

# VARIABLES IN SEMANTIC SATIATION

Thesis for the Degree of M. A. MICHIGAN STATE UNIVERSITY Burton L. Alperson 1964 THESIS





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# ABSTRACT

# VARIABLES IN SEMANTIC SATIATION

by Burton L. Alperson

Semantic satiation (the decrease in meaning of words with prolonged attention) has been studied by various investigators using decreases in the polarities of words on the Semantic Differential, decreases in the popularity of word associations emitted by <u>S</u>s and other associative techniques, and <u>S</u>'s introspective reports of when the meaning disappears as evidence for the phenomenon. Independent variables have included having <u>S</u>s repeat, stare at, repeat and stare at, and listen to the words.

Due to the proliferation of methods, the term "semantic satiation" has almost lost its meaning. There has been no serious empirical attempt yet reported to relate these variables, and they are held together by little more than a common name.

The various dependent variables all suffer from a number of weaknesses. The introspective techniques may bias results with suggestion and do not allow the use of non-satiated control groups. There has been no satisfactory replication of the results of the Semantic Differential studies reported outside of the laboratories of the originators of this technique, although several attempts to replicate the original studies have been reported. The word association techniques seem to be replicable, but the size and stability of the reported effects have generally been quite small.

The present study is an attempt to determine: (1) if any combination of independent and dependent variables yields significant results; (2) if any of these combinations are significantly better than others; and (3) if those combinations which are found to be significant are correlated.

The Semantic Differential technique and three word association techniques (popularity of the first response, total number of responses, and number of responses in the first five seconds) were investigated in a "before-after" design. Five treatments (visual, repetition, visual & repetition, listening, and nonsatiated control) were employed with each dependent variable, the Semantic Differential and word association groups being independent of one another. The Semantic Differential group received 90 seconds of total satiation time per word (divided among six 15 sec. periods). The word association group received 15 seconds of total satiation time per word. In order to determine the effect of making the association group more nearly approximate the Semantic Differential group, a small independent study was run using the word association variables under the repetition and control conditions with a 60 second satiation time.

No evidence was found for satiation using the Semantic Differential technique. It was suggested that differential reliabilities of words may have confounded the results. Whatever the reason, the failure of the present study, and other studies to find satiation with this technique brings its adequacy as a measuring instrument into question.

Of the word association techniques, only the popularity variable with 60 seconds of satiation time yielded evidence for satiation. Consideration of the data from the main study and the 60 second time control study suggests that an increase in the size of the independent variable will produce stronger satiation effects as measured by this technique.

The data do not permit generalizations concerning the superiority of one independent variable over another.

Approved 2/23/61 Por Bahan

# VARIABLES IN SEMANTIC SATIATION

By

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# A THESIS

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### CHAPTER I

# INTRODUCTION

Semantic satiation (the decrease in intensity of the meaning of a word after it has been given prolonged attention) has been studied in a wide variety of contexts. Early studies in the area were introspective and were primarily concerned with the selection of independent variables. In these studies some satiation procedure was employed during which trained observers (usually the experimenter and one or two cohorts) were to report when and how the meaning of the word disappeared. Using this technique, it was reported that satiation effects could be observed by presenting stimuli visually (Severance & Washburn, 1907) or by instructing Ss to repeat the word (Bassett & Warne, 1919) until the meaning disappeared. It was also noted that visual presentation seemed to produce stronger satiation effects that did repetition (Don & Weld, 1924) and that the words tended to break up between syllables (Severance & Washburn).

These early studies seem to regard the semantic satiation effect as an isolated laboratory curiosity. Later studies might be characterized as attempts to increase the generality of the phenomenon. Mason (1941), for example, found a significant

correlation between the time at which a word lost meaning and fluctuations in galvanic skin response. Wertheimer and Gilliss (1958), working within the framework of Kohler's studies of figural after effects, reported that two syllable words satiated faster than one syllable words, six letter words satiated faster than four letter words, and that the second half of the experimental session produces more satiation than the first half. Word frequency and the objectivity of the referent, however, did not prove to be significant variables. In another study, Wertheimer (1958) found a tendency for words that were rated as "fitting" (i.e. whose sounds were, in some sense, similar to their meaning) to be more difficult to satiate than words rated as "non-fitting".

All of the above studies used either the original introspective technique or some close variant of it. In 1956 Smith and Raygor introduced a word association technique for measuring satiation. After <u>Ss</u> fixated on a word which was presented on a screen, they were asked to write down their first association to the next word that was flashed on the screen. They reported that words yielded significantly more uncommon associations after they had been satiated than they did without satiation. Subjects classified as "impermeables" (introverts) seemed to be more prone to satiation than <u>Ss</u> classified as "permeables" (extraverts).

This technique was later used by Paul (1962) who modified it slightly by the use of Noble's (1952) continued associations technique. The use of Noble's system allowed for the examination

of a number of new dependent variables, and Paul reported that satiation was reflected in " . . . a reduced number of associations early in the response period, a reduced number of popular first associations, and an increased latency for the emission of popular associates." (p. 166). He also presented evidence for the generalization of satiation, although no regular generalization gradient was observed.

At McGill University, Lambert and Jakobovits (1960) introduced yet another dependent variable. Using a reduction in polarity scores on the Semantic Differential ratings of words as a measure of satiation, this group has attempted to link the effect both to Osgood's (1953) representational mediational theory of meaning and to Noble's (1952) associational system. Lambert and Jakobovits (1960; Jakobovits and Lambert, 1961, 1962 b), who feel satiation is a cognitive form of reactive inhibition, find support for Osgood's mediation hypothesis in satiation effects. They also feel that satiation effects are a function of the central rather than the peripheral nervous system.

Kanungo, Lambert and Mauer (1962; Kanungo and Lambert, 1963), on the other hand, view satiation as a gradual reduction in <u>m</u> components, such that the word being satiated begins to elicit itself as an association. They invoke this hypothesis to explain the effects of satiation on paired-associate learning, and a satiation study in which a technique similar to Paul's is used, but in which the dependent variable is Noble's <u>m</u>.

This brief history should include some reference to Warren's (1958, 1961, 1962) studies employing auditory repetition. When <u>Ss hear a word repeated on a tape loop</u>, the word they are listening to seems to change into other words. Warren (1962) feels that part of this process consists of a loss of meaning of the word which he relates to the satiation studies.

In terms of the satiation phenomenon itself, all of the above studies suffer from one or more of a number of weaknesses. In the first place the term "semantic satiation" is almost meaningless. Due to the proliferation of methods, when one speaks of semantic satiation he may be speaking of any combination of four or more independent variables with three or more dependent variables. Since there has been no serious empirical attempt yet reported to relate them, these variables are held together by little more than a common name.

Secondly, those studies employing timed introspection as a dependent variable (Severance and Washburn, 1907; Don and Weld, 1924; Wertheimer, 1958; Wertheimer and Gilliss, 1958; and Mason, 1941) must face the serious question of how much of the phenomenon is an artifact of the instructions. This method necessitates that the <u>Ss</u> be told that they are expected to satiate, e.g. "Fixate [the word] steadily, and give it maximal attention until its meaning has disappeared" (Don & Weld, 1924, p. 44) or "[<u>Ss</u>] were asked to judge the time at which meaning disappeared for each of 10 words . . . " (Wertheimer, 1958, p. 444). One may only guess at how much of the time difference is due to satiation and how

much of it is due to suggestion. Another major defect of this method is the fact that it is impossible to use a non-satiated control group here.

Thirdly, those studies which rely on decreases on Semantic Differential polarity (Lambert and Jakobovits, 1960; Jakobovits and Lambert, 1961, 1962; and Kanungo, Lambert and Mauer, 1962) are not unequivocal, although they do, at least control instructional bias. Several recent studies suggest that the phenomenon may not exist in terms of this technique; or if it does exist, it may be a unique characteristic of the McGill population. Floyd (1962) in a partial replication of the Lambert and Jakobovits study found "very weak support" for the existence of the phenomenon. Yelen and Schulz (1963), after failing to find satiation effects in a partial replication of the same study, attempted an exact replication and still failed to find evidence for satiation. They present evidence for a generation effect (i.e. an increase in meaning) which seems to be roughly inversely correlated with initial meaning on the Semantic Differential. Das (1964) has also reported this effect. In attempting to find satiation using polarity scores, he is apparently forced to discuss his results as representing degrees of "lack of satiation." Reynierse (1963) failed to find any evidence for satiation and he suggests that the selection of Semantic Differential scales may influence the results.

Finally, although the word association technique of Smith and Raygor has received relatively little attention, those studies

which have been reported do not yield as firm support as might have been hoped. As measured by this technique (both decrease in the number of associates and a decrease in the popularity of the first response) Paul suggests that satiation effects are "... slight... transient and quick to dissipste and [seem] to be dependent on individual word characteristics." (p. 165). Reynierse found no evidence for satiation using this technique. Kanungo and Lambert do report a decrease in relevant responses (m) after satiating a word. However, since no mention is made of a blind scoring system to separate relevant from irrelevant responses, these results are open to question.

In summary, it may be said that the literature of semantic satiation has not progressed a great deal since the 1920's when researchers were concerned with the search for significant independent and dependent variables. The most meaningful approach would seem to be a return to these questions using the more sophisticated techniques that the recent literature has made available. Until more is known about the satiation phenomenon itself, and until a reliable means of assessing it is found, attempts to relate this phenomenon to other variables are, at best, premature.

The present study is an attempt to deal with three questions. If all previously reported independent and dependent variables (with the exception of the introspective techniques) are employed with a given set of stimuli, and conditions are set up to allow the maximal possibility of satiation:

- Does any combination of independent and dependent variables yield significant results?
- 2. Are any of these combinations significantly better than others?
- 3. Are those combinations, which are found to be significant, correlated?

#### CHAPTER II

#### METHOD

# Subjects

Subjects were 150 volunteers from introductory psychology classes at Michigan State University. They were assigned to one of two major dependent variable groups: either Semantic Differential or Word Association. Each <u>S</u> was then further assigned to one of five treatment groups (Visual, Repetition, Visual & Repetition, Listening, or Control) within each dependent variable. Thus, there were 75 <u>S</u>s assigned to each dependent variable and 15 to each treatment. A separate study designed to control the length of the satiation period in the Word Association dependent variable group employed 18 additional <u>S</u>s from the Michigan State population. All assignments of <u>S</u>s to independent and dependent variables were random.

# Procedure

All <u>S</u>s were tested on 2 separate occasions. During the first session the stimuli (Table 1) consisted of 20 words. During the second session, one week later, 10 of the original 20 words were employed and were exposed by either <u>E</u> or <u>S</u>. The 10 experimental words were selected for the following characteristics: (a) 2 syllables, and (b) 6 or more letters (Wertheimer & Gilliss, 1958). A final consideration in the selection of these words was

to obtain a fairly representative sampling of Semantic Differential polarities (as calculated from Jenkins, Russell, & Succi, 1958 on the appropriate scales). The "filler" words (the words other than the 10 experimental words) were selected on the basis of having a polarity score relatively close to one of the experimental words. It was hoped that the similarity between the filler and experimental words would reduce the effects of memory of the ratings made in the first session.

# TABLE 1

Experimental Words	Polarity <sup>a</sup>	Filler Words	Polarity <sup>a</sup>
Bodkin <sup>b</sup>	2.26	Winter	4.53
Somber	4.18	Hungry	5,12
Bottom	4.80	Sweeping	5,68
Beggar	5.30	Graceful	6.70
Sunday	7.73	Hurried	7.27
Sister	8.47	Mallet	8.90
Abrupt	9.37	Sparkling	9.04
Sudden	10.07	Brother	9.16
Hammer	11.07	Success	10.91
Starving	11.51	Statue	11.01

STIMULI AND THEIR INITIAL POLARITIES ON RELEVANT SCALES

<sup>a</sup>As calculated from Jenkins, Russell, & Suci (1958).

<sup>b</sup>Not included in any of the analyses due to the large number of subjects who looked the word up between the pre- and post-test.

Each  $\underline{S}$  saw the experimental words in one of 15 predetermined random orders. The order of presentation of experimental stimuli was constant for each  $\underline{S}$  during both sessions. During the first session, however, the first word presented and every other word thereafter was a filler word. The order of the filler words was constant for all Ss.

Semantic Differential Polarity.--For each of the 75 <u>Ss</u> in this group <u>E</u> exposed the 20 stimuli one at a time during the first session. Each word was typed in capital letters on a 3"x5" index card. Following each word presentation <u>S</u> rated the words by pointing to a position on one of 6 Semantic Differential scales (GOOD-BAD, CRUEL-KIND, ACTIVE-PASSIVE, FAST-SLOW, WEAK-STRONG, or HARD-SOFT) which appeared on a memory drum. This procedure was repeated until all 20 words were rated on all 6 scales (for a total of 120 ratings per <u>S</u>). The order of words and scales maximized the distance between the re-occurrence of any particular word or scale. The instructions given to each <u>S</u> were substantially the same as those by Reyniesse (1963) (Appendix A).

<u>Word Association</u>.--During the first session, each of the 75 <u>Ss in this group took a word association test for each of the 20</u> stimulus words. Words were presented on 8 1/2" x 11" mimeographed sheets in a format similar to that used by Noble (1952). Specifically, each word appeared on a separate sheet; it appeared 30 times on the sheet, followed each time by a blank line on which <u>S</u> was to write his

responses to the word. Repetitions of the stimulus word were numbered from 1 to 30 on each sheet. Instructions given to each <u>S</u> (Appendix A) were identical to those used by Noble. <u>S</u>s were allowed 60 sec. to write down their responses, and each sheet was followed by a rest period lasting about 15 sec.

<u>Visual Presentation</u>.--During the second session, <u>S</u>s were given a "deck" of 3"x5" index cards containing the 10 experimental words. They were instructed to stare at the top word and concentrate on it until told to stop (15 sec. later). Following this, they either rated the word on a Semantic Differential scale or were given a word association sheet for the word, depending on which dependent variable group they had been assigned to the previous week. <u>S</u>s then stared at the next card in the deck and repeated the procedure. The order of presentation of words and scales remained constant in the two sessions for each <u>S</u>. Procedures for all other independent variables follow this pattern. Exceptions are noted below.

<u>Repetition.--E</u> presented each stimulus word for about 1 sec., following which <u>S</u> was instructed to repeat the word in a monotone at a rate of 2-3 times per sec. until he was told to stop.

<u>Visual & Repetition</u>.--Stimuli were exposed by <u>S</u> who was instructed to stare at the word while he repeated it in a monotone at a rate of 2-3 times per sec. until he was told to stop.

Listening, --Ss in this condition listened first to  $\underline{E}$ 's voice (recorded monophonically) over a set of sterophonic headphones. They were instructed to set a balance control to a point at which  $\underline{E}$ 's voice sounded as though it were coming from the center of their heads.  $\underline{E}$  then presented the words to them on the 3"x5" cards. Following a 1 sec. visual presentation of each word by  $\underline{E}$  they listened to the same word which was repeated at a rate of 2-3 times per sec. for 15 sec. by means of a tape loop. They were then tested on the appropriate dependent variable. Although intensity level was constant for all words for each  $\underline{S}$  it was not controlled between  $\underline{S}$ s. They were instructed to set the volume control of the tape recorder to a point at which they could hear "clearly and comfortably."

<u>Non-Satiated Control</u>.--Experimental words were presented in the same way in which they had been presented in the first session.

Satistion Time Control Study.--It may be noted that the total satistion time for a word for  $\underline{S}s$  in the Word Association group was 15 sec., in contrast to  $\underline{S}s$  in the Semantic Differential Polarity group who received 90 sec. of total satistion time per word (divided among six 15 sec. satistion periods). In order to determine the effect of making the Word Association group more nearly approximate the Semantic Differential group, a small independent study was run. This study was identical to the Repetition and Control conditions of the Word Association variable in the

main study. The only difference was that a smaller sample (N = 9 per group) and a 60 sec. satiation time were employed.

#### CHAPTER III

#### RESULTS

#### Semantic Differential Polarity

The scoring system for this group is parallel to that used by Lambert & Jakobovits (1960). An overall polarity score was calculated for each S on a given word (scale positions designated: -3-2-1 0 + 1+2+3). This procedure was repeated on the ratings made in the second session. A polarity difference score was then calculated by subtracting the polarity scores of the first session from those of the second. Thus an S who rated a word +3, +1, +0, -1, +2, -1 on the six scales in the first session and then rated the same word +1, +1, +1, -2, +1, 0 in the second would receive a polarity difference score of (1+1+1+2+1) - (3+1+1+2+1) = -2 for that word. The data in Tables 2 and 3 for the Semantic Differential group have been increased by a constant of 10 to eliminate negative signs for convenience. A mean less than 10 may be interpreted as a difference in the direction of satiation (i.e. a decrease in polarity), while a mean above 10 may be interpreted as evidence for a generation effect (i.e. an increase in polarity). The only significant value in Table 4, the summary analysis of variance for these scores, is the main effect for Words ( $p \not < .01$ ).

This method of obtaining polarity difference scores will admittedly distort or cancel ratings which change sign between the

					والمتعادية	
Dependent Varíable		Visual	Repetition	Visual Repetition	Listening	Control
Semantic	١×	9.27	10.07	10.12	9.62	9.87
Differential	S	3.40	3.95	3.75	3.79	3.22
Polarities	ι	. 304	.101	.126	.227	4
Word	١×	9.78	9.87	9.92	9.87	10.03
Association	S	. 68	. 69	. 69	.80	.57
Popularity	ц	. 845	. 349	.526	.543	:
Word	١×	11.04	11.06	10.76	11.07	10.16
Association	S	2.63	2.73	3.08	2.41	2.89
Total No.	Ч	. 480	.327	.491	. 497	1
Word	×	10.02	10.18	10.12	10.15	9.94
Association	S	. 63	. 65	.77	.73	.60
No. in 5 sec.	ч	.196	. 640	. 854	. 747	:

TREATMENT MEANS, STANDARD DEVIATIONS, AND DUNNETT'S t STATISTIC FOR MULTIPLE COMPARISONS WITH A CONTROL

15

TABLE 2

DEVIATIONS
STANDARD
AND
MEANS
WORD

TABLE 3

Dependent Variable		Somber	Bottom	Beggar	Sunday	Word Sister	Abrupt	Sudden	Hammer	Starving
Semantic	١×	9.49	10.41	9.61	9.63	9.24	10.91	10.40	10.12	8.31
Differential Polarity	S	3.29	3.97	3.42	4.11	3.41	3.51	3.52	3.39	3.49
Word	١×	9.94	9.80	9.85	9.73	9.71	9.95	10.07	9.88	10.11
<b>Association</b> Popularity	S	.56	.82	. 55	• 66	.92	.56	. 62	. 68	. 69
Word	١×	10.91	10.51	10.77	11.41	10.84	11.01	9.79	10.84	11.20
Association Total No.	Ś	2.45	2.54	2.93	3.03	2.54	2.44	3.15	2.54	2.73
Word	×	10.05	10.12	10.07	10.10	10.05	10.07	10.12	10.10	10.07
Association No. in 5 sec.	Ø		. 69	.73	.49	. 65	. 69	. 67	.73	.61

TABLE	4
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ANALYSIS OF VARIANCE FOR SEMANTIC DIFFERENTIAL POLARITIES

Source	df	MS	F
Treatments	4	16.397	. 559
Error a	70	29.281	
Words	8	44.673	4.206*
TxW	32	14.372	1.353
Error b	560	10.619	
Total	674		

\*p < .01

two sessions. However, since inspection of the data reveals only one such change for one  $\underline{S}$  on one scale for one word, this does not seem to be a major obstacle in the present study.

The values in Table 5 represent correlation coefficients of the Semantic Differential polarity scores between the first and second session in the Non-Satiated Control group. Table 6, the analysis of variance for words on the polarity difference scores in the same group, reveals that words are reliably different ( $p \le .05$ ) in the absence of an independent variable.

# Word Association

Three dependent variables were observed in this group. The first of these is a measure based upon the popularity of <u>S</u>'s first response for each word. Word norms (Appendix B) were tabulated from the responses

## TABLE 5

# RELIABILITIES (r) OF POLARITY SCORES (Semantic Differential Polarities: Control Group)

Words:	Bottom	Starving	Sister	Abrupt	Somber	Sunday	Beggar	Hammer	Sudden
r :	. 297	.361	.516	.528	.578	.657	.765	.852	.861

# TABLE 6

# ANALYSIS OF VARIANCE FOR SEMANTIC DIFFERENTIAL POLARITIES (Control Group Only)

Source	df	MS	F
Words	8	16.791	2.03*
Subjects	14	24.109	
SxW	112	8.24	
Total	134		

\* p ∠ .05

of the 75 <u>Ss</u> during the first session. In order to normalize the distribution, the customary transformation to log-frequency scores was performed. Responses during the second session were assigned log-frequency values based on these norms. An <u>S</u> who responded to "BOTTOM" in the first session with "top" (log-frequency = 1.6232) and in the second session with "end" (log-frequency = 0.4771) would be scored: 0.4771 - 1.6232 = -1.1561. A constant of 10 was added to each of these scores; thus, a mean above 10 is in the direction of generation while a mean below 10 represents satiation in Tables 2 and 3.

In the analysis of variance for these scores (Table 7) the only significant effect observed was the main effect for Words ( $p \ge .01$ ).

# TABLE 7

Source	df	MS	F
Treatments	4	1,156	1.734
Error a	70	.666	
Words	8	1.445	3.275*
TxW	32	,416	.942
Error b	560	. 441	
Total	674		

# ANALYSIS OF VARIANCE FOR WORD ASSOCIATION (Popularity)

\* p ~ .01

Two additional analyses were performed in the Word Association group. A decrease in the total number of responses from the first session to the second as well as a decrease in the number of responses written during the first 5 sec. of the writing period (as recorded by <u>E</u>) would be considered as evidence for satiation. These analyses are reported in Tables 8 and 9 and Tables 2 and 3. Once again, a constant of 10 has been added to the scores in Tables 2 and 3. A significant main effect for Words (p < .01) was observed in the "total number" variable (Table 8), while none of the values in the "number in the lst 5 sec." variable reached significance (Table 9).

# TABLE 8

ANALYSIS	OF	VARIANCE	FORV	WORD	ASSOCIATION	
		(Total Nu	umber)	)		

Source	df	MS	F
Treatments	4	20.709	.826
Error a	70	25.050	
Words	8	16.123	2.999*
T×W	32	6.457	1.201
Error b	560	5.376	
Total	674		

\* p < .01

# TABLE 9

Source	<u>df</u>	MS	F
Treatments	4	1.086	2.281
Error a	55	.476	
Words	8	.040	.085
TxW	32	.468	1.002
Error b	440	.467	
Total	539		

ANALYSIS OF VARIANCE FOR WORD ASSOCIATION (Number in 1st. 5 sec.)

1 The reduction in sample size here is due to the mis-recording of data for 3 Ss. To equalize N, 3 corresponding Ss were discarded in all groups. An S was discarded if he had received the same order of words as one of those whose data had been mis-recorded.

# Satiation Time Control Study

Total number of responses and number of responses in the first 5 sec. of writing were observed, but the complete analysis was not carried through since t-tests between the Non-Satiated Control and Repetition conditions yielded p values well above the .05 significance level. The summary analysis of variance for the Popularity data in this study is presented in Table 10. The main effect for Treatments is significant ( $p \ge .05$ ), and is in the expected direction for a satiation effect. The main effect for Words did not reach significance in this analysis.

#### TABLE 10

ANALYSIS OF VARIANCE FOR WORD ASSOCIATION (Time Control Study: Popularity)

Source	df	MS	F
Treatments	1	2.176	6.40*
Error a	14	. 340	
Words	8	.676	1.32
TxW	8	.455	. 89
Error b	112	.514	
Total	143		

\* p 🗲 .05

# Word Order Correlations

The "total number" variable in the main study, the "total number" variable in the Satiation Time Control study, the polarity difference scores, the initial Semantic Differential polarities, and the initial total number of associations  $(\underline{m}')$  were all compared with each other in terms of word order. None of these correlations reached statistical significance. However, the correlation between the main study and the Satiation Time Control study on the "popularity" variable was significant (r = .676;  $p \le .025$ ).

# CHAPTER IV

# DISCUSSION

Lambert & Jakobovits (1963) advance a number of reasons for Yelen & Schulz's failure to replicate their original study (they do not deal with the other failures). They note that the discrepancies might be accounted for by a change in the scoring system, a different task set, and differences in the samples of <u>Ss</u> employed. These arguments will be considered in turn.

The scoring system in the present study does not differ in any significant way from the Lambert & Jakobovits method. The only differences are in the addition of a constant to the scores, and the use of scores per-word-per-subject rather than scores per-word-persubject-per-scale. Neither of these changes will affect the overall analysis and both scoring systems will always agree on the direction of change.

Lambert & Jakobovits feel that Yelen & Schulz may have introduced a difference in task set "... by their mode of explaining the rating procedure or by their directions to repeat the word as rapidly as possible" (p. 6). Since Lambert & Jakobovits' (1960 & 1963) descriptions of their instructions parallel the instructions used in the present study almost word for word, this is not a relevant criticism in this case.

The present Michigan State sample was composed of volunteer <u>Ss as were the McGill samples</u>. This sample was predominantly 1st and 2nd year students while the McGill samples consisted of 2nd, 3rd, and 4th year students. However, until such time as Lambert & Jakobovits can demonstrate reliable differences in satiation within the span of approximately 18 to 23 years of age, criticism of the present study is seriously weakened on these grounds.

There is one major procedural difference between the Lambert & Jakobovits studies and the present experiment. Lambert & Jakobovits obtained pre- and post-satiation ratings from their <u>S</u>s in one experimental session, while in the present study there was a 1 week delay between pre- and post-satiation ratings. It is possible that this change accounts for the failure to find satiation effects in the present study. However, if one is to accept the theoretical explanation and the claims for the generality of the phenomenon, as measured by the Semantic Differential, which are advanced by the McGill group, it becomes difficult to understand why a one week delay should have any effect. It might also be pointed out that Kanungo & Lambert (1963) report satiation effects with a 24 hour delay between pre- and post-satiation ratings (using word association techniques).

There seems to be some confusion in the literature regarding the importance of the selection of stimuli in satiation studies. Reynierse, Yelen & Schulz, and Wertheimer feel that stimulus selection <u>may</u> be an important variable while Lambert & Jakobovits insist that it may or may not be of importance. This confusion makes

interpretation of the significant main effect for Words in Table 4 difficult and tentative. There are two converging arguments, however, which suggest that stimulus characteristics are relevant variables in satiation studies.

Intuitively it seems reasonable that some words are more meaningful (i.e. reliable) than others. Although the filler words did not appear during second session, there is some justification for regarding the control group as a reliability study of polarity difference scores. Inspection of Table 5 reveals that different words do seem to have different reliabilities. If this finding can be replicated, the implication would be that the probability of obtaining large random differences for words with low reliabilities would be increased, while it would be more difficult to obtain large difference scores for highly reliable words. The effect of these differences upon satiation is an empirical problem which cannot be studied with the data collected in the present study. It would be of interest to know whether or not there is any correlation between the reliabilities of words and their polarity difference scores in those studies which report finding satiation. This argument may be further strengthened by consideration of Table 6. Even in the absence of independent variables, there are reliable differences between the polarity difference scores of different words.

The only evidence for satiation, using polarity difference scores, are the introspective reports of the <u>Ss</u>. Not only were there no significant treatment effects, few of the differences

obtained were in the predicted direction (Tables 2 and 3). If there were any satiation effects, the Semantic Differential technique was not sensitive enough to measure them.

Total number of associates and the number of associates in the first 5 sec. of responding seem to be of little usefulness in satiation studies. The "Total Number" row in Tables 2 and 3 essentially replicates Kanungo & Lambert's (1963) finding that the number of associates increases from the first to the second session in this design. Their explanation of this finding, that memory facilitates responding, seems plausible. Whatever the explanation, this increase limits the validity of this measure for satiation studies. In the same study, Kanungo & Lambert report that the number of relevant responses decreases with satiation. This type of analysis was not included in the present study because of the difficulty of separating relevant from irrelevant responses. Under the best of circumstances this decision is an arbitrary one (in spite of Noble's criteria). The lack of a blind scoring system, in addition to the fact that one of the Es apparently made these decisions considerably weakens the evidence for satiation in this study.

Number of associations in the first 5 sec. is a very crude latency measure. The speed with which an <u>S</u> can write limits his score to 0, 1, 2, or in rare instances, 3. This restriction of range coupled with the discrete nature of the observations and the possibility of systematic errors in scoring by <u>E</u> lessens the sensitivity and validity of this measure. Response latency is an obvious measure

for satiation and it should be examined with a more sensitive instrument than the one employed in the present study.

Table 10 summarizes the only data in the present study which may be interpreted as evidence for satiation. There is some evidence in the literature for an increase in satiation effects with an increase in satiation time. Paul's (1962) satiation effects on a popularity of the first response dependent variable were obtained with a 30 sec. satiation interval. The only study which has examined the effect of different satiation times is the Smith & Raygor (1956) study. Using a popularity of response measure, they reported that satiation effects increase markedly with a shift from three 7 sec. satiation periods to one 20 sec. period. If the results in the present study do represent satiation effects, they are fairly impressive since they were obtained with a considerable loss of power due to the reduced sample size.

It should also be pointed out that in the main study, although none of the differences reached statistical significance, the popularity of associations measure was the only one in which all of the differences for treatments, and most of the scores for words were in the expected direction for a satiation effect. Thus, there is reason to suspect that a longer satiation interval in the main study might have produced clearer satiation effects. This hypothesis is slightly embarrassed by the fact that the Words main effect reached significance in the main study (Table 7), while it did not reach significance in the Satiation Time Control Study (Table 10). One possible explanation is that the satiation effect is strong enough to wipe out differences

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between words. There is some evidence for the same (or at least similar) process operating in both the Satiation Time Control study and popularity of response experimental groups in the main study. The correlation for word order between the experimental groups of the main study and the experimental group in the Satiation Time Control study is significant, suggesting that the difference between these studies is one of degree. The above arguments are speculative, but they do suggest that it would be profitable to replicate the Popularity variable under the conditions of the main study, using a longer satiation time.

#### CHAPTER V

# CONCLUSIONS

There is little doubt that the semantic satiation phenomenon exists. The problem is to find a reliable means of producing it and a measuring instrument sensitive enough to assess it. The data of the present study do not lend themselves to interpretations of the superiority of one independent variable over another. However, some generalizations concerning the various dependent variables which have been employed are possible.

The failure of the present study and a number of other studies to find satiation effects using the Semantic Differential technique leads one to question its adequacy in this situation. The only conclusions seem to be that either all of the investigators who have attempted to replicate the McGill studies have overlooked some procedural detail, or that only Canadian subjects satiate on this variable. The first alternative must remain a possibility. The second is rather unpalatable to all concerned.

The Total Number of Associates variable is of little use due to the possibility of a memory factor reducing the size of the effect.

Number of Associates in the First 5 seconds did not prove to be sensitive enough to measure satiation. However, due to the conceptual fidelity of a latency measure to the definition of satiation (i.e. a

decrease in the strength of meaning), research on a similar but more sensitive measure than the one employed in this study is definitely in order.

Based upon the previous literature and the present study, a Popularity of Associations variable seems to hold the greatest promise for satiation studies, at present. Although no significant satiation effects were found on this variable in the main portion of the present study, the results of the Satiation Time Control study and the comparative success reported in other studies with this variable suggests that satiation may be fairly reliably measured by its use. An increase in the size of the independent variable should lend more weight to this measure.

#### REFERENCES

- Bassett, M. F., & Warne, C. J. On the lapse of verbal meaning with repetition. <u>Amer. J. Psychol.</u>, 1919, <u>30</u>, 415-418.
- Das, J. P. Hypnosis, verbal satiation, vigilance, and personality factors: a correlational study. <u>J. abnorm. soc. Psychol.</u>, 1964, <u>68</u>, 72-78.
- Don, V. J., & Weld, H. P. Lapse of meaning with visual fixation. <u>Amer. J. Psychol.</u>, 1924, <u>35</u>, 446-450.
- Floyd, R. L. Semantic satiation: replication and test of further implications. Read at Midwestern Psychological Association, Chicago, May, 1962.
- Jakobovits, L. A. & Lambert, W. E. Semantic satiation among bilinguals. <u>J. exp. Psychol.</u>, 1961, <u>62</u>, 576-582.
- Jakobovits, L. A. & Lambert, W. E. Semantic satiation in an addition task. <u>Canad. J. Psychol.</u>, 1962, <u>62</u>, 112-119.
- Jakobovits, L. A. & Lambert, W. E. Mediated satiation in verbal transfer. <u>J. exp. Psychol.</u>, 1962, <u>64</u>, 346-351.
- Jenkins, J. J., Russell, W. A. & Suci, G. J. An atlas of semantic profiles. <u>Amer. J. Psychol.</u>, 1958, <u>71</u>, 688-699.
- Kanungo, R. & Lambert, W. E. Semantic satiation and meaningfulness. <u>Amer. J. Psychol.</u>, 1963, <u>76</u>, 421-428.
- Kanungo, R. N., Lambert, W. E., & Mauer, S. M. Semantic satiation and paried-associate learning. <u>J. exp. Psychol.</u>, 1962, <u>64</u>, 600-607.
- Lambert, W. E. & Jakobovits, L. A. Verbal satiation and changes in the intensity of meaning. <u>J. exp. Psychol.</u>, 1960, <u>60</u>, 376-383.
- Lambert, W. E. & Jakobovits, L. A. The case for semantic satiation. 1963, McGill University (Mimeo.).
- Mason, M. Changes on the galvanic skin response accompanying reports of changes in meaning during oral repetition. <u>J. gen. Psychol.</u>, 1941, <u>25</u>, 353-401.

- Noble, C. E. An analysis of meaning. <u>Psychol. Rev.</u>, 1952, <u>59</u>, 421-430.
- Osgood, C. E. <u>Method and theory in experimental psychology</u>. New York: Oxford Univer. Press, 1953.
- Paul, C. Generalized inhibition of verbal associations. <u>J. verb.</u> <u>Learn & verb. Behav.</u>, 1962, <u>1</u>, 162-167.
- Reynierse, J. H. Semantic satiation and generalization. Unpublished MA thesis, Michigan State University, 1963.
- Severance, E. & Washburn, M. F. The loss of associative power in words after long fixation. <u>Amer. J. Psychol.</u>, 1907, <u>18</u>, 182-186.
- Smith, D. E. P. & Raygor, A. L. Verbal satiation and personality. J. abnorm., soc. Psychol., 1956, 52, 323-320.
- Warren, R. M. & Gregory, R. L. An auditory analogue of the visual reversible figure. Amer. J. Psychol., 1958, 71, 612.
- Warren, R. M. Illusory changes of distinct speech upon repetition-the verbal transformation effect. <u>Brit. J. Psychol</u>., 1961, <u>52</u>, 249-258.
- Warren, R. M. Illusory changes in repeated words: Differences between young adults and the aged. <u>Amer. J. Psychol.</u>, 1961, <u>74</u>, 506-516.
- Wertheimer, M. The relation between the sound of a word and its meaning. <u>Amer. J. Psychol.</u>, 1958, <u>71</u>, 412-415.
- Wertheimer, M. & Gilliss, W. M. Satiation and the rate of lapse of verbal meaning. <u>J. gen. Psychol.</u>, 1958, <u>59</u>, 79-85.
- Yelen, D. R. & Schulz, R. W. Verbal Satiation? J. verb. Learn & verb. Behav., 1963, 1, 372-377.

APPENDICES

APPENDIX A

# TASK INSTRUCTIONS

# Semantic Differential

The purpose of this study is to measure the meanings of certain words by having you judge them against a series of descriptive scales. The scales and the words which are to be judged, will be presented individually. You are to point, with this pointer, to the position on the scale which, in your estimation, most nearly agrees with the meaning of the word. Please make your judgements on the basis of what these words mean to you.

Here is how you are to use these scales. If you feel that the word is very closely related to one end of the scale, you should point as follows. If you feel that the word is quite closely related to one or the other end of the scale (but not extremely) you should point as follows. If the word seems only slightly related to one side as opposed to the other side(but is not really neutral) then you should point as follows. The direction toward which you check, of course, depends upon which of the two ends of the scale seem most characteristic of the word you are judging.

If you consider the word to be neutral on the scale, both sides of the scale equally associated with the word, or if the scale is completely irrelevant, unrelated to the word, then you should point to the middle space. Important: Point in the middle of the spaces. Do not point to the boundaries.

Do not try to remember how you checked similar items earlier in the test. Make each item a separate and independent judgement.

Make each judgement as rapidly as possible. It is your first impression, the immediate "feelings" about the words that we want. On the other hand, please do not be careless because we want your true impressions.

Are there any questions about your task? If not, let us try a sample item so that you can get a feel for what is required.

Let's begin.

# Word Association

This is a test to see how many words you can think of and write down in a short period of time.

You will be given a <u>key</u> word and you are to write down as many <u>other</u> words which the key word brings to mind as you can. These other words which you write down may be things, places, ideas, events, or whatever you happen to think of when you see the key word.

For example, think of the word, KING. Some of the words or phrases which KING might bring to mind are written below:

queen	kingdom
King Cole	England
ruler	imperial
Sky-King	kingfish

No one is expected to fill in all the spaces on a page, but write as many words as you can which each key word calls to mind. Be sure to think back to the <u>key</u> word after each word you write down because the test is to see how many other words the key word makes you think of. A good way to do this is to repeat each key word over and over to yourself as you write. APPENDIX B

WORD NORMS<sup>1</sup>

ABRUPT

1.2788-19 sudden 1.2041-16 quick(1y) 1.0414-11 stop .7782- 6 short .6990- 5 halt, sharp .3010- 2 end, ending, fast .0000- 1 glad, nasty, now, pause, statement, unceasing, volcano BEGGAR (illegible: 1) 1.2788-19 poor 1.1761-15 thief .9031-8 bum .7782- 6 money .4771- 3 hunger(ry), tramp .3010- 2 alms, hobo, rich man .0000- 1 beaver, beg, book, cup, dirt, drunk, food, king, man, penurious, poor man, poverty, rogue, scarce. BODKIN (no response: 5) .6990- 5 body .6021- 4 nothing .3010- 2 blank, book, Brooklyn, don't know, elf, gremlin, man .0000- 1 author, baby, bare, bark, batch, bay, book, boot, bridge, Buddhist, catkin, chemistry, child, clothes, cow. delta,

1 The format of these norms is as follows: the stimulus word appears in capital letters. Below it are the log frequency and frequency of the responses.

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BODKIN (con't.)
.0000-1 doll, dress, sat, experiment, gadkin, ghoul, hat, horse,
jacket, jersey, John, Kathy, mannequin, nonsense, nun,
nut, odds, odkin, pin, Prof., Baken, pumpkin, relative,
sodkin, surry, stockings, stupid, toboggan, wagon, what,
wisdom, word.
```

# BOTTOM

- 1.6232-42 top
  - .6021- 4 lake
  - .4771- 3 end, pit, up
  - .3010- 2 floor
  - .0000-1 bare, bell, black, boat, bottomless, bottoms up, button, butt, cliff, deep, down, empty, inside, low ocean, pot, seat, ups.

# HAMMER

1.5315-34 nai
---------------

- .6990- 5 pound, saw
- .6021- 4 song
- .4771- 3 mallet
- .3010- 2 anvil, head, hit, Peter, Paul & Mary, sickle, tools, beat, bell, chisel, crush, head, John Brown, noise, record, shark, sledge, wood, workshop.

# SISTER

1.6721-47 brother

.4771- 3 girl, none

.0000-1 big sister, cold, confidant, Dianne, four, Johanna, Judy, Karen, little, love, Mary, Mary Ellen, me mother, my, niece, Rosanne, Sally, sibling, sister-in-law, smaller, three.

#### SOMBER

- 1.0792-12 sad
- 1.0414-11 quiet, sleep
  - .8451- 7 sober
  - .3010- 2 dull, drunk, serious
  - .0000-1 bland, bleak, bomber, color, dark, dread, dreary, dry, funeral, gentle, grey, happy, man, moody, morbid, night, noisy, peaceful, person, polite, puritan, severe, silent, solemn, still, surly, swift, winter.

#### SUDDEN

- 1.3010-20 quick
- 1.0000-10 stop
  - .8451- 7 abrupt
  - .6990- 5 fast
  - .4771- 3 now, start, suddenly
  - .3010- 2 death, surprise
  - .0000-1 all, at once, fright, halt, happening, hit, jump, last, life, movement, noise, panic, right, second, sharp, short, slam, soon, still, swift.

#### STARVING

- 1.5798-38 hunger(ry)
- 1.2304-17 food
  - .3010- 2 dying, man, people, skinny
  - .0000-1 animal, children, eating, hamburger, malnutrition, now, pain, poverty, set stomach, thirst, tomorrow.

# SUNDAY

1.5135-33 church

1.3617-23 Monday

SUNDAY (con't.)

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- .6990- 5 school
- .4771- 3 sabbath
- .3010- 2 weekend
- .0000-1 day, dinner, ice cream, never on, relax, Saturday, skip, supper, week.

# ROOM USE CHILY. 1/2/65 3: 201 11007-01 2/1/68 LD

ROOM USE ONLY

