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# A Comparison of Free and Controlled Association on the Loyola Language Study

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# A COMPARISON OF FREE AND CONTROLLED ASSOCIATION ON THE LOYOLA LANGUAGE STUDY

by

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## LIFE

John J. Trainor, S.J., was born in Chicago, Illinois, March 22, 1923.

He was graduated from Leo High School in Chicago in June, 1940, and entered the Society of Jesus in August of the same year. He was graduated from Loyola University, June, 1945, with the degree of Bachelor of Arts and in June, 1947, with the degree of Master of Arts in Classics.

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## PREFACE

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# CHAPTER I

## INTRODUCTION AND STATEMENT OF PROBLEM

Free association is a technique used in projective testing in which the subject is asked to respond to a given stimulus word with the first word that comes to his mind. Controlled association, as used in the studies at Loyola University, asks the subject to write down the one word which he thinks the greatest number of people would think of when they see or hear the stimulus word. Free association is a technique used in formal psychoanalysis to discover certain deep associative links in the person's thoughts by letting his mind wander at random, verbalizing without restraint. From the Wurzburgers onward through the present day psychiatrists the concept has persisted that somehow the processes of association and their varied characteristics would reflect the structure and content of thought. This method which consists of responding with the first word that comes to mind and the controlled association which puts some definite limits on the associative process have long been used for the diagnosis and treatment of disorders of various kinds.

Olof Johnson and Louis B. Snider developed the controlled association which has since been adopted by Loyola University as the Loyola Language Study. Whereas in free association the subject is asked to give the first response which comes to his mind upon hearing the stimulus word, in the Loyola Language Study the subject is asked to pause and deliberate what most people would be

likely to think of when they see or hear the individual word. On the test booklet the instructions are given: "Please write next to each of the words the one word which you think the greatest number of people would be most likely to think of when they see or hear the word in the list. Take as much time as you need to think about the word which seems to you to 'go along' with each printed word. Then choose the one word which you think the greatest number of people would be most likely to think of when they see or hear the given word. Remember, you are not asked to write down just any word that comes to your mind."

In this study of normal individuals the results of free and controlled association are compared using the same subjects and the same set of eighty words. The free association test and the controlled association test are given at least a month apart to the same subjects. We ask if there is a significant difference in the results obtained. Will they give identical results or will one or the other be a surer index of a person's ability to respond the way that most people do during the association process? In the free association test the first answer to come to mind could be supposed to be not as closely related to the stimulus as in the controlled association, owing to chance occurrences of the moment, to lack of reflection and selection, to lack of time for weighing meanings; in a word - because of individual differences in the way the stimulus strikes the individual at the moment.

If these factors enter into the response given to the stimulus words in free association, then free association should yield proportionately less communal responses than the controlled association which asks the subject to choose what he judges to be the word most people would think of. The supposi-

tion which investigators have always made is that the more normal a person actually is, the more communal will be the responses which he gives. Thus in attempting to measure the person's sensivitivy to the communal association shared by the rest of the population the controlled association should be able to appraise his tendency to conform to or deviate from normal thought. A child gradually learns the meanings of words and their connection with other words so that each word means the same thing to him and to the person to whom it is addressed. These normal associations spring up between words and would seem then to be common to many people.

On the other hand free association would seem to be governed by the trials or endeavors of the present. The situation the person is in, any trouble in which he finds himself, the mood he is in and the forces troubling him would seem to influence his response when he gives the first word that comes to his mind. Free association, then, might be more effective at discovering disorganized states than the controlled association. If he is well adjusted to his situation then he would be expected to give the commonly expected response. If he were troubled or upset his response would be expected to reflect this emotional state.

As the person deviates more and more from the normal way of thinking and acting, his responses would be expected to deviate from the most common responses, or as Rosanoff would say, the more "individual" responses will he give. This should be true of both controlled and free associations. When he endeavors to reflect and give the word he thinks the greatest number of people would give to the stimulus word his inability to achieve communality of thought should be more obvious than when he answers on the spur of the moment, giving

the first word that comes to his mind. This test, therefore, either as free or controlled association, should measure a certain quality of the subject's associations. It should also give some indication of his ability to share thoughts and perhaps feelings with others. His ideas of social acceptability or intellectual value are likely to influence his response in controlled association more than the emotional and interest patterns which affect his behavior at the moment. His relations with others, his social attitudes, his self-evaluation and value system should enter into the deliberate choice he makes as he decides what most people would think of. His emotions and present situation would seem to have a greater influence on him when he replies to the stimulus word with the first word that comes to his mind.

The purpose of this study is to study the differences between the controlled and free association responses given by the same normal subjects to the same group of words. It seeks to discover whether there is an intra-test consistency among the various parts of the same test. It seeks also to discover what difference, if any, exists between controlled and free association on the same group of words with the same subjects. To test for consistency and difference the same scoring system will be used for both sets of responses. These scores will be determined entirely by the population sampled in the testing. The same statistical treatment should provide the basis for communality judgment and significance of difference between the free and controlled associations. The statistical method will also provide the basis for the study of intra-test reliability on the part of both free and controlled association. This is one of many studies being made using the Loyola Language Study as the experimental instrument.

## CHAPTER II

## REVIEW OF RELATED LITERATURE

### A. Free Association

1) Kent and Rosanoff

The most important work done on word association was done by Kent and Rosanoff. They administered a free association test of 100 words to 1000 normal and 247 mentally unbalanced subjects. Their list of 100 words excluded words that would be likely to recall personal experiences and separated in space words that were closely connected with each other. When the stimulus word was repeated as a response, the stimulus word was given a second time after the test was completed. The subjects with a widely divergent background in education and culture ranged from eight to eighty in age and were composed of both sexes. The hospitalized patients were mostly inmates at Kings Park State Hospital in New York.

Kent and Rosanoff observed the almost universal tendency among normal persons to give one or another of a small group of common responses, though they found no significant differences pertaining to age, sex or education (8:146). Their work showed a gradual transition from the normal state to pathological states so that by the use of free association no sharp distinction can be drawn between mental health and mental disease (8:373).

2) Esper

In 1918 Esper confirmed one aspect of the work of Kent and Rosanoff

when he found that the favored associations of children and adults are the same and the essential character of their association is similar (4:486).

3) Noh and Guilford

Noh and Guilford found sex differences which Kent and Rosanoff did not find when they discovered that the responses of men have less communality than the responses of women (14:418).

4) Miles and Terman

Miles and Terman who are experts in sex differences in word association insist that it is possible to construct a word association test that will bring out measurable sex differences for any unselected groups (13:205).

5) Carter

In 1938 Carter made a study to measure emotional response in a free association test by means of reaction time. He used eight pleasant, eight unpleasant and eight indifferent words (none of which are used in this present study) to test twenty-six pairs of identical twins and twenty-four pairs of fraternal twins. The twins ranged in age from nine to seventeen years. He based all his conclusions on reaction time which is what he was interested in. He found that sex differences are small and unreliable and that age, sex and intelligence are only slightly related to association time. There is a greater similarity of identical twins in association-time scores than there is for fraternal twins, but the greater similarity is slight. He discovered that the longer reaction time was associated with emotional disturbance and hence the association-time technique was serviceable in discriminating disruptive emotional reactions from the emotional reactions of a milder nature. He found high inter-correlation scores between Pleasant, Unpleasant and Indifferent

scores (1:201-215).

6) Carter and Sorenson

Carter and Sorenson conducted a study on twin resemblances by using the free-association technique. Seventy-two male twins and seventy-two female, ranging from nine to seventeen years, were their subjects. They investigated community of response for a subject by scoring the extent to which that subject gives common responses. They used the same 24 stimulus words that Carter had used in his previous study. They did not use the raw frequency scores, in measuring community of response, because that would give certain stimuli undue weight, as would also the square roots of their frequencies. In one treatment of their data, they developed normalized standard scores for each frequency distribution before summating the scores for all the items. They concluded that identical twins showed only slightly more community of response than did fraternal twins. They found negligible correlation between community of response and age. It is more significant that they report that the different methods of treating their data yield slightly different results. The most reliable method of treating the data was the simple measure of individual responses. The second most reliable was by the securing of normalized scores. These two methods tended to equalize the weight of individual items in the determination of a total score for community of response (17:237-246).

7) Goodenough

Florence L. Goodenough used a test of free association for the appraisal of personality. She used homonyms as stimulus words and categorized responses into groups on the basis of some common characteristic of meaning that has been empirically found to have unequal appeal for individuals differing

in respect to the trait that it is desired to measure. She disguised the test as a speed test and administered it to groups. She found that objective norms for scoring could be set up so that clerical workers of moderate competence could score these tests with a degree of accuracy that is only slightly less than is ordinarily found for wholly objective tests (5:102).

## B. CONTROLLED ASSOCIATION

### 1) Maller

J. B. Maller did the first work on association as a diagnostic device. His multi-choice association test was found to discriminate between psychiatric patients and normals by indirectly measuring emotionalized response patterns. He used a list of 200 stimulus words in his test with each stimulus word followed by two response words from which the subject had to choose one as his own response. One member of each pair represented a normal and one an abnormal association. The subject underlined the word in each pair which he associated with the stimulus word. The score was the total number of abnormal words underlined. He found that the average total score was about twenty abnormal words for normal subjects and was consistently higher for abnormals, ranging as high as 100 abnormal words (11). His findings are in accord with the studies using free association insofar as disordered persons on the whole give a higher than average percentage of abnormal responses.

### 2) Malamud

Malamud in 1946 conducted a validity study on Maller's Controlled Association Test. He administered the same test to 150 Norwich State Hospital patients and to 150 normals. He concluded that both validity and reliability

were satisfactory when proper systems of weights were used even for individual diagnosis. He found that the scoring was valid for determining group differences in terms of maladjustment, but because of the high percentage of misclassification of normals was not sufficiently discriminating for screening out individuals. He concluded that a weighted scoring system must be devised to give satisfactory stability to the test for individuals as well as for group diagnosis (9:37-43).

Though Malamud's results are quite promising, something of the freedom and spontaneity of the association test has been lost with this method. A subject in this test has only two choices of response and an abnormal subject may underline the normal response, even though another, and abnormal response, is the word most closely associated in his mind with the stimulus word. In the Loyola Language Study, on the other hand, a subject is free to respond with any one of many possible responses that come to mind, while he is following the instructions in the test. These instructions (given on page 1) give ample opportunity for the manifestation of many kinds of responses, some of which will be less common than others. The controlled association method of the Loyola Language Study should, therefore, give even greater validity than Maller's test because it explores the whole range of possible responses which a stimulus word may suggest to the subject. Nevertheless Malamud holds out high hopes for the diagnostic future of his type of Controlled Association Test:

> A multiple choice word test bearing a multi-scoring character similar to that of the MMPI or the Strong Vocational Aptitude Test might be devised for use both in the clinical and industrial fields. By means of item analyses of carefully defined clinical and control groups a variety of scoring keys might be derived for the various diagnostic syndromes. A single administration of such a test would yield a clinically

> useful profile without the necessity for gaining the subject's willingness to reveal himself directly, as is necessary in the MMPI, for example. It also appears possible that comparisons of successful and unsuccessful workers in occupations where particular personality traits, values, or interests are important requisites might yield additional scoring keys useful in the selection of employees (9:43).

3) Crown

Sidney Crown in 1947 using 200 normals and 200 abnormals established a critical score in the Maller Word Connexion List and published validity and reliability studies. Later in a much larger study he found that the test discriminated neurotics, but not psychotics, from normals. He found, too, that the overlap was great, even for neurotics, so that persons of certain occupational groups were made to appear very neurotic, if the previous critical scores were used as cutting points. He advised using any critical score with great cautions. Psychotic groups tend to score lower on this Word Connexion Test than do the neurotic groups. This supports his hypothesis that variation from normality of the psychotic and neurotic illnesses is along different, uncorrelated dimensions.

He found that normal samples from the general population show a considerable range in scores on the Word Connexion List. This could be due to variations in intelligence between the groups, but it emphasizes the necessity for caution in drawing conclusions from the results of single investigations where the test performances of normal and abnormal groups are compared. He concluded that the screening efficiency of the Word Connexion List is such that it can have only suggestive value in screening and selecting individuals (3:111). Crown's study having to do with diagnostic and screening possibilities of word association is closely related to the larger work of which this study is a part.

4) Johnson and Snider

In 1953 Olof Johnson and Louis B. Snider used 80 of the Kent and Rosanoff 100 words to construct a controlled association test. Their purpose was to measure the degree of mental illness of hospitalized patients and by retesting them after treatment to determine the degree of recovery. This retesting was never undertaken. They tested groups of patients at Boston State Hospital, Boston, Massachusetts. To score and evaluate the patient's tests they used the norms obtained from their original testing with the general population of Boston. Data have been prepared from 389 men and 400 women tested in Boston. Their test has been copyrighted by Loyola University under the title of the Loyola Language Study.

5) Stanek

Richard J. Stanek duplicated the work of Johnson and Snider in the Chicago area. He used a method of stratified random sampling from a normal population, similar to that used by Snider and Johnson. His work appears in the form of a dissertation in the Loyola University Psychology Department under the title of "The Variability of Age, Sex and Education in Responding to a Controlled Association Test." He tried to determine whether differences in age, sex and education significantly affect responses on the test. In his study he subdivided groups of 400 men and 400 women according to age and education. There was found to be a positive correlation with education and a negative correlation of the same magnitude with age. Both correlations were significant for the entire sample of 400 men and 400 women, but neither showed a rectilinear relationship throughout the whole range of ages and education. There was also a sex difference found in his study, which showed up in his consistently higher

communality scores for women as compared to men.

6) Stewart

Virgil Stewart conducted a study on the relationship between the Loyola Language Study and a test of linguistic ability with college freshmen. One hundred males and 100 females were his subjects. The correlations he found between the Loyola Language Study and the linguistic test, as well as with actual grades received from teachers, were not significant even at the .05 level of confidence. He found that male high achievers in the tests correlated tend to do poorly on the Loyola Language Study, though he did not find a similar result for the female high achievers.

Other studies are being done on various aspects of the Loyola Language Study and still others are being planned, but their results are not yet available. Previous work has shown the validity of the Loyola Language Study as a tool for discriminating patients from normal subjects. From the summaries of the work of others, it can be seen that none of them approaches the problem in exactly the same way as this study does. Other work is being done on the difference between free and controlled association with different time lapses between the tests and with different groups of subjects.

# CHAPTER III

# PROCEDURE

## A. Instrument Used

The Loyola Language Study is the test used in this investigation. It is a word association test which consists of eighty words chosen from the Kent-Rosanoff list of 100 words. This test was administered twice at the intervals of from four to eight weeks. To part of the subjects the test was given as a free association test first with the instructions: "Answer as quickly as you can. Put down the first word that comes to mind when you see each of these words." To the other part of the subjects the test was given as a controlled association test with the instructions read by the administrator from the instructions printed on the test booklets themselves. These instructions read: "This study wants to find out what word you think the greatest number of people would be most likely to think of when they see or hear each of the words on these two pages. Please write next to each of the words the one word which you think the greatest number of people would be most likely to think of when they see or hear the word in the list. Take as much time as you need to think about the word which seems to you to "go along" with each printed word. Remember, you are not asked to write down just any word that comes to your mind. You should write down the one word which you think the greatest number of people would be most likely to think of."

The subjects were also asked to read for themselves the full instructions which are written on the booklets. Uniformity was thus insured in the

administrations of each form of the test. Between four and eight weeks later the same subjects were retested. About half of the subjects took the free association test first followed by the controlled association test on the same words four to six weeks later. The other half took the controlled association test first followed by the free association test. The appropriate instructions were called attention to in each method of testing. When asked after the testing was completed whether they remembered the words they had written the first time they took the test, subjects said they did not, and some of them were even surprised to find it was the same test with different instructions. The same booklets were used in the administration of both parts to facilitate uniformity of scoring. The controlled association test took the subjects four to five times as long as the free association test.

## B. Method

These subjects were all tested in groups. The author or trained supervisors supervised all the testing. The subjects were given all the time they needed to do the controlled association and were encouraged to respond to the free association as quickly as possible. The supervisor introduced the testing by announcing to the group that this project was part of a project that Loyola University was conducting on an extensive scale. The subjects were asked for their cooperation and assured that their names would never be used in the tabulation of results. The supervisor read the instructions and for the controlled association test had the subjects read the instructions printed on the booklet. The supervisor distributed the booklets and the information items on page four were filled in. Any questions that were asked concerning the

instructions of the test or the stimulus words were answered in these words: "Follow the instructions as well as you can." The testing periods were not timed and the testees had ample time in which to complete the tests. In this way the conditions of administration were identical. The testees took the test in groups, usually in a classroom, were very cooperative and were required to keep perfect silence during the test.

## C. Subjects

The ages of the subjects in the sample used range from 19 to 58. The median age of the subjects was 24 years, while the mean age was 26.78 years. Their years of education ranged from 13 to 20. The median education year was 15, while the mean of the education was 15.09 years.

## D. Scoring

When the testing was completed there were 164 pairs of booklets, one with free and one with controlled association. Each of the eighty words was scored with the entire sample. The total frequencies for each word came from the combined total of 328 tests. New scoring frequencies had to be established because the norms used by Stanek for the Chicago area had come from the controlled association method alone. A frequency of 1 was given for each single response. The following rules for grouping were used. Singular and plural nouns were grouped together. The tense and voice of verbs were grouped separately on the assumption that they might later have a significance in personality evaluation. Omissions and multiple word responses were given a raw score of zero. However logical exceptions were made for multiple word responses

like corned-beef and United States so that they were accepted as valid and scorable responses. In case of poor penmanship or unusual spelling a comparison of handwriting usually determined what the response was. If one word was inclosed in a parenthesis the other word was scored as the response. If the first of two words was an article the article was disregarded in the scoring. If the first of the two words was a modifier of the second, e.g. very well, small child, the response was scored as a multiple word response.

The response frequencies were tabulated for both the free and controlled associations. A comparison of scores for both methods is given for the words soldier, foot, thirsty and stomach. Tables I, II, III and IV on pages 18, 19, 20 and 21). In these tables can be seen the absolute number of responses given to each word, as well as the percentage of that number with regard to the whole sample. Foot is the only one of these words which does not show notable differences between the free and controlled associations. Then these frequencies were combined to give an absolute score to each word from the 328 respondents. The accompanying tables show the combined frequency lists for dark, bread and comfort. (Tables V and VI on pages 22 and 24.) These tables are typical of the results with the entire eighty words. The absolute accumulated scores were the ones that entered into all the scoring and the testing for significant differences.

The scoring was done with 164 pairs of booklets and then 50 males and 50 females were selected at random to be the sample for this thesis. No tests were used that had as high as ten per cent of erroneous responses; i.e. multiple-word, repetitions of stimulus words, and/or omissions of responses.

## E. Statistics

Rank correlations were used in the statistical analyses because the scores represent variables of a qualitative rather than a quantitative sort. Pearson's r was not used because the two variables did not seem to be measured on a continuous metric scale.

## F. Reliability

Test-retest reliability for the controlled association was computed as a prelude for this present study by having 82 subjects not used in the study proper take the controlled association test at the beginning of a course and then at the end of the semester. Subjects declared that they could not possibly remember all the responses they had given to each of the eighty words on the previous occasion. They readily became confused because of the similarity of the meanings of various items, for example "bread" and "butter," "sickness - health - doctor." Nevertheless the test correlation for all eighty items was .49 and this value did not change when the odd items of the test were correlated with the even items of the retest. When the total length of the test was reduced by scoring only the items which had top screening efficiency, as determined in another study, the correlation between test and retest rose to .55 for a sample of 82 subjects.

TABLE I

Comparison of Frequencies of Responses in Free and Controlled Association to SOLDIER

| FREE Association | | | CONTROLLED Association | |
|---|---|---|---|---|
| Frequency Number | Percents | Word | Frequency Number | Percents |
| 48 | 29.2 | army | 57 | 34.7 |
| 4 | 2.4 | boy | 4 | 2.4 |
| 1 | .6 | battle | 2 | 1.2 |
| 4 | 2.4 | fight | 2 | 1.2 |
| 1 | .6 | fighter | 1 | .6 |
| 1 | .6 | fighting | 2 | 1.2 |
| 19 | 11.5 | gun | 14 | 8.5 |
| 15 | 9.1 | man | 10 | 6.0 |
| 2 | 1.2 | rifle | | |
| 20 | 12.1 | sailor | 11 | 6.6 |
| 4 | 2.4 | uniform | 8 | 4.8 |
| 34 | 20.7 | war | 47 | 28.6 |
| 14 | 8.5 | singletons | 7 | 4.2 |

TABLE II

Comparison of Frequencies of Responses in Free and Controlled Association to FOOT

| FREE Association | | | CONTROLLED Association | |
|---|---|---|---|---|
| Frequency Number | Percents | Word | Frequency Number | Percents |
| 1 | .6 | ball | 1 | .6 |
| | | body | 2 | 1.2 |
| 1 | .6 | bottom | 2 | 1.2 |
| 2 | 1.2 | corn | 1 | .6 |
| | | doctor | 2 | .6 |
| 6 | 3.6 | hand | 13 | 7.9 |
| 3 | 1.8 | head | 1 | .6 |
| 2 | 1.2 | inch | | |
| 15 | 9.1 | leg | 12 | 7.3 |
| 1 | .6 | pedal | 1 | .6 |
| 72 | 43.8 | shoe | 72 | 43.8 |
| 2 | 1.2 | socks | 2 | 1.2 |
| 2 | 1.2 | sore | 2 | 1.2 |
| 1 | .6 | stand | 1 | .6 |
| 2 | 1.2 | step | 1 | .6 |
| 20 | 12.2 | toes | 18 | 10.9 |
| 2 | 1.2 | soldier | | |
| 15 | 9.1 | walk | 18 | 10.0 |
| | | walking | 2 | 1.2 |
| 14 | 8.5 | singletons | 11 | 6.6 |
| 2 | 1.2 | double response | 1 | 1.2 |

TABLE III

Comparison of Frequencies of Responses in Free and Controlled Association to THIRSTY

| FREE Association | | | CONTROLLED Association | |
|---|---|---|---|---|
| Frequency Number | Percents | Word | Frequency Number | Percents |
| 46 | 28.0 | drink | 31 | 18.9 |
| 12 | 7.3 | dry | 22 | 13.4 |
| 3 | 1.8 | hungry | 3 | 1.8 |
| 1 | .6 | parched | 3 | 1.8 |
| 1 | .6 | refreshment | 1 | .6 |
| 2 | 1.2 | tired | 1 | .6 |
| 92 | 56.1 | water | 99 | 60.3 |
| 7 | 4.2 | singletons | 5 | 3.0 |

TABLE IV

Comparison of Frequencies of Responses in Free and Controlled Association to STOMACH

| FREE Association | | | CONTROLLED Association | |
|---|---|---|---|---|
| Frequency Number | Percents | Word | Frequency Number | Percents |
| 49 | 29.8 | ache | 31 | 18.9 |
| 3 | 1.8 | acid | | |
| 1 | .6 | belly | 5 | 3.0 |
| 8 | 4.8 | body | 11 | 6.6 |
| 2 | 1.2 | digestion | 3 | 1.8 |
| 5 | 3.0 | eat | 7 | 4.2 |
| 2 | 1.2 | eating | 1 | .6 |
| 2 | 1.2 | empty | 2 | 1.2 |
| 52 | 31.7 | food | 63 | 38.3 |
| 2 | 1.2 | full | 3 | 1.8 |
| 5 | 3.0 | hunger | 4 | 2.4 |
| 2 | 1.2 | hungry | 5 | 3.0 |
| | | intestine | 2 | 1.2 |
| 1 | .6 | mouth | 2 | 1.2 |
| 1 | .6 | organ | 2 | 1.2 |
| 1 | .6 | organism | 1 | .6 |
| 6 | 3.6 | pain | 3 | 1.8 |
| 4 | 2.4 | ulcer | 2 | 1.2 |
| | | sickness | 2 | 1.2 |
| 17 | 10.4 | singletons | 12 | 7.3 |
| | | double responses | 3 | 1.8 |

TABLE V

Combined Frequencies in Free and Controlled Association for Stimulus DARK

| | | | |
|---|---|---|---|
| afraid | 2 | | |
| black | 50 | | |
| blind | 2 | | |
| bright | 2 | | |
| color | 2 | | |
| evening | 2 | | |
| fear | 3 | | |
| light | 125 | | |
| mysterious | 2 | | |
| night | 105 | | |
| red | 2 | | |
| room | 3 | | |
| quiet | 2 | singletons | 26 |

for BREAD

| | |
|---|---|
| butter | 204 |
| eat | 18 |
| eating | 2 |
| flour | 5 |
| food | 44 |
| knife | 2 |
| life | 4 |
| loaf | 4 |
| sandwich | 6 |
| slice | 3 |

TABLE V (Continued)

for BREAD

| | | | |
|---|---|---|---|
| toast | 2 | | |
| water | 9 | | |
| wheat | 3 | | |
| white | 3 | singletons | 19 |

TABLE VI

Combined Frequencies in Free and Controlled Association for Stimulus COMFORT

| | |
|---|---|
| aid | 2 |
| bed | 27 |
| chair | 20 |
| console | 2 |
| contentment | 2 |
| cozy | 2 |
| discomfort | 3 |
| ease | 76 |
| easy | 2 |
| enjoyment | 2 |
| good | 2 |
| hard | 3 |
| help | 5 |
| house | 2 |
| home | 8 |
| joy | 3 |
| leisure | 4 |
| luxury | 7 |
| mother | 2 |
| peace | 2 |
| pillow | 2 |
| pleasant | 3 |
| pleasure | 11 |
| quiet | 2 |
| rest | 22 |
| resting | 3 |
| relax | 16 |
| relaxation | 5 |
| relaxing | 3 |
| satisfaction | 6 |
| security | 2 |
| sleep | 10 |
| sofa | 3 |
| soft | 21 |
| sorrow | 2 |
| sitting | 3 |
| station | 3 |
| singletons | 29 |
| no response | 4 |
| double response | 3 |

## CHAPTER IV

## Analysis of Results

In this experiment two tests were given to each subject: one with the free association method and one with the method of controlled association used in the Loyola Language Study. In the sample of 100 chosen at random for this study 34 persons, 17 males and 17 females, were given the free association test first and the controlled association test at least a month later. Sixty-six persons, 33 males and 33 females, were given the controlled association test first and the free association second.

There was one notable quantitative difference between the two tests, and that was in the length of time taken for each of the tests. On the controlled association testing most of the subjects took between twenty and thirty-five minutes, whereas most of the subjects finished the free association test in about five or seven minutes. It is impossible to say exactly what the subjects were doing during the extended time it took them for the controlled association, but the fact of the longer time remains. If frowning and scowling and deliberation before putting down certain responses is any indication, then they were apparently trying to carry out the instructions of giving the word which they thought the greatest number of people would give when they saw or heard that word. It seems to be a longer process to decide what <u>most</u> people would answer to the stimulus word than to write down the first word that comes to mind when the stimulus is presented. Because of the longer time involved

there would seem to be a greater opportunity to give a more appropriate and reflective response. This is borne out by the following results.

A. Effect of Order

It is expected that the second test might be better than the first if there is any practice effect from one test to the other. The comparison was made by comparing the number of persons in the order Free first and Controlled second who have the second test higher than the first with the number of persons in the order Controlled first and free second who have the second test higher than the first. This was tested in two ways: 1) with the Chi square using total scores where the expected frequency is the mean or equal percentages for the two; and 2) using the Spearman rank correlations.

Results

Fourteen persons got a higher score on the free association test when this was given first, while thirty-eight persons got a higher score on the controlled association test when this was given first. Thus a total of fifty-two persons received a higher score on the first test, regardless of instructions, while forty-eight persons received a higher score on the second test, whether that was given as free or controlled association. The Chi Square was far below significance and thus no more than a chance association exists between taking the test first and making a high score.

The Spearman rank correlation formula was used as a check on Chi-Square. This could be used because all the subjects, both the thirty-four who had taken the free association test first and the sixty-six who had taken the controlled association test first, had taken both tests. The rank correlation between Free and Controlled Association scores should be the same, except for

chance, whether the free or controlled is given first. These correlations were made for each of the four columns into which the Loyola Language Study is naturally divided (see Appendix) using the Spearman rank correlation formula:

$$RHO = 1 - \frac{6\Sigma D^2}{N(N^2-1)}$$

The means were obtained for the correlations obtained from the four parts of the test.

TABLE VII

Table of Rank Correlations for Test-Retest Consistency

| | Col. 1 | Col. 2 | Col. 3 | Col. 4 | Mean |
|---|---|---|---|---|---|
| 66 prs. - controlled 1st. | .42 | .57 | .41 | .54 | .485 |
| 34 prs. - free 1st. | .55 | .63 | .51 | .39 | .520 |

The correlation for all four columns combined for the sixty-six pairs who took the controlled association test first is .485, while that for the thirty-four pairs who took the free association test first is .52. The difference is insignificant. The order of presentation, therefore, does not significantly affect the results.

B. Effect of the Method of Presentation

It is expected that a person's total score on Controlled Association would be higher than his total score on Free Association since he has been given the instructions and the opportunity to ponder and reflect. This would seem to give him a chance to avoid the emotional and environmental stimuli of the moment. This testing for significance of difference was done in a number of ways.

1) Herr-Rimoldi "Median"

According to this method a cutting point is used whereby a score of 1 is given to the responses that fall among the top frequencies and a score of 0 for those which do not fall among the top frequencies. Normally 50% of the total responses would be the cutting point, but if one response goes far above 50% then a higher cutting point has to be used. The cutting point used in this study was 64%.

To try to determine whether median scores would show a significant difference between free and controlled association of these one hundred subjects the Herr-Rimoldi "median" scores were used on the last column of the two hundred tests. The last column was selected for testing because in other studies, as well as in this one, the fourth column showed a highly consistent correlation with other columns. The cutting point was set at 64% rather than the median at 50% because some of the top frequency words went above 50% by themselves, with a good percentage of the responses being given to the next highest word. Using these median scores, the number of responses needed to total 65% of all respondents ranged from one response needed for needle, dream, bed, woman and butter to eleven words needed for music and twelve words needed for trouble. The word thread in response to the stimulus word needle obtained 64% of the total responses by itself. But for the stimulus word trouble the following twelve words were necessary to make up a full 64%: bad, difficulty, fear, fight, law, police, problems, sorrow, worry, wrong, sad and peace.

Results

Using the Herr-Rimoldi "median" there was no significant difference between Free and Controlled Association, though the trend was in the expected

direction of the controlled association receiving, in general, more scores of 1 than the free association. Thus there was a definite trend, though not significant, for the individual to acquire higher scores, i.e. give more common responses, on the Controlled association than on the Free association test. Since this proved to be so, the median scores were abandoned for the rest of the test. The reason why they failed is that the cut-off point fails to utilize differences occurring among the very high and the very low frequencies. This cut-off point gives no more force to the one word which by itself equals 64% of the responses for needle than it does to any one of the twelve words that make up the 64% of the total responses for trouble. Each gets a score of 1. Furthermore, the median scores give no credit at all for the words with low frequency scores. As a result, it does not distinguish items of varying difficulty from each other because the results are expressed only in pass-or-fail categories. The items certainly seem to vary in difficulty judging from the varying numbers of what purport to be attempts to give communal responses to each word.

2) Wilcoxon Matched-Pairs Signed-Ranks Test

Because each one of the one hundred subjects had taken both tests, the Free association and the Controlled association, this formula could be used to test for significance of difference in results of the total test. The formula is: $$Z = \frac{T - \left(\frac{N(N+1)}{4}\right)}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}$$ in which T is equal to the sum of the ranks (absolute difference regardless of plus or minus signs - with the lowest difference receiving the rank of 1) of those persons who have "minus" scores; that is, in the expected direction where a Z

is the correction for N. Taking all one hundred persons and assigning two scores to each, one for free and one for controlled association, a rank was given to the differences between the total scores of the free and the total scores for controlled association regardless of plus or minus signs.

## Results

Since trends in the expected direction resulted in larger scores on the controlled association, those who obtained a larger score on their free association test were the ones who had a minus score; that is, in the unexpected direction. The forty-two minus responses gave a Wilcoxon T-score of -596. In the application of the formula the Z score was 2.049 so that P is .021, which means that there is a significant difference between the methods of free and controlled association at the .02 level of confidence. There are only two chances in a hundred that this difference could have occurred by chance.

3) Parametric Formula:

The usual parametric formula (12:64) was also employed to test for significances between the free and controlled association tests. This gave a P of .01 which indicates a highly significant difference. This formula was used as a check on the Wilcoxon formula, though its use is probably illegitimate because not all of the assumptions underlying its use can be accepted with certainty. According to this formula CR is 2.304 which is significant at the .02 level of confidence since there are only two chances in a hundred that this could have happened by chance. All of the other statistical procedures used in the findings are non-parametrical, since the variables might not seem to some theorists to be measured on continuous metric scales (6:310 and chapter 15).

4) Item Analysis

Since there is a significant difference between free and controlled association on the total results of the test, there should be a similar difference on the individual items of the test. It would be expected that controlled scores would show greater communality of response than free association on the individual words of the test. In an endeavor to break the test down into various parts an item analysis was used for each of the eighty words. The total frequencies given to each word by the one hundred subjects when they took the free association test were compared to the total frequencies given to each word by the same subjects when they took the controlled association test. Then each word was evaluated to see whether it received a higher score from the total free association responses than it did from the controlled responses. (Table IX on p.36.)

Results

Fifty-four words were found to discriminate the controlled from the free association by giving a greater total frequency to the controlled association test than they did to the free association test. The sum of the differences for the 54 words was 40,818 with a mean difference of +755.8. The sum of the differences for the 26 words which did not discriminate was -14,660 with a mean difference of -563.8. The mean difference for the entire 80 words was +326.975 in favor of the controlled association. Fourteen of twenty-two adjectives do not discriminate. The adjectives which do discriminate between the controlled association and the free association are beautiful, cold, blue, thirsty, hungry, afraid, red, loud. Exclusive of eating and working which are also participles only ten nouns do not discriminate. The nouns which do not

discriminate are fruit, joy, king, comfort, girl, man, ocean, tobacco, woman and sickness. The total responses for each word are given in the following tables. In this study then 67.5% of the words do discriminate between the Controlled Association method and the Free Association method.

5) Column Analysis

The results of testing for differences on the total scores and on the individual items which showed a definite trend in favor of the controlled association are supported by an analysis of the four columns of the test. In the first column 50 persons were higher on controlled association and 50 higher on free association. In the second column, despite the greater number of words which showed a trend in favor of free association, 54 persons received a higher score on controlled association while 46 received a higher score on free association. In the third column 43 received a higher score on the free association while 57 obtained higher scores on the controlled association test. In the fourth column the most significant difference is seen when only 32 received higher scores on free association while 68 received higher scores on the controlled association test. The fourth column, therefore, shows the largest difference between controlled and free association, but the second and third columns show a trend in the expected direction.

6) Unusual Responses

Since the subjects have time to stop and ponder over their responses in an effort to give the word they think the greatest number of people would give, fewer unusual responses would be expected in the controlled association test than in the free association. Unusual responses are the responses which occur only once in the total possible responses of 328 persons, each responding

once to each stimulus word. Fifty-nine percent of the singletons in this study were given during the free association testing with 47 words having more singleton responses from the free association test than from the controlled. Forty-one percent of the words had more singleton responses from the controlled association than from the free. This 41% represents 30 words. Three words had an equal number of unusual responses from both free and controlled association methods. The mean for the number of singletons for the controlled association for the entire 80 words was 13.4. The mean for the unusual responses for the free association method was 14.6 for the entire 80 words. There is no significant difference between these scores but there appears a trend in the expected direction.

7) Top Discriminating Words

There are eleven top discriminating words in the studies done on Chicago men and women which are common to both men and women (7). The mean for these words in this study is +596.90. This means that the mean score for each of these words is 596.9 absolute frequencies higher for the controlled association test than for the free association. In the combined studies of Chicago men and women there are 14 words proper to men alone and 14 other words proper to women alone that discriminate normal persons from patients in mental institutions. In this study the mean for the 14 words proper to the men alone is +364.28 while the mean for the 14 words proper to women alone is +983.86. The mean for the other 41 words in this study from pooling the responses from men and women is only +73.37. Hence those words which show the greatest difference between Free and Controlled Association are also the words which best distinguish normals from abnormals.

8) Intra-Test Consistency

It would be expected that the four columns of free responses would be consistent among themselves and that the four columns of responses from the controlled association would also be internally consistent. Using total scores for each column it would be expected that the rank correlation between free and controlled association should be less than that between free and free or between controlled and controlled. The table for the correlations between free and controlled association are given on page 27.

Results

The table for the intra-test consistency correlations for the free and for the controlled association will now be given.

TABLE VIII

Table for Intra-Test Correlations for Consistency

| | Columns | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1-2 | 1-3 | 1-4 | 2-3 | 2-4 | 3-4 | Mean |
| I. Free vs. Free | | | | | | | |
| 66 prs. (contr. 1st) | .65 | .55 | .54 | .67 | .52 | .69 | .603 |
| 34 prs. (free 1st.) | .73 | .52 | .41 | .51 | .59 | .68 | .573 |
| II. Controlled vs. Controlled | | | | | | | |
| 66 prs. (contr. 1st.) | .67 | .62 | .52 | .64 | .49 | .66 | .600 |
| 34 prs. (free 1st.) | .67 | .61 | .62 | .75 | .68 | .49 | .666 |

The intra-test correlation is reliably consistent for both free and controlled association since the mean for the 66 pairs in comparing free with free association is .603 while the mean for the 34 pairs in comparing free with free is .573. The mean for the 66 pairs in the correlation of controlled

association with controlled, column by column, is .600 while the mean for the 34 pairs comparing controlled with controlled is .666. The mean rho for all four sets is reliable since a correlation above .50 is significant at the .01 level for 34 pairs of scores. The mean for both groups of free versus free association combined is .588, while the mean for both groups of controlled association combined is .633. The difference between these means is .05 which, though it is in the expected direction, is not significant. The internal consistency for free as well as for the controlled association is higher than the re-test given above for free versus controlled association (p. 27).

In all these correlations Rank Difference Correlations were used because the scores represent variables of a qualitative rather than a quantitative sort. Pearson's r was not used because the two variables did not seem to be measured on a continuous metric scale.

TABLE IX

Table for Item Analysis - Column by Column - Total Frequencies

| Word | Free | Contr. | Word | Free | Contr. |
|---|---|---|---|---|---|
| soldier | 5657 | 6645 | sour | 5766 | 4786 |
| hungry | 17,496 | 19,076 | king | 12,440 | 12,249 |
| butterfly | 2360 | 2639 | deep | 3331 | 3122 |
| long | 13,071 | 11,005 | sleep | 5020 | 5491 |
| head | 2252 | 2405 | black | 8562 | 7946 |
| anger | 2326 | 3444 | hammer | 10,094 | 10,615 |
| afraid | 4586 | 4696 | table | 12,113 | 13,927 |
| fruit | 10,359 | 10,023 | thirsty | 13,013 | 14,963 |
| dark | 8855 | 8678 | quiet | 1747 | 1637 |
| red | 2877 | 3362 | hard | 6087 | 5467 |
| loud | 8860 | 9639 | blue | 6714 | 7699 |
| bath | 6179 | 6622 | sweet | 6899 | 6482 |
| eating | 11,246 | 10,929 | stomach | 6368 | 6598 |
| joy | 5388 | 5294 | working | 1646 | 1507 |
| rough | 2342 | 1966 | comfort | 2925 | 2503 |
| heavy | 4559 | 3971 | soft | 4785 | 4446 |
| high | 5124 | 4355 | short | 5272 | 4793 |
| white | 7053 | 6715 | beautiful | 2755 | 2973 |
| command | 5809 | 7362 | cold | 4580 | 4980 |
| whiskey | 4732 | 5029 | whistle | 2318 | 2417 |
| yellow | 2099 | 2389 | carpet | 6748 | 7935 |

TABLE IX (Continued)

| Word | Free | Contr. | Word | Free | Contr. |
|---|---|---|---|---|---|
| window | 3593 | 5101 | needle | 11,594 | 12,306 |
| scissors | 10,518 | 11,364 | hand | 4283 | 4701 |
| foot | 7463 | 7876 | thief | 3304 | 4701 |
| doctor | 3015 | 3075 | dream | 6939 | 9408 |
| wish | 4468 | 5199 | trouble | 1108 | 1417 |
| house | 6879 | 8049 | religion | 5420 | 5933 |
| justice | 4053 | 4464 | street | 2368 | 2624 |
| river | 7395 | 9765 | health | 2163 | 2774 |
| sickness | 3606 | 3391 | ocean | 7126 | 7104 |
| mountain | 3694 | 4253 | bed | 12,134 | 15,449 |
| stove | 3378 | 3790 | child | 1567 | 2013 |
| girl | 13,219 | 10,726 | tobacco | 9247 | 8925 |
| salt | 7184 | 7511 | woman | 10,505 | 9676 |
| man | 11,229 | 10,033 | cabbage | 3206 | 3745 |
| cheese | 2494 | 3094 | citizen | 1276 | 2614 |
| baby | 1294 | 1685 | earth | 2223 | 2794 |
| moon | 3066 | 3410 | lion | 4012 | 4041 |
| spider | 10,282 | 10,758 | butter | 11,691 | 15,328 |
| bread | 14,075 | 14,177 | music | 1284 | 1286 |

## CHAPTER V

## SUMMARY AND CONCLUSIONS

In summarizing and concluding this study the following points seem to merit repetition.

1) A study comparing free association and controlled association has been completed. A total of 164 pairs of tests were used in computing the frequencies used. Total raw frequencies were used in all computations. In this study there were two groups: 34 persons who had taken the free association test first and the controlled association test at least a month later; and 66 persons who had taken the controlled association test first and the free association at least a month later.

2) There is no significant practice effect when first free association tests are compared with first controlled association test, regardless of the instructions given. There was no significant difference between test 1 and test 2, no matter which test, free or controlled association, was given first. The order of presentation does not significantly effect the difference between free and controlled association.

3) Using the Herr-Rimoldi median scores as a cutting point there was no significant difference between free and controlled association, though the trend was in the expected direction of the controlled association obtaining slightly higher scores.

4) Using the Wilcoxon Matched-Pairs Signed-Ranks test for signifi-

cance of difference a significant difference of the controlled association over free association was found at the .02 level of confidence. Checking the same data by means of a parametric formula there was a significant difference between controlled and free association at the .02 level of confidence.

5) Of the eighty words in the study, 67.5% discriminate controlled from free association. Nouns discriminate much better than adjectives.

6) Though the second and third columns of the test show a trend in the expected direction of persons getting a higher score on controlled association than on free association, the fourth column (with 68 of the 100 persons receiving a higher score on the controlled association test) showed the most significant difference between the two.

7) There were more unusual responses (scored as singleton responses) given in the free association test than in the controlled association, but the difference was not significant.

8) The words which in other studies discriminate Chicago men and women from hospital patients have also proved to be highly significant in this study.

9) The intra-test correlation is reliably consistent for both free and controlled association, whether the free association or the controlled association is taken first. The intra-test correlation for the controlled association is not significantly higher than the correlation for the free association, though it shows a trend in the expected direction.

10) As a prelude to the present study in a test re-test situation with the same instructions being given each time for the controlled association the test was found to be reliable.

11) With the significantly greater communality of response shown in favor of controlled association as compared with free association, there is sufficient reason for using the controlled association test rather than the free if we want to investigate deviations from common responses among psychiatric patients. The controlled association successfully increases the number of common responses over the free in normals. There might be some doubt whether or not it will do so in psychiatric patients.

REVISED

# LOYOLA LANGUAGE STUDY

## *Instructions*

WHEN PEOPLE see or hear a word, they often think of another word. If you say the word *stem,* most people would think of *flower.* Some, but not the greatest number, might think of *pipe, grass, stop,* and so forth.

This study wants to find out what word you think the ***greatest number of people*** would be most likely to think of when they see or hear each of the words on the next two pages.

Please write next to each of the words the ***one word*** which you think the ***greatest number of people*** would be most likely to think of when they see or hear the word in the list. Take as much time as you need to think about the word which seems to you to "go along" with each printed word. Then choose the ***one word*** which you think the ***greatest number of people*** would be most likely to think of when they see or hear the given word. Write the ***one word*** which you choose beside the printed word. Do not skip any word.

Remember, you are not asked to write down just any word that comes to your mind. You should write down the ***one word*** which you think the ***greatest number of people*** would be most likely to think of.

***Important:*** please fill out the information blank on page 4.

2

Beside each of the words printed below write the ***one word*** which you think the ***greatest number of people*** would be most likely to think of when they see or hear that word.

| Col. 1 | Col. 2 |
|---|---|
| soldier | sour |
| hungry | king |
| butterfly | deep |
| long | sleep |
| head | black |
| anger | hammer |
| afraid | table |
| fruit | thirsty |
| dark | quiet |
| red | hard |
| loud | blue |
| bath | sweet |
| eating | stomach |
| joy | working |
| rough | comfort |
| heavy | soft |
| high | short |
| white | beautiful |
| command | cold |

| Col. 3 | Col. 4 | 3 |
|---|---|---|
| whiskey | whistle | |
| yellow | carpet | |
| window | needle | |
| scissors | hand | |
| foot | thief | |
| doctor | dream | |
| wish | trouble | |
| house | religion | |
| justice | street | |
| river | health | |
| sickness | ocean | |
| mountain | bed | |
| stove | child | |
| girl | tobacco | |
| salt | woman | |
| man | cabbage | |
| cheese | citizen | |
| baby | earth | |
| moon | lion | |
| spider | butter | |
| bread | music | |

*Turn to page 4*

4

The following information is essential for research purposes. Without it, no good can come from the trouble you have taken to fill out the two previous pages.

RESIDENCE *(city and state)*.....

BIRTHPLACE *(city and state)*.....

MONTH AND YEAR OF BIRTH.....

SEX *(male or female)*.....

Highest year of school completed (circle one):

| | | | | HIGH SCHOOL | | | | COLLEGE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | ..... |

From what countries did your parents' people come?

*Father's people*.....

*Mother's people*.....

YOUR OCCUPATION.....

If you are a student or housewife, what is your father's or husband's occupation?.....

***If you wish, give your name and address***

NAME.....

STREET.....

CITY.....

***Return to:***

**LOYOLA LANGUAGE STUDY**

***820 North Michigan Avenue***

***Chicago 11, Illinois***

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## APPROVAL SHEET

The thesis submitted by John J. Trainor, S.J. has been read and approved by three members of the Department of Psychology.

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content, form, and mechanical accuracy.

The thesis is therefore accepted in partial fulfillment of the requirements for the Degree of Master of Arts.

10/2/58
Date

Vincent V Herr
Signature of Adviser