was done prior to the experiment on the basis of a questionnaire filled out by the child's parents (reproduced in Appendix A). Criteria for assignment to one of the groups were as follows:

Tagalog-primary

At least one parent native Tagalog.

Two of the following three conditions fulfilled:

Tagalog was the primary language in the home;
Child spoke Tagalog primarily before entering school;
Child was scolded primarily in Tagalog.

English-primary

Not more than one parent native Tagalog.
Two of the following three conditions fulfilled:

English was the primary language in the home;
Child spoke English primarily before entering school;
Child was scolded primarily in English.

The child's most recent grades were also consulted, and it was determined that the grade in the secondary language was not substantially higher (by more than .5) than the grade in his primary language. (See Appendix B for data on subject's linguistic backgrounds). Although the grades may have indicated level of accomplishment rather than proficiency, this procedure was potentially useful in eliminating borderline cases. However, in this sample, there was no case in which grades were inconsistent with the information from the language background questionnaire.

In the U.P. Elementary school most of the students are Tagalog-speaking, and at entrance to school have a slight to moderate knowledge of English. However, from the beginning, all classes were conducted in English, with the exception of a period a day devoted to the dialect, officially called Pilipino, which is Tagalog. The playground language remains principally Tagalog.

There is a second group of students who enter school with only a minimum knowledge of Tagalog. They may speak English at home or another dialect. They become exposed to Tagalog in the playground and in the Tagalog class, which is conducted almost solely in Tagalog. By the time they have reach Grade Five, all students (with the exception of a few newcomers), are assumed to have sufficient fluency to read and speak both English and Tagalog with ease. They can, therefore, be regarded as bilingual.[2]

All subjects were between ten and twelve years old, and had attended U.P. Elementary School since at least Grade Three. These restrictions were imposed in order to insure a rough degree of equivalence in educational background and years of linguistic training. The age group was chosen by the following considerations. At this level, subjects have attained a fairly wide reading vocabulary and they have had several years' exposure to reading materials in both languages. Further, it was anticipated that the effects of the differential pre-school and home experiences of the subjects would not have been obliterated by school training up to Grade Five. Lastly, this is the age group at which, according to Piaget, syncretism of understanding is at its height, that is, the meaning of a word (at least in the primary lan-

[2]Osgood (1954) divides bilinguals into two categories. First is the compound bilingual who learns both languages in the same non-linguistic context. Included in this group are bilinguals whose family uses both languages interchangeably, and those who acquire a second language in a school stressing drill and translation rather than the direct method. The second or coordinate group learn the two languages in separate non-linguistic contexts. One language is learned in the home, the other in a school using the direct rather than the translation method (Lambert, 1954).

guage) would be liable to the influence of the entire context in which it has occurred in past and present experience (Piaget, 1955).

All subjects had received a passing average during the most recent marking period. In the absence of I.Q. information, a minimal level of intelligence, which was all that was required, was indicated by ability to do fifth grade work.

Any subject unable to read any word at exposure of 1.00 second during the practice period was excused. Adequate visual acuity was implied for all subjects by this procedure. Students were requested to wear glasses during the experimental session if they customarily wore them for reading. Only one subject wore glasses.

Subjects were rated by their teachers on amount of nervousness and anxiety displayed. Each subject was rated independently by his teachers on a five-point scale (See Appendix C for Anxiety Rating Scale). In order to standardize ratings of the different teachers, each rating was transformed into a standard score. The rating for thirty-five subjects was the average of ratings by three teachers. For ten subjects, the rating by only one teacher was available.

Materials

Defense was tested by determining recognition thresholds for emotional and neutral words.[3]

For each experiment within the study, two lists of twelve words each were prepared. One list was of English word, the other of Tagalog. Each list contained six neutral words and six words assumed to be anxiety-provoking for children of this age group. The lists are shown in Table 1.

The English list was prepared first, in the following manner. First, six anxiety-producing words were chosen. Words were judged anxiety-producing if:

(1) They occurred in any list of words used in published studies of perceptual defense; or

(2) They received a rating of 500 or higher on the good-evil scale of the Jenkins' semantic differential atlas (Jenkins, 1958); or

(3) They were a close synonym of either of the above.

Each anxiety word was then matched with a neutral word of the same length and frequency of occurrence as measured by the Thorndike Word-list for children (Thorndike, 1932). If any of the words of matching frequency and length were found in the Jenkins' *Atlas* with a rating between 225 and 375, they were considered neutral. However, inasmuch as very few of these words were found in the *Atlas*, a subjective choice of neutral words was made from the available alternatives

[3]It was expected that perceptual defense against linguistic material would be marked in a Philippine setting where use of pleasant speech and euphemism is highly valued, and "harsh and insulting speech correspondingly devalued" (Lynch, 1962).

TABLE 1

TEST MATERIALS

EXPERIMENT A

Anxiety Word	Neutral Word	Frequency
English		
1. bad (687)*	A. red (353)*	1a**
2. shame	B. plate	2a
3. stink (stench 590)*	C. clown	7
4. breast	D. shadow (shady 367)*	2a
5. devil (663)*	E. model	2b
6. dumb	F. ours (Me-247)*	3a
Tagalog		
7. pilyo	G. busog	
8. hiya	H. oras	
9. mabaho	I. umulan	
10. suso	J. biro	
11. demonyo	K. sinulid	
12. gago	L. tayo	

Total number of letters in English words: 56
Total number of letters in Tagalog words: 58

EXPERIMENT B

Anxiety Word	Neutral Word	Frequency
English		
1. rude	A. bent	2b
2. cheat (steal-667)*	B. pilot	4a
3. stupid	C. energy	4b
4. belly	D. fable	6
5. filthy	E. planter	6
6. lice	F. stub	11
Tagalog		
7. bastos	G. palagi	
8. dayain	H. manood	
9. tanga	I. lahat	
10. tiyan	J. buhay	
11. basura	K. pareho	
12. kuto	L. sabi	

Total number of letters in English words: 60
Total number of letters in Tagalog words: 64

*Figures in parenthesis refer to rating on Scale 11 (good-evil) of Jenkins' Atlas (Jenkins, 1958).

**Frequency ratings are from Thorndike's Teacher's *Word Book* (Thorndike, 1932). Category 1a includes the 500 words of greatest frequency in this sample; 1b the second 500 words, 2a the third 500, 6 the six thousand, etc.

of matching frequency and length in the Thorndike list.

With the aid of the fifth grade Tagalog teacher, and a Tagalog-English Dictionary,[4] the Tagalog list was matched with each English anxiety word if it was judged that it was roughly equivalent in:

(1) Denotative meaning;

(2) Connotative meaning and strength;

(3) Familiarity to fifth grade students;

(4) Reading level.

Finally, a neutral Tagalog word was matched with each Tagalog anxiety-word with respect to length, subjectively judged familiarity and frequency, and reading level. The two lists, English and Tagalog, were equated for total length of words (within four letters for twelve words).

The lists were arranged in a "systematized random order" as follows:

Experiment A:

1 B 3 D A 2 C 4 5 E F 6 (English)

7 I 8 G J 9 H 10 12 L K 11 (Tagalog)

Experiment B:

A C 2 B 1 3 D 4 5 E F 6 (English)

J H 9 G 7 8 I 10 12 L K 11 (Tagalog)

The lists were typed in Pica capitals by a Royal Aristocrat portable typewriter on an adding machine paper roll.

Some procedural shortcomings in this type of experiment were suggested by Spense who wrote:

". . . the affective qualities of the so-called 'taboo' and control stimuli are usually assumed, not predetermined."

". . . the frequency counts generally used often do not apply specifically to the experimental sample". (Spense, 1957)

It is recognized that these structures are especially valid in a cross-cultural experiment using more than one language, and their implications for the limitations of this study are evidently to be taken into considerations.[5]

[4]Dictionary: Pilipino-English/English-Pilipino, ed. A. A. Tablan/C. B. Mallari, New York: Washington Square Press, 1961.

[5]Matching of Tagalog and English words with regard to emotional connotations was particularly dependent upon subjective opinion. One reader suggested that "busog" and "biro" could be anxiety words, that "tiyan" and "basura" were relatively neutral, and that "basura" was a poor equivalent for "filthy". Inasmuch as statistically significant results were obtained, however, the lists as a whole can be regarded as adequate.

Procedure

In Experiment A, twenty-five subjects were used, fourteen Tagalog-primary and eleven English-primary. In Experiment B, twenty subjects were used, sixteen Tagalog-primary and four English-primary. The imbalance in the number of subjects in the two groups in Experiment B was due to the limited number of available subjects in the English-primary group. It was decided to equate the numbers of subjects in the two groups as nearly as possible in Experiment A, and use whatever further subjects were available in Experiment B.

Different word lists were used in each experiment. It was felt that a replication of Experiment A, in Experiment B, was desirable in order to indicate that the results were not a function of particular words, but rather of the more general classes of anxiety-producing words versus neutral words.

In each experiment, subjects were tested individually using the Gerbrands Tachistoscope (1953 model) in the U.P. Psychological Laboratory. Materials were shown at a distance of approximately 24" from the viewing aperture of the apparatus.

Levels of illumination in the tachistoscope and the laboratory itself were kept constant. There were four 4-watt, 400-volt fluorescent bulbs in the tachistoscope itself. The laboratory area, approximately 25 feet x 13 feet x 16 feet in height was illuminated by two pairs of 40-watt, 110–volt fluorescent bulbs, approximately 12 feet from the floor. One pair was almost directly over the tachistoscope. The other pair was approximately 15 feet distant from and parallel to the first pair. A third pair of similar lights was visible, placed at the same height in an alcove forming an L with the laboratory. These lights were approximately 9 feet from the second pair, in a straight line with them.

After entering the laboratory, each subject was seated in front of the tachistoscope and was read the following instructions, designed to induce the indicated sets:

"I'm going to use this machine to test how fast you can read some words.	To induce a mild ego-involved anxiety.
"I will show you some words in the machine here (indicating viewer) one at a time. At first the word will be shown very quickly, probably too fast for you to read it. Then it will be shown again, more slowly, until you can read it.	
"As soon as you think you know what the word is, read it to me.	To encourage immediate reporting of perception.
"If you are wrong I will tell you and show it to you again and again until you have it right. You won't be marked down	To encourage guessing, prevent withholding of reports until certainty.

for wrong answers, so tell me as soon as you think you recognize a word.	
"Your teacher says you know all of these words. None will be strange or new to you.	To encourage reporting of words.
"Remember, I am testing your ability to read quickly, so please do your best.	To remind of test situation.
"Any questions? Let's practice first before the test. When I say "Ready" I will show you the first practice word. All these words will be in English (Tagalog)".	To prepare for first presentation; to prepare for specific language.

There followed a practice period during which five words were presented, of neutral quality, in the language being tested. During this period attempts were made to encourage the student regarding his performance and to prevent premature discouragement.

Each word during the practice and test sessions was presented the first time two seconds after the "Ready" signal at an initial duration of .01 second. Successive exposures followed at six to seven second intervals with the duration raised by .01 second at each exposure. This procedure was adopted to allow the subject to "prepare" for each exposure on the basis of a sustained interval. After each wrong guess, the experimenter again said "Ready" and exposed the word two seconds later at the next highest exposure duration. A second practice session of five words was presented in the second language before the test in the second language. This practice session was found necessary because thresholds generally rose abruptly at the introduction of a different language.

Each subject was tested in one session of twenty to forty minutes, except for three who were tested in two sessions. Half of each group was tested in Tagalog first, the other half in English first.

Scoring

The method used was an ascending method of limits with a total initial accuracy indicator. That is, the threshold score for each word was equal to the exposure time (number of one-hundredths of a second) at which the subject reported the word accurately.[6] This number also indicated the total number of exposures prior to correct identification.

Dember defends this psychophysical procedure:

> "The identification task involves a very large number of alternatives, and the role of chance is, consequently, very small. When the subject identifies a stimulus, the experimenter can be quite confident that it was not just a lucky guess. Since confidence in the response category is high, the use of the method of limits is appropriate" (Dember, 1961).

Choice of this method is indicated by the nature of the problem where

> ". . . it would not be compatible with the nature of the experiment to include the measurement procedure suprathreshold presentations.
>
> The way to avoid suprathreshold stimulus presentations, is, obviously, to use only subthreshold values. This, however, immediately eliminates a constant-stimulus method. A complete method of limits will also not do. What is left, of course, is the ascending portion of the method of limits. The stimulus is presented at a value well below threshold. Increments are added until correct identification occurs. At this point the stimulus is discarded" (Dember, 1961).

Each subject received a defense score in English and a defense score in Tagalog. Each defense score is a difference obtained by subtracting the sum of the thresholds for the six neutral words from the sum of the thresholds for the six anxiety words. This difference could be positive or negative.[7] In order to make the relative thresholds independent of the tachistoscopic acuity level of individual subject, which varied, as in other studies (Postman, 1958), the difference was expressed as a percentage of the sum of thresholds for neutral words.[8] This is referred to as the corrected defense score.

Scores for Experiment A are presented in Table 2, for Experiment B in Table 3.

Prerecognition responses[9] of the subjects were also recorded and their number examined for significance.

The null hypotheses tested were:

(1) There is no significant difference between defense in the primary language and defense in the secondary language.

(2) There is no significant difference between the Tagalog-primary group and the English-primary group with respect to the difference between the English defense score and the Tagalog defense score.

(3) a. There is no significant difference between the English defense scores of the Tagalog-primary group and the English defense scores of the English-primary group.

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[6]For examples of this method, see Howes, 1951 and McGinnies, 1951.

[7]See Chodorkoff, 1954; Kurland, 1954; and McGinnies, 1952.

[8]Whether these corrected scores were used, or raw or standard scores, results were statistically close and the same levels of significance were reached. Spearman rank correlations between the three forms of scores (by formula: $\text{rho} = 1 - \frac{6\,\Sigma d^2}{N^3 - N}$ were close to 1.00).

[9]Prerecognition responses are all verbal identifying responses made by the subject which do not agree with the actual stimuli.

TABLE 2

THRESHOLDS FOR ANXIETY AND NEUTRAL WORDS

EXPERIMENT A
English Words

Tagalog-primary group (N = 14)

Subject No.	(1) Sum Thresholds for Anxiety Words	(2) Sum Thresholds for Neutral Words	(3) Defense Scores (1) – (2)	(4) Corrected Defense Score
A1	21	20	1	5.0
A2	26	31	−5	−16.1
A3	23	30	−7	−23.3
A4	22	14	8	57.1
A5	50	44	6	13.6
A6	26	24	2	8.3
A7	60	71	−11	−15.5
A8	26	28	−2	−7.1
A9	24	16	8	50.0
A10	16	13	3	23.1
A11	40	24	16	66.7
A12	30	32	−2	−6.3
A13	23	16	7	43.8
A14	46	54	−8	−14.8

English-primary group (N = 11)

A101	37	22	15	68.2
A102	25	18	7	38.9
A103	35	31	4	12.9
A104	31	44	−13	−29.5
A105	72	79	−7	−8.9
A106	29	20	9	45.0
A107	24	35	−11	−31.4
A108	67	54	13	24.1
A109	59	45	14	31.1
A110	22	39	−17	−43.6
A111	35	24	11	45.8

EXPERIMENT A
Tagalog Words

Tagalog-primary group (N = 14)

Subject No.	(1) Sum Thresholds for Anxiety Words	(2) Sum Thresholds for Neutral Words	(3) Defense Scores (1) – (2)	(4) Corrected Defense Score
A1	26	20	6	30.0
A2	60	52	8	15.4
A3	22	14	8	57.1
A4	17	23	−6	−26.1
A5	50	36	14	38.9
A6	26	22	4	18.2
A7	151	114	37	32.5
A8	50	37	13	35.1
A9	21	24	−3	−12.5
A10	27	15	12	80.0
A11	33	28	5	17.9
A12	36	24	12	50.0
A13	44	15	28	175.0
A14	46	43	3	7.0

(Table 2 continued)
English-primary group (N = 11)

A101	27	28	−1	−3.6
A102	21	18	3	16.7
A103	31	30	1	3.3
A104	21	31	10	−32.3
A105	43	52	−9	−17.3
A106	22	39	−17	−43.6
A107	14	33	−19	−57.6
A108	50	40	−10	25.0
A109	50	34	16	47.1
A110	49	34	15	44.1
A111	39	43	−4	−9.3

b. There is no significant difference between the Tagalog defense scores of the Tagalog-primary group and the Tagalog defense scores of the English-primary group.

It was decided to reject the null hypotheses by appropriate non-parametric one-tailed tests at the .05 level.

RESULTS

Null hypothesis 1 was tested by use of the sign (binomial) test (Sigel, 1956). A plus was assigned to each subject whose defense score in his primary language was greater than the defense score in his secondary language. Since the number of subjects in each experiment was twenty-five or less, and $P = Q = \frac{1}{2}$, a table of probabilities associated with values as small as observed values of x in the binomial test was used to calculate probabilities (Siegel, 1956). Results are in Table 4 below.

The null hypothesis was discarded for both Experiment A and Experiment B. The evidence indicated that defense in a primary language was greater than defense in a secondary language a significant number of times.

TABLE 3

THRESHOLDS FOR ANXIETY AND NEUTRAL WORDS

EXPERIMENT B
English Words

Tagalog-primary group (N = 16)

Subject No.	(1) Sum Thresholds for Anxiety Words	(2) Sum Thresholds for Neutral Words	(3) Defense Scores (1) − (2)	(4) Corrected Defense Score
B1	66	42	24	57.1
B2	42	31	11	35.5
B3	36	33	3	9.1
B4	57	56	1	1.8
B5	54	45	9	20.0
B6	17	17	0	0.0
B7	26	28	−2	−7.1
B8	46	44	2	4.5
B9	63	44	19	43.2
B10	19	21	−2	−9.5
B11	15	22	−7	−31.8
B12	38	34	4	11.8
B13	68	79	−11	−13.9
B14	28	22	6	27.3
B15	40	38	2	5.3
B16	40	33	7	21.2

(Table 3 continued)

English-primary group (N = 4)

B101	44	18	26	144.4
B102	92	38	54	142.1
B103	63	58	5	8.6
B104	132	62	70	112.9

EXPERIMENT B
Tagalog Words

Tagalog-primary group (N = 16)

Subject No.	(1) Sum Thresholds for Anxiety Words	(2) Sum Thresholds for Neutral Words	(3) Defense Scores (1) − (2)	(4) Corrected Defense Score
B1	54	39	15	38.5
B2	19	22	−3	−13.6
B3	32	28	4	14.3
B4	81	78	3	3.8
B5	55	41	14	34.1
B6	14	17	−3	−17.6
B7	31	27	4	14.8
B8	47	30	17	56.7
B9	43	23	20	87.0
B10	17	23	−6	−26.1
B11	20	17	3	17.6
B12	47	21	26	123.8
B13	73	60	13	21.7
B14	26	20	6	30.0
B15	52	48	4	8.3
B16	26	29	−3	−10.3

English-primary group (N = 4)

B101	28	70	−42	−60.0
B102	42	33	9	27.3
B103	88	68	20	29.4
B104	66	58	8	13.8

For null hypothesis 2, two independent groups had been set up prior to the experiment by the language questionnaire. Null hypothesis 2 stated that these two groups were from the same population with regard to the variable being tested. In order to apply the Mann-Whitney U test, the difference between each subject's English defense score and his Tagalog defense score were arranged in an ordinal system. The value of U was the number of times the rank of a subject from one specified group preceded the rank of a subject in the other group. Since the direction of deviance from the null hypothesis was predicted, a one-tailed test was used. A table of critical values of U in the Mann-Whitney Test was used to calculate probabilities of values of U (Siegel, 1958). See Table 5 for results.

Since the probabilities were under .05, null hypothesis 2 was rejected and the experiment was interpreted as providing evidence that the two groups were from different populations. That is, the Tagalog-primary group showed significantly greater defense with Tagalog material than with English, and the English-primary group showed significantly greater defense with English than with Tagalog material.

For null hypothesis 3, part a, the corrected

TABLE 4

EXPERIMENT A

(N = 25)

Subjects	No. with higher defense score in primary language	No. with lower defense score in primary language	Signs	p
Tagalog	11	3	11+3−	
English	8	3	8+3−	
Total	19	6	19+6−	$p < .007$

EXPERIMENT B

(N = 20)

Tagalog	11	5	11+5−	
English	3	1	3+1−	
Total	14	6	14+6−	$p < .025$

TABLE 5

EXPERIMENT A

(N = 25)

Tagalog-primary group ($N_1 = 14$)

Subject	Corrected English Defense Score Minus Corrected Tagalog Defense Score	Rank	U*	P
A1	−25.0	16	38	
A2	−31.5	18		$p < .025$
A3	−80.4	23		
A4	83.2	2		
A5	−25.3	17		
A6	−9.9	13		
A7	−48.0	20		
A8	−42.2	19		
A9	62.5	4		
A10	−56.9	22		
A11	48.8	6		
A12	−56.3	21		
A13	−131.2	25		
A14	−21.8	15		
English-primary group ($N_2 = 11$)				
A101	71.8	3		
A102	22.2	8		
A103	9.6	9		
A104	2.8	11		
A105	8.4	10		
A106	88.6	1		
A107	26.2	7		
A108	−.9	12		
A109	−16.0	14		
A110	−87.7	24		
A111	55.1	5		

EXPERIMENT B

(N = 20)

Tagalog-primary ($N_1 = 16$)

Subject No.	Corrected English Defense Score Minus Corrected Tagalog Defense Score	Rank	U*	P
B1	18.6	6	10	$p < .025$
B2	49.1	4		
B3	−5.2	12		
B4	−2.0	9		
B5	−14.1	13		
B6	17.6	7		
B7	−21.9	15		
B8	−52.2	19		
B9	−43.8	17		
B10	16.6	8		
B11	−49.4	18		
B12	−112.0	20		
B13	−35.6	16		
B14	−2.7	10		
B15	−3.0	11		
B16	31.5	5		
English-primary ($N_2 = 4$)				
B101	204.4	1		
B102	114.8	2		
B103	−20.8	14		
B104	99.1	3		

*U = number of times the rank of a Tagalog-primary subject precedes the rank of an English-primary subject.

English defense scores were arranged in an ordinal system in order to apply the Mann-Whitney U test. Since it was predicted that the direction of deviance from the null hypothesis, if any, would be in a specified direction (English defense scores of English-primary subjects greater than English defense scores of Tagalog-primary subjects), a one-tailed test was used.

In null hypothesis 3, part b, the corrected Tagalog defense scores were ranked. The predicted direction of deviance in this case was that Tagalog defense scores of Tagalog-primary subjects would be greater than Tagalog defense scores of English-primary subjects. Again a one-tailed Mann-Whitney U test was used.

Tables 6 and 7 show the results.

Null hypothesis 3a was accepted in Experiment A and rejected in Experiment B. Null hypothesis 3b, on the other hand, was rejected in Experiment A and accepted in Experiment B. These results suggest that it was not the absolute amount of defense in a language that determined

TABLE 6

EXPERIMENT A
(N = 25)

Tagalog-primary group (N_1 = 14)

Subject No.	Corrected English Defense Score	Rank	U*	p
A1	5.0	15	76	$p > .05$
A2	−16.1	21		
A3	−23.3	22		
A4	57.1	3		
A5	13.6	12		
A6	8.3	14		
A7	−15.5	20		
A8	−7.1	17		
A9	50.0	4		
A10	23.1	11		
A11	66.8	2		
A12	−6.3	16		
A13	43.8	7		
A14	−14.8	19		

English-primary group (N_2 = 11)

A101	68.2	1
A102	38.9	8
A103	12.9	13
A104	−29.5	23
A105	−8.9	18
A106	45.0	6
A107	−31.4	24
A108	24.1	10
A109	31.1	9
A110	−43.6	25
A111	45.8	5

*U = number of times the rank of a Tagalog-primary subject precedes the rank of an English-primary subject.

EXPERIMENT B
(N = 20)

Tagalog-primary group (N_1 = 16)

Subject No.	Corrected English Defense Score	Rank	U*	p
B1	57.1	4	8	$p < .025$
B2	35.5	6		
B3	9.1	11		
B4	1.8	15		
B5	20.0	9		
B6	0.0	16		
B7	−7.1	17		
B8	4.5	14		
B9	43.2	5		
B10	−9.5	18		
B11	−31.8	20		
B12	11.8	10		
B13	−13.9	19		
B14	27.3	7		
B15	5.3	13		
B16	21.2	8		

English-primary group (N_2 = 4)

B101	144.4	1
B102	142.1	2
B103	8.6	12
B104	112.9	3

*U = number of times the rank of a Tagalog-primary subject precedes the rank of an English-primary subject.

TABLE 7

EXPERIMENT A
(N = 25)

Tagalog-primary group (N_1 = 14)

Subject No.	Corrected Tagalog Defense Score	Rank	U*	p
A1	30.0	10	37	$p < .025$
A2	15.4	15		
A3	57.1	3		
A4	−26.1	22		
A5	38.9	7		
A6	18.2	12		
A7	32.5	9		
A8	35.1	8		
A9	−12.5	20		
A10	80.0	2		
A11	17.9	13		
A12	50.0	4		
A13	175.0	1		
A14	7.0	16		

English-primary group (N_2 = 11)

A101	−3.6	18
A102	16.7	14
A103	3.3	17
A104	−32.3	23
A105	−17.3	21
A106	−43.6	24
A107	−57.6	25
A108	25.0	11
A109	47.1	5
A110	44.1	6
A111	−9.3	19

*U = number of times the rank of an English-primary subject precedes the rank of a Tagalog-primary subject.

EXPERIMENT B
(N = 20)

Tagalog-primary group (N_1 = 16)

Subject No.	Corrected Tagalog Defense Score	Rank	U*	p
B1	38.5	4	26	$p > .05$
B2	−13.6	17		
B3	14.3	12		
B4	3.8	15		
B5	34.1	5		
B6	−17.6	18		
B7	14.8	11		
B8	56.7	3		
B9	87.0	2		
B10	−26.1	19		
B11	17.6	10		
B12	123.8	1		
B13	21.7	9		
B14	30.0	6		
B15	8.3	14		
B16	−10.3	16		

English-primary group (N_2 = 4)

B101	−60.0	20
B102	27.3	8
B103	29.4	7
B104	12.8	13

*U = number of times the rank of an English-primary subject precedes the rank of a Tagalog-primary subject.

the results in the two groups, but rather the relative amounts of defense in the primary and secondary languages.

These differential findings in hypothesis 3 also indicate that the Tagalog and English lists within each part of the experiment were not equivalent in efficiency. The Tagalog list in Experiment A and the English list in Experiment B had more discriminatory power than either the English list in Experiment A or the Tagalog list in Experiment B. Neither of these differences was sufficient to reduce the effect of the variable under study of a level below significance.

The amount of perceptual defense shown by the anxiety ratings of a subject could also be related to personality idiosyncrasies. The validity of this hypothesis was tested by obtaining correlations between the ranks of total defense

scores (English plus Tagalog) of subjects and the ranks of their anxiety ratings. These correlations, although not significant statistically, indicated some trend of personal emotional sensitivity in the perceptual defense phenomenon.

The number of prerecognition responses were observed to fluctuate widely between subjects. The range extended from three subjects who made on prerecognition responses to any word, to one subject who made over one hundred.

Another result worth noting was that more prerecognition guesses were made by subjects in both groups to English words than to Tagalog. This indicated that the number of prerecognition responses was related to other factors than those involved in the perceptual defense effect.

DISCUSSION

The experimental procedures have produced evidence that the perceptual defense effect is greater in the primary language than in the secondary language. The two groups of subjects, Tagalog-primary and English-primary, were inferred, on the basis of this evidence, to be truly independent groups. Inasmuch as the experiment was designed to control all other relevant independent variables, it was inferred that the difference between the two groups was derived from their learning histories with respect to linguistic material.

These linguistic histories differed in several ways. First, the primary language was learned in

TABLE 8

RANK CORRELATIONS BETWEEN ANXIETY RATING AND TOTAL DEFENSE SCORE

EXPERIMENT A (N = 25)				EXPERIMENT B (N = 20)			
Subject	Defense Score Rank	Anxiety Rating Rank	rho*	Subject	Defense Score Rank	Anxiety Rating Rank	rho*
A1	12	16	.28	B1	6	8	.38
A2	21	7		B2	12	4	
A3	13	8.5		B3	11	9	
A4	14	1		B4	17	15	
A5	7	10.5		B5	9	7	
A6	16	20		B6	19	13.5	
A7	17	23.5		B7	16	20	
A8	15	18		B8	7	18	
A9	10	10.5		B9	3	11	
A10	2	8.5		B10	20	1	
A11	3	6		B11	18	19	
A12	9	23.5		B12	2	11	
A13	1	14.5		B13	15	13.5	
A14	22	3		B14	8	4	
A101	5	14.5		B15	13	11	
A102	6	18		B16	14	17	
A103	18	21		B101	5	4	
A104	24	4		B102	1	4	
A105	23	23.5		B103	10	16	
A106	19	2		B104	4	4	
A107	25	12.5					
A108	8	18.					
A109	4	23.5					
A110	20	12.5					
A111	11	5					

*By Spearman Rank-Correlation (Siegel, p. 203).

a different setting than the secondary language. The setting for the primary language was the home; the setting for the second language was the school.

Second, reinforcement was supplied by different agents. Reinforcement of responses involving the primary language was supplied primarily by parents or those who cared for the child's first needs. Additional reinforcement was given in the primary language by the teacher, extensively in English, less in Tagalog. Reinforcement of responses involving the second language was carried out primarily by the teacher.

Third, the primary language was learned at an earlier development period in the subject's life, when the child may have been more susceptible to emotional influences.

Fourth, the subjects had been exposed to longer histories of training in their primary language. A longer period for differential reinforcement of responses had thereby been available in the primary language. Greater frequency of association and reinforcement accompanied this longer period.

In this experiment no attempt was made to control any of these factors which make up the conditioning history of the subject with respect to materials used in the experimental test. Therefore, the experimental evidence can only indicate that linguistic conditioning as a whole was relevant in producing perceptual avoidance of anxiety-producing words. That is, the amount of perceptual defense against words in a language is a function, at least in part, of the variables involved in linguistic conditioning of the subject in that language.

While the relative amount of defense in the two languages could thus be related to the linguistic background of the subjects, the absolute amount of defense was dependent on other factors. Amount of anxiety displayed was suggested as a possible factor and a trend in this direction demonstrated.

The evidence is subject to the limitations in the design. It would be interesting to extend this study to examine, for example, the influence of the age of the subjects on the results. Such a study could use college students as subjects. Repetition of the experiment in another country, with other kinds of bilinguals, would also widen the scope of the findings.

This study does not attempt an analysis of whether the perceptual defense effect is truly a perceptual effect, or explicable solely on the basis of response-probabilities. It also indicate that what is called the perceptual defense effect can be related to the individual life histories of the subjects with respect to the materials used.

APPENDIX A

QUESTIONNAIRE ON LANGUAGE BACKGROUND

Child's name
Native dialect of child's mother
  Does mother speak English?
  What other dialects does mother speak?
Native dialect of child's father
  Does father speak English?
  What other dialects does father speak?
What language is spoken most in the home?
  What other languages are spoken in the home?
  What language did child speak before entering school?
  What other languages did child speak before entering school?
In what language is the child scolded?
Has the child ever lived outside the Philippines?
  Where?
  How long?

APPENDIX B
LINGUISTIC BACKGROUNDS OF SUBJECTS

Tagalog-primary group

Number	Mother's dialect	Father's dialect	Spoken chiefly at home	Spoken chiefly before school	Scolded chiefly in	Tagalog grade	English grade
A1	Tagalog	Ilocano	Tagalog	Tagalog	Tagalog	1.7	1.8
A2	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.5	3.2
A3	Tagalog	Pampango	Tagalog	Tagalog	Tagalog	2.4	2.9
A4	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	3.0	2.8
A5	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.9	2.6
A6	Tagalog	Visayan	Tagalog	Tagalog	Eng. & Tag.	2.0	2.3
A7	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.5	2.5
A8	Pampango	Tagalog	Tagalog	Tagalog	Tagalog	2.0	2.3
A9	Tagalog	Pampango	Tagalog	Tagalog	Tagalog	2.7	2.4
A10	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	1.7	1.7
A11	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.6	3.2
A12	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.0	1.9
A13	Tagalog	Visayan	Tagalog	Tagalog	Tagalog	2.8	2.8
A14	Ilocano	Tagalog	Tagalog	Tagalog	Tagalog	3.0	2.8
B1	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.0	2.5
B2	Ilocano	Tagalog	Tagalog	Tagalog	Tagalog	2.9	2.9
B3	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.3	2.6
B4	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	1.9	2.2
B5	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	1.9	2.0
B6	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.4	2.4
B7	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.2	2.5
B8	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.2	2.9
B9	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.7	3.2
B10	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.4	2.8
B11	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	1.6	1.7
B12	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.5	2.9
B13	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	1.7	1.5
B14	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.5	2.9
B15	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.7	2.7
B16	Tagalog	Tagalog	Tagalog	Tagalog	Tagalog	2.4	2.4

English-primary group

Number	Mother's dialect	Father's dialect	Spoken chiefly at home	Spoken chiefly before school	Scolded chiefly in	Tagalog grade	English grade
A101	Tagalog	Pampango	English	English	Tagalog	2.0	1.8
A102	Tagalog	English	English	English	English	2.2	2.0
A103	English	Ilocano	English	English	English	2.4	2.3
A104	Ilongo	Punjab	English	Tagalog	English	3.2	3.0
A105	Tagalog	Ivatan	English	English	English	2.3	1.7
A106	Ilocano	Ilocano	Tagalog	English	English	3.2	3.4
A107	English	Ilocano	English	English	English	2.2	2.4
A108	Visayan	Visayan	Visayan	English	English	2.6	2.4
A109	Visayan	Batanes	English	English	English	1.9	1.8
A110	Chinese	English	English	English	English	1.8	2.0
A111	Ilocano	Ilocano	English	English	Eng. or Tag.	2.6	2.8
B101	Tagalog	Spanish	Tagalog	English	English	3.5	2.8
B102	Ilocano	Chabacano	Eng. or Tag.	English	English	2.8	2.8
B103	Ilocano	Bicol	English	English	English	3.0	2.5
B104	Pangasinan	Pampango	English	English	English	3.3	3.2

APPENDIX C

ANXIETY RATING SCALE

"Please indicate on a five point scale how nervous you consider each student:

5 – very nervous and anxious

4 – somewhat nervous and anxious, more than average.

3 – moderately nervous and anxious.

2 – showing little nervousness and anxiety.

1 – extremely calm and self-controlled."

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