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Sex Differences in Associative Structure

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To the Graduate Council:

I am submitting herewith a dissertation written by Riley F. Elder Jr. entitled "Sex Differences in Associative Structure." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Howard R. Pollio, Major Professor

We have read this dissertation and recommend its acceptance:

James M. Anker, Louis Dotson, Ohmer Milton

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

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December 4, 1968

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Accepted for the Council:

Vice President for
Graduate Studies and Research

SEX DIFFERENCES IN ASSOCIATIVE STRUCTURE

A Dissertation

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

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by

Riley F. Elder, Jr.

December 1968

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Riley F. Elder, Jr.

ABSTRACT

First, the history of the concept of associative structure was traced, and various methods of its assessment were reviewed. Included, also, was a survey of word association literature, with emphasis on the most recent studies. Three separate studies followed which were diverse techniques for the assessment of sex differences in associative structure, plus suggestions of some possible reasons--both proximate and remote--for these differences.

The first procedure consisted of an investigation of the Jenkins and Palermo Word Association Norms with respect to sexually distinct responses. This revealed many significantly differing responses, and suggested that the differences were the result of a differential emphasis in associations rather than an absolute dissimilarity in the composition of their respective associative structures.

The second experiment was characterized by the administration of a multiple choice questionnaire derived from the findings just mentioned. Three age groups of Ss were employed: elementary school (third grade), high school (freshmen), and college students. The differences anticipated by the results of the first study were generally confirmed with the added finding that such divergencies increased as a function of age.

A third experiment was undertaken employing a procedure similar to the one used by the television game of Password. This is a word association game in which one member of a pair team is required to give associations to a clue word until his partner is able to identify the clue word. Ss were drawn from the same age levels as those recruited in the second experiment. Findings were: (1) same sexed pairs are more facile at achieving a solution in such a situation than are different sexed pairs, and (2) females are superior to males in arriving at correct responses in this context. The predicted age effects (to parallel the intensification of effect found with increasing age in Experiment II), oddly, did not occur, and potential reasons for this are discussed. A general overview is provided, along with suggestions for the direction(s) future research might take.

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CHAPTER I

INTRODUCTION

The concept of associative structure, or more generally, the concept of structure per se, has had a somewhat checkered history in the field of psychological thought. So tainted was it, that it led Pollio (1968) to draw an analogy between it and Cleland's somewhat charming, if repetitious, little heroine, Fannie Hill. He intended the parallel to be somewhat facetious, of course, but while there is humor here, there is also an underlying current of fact. That is to say, the concept of structure has been in and out of fashionable psychological circles and, even though it enjoys more popularity today, it is still looked upon in some psychological groups as appealing to a scientifically purient interest. It got itself into trouble, one might add, in much the same way as did poor Fannie. That is, by a rather naive and uncritical choice of its associates, and the extent of its involvement with those unfortunate choices, combined with particularly poor timing.

The analogy can be extended even further to note that like Fannie's associates, the peers of the realm, concepts such as "mind" and "subjective thought," while no doubt important, and accruing to themselves a certain flair, were none the less elusive, slippery customers. However, to the chagrin of tongue clucking moral puritans and scientific purists, both the concept of structure and dear Fannie have proved themselves rather viable creatures indeed, and have reemerged from their relegations to coventry, each time with more zest and strength than before. Moreover,

the day is here when Mr. Cleland has at last triumphed over the Supreme Court, and a strong and vigorous concept of structure is pounding down the gates of an overly narrow behaviorism. The time is upon us when people with structural and functionalistic bents are saying with Teddy Roosevelt, "We stand at Armageddon and we battle for the Lord." This, of course, leaves no doubt as to the position of the behaviorists, theoretically and theologically.

In recent times various formulations of this concept of psychological structure, more particularly associative structure, have been put forward by Peak (1958) and Deese (1965). First let us consider Peak's ideas. Central to her thought are the concepts of activation and structure. By activation she means:

> . . . a term similar in meaning to stimulation, but more general in the sense that the change which activates a structure may be either the energy change which takes effect by way of sense organs (a stimulus) or a central event, such as an aroused concept, which in turn produces change in or activation of another structure. Activation is transmitted change (p. 325).

She indicates that the term structure is used in a very broad sense to denote a "system of relationship between identifiable parts (p. 325)." The concept should be regarded as a hypothetical construct inferable from controlled observation. It forms a basis for prediction of subsequent behavior when similar conditions obtain, and when the system of relationships remains the same.

Central to her concept of structure are the ideas of position and distance. By position she means ". . . membership in a category (nominal position) or in terms of some amount of property or position in a series (ordinal position, or a point on an interval or ratio scale) (p. 326)."

With respect to distance, she says ". . . psychological distance from any point a to point b is defined in terms of a number of units or steps in an ordered series of some kind which intervene between a and b which are themselves part of the series (p. 326)."

She then goes on to describe different relationships encompassed by structures, such as similarity, opposition, compliments, antecedents, and consequences, in the light of position and distance. For example, with respect to similarity, she describes it as points on a continuum such that a is indistinguishable from b and b is indistinguishable from c, but a is not equal to c. She assumes that distances are rather short on such a continuum and that activation of any one point tends to keep the entire continuum at a relatively high state of readiness for activation. She recognizes the generality involved in such an analysis by pointing out that it could be applied to such things as friendliness, conservatism, coldness or aggressiveness. She states that anyone of these could be viewed as an unidimensional phenomenon constituting a series of ordered positions, each position displaying no detectable gap between it and the next adjacent one. With respect to the principles of activation, she discusses such things as serial arrangement, multiple input, duration of activity and action decrement.

For purposes of illustration here, let us take her analysis of multiple input to the same point. She goes at this in a probablistic fashion.

> . . . given the probability that a will activate c and that b will activate c, the probability that a and b together will activate c is assumed to be equal to: 1 minue (Pca x Pcb) where Pca is the probability that a alone will not activate c and Pcb is the probability that b alone will not activate c (p. 329).

She then points out again the generality of such a concept by indicating how it is relevant for such things as contrast effects, set, and instructional information, to name only a few.

The essential point that should be made here is that the concept of structure can be set down, and described in such a way as to make it applicable to analyses of behavior and generative of testable hypotheses. The lack of such precision in early years was precisely the weak point at which the concept was attacked by those who wished it no good will.

Another method for handling the concept of associative structure has been provided in a series of papers by Deese (1965). He says:

> In using the term associative meaning, I do not mean to imply the operation of classical association and production of meaning. The term is meant simply to describe a major characteristic of the distribution of responses obtained in a free association test. The term meaning itself we shall use to refer to the hypothetical incomplete unconstrained distribution from which the associative distribution is drawn (pp. 42-43).

The distinction here seems to be the same type of one that is made between a parameter and a statistic. Further, he states that he is regarding associative meaning as a subset of a more general set: meaning in the broadest sense. He says that there are other forms of meaning, such as one which might be termed dictionary meaning, the typical use of the word as it is defined in a common dictionary. Further, he adds that another form such as categorical meaning might be applied to Bousfield's (1953) norms, and that all of these would be subsets of the general set meaning.

By extension, the term associative structure, in the most abstract sense, might be said to be the total of all the possible relationships which exist among collective associative structures, as measured over the

population of English speaking people. What is meant here is the pooling of all the individual associative structures to form what might be termed the population associative structure. That the associative structures of any particular individual are general in nature and part of the whole can be illustrated by the degree of overlap between people when one tests for associative structures by the free association method. However, that they also retain an idiosyncratic flavor may be seen by the variety of associative responses, and therefore associative relationships, which can be obtained by the same method. What will be argued in the present paper, for example, is that the associative structures of men, in general, and the associative structures of women, in general, contain sufficiently different structures to warrant their being regarded as separable. Of course, there will be a large degree of overlap, but there will be some associations, or associative relationships, which will be more masculine in orientation and those which will be more feminine in orientation.

In order to assess the pattern of relations inhering in a set of words, Deese employs a procedure which initially (Deese, 1962) viewed associative structure as dependent upon a network of words, although he no longer (Deese, 1965) considers the original rationale for this procedure completely justified. His (1962) method involved an analysis of the overlap in associative distributions common to two words. These overlap coefficients were arranged in an n x n matrix, which was considered as equivalent to a matrix of correlations. Each entry in the diagonal was considered to be unity. The measure of associative overlap, or index of commonality, is $Ic = \frac{A \cap B}{N_a \cdot N_b}$ where $A \cap B$ is the intersection of the two stimuli, and the denominator is the geometric mean of the two

distributions. He extends this idea by subjecting this type of matrix to a centroid factor analysis, plus several rotations. The results of such a procedure may be shown in the following example (Deese, 1965, p. 78). First, a matrix is generated using, as stimuli and responses, words which had earlier been found to be responses to the word BUTTERFLY. Factor analysis and rotations yield four factors. One factor, for example, deals with animate words, bee, bird, and wing. Another deals with inanimate words, sky, yellow, blue. Thus, it can be seen that such stratagems can provide methods of qualitatively and quantitatively dealing with the concept of associative structure. By way of illustration, Figure 1 is a reproduction from Deese (1965, p. 78).

Another related method for determining associative structure has been set forth by Pollio (1964). This involves, essentially, a variation on a matrix theme, wherein unity is entered for the occurrence of an associate, and nothing is entered for the nonoccurrence of an associate, such that the effect is like an on-off switch; and he demonstrates that this method has some methodological advantages over others extant. The primary advantage derives from the fact that multiple-step connections between words do exist and are assessable by this procedure. Other methods available at the time were capable of handling only one-step connections. To use his words: ". . . let us assume that word A produces word B as an associate, B produces C as an associate, and C produces D as an associate (Pollio, 1968, p. 43)." Under these conditions A would have a two-step connection to C and a three-step connection to D, and procedures for handling such a concept are required.

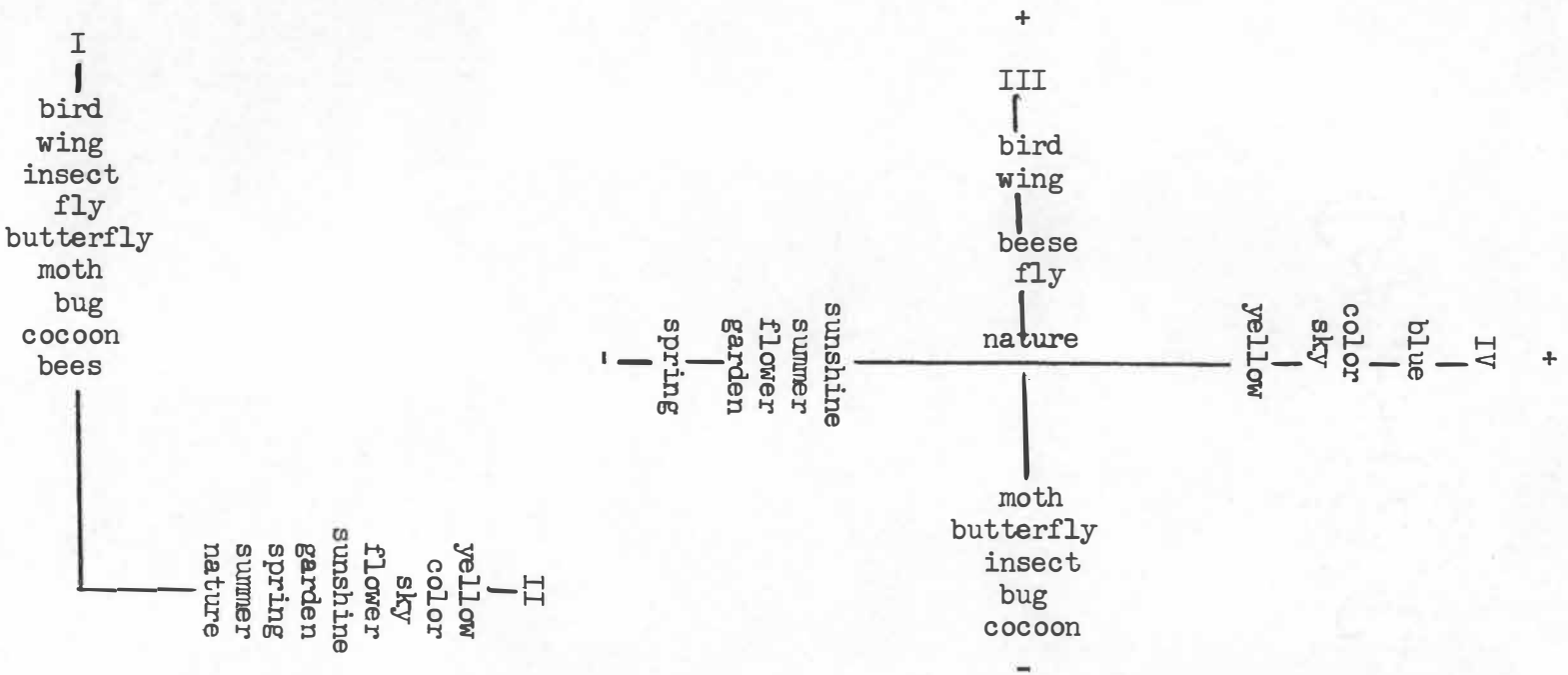

Figure 1. A projection of factors I and II and of factors III and IV for the Butterfly collection.

Thus, we see that the concept of associative structure can be spelled out in some detail and subjected to meaningful quantitative analyses. Various methodologies, including proportions, matrices, and factor analysis, have been employed to demonstrate the viability of this concept as well as to quantify it.

Perhaps, at this point, a "tour de horizon" of association theory in general is in order. Since we know how to measure associative structure, it might be instructive to have an overview of what theories have been proposed to account for how structures got the way they are.

Beginning with Plato, the germ of the concept of association by temporal order or contiguity is in evidence. Although the matter was also treated by Aristotle and Thomas Aquinas, the philosophical elaboration of the idea was most extensively carried out by the British empiricists, Hobbes, Locke, and Hume. Hobbes stated that one idea comes to be associated with another through experience of contiguous occurrences in such a fashion as would be acceptable in modern terms. That is, what he had to say about the matter could be embraced by a modern behaviorist. Perhaps his statements about looking out of his window and describing a chain of associations should be recalled in this connection.

Locke expanded the idea of contiguity of sensory experience, transformed somehow into the mental units of the mind, and made it the foundation of his epistemological and metaphysical thought, including the concept of the mind as <u>tabula rasa</u>. Hume also employed the idea of contiguity, even assimilating the idea of causality to it, and added the principle of frequency as the source accounting for the strength of associations--the latter, of course, also of major consideration and import in most all subsequent psychological theorizing.

Locke's own conceptualization of the human mind as tabula rasa--that is, as a passive, merely receptive organ--survives to this day as an often unstated theoretical underpinning of stimulus-response psychologies in general, and of behaviorism in particular. Such a view considers the mind to be only the result of a fortuitous concourse of randomly jumbled sensory occurrences, somehow transmutated into their corresponding mental events. Such a position does not admit such concepts as volition or the idea that the organism (mind) itself has the intrinsic capacity to impose order and structure on the association of thought.

Such a position has become increasingly embarrassing over the years to the more rigid behaviorists, as it could easily be demonstrated that some things were highly associated, with the possibility of their ever having undergone contiguous occurrence nearly zero. Also, the more fundamental objection, that such a theory could not possibly account for the organization evident in human behavior, gave rise to several psychological attempts (the Wurtzburg school, the Gestaltists, and, more recently, the information processing groups, e.g., Miller, Galanter and Pribram, 1960) to retrieve the situation. None of the earlier two, however, were very successful as they were painfully short of both generality and experimental vigor, and the efficacy of the latter group remains to be seen.

In the meantime, the theoretical incumbents of the S-R position were busily trying to modify their theories to encompass the expanding psychological thought. One such salvage attempt was Osgood's (1953) fractional mediated meaning response, r-m (quite anfractious, really). This vehicle possessed mediational qualities and was to be considered

a given capacity of the organism. Originally an idea of Hull's (1930), Osgood employs this concept as the theoretical rationale for the research done with a rating-scale procedure called the semantic differential. In this procedure words are rated by subjects (Ss) on three different scales: an evaluative one (GOOD-BAD), one representing activity (ACTIVE-PASSIVE), and the third a dimension of potency (STRONG-WEAK). Actually, he began with many more scales, but reduced them, for working purposes, to these three on the basis of empirical findings. He is able to place words so rated in a tri-dimensional space, using these three scales as the (orthogonally arranged) axes defining the space. The fractional mediation hypothesis, as employed in this type of verbal behavior, states that any given stimulus word will elicit small fractional components of the response which had been associated with the environment (either physical or in a linguistic context) on the occasion when the word was first encountered. Obviously, this is a fairly straightforward, although more refined, restatement of the "law" of association by contiguity.

In a recently published paper, Pollio (1968a) sets forth some tentative hypotheses under the terms dimensional principles and inter-verbal principles, the distinction being derived from the two basic methodological techniques--some form of rating-scale and word associations, respectively--employed in studies of verbal behavior. The first principle in each case serves to relate associative structure to behavior; but, the important point to be made here is that these principles are quire amenable to a contiguity type of theory. For example (Interverbal Principle 1.): "Word associations reflect the operation of a previously

learned connection or habit between two words (p. 61)." Both the choice of words and the general flavor of the statement indicate the degree to which the concept of contiguity has permeated psychological theorizing.

Providing a new approach, Deese (1965), at one time a loyal proponent of association by contiguity, has developed a proposition that may help in overcoming the objections to traditional associationism. This view assumes that associations are formed between things (words) on the basis of the attributes which they share in common, rather than contiguous co-occurrence. The organism is given the ability to abstract and to place a word among an appropriate set of words on the basis of sharing pertinent attributes. Thus, for example, the words car and wagon might be associated; again, not because they have undergone any co-occurrence, but due to the fact that they possess common attributes (vehicles for riding, have wheels, etc.).

As Pollio, another erstwhile contiguity theorist, has recently (1968b) pointed out in a review of Deese's book, we can combine this new hypothesis of how associations are produced with the idea that repetition of associations (the law of frequency, an old companion of contiguity) is the factor which is involved in building up and/or of maintaining the strength of any given associative bond, if such exists, for a given pair of words. This, he states, will allow for a rapprochement of what is most viable in contiguity theory with the more constructive approach proposed by Deese.

The ideas to be set forth in this paper are very similar to studies on the relationship between attitudes and associative structure reported by Deese (1965) in his chapter entitled "The Psychological Structure of

Meaning." In this instance, Deese showed how differences on the Allport Lindsey Scale of Values seem to be related to differences in association for different groups of Ss, the groups being characterized by their attitudes. Subjects were differentiated on the basis of their scores on the religious value portion of the scale: the highest twenty-five percent being compared with the lowest twenty-five percent as to their associations to a set of words of a religious nature, e.g., WORSHIP and REVERENCE. The results were subjected to a factor analytical treatment, with the conclusion that ". . . the structure of attitudes can be discerned from the study of organization in associative meaning (Deese, 1965, p. 84)." A greater degree of cohesiveness in the organization of "religious" words is displayed by the high scorers. If such a thing as attitude can be shown to be reflected in the differences in associative structure, the probability that other individual differences, specifically sex differences, can be so assessed is greatly increased.

Some work has been attempted in the area of personality correlations with associative responding, typically by attempting to demonstrate a co-variation between some (unually gross) measure of personality and a classification of responding. For example, subjects classified as impulsive persons have been found, by Dunn, Bliss, and Siipola (1958), to respond more quickly, and with more contrast responses, than subjects labeled inhibited. This general finding has been confirmed by Herron, Nordlie and Cofer (1957) and they indicate that a person's manner of responding may reflect a broad personality description. Moran, Mefferd, and Kimble (1964) have written that they found "idiodynamic sets" (the term which they used to describe object-reference responding, synonym,

and super-ordinate responding) and/or the use of rapid contrast and coordinate responding as general habits of response for certain groups of people. These sets, as Rosenberg and Cohen (1966) point out, may be interpreted as self-instructions that a person gives to himself which tell him how to respond.

Foley and MacMillan (1943) conducted an experiment in which they measured the response from the students of two professions, medicine and law, using as stimulus words those which are employed in both professions but which have a different meaning in each. An example of such a word would be INSTRUMENT. They reported a general tendency for the lawyers to associate to the words in a legalistic manner, and for the medical students to respond with medical terms. This is a further demonstration of social factors affecting associative structure.

That there is a reasonably good correspondence between root norms (reflecting a cultural hierarchy) and individual strength of responding has been attested to by Brody (1964), and later on by Silverstein (1967). Also, in this general regard, Garskof (1965) has demonstrated that the pattern of multiple responding from small groups yields results that are quite similar to that of large groups when only a single response is requested.

It has been found that responses can be affected by the emotional properties of the stimulus word (Rappaport, 1951; Rappaport, Gill and Schafer, 1946). A series of experiments (Pollio, 1964; Pollio, 1965; Pollio and Gerow, 1968).has demonstrated that words of high negative emotionality, that are employed as stimulus words, will tend to elicit responses that are more neutral than the stimulus words. Likewise, a

stimulus word bearing positive emotional qualities will elicit responses that are positive in their affective nature. Pollio (1963), in a separate experiment, has also reported that associative responses are affectively quite similar to the stimuli employed. Thus, in the general area of affective feeling tone of stimulus words and their associative responses, the general trend would seem to indicate that responses do tend to be similar in this regard to the stimuli employed.

In a recent study of the children of blue collar workers, rural children, and Amish children of Maryland, Entwisle (1966) writes of some cultural differences found between these groups that could, by extension, be of significant portent for the current paper. She correctly points out that there are certain methodological hazards which must be avoided, if possible, in studies of this type: the fact that procedures of administration (instructions) have differential effects on lower and middle class children, to cite one example. She also states, again quite directly, that the poor controls exercised in many studies in this general area tend to confound, to a rather severe degree, social class and intelligence. She states, however, that in her studies I.Q. has been kept constant and educational opportunity differences have been kept to a minimum due to the somewhat unique structure of the Maryland school system.

Perhaps it might be best to begin a discussion of her work with her broadest generalization: that there is "considerable variation in language development between certain American sub-cultures, even when I.Q. is held constant (Entwisle, 1966)." She even feels justified in stating ". . . some sub-cultural groups may be retarded by as much as

two years." But she hastens to add that what she means by this retardation is not such a superficial thing as an enlarged vocabulary or possession of grammatical elegance, but more fundamental, intuitively held concepts such as the substitution properties of adjectives and verbs.

She indicates that she found minimal differences in language ability among children with somewhat disparate socio-economic levels (roughly the nine-and-one-half versus the six-and-one-half thousand dollar annual income groups) when both were urban residents; however, quite large differences were obtained in a comparison of urban and rural groups. Hence, she states, rather categorically, that "residential locus itself is the factor responsible," reasoning that social isolation in and of itself, poor exposure to language as a result of lessened dialogue with adult speakers, and more restricted exposure to mass media, such as television, possibly contribute to this factor.

Even with I.Q. control, the Amish children were further behind the rural Maryland children in language development: additional evidence that isolated residential locus and/or unique sub-cultural customs are major factors affecting the results. To illustrate: the clannishness and social customs which are peculiar to the Amish; the fact that they tend to have a high number of siblings in the family, resulting in a magnified competition for adult interaction; and neither reading nor watching television is very characteristic of the Amish. Thus, differing sub-cultures may produce differential language acquisition and, by inference, differing associative structures.

Incidentally, it should be mentioned, there is also the possibility of genetic factors having a bearing, inasmuch as the Amish tend to be genetically a rather inbred social group. The same thing is true of our mountain culture (from which the data of the present paper were drawn), due to the isolation and subsequent tendency toward inbreeding which occurs when a group separates itself by geographical distance, as well as by custom.

One of Entwisle's major concerns in this study was the occurrence of syntagmatic versus paradigmatic responses. Syntagmatic responses are those which follow an associational scheme based on syntactical relationships (STIMULUS: noun; Response: verb). Paradigmatic responses are those which are similar to the stimulus term with respect to grammatical form (STIMULUS: pronoun; Response: pronoun). An example of the former would be the response goes to the stimulus word HE; an example of the latter would be she to the stimulus term HE. The fact (to be mentioned again later) that paradigmatic responding increases, in relation to syntagmatic responding, with increasing age has led seme to reason that a higher degree of paradigmatic responses indicates a greater "linguistic sophistication." This is put in quotes as the relationship is somewhat vague and ill defined. At any rate, the Amish children displayed less paradigmatic and more syntagmatic responses than other comparable groups, but the difference tended to diminish with increasing age.

With respect to ontological differences associated with increasing age, Woodrow and Lowell (1916) indicate that there is some shifting in responses with changing chronological age. Theirs is a fairly early report in this area. Since then the methodology of investigation has

become a great deal more sophisticated. In 1961, Erwin showed that paradigmatic responding increased as a function of increasing age. Rosenzweig and Menahern (1962) confirmed this, as have several others, including Entwisle above.

It has been reported (Palermo, 1963; Jenkins and Palermo, 1965) that girls and women generally tend to have higher commonality scores (really measures of overlapping responding) than do men.

Sex differences in general, at least from the masculine point of view, have stirred emotions in the masculine breast which range all the way from mild irritation to a hopelessly frustrated rage. So keenly are these differences felt that many sayings relating to this are a standard part of our language. Such phrases as: "Nothing vexes like opposite sexes"; "If there was a third sex, women wouldn't stand a chance"; and Freud's frustrated "Was will das Weib?" (What does a woman want?). The matter is put rather wittily and charmingly in a song from My Fair Lady entitled "Why Can't a Woman be More Like a Man?". The fact that these things are so appreciated by humans, and have become so much of an ingrained part of our culture, is a tribute to the durable nature of these truths.

Terman and Miles (1929) report a study in which they ". . . surveyed the reported differences between the sexes in the association of ideas as demonstrated by traditional types of the word association technique (p. 204)." Actually, the paper is a fairly extensive review of the literature in the area up to the time of publication, and a report of the conclusions which could be drawn from such a review. One of the principal considerations of the authors was the old nature-versus-nurture problem,

and they concluded that there was not sufficient information to make a determination at the time they reported. Their inclination, however, on the basis of their observations, was to side with the nurture aspect of the argument, concluding that the differences found were due more to the result of "interest" than to any innate biologically determined sexual differences. At any rate, they do wind up with two major conclusions. The first is that there are "significant sex differences in the quality of word association . . ." and the second is that these differences are attributable to differences in the "respective fields of interest of men and women (p. 204)."

To put the matter in more current terms, they conclude that the situation is largely a matter of role playing and that the acceptance of one's masculine or feminine role, and developmentally playing such a role, will lead to the evolution of different associative structures characteristic of the respective roles. They further assert that the masculine characteristics are those of "objectivity, logic, cool judgment," whereas the feminine characteristics are said to be "subjectivity, personal evaluation, and warm appraisal." Of this, more later.

Goodenough (1946), taking her cue from earlier work done by Miles and Terman (1929), and from a subsequent book published by Terman with Miles (1936), performed an experiment which has central bearing on this paper. She, too, was interested in sex differences in associative structure, although she did not call it that, and devised a rather ingenious experiment to demonstrate them. She selected a series of homographic words and gave these lists to groups of males and females.

Each of the homographs had one meaning more "masculine" in nature and the other more "feminine" in nature. For example, to the word BOW, arrow might be considered a masculine association whereas a more appropriate association for females might be hair or ribbon. In this experiment, Goodenough reports nearly nonoverlapping distributions. The men chose more "masculine" associations and the females chose more "feminine" associations under this "free" association technique. The results of her study provide strong evidence for the qualitative differentiation of associative structures between the sexes.

Goodenough also deduces from this study that "feminine" attitudes in men are not the same as "feminine" attitudes in women and vice versa. There is, she concludes, sufficient overlapping of associations between "feminine" men and women and between "masculine" women and men to perhaps warrant the use of terms with respect to them. But, again, the type of femininity or masculinity found in the opposite sex is certainly not the same as that which is found in the appropriate sexual gender. Exemplificative of this is the female who has a keen interest in athletics which might cause her to give certain masculine associations to stimuli relevant to this area, but who would respond in a typically feminine manner to most of the other stimuli.

Empirical evidence of sex differences in language usage may also be found in a previously mentioned book (Terman and Miles, 1936) which constitutes an attempt by the authors to survey and report on sex differences in general. Although the test that they develop as a result of this work is a rather long one (including such divisions as association, general information, emotional and ethical responses, interests,

etc.), the only part that is really pertinent to the current paper is the construction of a word association test.

There were two forms of this test, A and B, each containing sixty items. Words were selected as stimulus words on the basis of empirical findings of discriminatory power, and on "hunches." Each stimulus word was then paired with four possible alternate response choices (two masculine in flavor, and two feminine) and the test was administered in the form of a questionnaire check list. Of the one-hundred-and-twenty stimulus items employed, thirty proved to be useful in discriminating between the sexes. They included POIE (male response being predominately telephone and a female response being north), CASE, POST, JACK, and BRACE. In attempting to characterize their findings, the authors describe females as choosing words for domestic things or happenings, "for kindly and sympathetic activities," and for trinkets or "tokens of adornment"; while males selected words relating to "physical science, machinery, outdoor pursuits, and terms suggestive of excitement and adventure, and rather less predominately, . . . political, business, and commercial words." As we will see, these findings are essentially in agreement with the findings of the present study. Terman and Miles also conclude that any such word association test is going to have a low reliability and suggest that, in order to be useful as a clinical device, such a test should be of a minimum length of six-hundred stimulus items.

Perhaps one of the most general psychological analyses of the differences between the sexes is provided by Theodore Reik in his book Of Love and Lust (1949), in which he systematically delineates the

attitudes and feelings of both sexes in their responses to a series of concrete situations. For example, he discusses their differential attitudes toward the home, jealousy, guilt, sexuality, and a variety of other topics. To illustrate, he points out that jealousy is an emotion which is really a compound of two other emotions: anger and envy. In men anger is the stronger component (he wants to kill the other guy) and in women envy plays a more important role (she wants to know everything about her rival: hair, figure, personality, etc.).

However, it is what he had to say with regard to sex differences in language function that is most pertinent to this paper. The kernel of his thinking in this area may be shown quite readily from the following quotation.

> When we say men and women speak different languages, the word "language" is not restricted to the spoken or written words. The languages are here conceived of as a means of expressing thoughts or feelings. Men and women have different thoughts and feelings connected with the same words and with the ideas expressed by them. When a man and woman speak of marriage, they use, perhaps, the same word, but the emotional character, the thought of marriage, is not the same. The same is true with words like love, sex, home, babies and so on (p. 601).

He continues in some detail and reports on the literature dealing with some of the more primitive cultures throughout the world, wherein the men and women actually are required by their culture to speak a different language, i.e., to use different words for the same referent. He ends with this thought: ". . . men and women speak different languages even when they use the same words."

Another way of putting this, for the purposes of this paper, would be to say that the associative structures of men and women are different. This, of course, is supported by the work of Miles and Terman and, further, by the work of Florence Goodenough.

In an interesting and significant study, Rosenberg and Cohen (1966) have provided what is probably the first effort toward a mathematical description of the psychological processes at work in producing word associations. They also employed a methodological procedure that combined good experimental control with fairly extensive generality. Their procedure consisted of the following. First, they presented a series of cards containing word pairs to a group of Ss, called speakers. They then told each speaker that one member of the word pair was to be considered the referent, or object word, and the other was to be considered the nonreferent. Next, the speakers were told that their job was to give an associate to the referent word that would enable a subsequent S, called a listener, to tell correctly which member of the word pair was the referent. For example, one such word pair was WOMAN-LADY, with LADY being the referent. If a speaker gave an associate such as tramp, title, Chatterly, finger, or pink, a listener would have a reasonably easy time identifying the correct member. However, an associate such as female would provide little information on which a listener could base his discrimination.

After each speaker produced an appropriate associate for every word pair, each word pair plus its associate, was printed on a separate card. The cards were then administered to groups of listener Ss, who were told that their task was to determine from the associate just which member of the word pair was the sought-after or referent word. Subjects in all cases were male college undergraduates.

Out of this work, Rosenberg and Cohen developed a stochastic theory that defines the speaker's task as a two-stage psychological process,

which they term sampling and comparison. They further postulate that the listener's task in these examples is one of a single stage psychological process, very similar, if not identical, to the comparison stage of the speaker. In all cases, these processes are seen as amenable to probabilistic description, and that is what they attempt to do. Very simply, the speaker's process goes somewhat like this: He looks at the stimulus word and then begins to search his own associative structure (more exactly, that portion which is related to the referent word) for a likely response. Having selected a response, he then compares it with other available responses in his appropriate associative repertory to determine if it is indeed the most probable response to make in that given situation. With this decision made, he presents the "clue" word to his listener. The listener, after seeing the speaker's clue word, does something very similar to the comparison stage mentioned above. He appraises his associative structure for what would seem to him to be the most appropriate, or "right," stimulus word in the light of the clue he was given. (Refer to Figure 2, p. 25)

After searching the literature for appropriate formulae or models, Rosenberg and Cohen review some earlier models and decide to pattern their sampling and comparison processes after a choice model proposed initially by Bradley and Terry in 1952. They state, relevant to their choice, that there may be some formal differences between the models they considered, but that the various ones are "almost equivalent in practice." At any rate, they derive the equations for the speaker's sampling stage, the speaker's comparison stage, and the listener's comparison stage, and proceed to test the fits of their assembled data

to these models. The empirical results obtained are in striking agreement with the theoretical predictions.

A sketch of their ideas in these areas may be seen in Figure 2. The symbol I_r refers to the distributions of associations to the referent. The symbol i is used to denote the associative strengths of the referent and nonreferent to a sample response, and these are denoted $s_i(r)$ and $s_i(n)$, respectively. For the listener, these same associative strengths, of the referent and nonreferent to the speaker response, are denoted by $l_i(r)$ and $l_i(n)$, respectively. It should be noted that, while the sampling and comparison stages are separable conceptually, in actual practice they are quite interlaced with one another, making it difficult to tell which is operating at any given moment.

What follows is a series of three experiments designed to demonstrate the general proposition that the associative structures of men and women differ in detectable ways, and an investigation of the possible effects that any such differences might have on the process of communication between the sexes.

It is reasonable to expect that communication may, in some way, be impeded between opposite sexes: the same words may have slightly different meanings for each sex. Conversely, communication between same sexed individuals should be superior to that among different sexed persons, other things being equal. Men may be able to convey more meaning to other men than they can to women, and vice versa. Also, if the ontological generation of a structure is related to role acquisition, as was implied by Terman and Miles, then one would expect to find some age

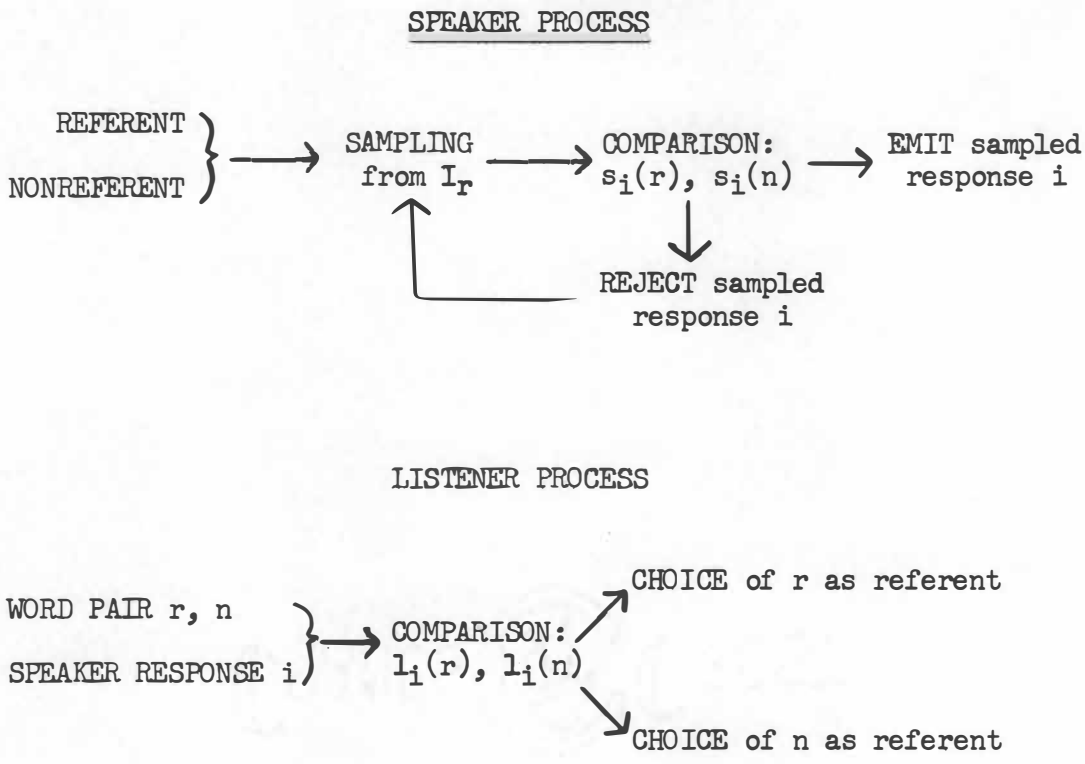

Figure 2. Sketch of the speaker and listener processes.

differences in associative structures affecting communication ability. For example, the structures of children should not show as much sex related differences as those of adults.

Lastly, it is hoped that this study may include some findings that will serve to illuminate the general area of individual differences with respect to the divergencies in personality characteristics between males and females. Perhaps a small ray of light may be shed on at least part of the reason why "you can't live with them and you can't live without them."

CHAPTER II

EXPERIMENT I

The purpose of the first experiment was to search for any sex differences that might be found in existing norms of word associations such as those provided by Jenkins and Palermo (1964). This list consists of 200 stimulus words and the responses produced to them by 250 boys and 250 girls in each of the grades four through eight, ten and twelve. These norms also contain responses to the same stimulus words produced by 500 males and 500 females in an introductory psychology course at the college level. The data are presented in the following form:

BEAUTIFUL

	4th		5th		6th		7th		8th		10th		12th		Coll.	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
girl	5	7	7	2	18	3	19	5	28	19	51	39	53	36	95	64
lovely	14	16	14	25	19	31	5	19	6	15	12	15	11	13	16	34

An inspection of this entry will reveal the following information. BEAUTIFUL is the stimulus word; girl and lovely are two of the response words. The numbers in the table indicate the frequency with which these particular responses were given to the stimulus BEAUTIFUL for each of the eight age levels. Notice that for the response word girl, the female response frequency is less than the male frequency for seven of the eight age levels; while, for the response word lovely, the male frequency is less than the female for eight out of eight age levels. By direct binomial expansion, the probability of seven events occurring in

one direction out of a possible eight is .017, and the probability of getting eight events out of eight in one direction is .002. What this means is that wherever such an arrangement is to be found, the sexes are displaying a differential emphasis on a particular associate as it relates to the stimulus word.

With these significance levels in mind, a survey was made of the entire set of norms in search of such sex differences, i.e., where one sex predominated in either seven or eight of the eight age levels. Of the 200 stimulus words contained in the Jenkins and Palermo norms, 185 had at least one response word which was characterized by the above mentioned sex differentiation. In 101 cases the number of significant female responses to a stimulus word outweighed those of males, while they were equal in 29 cases, and the male predominated in 55. In all, there were 616 responses (about five percent of the total of 15,701) given to these 185 stimulus words which were so characterized by a sex difference: 251 were predominate in male frequency, and 365 were predominate in female frequency. It would be desirable to compute exact probabilities, for comparison purposes, appropriate to the results reported in this paragraph. However, a determination of just what these should be would be difficult, if not impossible, due to the complexities involved.

At this point, the reader's attention is directed to Appendix A (p. 59) where a perusal of the responses given by the different sexes will yield some idea of the qualitative flavor of these data.

An interesting finding, and one only partially expected, was that, while thirty-seven percent of the male dominate responses were syntagmatic,

only five percent of the female responses were. Female responses tended largely to be paradigmatic. As will be recalled, syntagmatic responses are associates based on syntax, while paradigmatic ones are those which take the same form as the stimulus word. An example from the current data will show, for instance, that to the stimulus word CLOSER a significant masculine response was than, and a significant feminine response was farther.

It should be mentioned that Entwisle (1966) has mentioned finding a similar effect; yet, in her data, any recognizable indication of this effect disappears after the first grade. This is not true for the data at hand--the effect persists.

Next to be mentioned are the commonality values. These values were arrived at by summing the response frequencies for each sexually significant response (across all age groups) and then converting these sums by averaging. The value for male dominant responses is .013 and for female dominant responses is .024.

A glance at the data will show that there is a substantial tendency in the case of female dominant words for the differences in frequency of occurrence between male and female responses to be of a greater magnitude than are the differences between the two in the case of male dominant responses. The average difference score between frequencies of male and female responding on male dominant words was 45, while the average difference on female dominant responses was 68.5. By way of illustration, take the responses to the stimulus word FOOT. A male dominant response to this was feet, with males and females giving the following frequencies, 201 and 150 respectively, or a difference of 51. A female dominant

response to FOOT was toes, with males giving this response 171 times and females 241 times, or a difference of 70. Such differences persist throughout the data. Another way of saying this is that, when they differ, females are more unequivocal in doing so than are males.

From all of these data, it is obvious that, while they share a marked degree of overlap, the associative structures of males and females do display a detectable difference. Also, the qualitative differences show a surprising degree of resemblance to what are generally considered "masculine" and "feminine" characteristics, and this point will be discussed at greater length in the Discussion of the paper.

CHAPTER III

EXPERIMENT II

The purpose of the second experiment was to seek further evidence of male and female differences in associative structure. It was also felt that such a phenomenon is dependent on the adoption, or playing, of a role, as was inferred in the study by Terman and Miles. Consequently, the rehearsal and appropriate training for such a role would intensify such an effect over the years. The older one gets, the more adroit one becomes at playing one's role, and this differential role assumption by the opposite sexes leads to differences in associative structure between men and women. Suitable role-predicted responding should, therefore, be less pronounced in younger children than in older ones due to the lack of experience in role playing on the part of the younger subjects.

Subjects

The subjects were in three age groups, with seventeen males and seventeen females selected for each age level. The first group was composed of third graders (ages 8 and 9) from the elementary school in Wise, Virginia. Another group consisted of ninth graders (ages 14 and 15) from the high school in Wise. The third group (ages 18 through 22) involved students enrolled in an undergraduate psychology course at a local college (Clinch Valley College).

Materials and Procedure

The material in this experiment consisted of a selection of certain stimulus words from a list derived from the Jenkins and Palermo norms (Experiment I), along with four possible response words for each stimulus word. Two of these response words were ones which were characteristically selected by females and the other two were ones which were characteristically selected by males, as determined in Experiment I. A list was then made of the thirty-four stimulus words chosen, each with its set of four response words (which were arranged in a random order as to sex preference). A sample data sheet used in this experiment may be found in Appendix B (p. 74). Again, the predictions were that the subjects involved would choose the appropriate response word depending on their sex, and that the ability to choose a predicted response word would tend to intensify over age groups, increasing from the third grade students up to the young adults.

Instructions to the three different groups varied slightly to take into consideration the differences in age levels, but generally they were (after passing out the lists):

> We're going to play a word game. Each of you has a list of words. Each word printed in capital letters is followed by four words printed in small letters. Now here's how the game is played. If I say "boy" what do you think of? (All say "girl.") That's right. Now, if I say "good" what do you think of? (All say "bad.") That's right again. Now look at the first word on your list: CHILD. Think to yourself, which of the four words that follow CHILD would come to your mind first if I said "child"? Draw a line under the one that you would think of first. You are to do the same with all the rest of the words. Think. Which of the four words that follow each capitalized word would come first to your mind if I said the capitalized word? Underline it. Are there any questions?

Results and Conclusions

A Chi Square (X^2) test was performed on the responses to each individual stimulus word for each age level, yielding 102 (3 x 34) tests. A X^2 was also run for each stimulus word for all three age levels at once. This yielded 34 (2 x 3) tests, for a total of 136 X^2 tests (102 + 34). The reader is referred to Table 6 (Appendix C, p. 77) to inspect these results. An alpha level of .05 was used in all instances. The C and I used in the table refer to correct prediction and incorrect prediction, respectively. That is, for each stimulus word, the number of correct and incorrect responses were totaled and entered. Inspection of the table will reveal that among the overall analyses (C - I x 3 age groups), eleven of the thirty-four stimulus words were significant at the .05 level. When the age groups were evaluated separately, the college group also showed ten out of thirty-four words were significant at the chosen level. The high school and elementary groups had three and two, respectively.

Realizing that such analyses violated in some degree the independence assumption associated with X^2, compensation was sought by subjecting each of the above analyses to a binomial test maintaining, for this purpose, the fairly stringent alpha level of .05. By direct binomial expansion, it was determined that four or more words which were significant at the .05 level would constitute a binomial test of significance (also at the .05 level). Incidentally, this is also the case when the data were evaluated by a Poisson distribution. Actually, four significant words out of thirty-four is significant at the .03 level in the binomial evaluation, and five such words would be beyond the .01 level.

By this analysis the overall (2 x 3) data are significant at better than the .01 level. The major prediction is supported: the Ss did choose responses on the basis of their sex. Further, there is, as predicted, an increase in this function over age levels, ranging from the two significant stimulus words for the youngest to the ten for the oldest--this last also significant at better than the .01 level. Even though some latitude was taken with X^2 assumptions, the results are fairly impressive.

It is possible that some criticism could be raised that the method here employed was not a particularly precise or direct assessment of associative structure. It must be admitted that the procedure is less direct than was first thought. However, if the stimulus word raises a cluster of associations (associated with that word) for each S to a higher degree of awareness, or promotes among them a higher probability of response, and if the S then compares the four possible response words with his own associations and selects one from among the four on the basis of this comparison, then his associative structure is being tapped, however indirectly.

These findings, in general, confirm the idea that there are differences in associative structure between males and females, and indicate further that there is a tendency for such an effect to increase over age levels. They also point up the fact that the findings from the norms in Experiment I are demonstrable in a somewhat more experimental setting.

CHAPTER IV

EXPERIMENT III

The purpose of the third experiment was to obtain still more experimental evidence for the postulated effects of sex differences in associative responding, rather than to rely on normative, or what might be called survey, approaches. More specifically, it was predicted that the same sexed individuals, having more similar associative structures, would be able to solve a word game quicker than would the different sexed persons; that is, they would be able to communicate more easily. It was further predicted that there would be sex effects with females generally being more facile at obtaining a solution, in such a situation, than males. One would also predict age effects in the light of the findings in the second experiment: namely, that there would be an interactive effect between same or different sexed Ss and the age parameter. If a longer experience in playing one's sexual role affects the relationships to be found in one's associatives structure, resulting in more similar structures for same sexed individuals, then communicative ability between same sexed individuals should increase over age, relative to different sexed persons.

Subjects

The subjects were drawn from the same sources as those in Experiment II and were categorized in the same age groups. However, none of the subjects for this experiment had been employed previously in any experimental task. At each age level five male-male and five

female-female pairs of subjects were randomly selected. Also, for each age level, ten pairs of male-female subjects were drawn on a random basis. This yielded a total of 60 pairs, or 120 subjects. Thus, for each age level, there were three groups: one male-male (N = 5 pairs), one female-female (N = 5 pairs), and one male-female (N = 10 pairs).

Materials and Procedure

This experiment was set up along the lines of the game of "Password" (until lately a regular feature of network television), with some small variations. The game consists essentially of one person guessing correctly a word which the other member of a pair knows but may not reveal. That is, the first person, knowing what the word is, gives associations to this word as clues to the second person, who then, on the basis of these associative clues, must guess what the initial, or to-be-gotten, word is.

The subjects, one pair at a time, were seated in a room where they and the experimenter were the only ones present. Ss were given the following instructions:

> We are going to play a game very similar to the game of Password. I am going to give one of you a card with a word printed on it, and the object of the game is for the other person, who may not look at the card, to guess what the word is. In order for him to do this, the holder of the card may say any word of which the word on the card reminds him. The holder of the card may give any word he wants other than proper names such as persons or places, and he also may not use words which contain the to-be-guessed word. For example, if the secret word was "board" you could not give the clue "boardwalk" because it does contain the to-be-guessed word. Every now and then you may guess a word that is one form of the secret word. When this happens you will be told. For example, you may say "running" when the correct word is "run." If this happens you will be told that you have gotten one form of the word.

One member of each pair of subjects was then given a 3" x 5" card with the word to-be-gotten, by the other member of the pair, typed on it. The order of word presentation was randomized (by shuffling the cards) and the selection of the pair member to take the initial speaker role was also randomized. From this point, the task of speaker was alternated back and forth between the two. They were then instructed to proceed with the game, and a count recording was made of the number of trials, i.e., the number of clues given by the holder of the card necessary to obtain success by the other member of the pair. The numbers of trials to correct solution were then summed for each group. It should be underscored that the measure here was a trials-to-criterion type of solution, a low score indicating a greater facility at achieving a solution, and a high score indicating less facility.

The words chosen as stimuli for this experiment were JUSTICE, THIEF, DEEP, STREET, and PLAYING. They were selected as having yielded reasonably good performance in Experiment II, and also on the basis of psychological dynamics, primarily Freudian.

Occasionally a speaker (one who was emitting associations), being caught up in the task and anxious to help his partner, would inadvertantly blurt out the secret word instead of an association. When this occurred (only four times and with no apparent pattern), another randomly selected pair was recruited and their performance was substituted for the particular cell involved only.

A maximal level of ten responses (associations) was also invoked, this being a convenient cut-off point.

Results and Conclusions

A description and an analysis of the total data are presented in Tables 1 and 2. It should be noted in Table 1 that all values are in the predicted direction.

Table 1

Mean Number of Trials to Criterion over Three Age Groups by Same Versus Different Sex

	Elementary School	High School	College
Same Sex	3.72	4.14	4.22
Different Sex	4.00	4.70	4.72

The variance analysis (Table 2) consisted of a two by three by five analysis of variance, the parameters being (1) same sex or different sex, (2) age, and (3) words, respectively. A significant word effect (.001) was obtained indicating that the words themselves were differentially difficult to solve. Obviously, some words were harder to guess than others, with the order of difficulty (from easiest to hardest) being STREET, THIEF, DEEP, PLAYING, and JUSTICE. The A x C interaction (the same or different sex versus words interaction) was significant at the five percent level. This finding indicates that same sexed pairs do exhibit superior performance to different sexed ones when the level of word difficulty is also considered.

Table 2

Summary of Analysis of Variance of Associative Clues as a Function of Same Versus Different Sex, Age Level, and Word Difficulty in Experiment III

Source	df	Sum of Squares	Mean Square	F	Significance level (P)
Between Subjects	59	134.0	-	-	-
A (S-D)	1	16.8	16.8	<1	-
B (age)	2	21.3	10.7	<1	-
AB (age v. S-D)	2	1.4	.7	<1	-
Error	54	945.5	17.5	-	-
Within Subjects	240	887.2	-	-	-
C (words)	4	327.5	81.9	34.1	$P < .001$
AC (S-D v. wds.)	4	24.7	6.2	2.5	$P < .05$
BC (age v. wds.)	8	12.4	1.6	<1	-
A x B x C	8	31.9	4.0	1.7	-
Error	216	523.4	2.4	-	-

Figures 3 through 7 (Appendix F, p. 85) give a graphic analysis of the results taken word by word. The ordinate represents the total number of responses required to guess the word. Those curves marked same sex include all the male-male and female-female pairs used in the experiment (Total N = 30 pairs, 10 for each age level). The ones marked different sex include all the male-female pairs used in the study (Total N = 30 pairs, 10 for each age level).

Three of the words, DEEP, STREET, and PLAYING, appear to yield rather unequivocal results in the predicted direction. That is to say, the different sexes for those three words obviously had a more difficult time achieving this correct solution than did the subjects of the same sex, for each of the three age levels. One word, THIEF, shows a small reversal for the elementary school children, but is in the predicted direction for the high school and college subjects. The word JUSTICE shows an almost complete reversal of prediction, with only the college subjects responding in the predicted fashion.

Actually, but for the word JUSTICE, the predicted would have been found to be extremely conclusive. A glance at the relevant graphs, Figures 3 through 7, will show that of thirty plotted points, twenty-four (or eighty percent) are in the predicted direction. At any rate, same sexed pairs do demonstrate greater ability to communicate, at least in the context of the Password game, when the difficulty of the words themselves is taken into consideration. A look at the appropriate graphs will probably be a more effective aid in conceptualizing this finding than will consideration of the analysis of variance summaries.

For an indication of sex differences found in this study, the reader is referred to Table 3, where, again, all values are in the expected directions: females being better than males in the performance of this task.

Table 3

Mean Number of Trials to Criterion by All Three Age Groups by Male Versus Female

	Elementary School	High School	College
Male	3.80	4.36	4.60
Female	3.64	3.92	3.84

The second analysis of variance (Table 4 is actually quite similar to the first: the only major change being that the A variable, instead of being same sex or different sex (as was the case for the first analysis), now represents the male-female dichotomy. It was thought valuable to see if there was a sex difference between males and females, as well as the previously detected difference between same sex versus different sex. Again, we see that the word difficulty differences are significant (.01), and the sex differences were also significant at the five percent level. This demonstrates, again, that the words are differentially difficult to successfully guess and, also, that there are sex differences in the ability to produce a successful solution, with females rather constantly better able to arrive at

Table 4

Summary of Analysis of Variance of Associative Clues as a Function of Male Versus Female, Age Level, and Word Difficulty in Experiment III

Source	df	Sum of Squares	Mean Square	F	Significance level (P)
Between Subjects	24	43.3	-	-	-
A (M-F)	1	7.7	7.7	5.5	$P < .05$
B (age)	2	7.2	3.6	2.6	-
AB (age v. M-F)	2	1.9	1.0	< 1	-
Error	19	26.5	1.4	-	-
Within Subjects	125	450.6	-	-	-
C (words)	4	252.7	63.2	42.1	$P < .01$
AC (M-F v. wds.)	4	11.6	2.9	1.9	-
BC (age v. wds.)	8	24.8	3.1	2.0	-
A x B x C	8	5.2	.7	< 1	-
Error	101	156.3	1.5	-	-

quicker solutions, i.e., more able to communicate with themselves. The order of difficulty for the words in this analysis was (from easiest to hardest) STREET, DEEP, PLAYING, THIEF, and JUSTICE.

Figures 8 through 12 (Appendix F, p. 85) show a further breakdown of the previous data, such that we now have (for each word) one line representing different sex pairs (N = 10) and the other two representing male-male pairs (N = 5) and female-female pairs (N = 5), respectively. The ordinates in these cases are averages (to equalize differing N's) of numbers of responses. The principal finding here is that the female-female pairs have a general tendency to arrive at quicker solutions than do either the male-male pairs or the different sex pairs, although they are not consistently lower for any of the words.

After consideration of these results it was then deemed advisable to do individual analyses of variance for each of the five words. The first was a two by three analysis consisting of an A variable which represented a male-female dichotomy, and a B variable representing the three age levels employed. The results of these five analyses may be seen in Table 7 in Appendix D (p. 81). Then, each separate word was further analyzed with two parameters: A, same or different sex, and B, age levels. The summaries of these five analyses may be seen in Table 8 in Appendix E (p. 83). The results of these ten analyses show that, in general, the predicted effects occur for the easiest words (STREET and PLAYING) and that they fail to occur on difficult to solve words (JUSTICE). Actually, JUSTICE shows some significant reversals.

The overall results of all the analyses might be summarized by saying that there were obvious differentials in the ease with which the different words could be correctly solved, the most difficult being the most abstract one, JUSTICE. Another important finding is that same sexed pairs show an ability toward easier solutions than do different sexed ones when word solution difficulty is considered. Communication is facilitated by same sexed pairs. Sex effects were also generally obtained throughout this experiment, but, oddly enough, no age differences were found in this particular investigation--an unusual finding in light of the fact that they are usually obtained in this general type of data and, indeed, were obtained in the second part of the experiment. Although there were no statistically significant differences in age effects in Experiment III, an inspection of Tables 1 and 3 (p. 38 and p. 41) will show a trend toward a reversal of prediction, in that the younger Ss (elementary school) appear to have an easier time at achieving a correct solution than do the older ones. These and other findings will be discussed more thoroughly in the Discussion section.

CHAPTER V

DISCUSSION

The most general finding of this series of experiments is, of course, that there are sex differences in associative structure. This was demonstrated in Experiment I where the Jenkins and Palermo norms showed that, of the 200 stimulus words, 185 had one or more responses that were characterized by a sex difference. In Experiment II, when subjects were faced with two typically masculine and two typically feminine words as response choices to a stimulus word, they chose in the manner predicted for their sex. In the third experiment, the same sexed pairs were superior at arriving at correct solutions (when the differentials in word difficulty were taken into consideration) than were different sexed pairs: by inference, the facilitation being the result of sex determined similarity of associative structure. Also, females in general are more adept at this word game than are males. The previous work of Terman and Miles, and Goodenough, is in concurrence. As will be shown in more detail later on, these differences in associative structure are probably best explained as a differential emphasis on the attributes accorded to stimulus words by males and females, resulting in differences of stress or accent which, therefore, lead to a somewhat dissimilar emphasis in the choice of responses.

Other findings in this study also bear out what most investigators in the general area have found. Men are more concrete in their associations and tend to be less grammatically sophisticated, i.e., produce

more syntagmatic responses; while females tend to be more poetic, to be less inclined toward physical objects than men, and to produce a preponderance of paradigmatic responses, which suggests greater verbal facility.

These differences in associative structure between males and females go a long way toward explaining differences that are typically attributed to the masculine and feminine character. For example, a perusal of the responses which were characterized by a sex difference in Experiment I (see Appendix A) will show the following. In response to the stimulus word ALWAYS, the significant feminine replies were ever, forever, and never. The last is a linguistically logical paradigmatic opposite, but what about the overtones of ever and forever as responses to ALWAYS? Certainly ever is poetic, and both taken together convey an idea of the feminine attitude of fidelity, permanence, duration, and continuity. The only significant male response was sometimes; grammatically logical, perhaps, but what of the overtones?

To the stimulus CRY, female subjects respond laugh, sad, weep; males answer yell. To females it simply calls up the conveyance of an emotion; to men it connotes more of a value judgment: irritation. To the stimulus DREAM, females respond with boy, lovely, wish (Freud would have smiled at the last), while for males the only significant response was girl. For males, HEAD means brain; for females the associations are eyes and hair, concomitant attributes of allure. Many more examples could be drawn from this particular qualitative analysis to make the point, but only one more will be included. To the stimulus word THINNER,

significant responses for males were paint, than, and water. But what responses to THINNER were significant for females? Well, they were diet, fat, fatter, and skinny.

A more extensive look at the data from this section (Experiment I) will reveal, as Reik (1949) remarked, that women in general do not have to be told that the proper study of man is man, because, really, they are not very much interested in anything else. Also obvious from such an inspection is the fact that females are more sensitive to the subtile nuances of language (and are permitted a more socially acceptable release of aggressive feelings through this medium) giving rise to their ability for "catty" remarks. What sort of man, for example, could conceive the remark (made by one female to another): "You look so pretty tonight dear; I hardly recognized you."

Of some concern is the failure to achieve any age results in Experiment III in contrast to such results obtained in Experiment II. A possible explanation may be found in the operational differences employed in the two procedures, and the resulting different psychological processes required for each task. In Experiment II, a great deal of context or structuring was imposed by the fact that the choice of response was restricted to the four responses to each stimulus set forth by the experimenter. However, in Experiment III, no such restriction was imposed, and the subject's task was to sample from his entire relevant associative structure. Thus, the different tasks might be compared to the differences to be found between recognition and recall.

In this regard, Rosenberg and Cohen (1966, p. 228) remark: ". . . performance on recall tasks is determined by a two-stage process formally similar to the present speaker model, and recognition by a one-stage process similar to the present listener model." Consequently, in recall, a person must first sample his entire relevant network of associations, and then compare the available responses for the one he considers most efficacious of producing the desired reaction in his partner. Recognition, however, involves only a comparison function. The operations required in Experiment III were ones of recall, while Experiment II demanded only recognition. A recall situation, then, might serve to obscure, by making more potential responses available to all subjects as well as calling for a more elaborate psychological process, an effect that is detectable by a more simple recognition task.

The paradoxical reversals in response to the word JUSTICE seem nearly inexplicable. The Ss employed in the experiments were somewhat heterogeneous, some being the children of professional and executive personnel, and some being the children indigenous to the local mountain culture. Now, there is such a thing as "mountain justice" which differs in many respects to the more legally oriented concepts of the word justice. In addition, the word itself is abstract, and it was the most difficult one to solve. Perhaps there is some sort of interaction between these variables capable of producing the obtained results, but, other than this, no explanation can be deduced.

As was mentioned in the results portion of Experiment III, no significant age effects were found, but there was a tendency for younger Ss to get quicker solutions. A potentially clarifying reason may be

found in the fact that the associative structures of younger people are less elaborate, affording them fewer potential responses in contrast to the variety available to older persons. The relative richness of available associates of more experienced Ss may give them greater precision in the task of selection of appropriate clues, but such a condition might also serve to make the task of appropriate selection more difficult, due to the greater number of choices accruing to a more elaborate structure. To illustrate: an older S would certainly have a more rich pattern of association (greater number of words) to the word JUSTICE, but a third grade student, involved in the learning and recitation of the "Pledge of Allegiance," may have a very simple, if primitive, association between "liberty" and "justice" (for all). Whereas the responding of the older Ss may take the form of searching and selecting as described by Rosenberg and Cohen, the younger Ss perform in a more direct type of conditioned responding.

At this point, perhaps an attempt should be made to characterize the mental processes involved in producing word associations, with specific regard to the sex differences obtained. What exactly is a subject doing when he is involved in a process of generating associations? It will be recalled from the Introduction that Deese's most recent formulation of the problem consists of regarding the organism as having the capacity to form associations on the basis of common attributes. Rosenberg and Cohen (1966, p. 227) state their case as follows:

> . . . the subject in the word association task first samples a response from a hypothetical set of responses and then compares certain properties of this sampled response with criteria supplied

> by the experimental instructions (as in controlled word association) or supplied by the subject himself (in free word association). The subject either emits the sampled response or rejects it depending on how closely the sampled response approximates the assigned or self-instructed criteria.

This description seems amenable to Deese's, if one views the above mentioned "properties" and "self-instructed criteria" as meaning that one is instructing oneself to associate on the basis of similarity of attributes or characteristics. For example, they are operationally equivalent in their prediction, say, that the associative response butterfly will be given to the stimulus MOTH, because these two share the properties of being insects, having wings, being capable of flight, being found primarily in summer, etc.

The sex differences in associative structure between males and females may then be made on the basis of differential emphasis of their choice of attributes. Take, for example, the word HAND. While there is a great deal of overlap in the responses that the different sexes give to this word (they both give responses like foot), a clear differentiation of attributes can be seen in the fact that words such as work and fist are given by males, whereas other words such as soft and ring are typically female. After all, thinking of the hand as an instrument for use in work and fighting is masculine, while such things as attractiveness and desirability, as well as preoccupation with securing for oneself a husband, is feminine.

If one reflects for a moment on the general nature of the differences in physical structure between the hands of men and women, and the things they are required to do, the following picture emerges.

Men's hands are larger and stronger than women's, giving rise to an attitude that men's hands are more suitable for grasping and wielding larger objects; they are considered, therefore, more powerful. Men's hands are more calloused and are, on the whole, dirtier, leading to a conceptualization of activities appropriate to male hands. Female hands are softer with greater manual dexterity, generating an attitude of dantiness and facility, just the sort of hands to care for a baby, for example. The differential treatment of the fingernails by the sexes adds to the overall picture. In contrast to men, female fingernails are not utilized merely for functional operations, but are also regarded as another set of armaments in the arsenal of allure or attractiveness. They are shaped, polished and painted to look pleasant and to be desirable. When one considers the matter in this fashion, it is easy to see how differential attitudes are formed and why men associate to HAND with fist and work and females are more concerned with soft and ring.

The source and types of events that could conspire, ontologically, to create these divergent emphases for men and women remain to be discussed. When this is attempted, one runs immediately onto a nature-nurture type of problem. While Freud's remark about biology being destiny no doubt has merit, man is eminently a social animal as well. The effect is no doubt an interactive one between these two variables. That is, accepting the biological differences which no doubt do affect this phenomenon, social forces also are at play. For example: given the general differences in body builds, it is not very likely that females would place any undue importance on having

physical strength for themselves, whereas, men certainly do desire this. What is being said here is, if the situation is one which is largely dependent on role playing, or role adoption, basic biology is going to have some bearing on what sort of characteristics or qualities the respective roles will take.

Certainly, also, there are factors which go into the determination of the differing roles which are almost purely social. At any rate, this adoption or playing of a role is one in which attitudes are introjected, particularly personal attitudes towards oneself, concerning how one should play one's role, and society is, in large, the vehicle that is the carrier of these attitudes. Indeed, the culture is so replete with these phenomena, it would really be quite difficult to trace them all out. For example, little girls are told, while they're being bounced on their parents knees, that they are "sugar and spice and everything nice" while boys of the same age are being described as "rags and snails and puppy dog tails." Little girls are taught at an early age that they must not show their aggression too much and must be somewhat more passive; boys, on the other hand, are encouraged towards competitiveness and activity.

What general principles can we, then, derive from this analysis? First, sex differences in associative structure do exist, and may be a matter of differential emphasis in the pattern of attributes that underlies association. Words have different meanings for males and females because of this. Second, males make a great deal more syntagmatic responses than females, suggesting a superior ability in language usage for females. Also, females show a greater average

commonality than males, indicating more overlap of responding for them than males demonstrate. Role acquisition through introjection of attitudes, moreover, increases as age increases. Females are more facile at playing word games (at least of the type investigated) than males. In general, similar roles (same sex) facilitates solutions in word association games between pairs of players, and suggests that communication across sexes is more difficult than communication between same sexed individuals.

Indeed, there is "man talk" and "woman talk" and it is more than just a matter of similar interests or commonly shared knowledge. The reason is more fundamental. It is that similar emphases in associative structures render communication more meaningful by mutually shared nuances, overtones, and connotations of the actual words that are being exchanged.

BIBLIOGRAPHY

BIBLIOGRAPHY

Bousfield, W. A. The occurrence of clustering in the recall of randomly arranged associates. J. general Psychol., 1953, 49, 229-240.

Brody, N. Anxiety and the variability of word associates. J. abn. soc. Psychol., 1964, 68, 331-334.

Cleland, J. Fanny Hill. London: Privately printed, 1749.

Deese, J. On the structure of associative meaning. Psychol. Rev., 1962, 69, 131-175.

_____. The structure of associations in language and thought. Baltimore: The Johns Hopkins Press, 1965.

Dunn, S., Bliss, J., and Siipola, E. Effects of impulsivity, introversion, and individual values upon associations under free conditions. J. Pers., 1958, 26, 61-76.

Entwisle, D. R. Word associations of young children. Baltimore: The Johns Hopkins Press, 1966.

Ervin, J. M. Changes with age in the verbal determinants of word association. Amer. J. Psychol., 1961, 74, 361-372.

Foley, J. P., and MacMillan Z. L. Mediated generalization and the interpretation of verbal behavior: V. Free association as related to differences in professional training. J. exp. Psychol., 1943, 33, 299-310.

Garskof, B. E. Relation between single word association and continued association response hierarchies. Psychol. Rep., 1965, 16, 307-309.

Goodenough, F. L. Semantic choice and personality structure. Science, 1946, 104, 451-456.

Hevron, M. D., Nordlie, P. G., and Cofer, C. N. Measurement of attitude by a simple word association technique. J. Soc. Psychol., 1957, 46, 81-89.

Jenkins, J. J., and Palermo, D. S. Word association norms. Minneapolis: The University of Minnesota Press, 1964, 469 p.

Miller, G. A., Galantner, E., and Pribram, K. H. Plans and the structure of behavior. New York: Holt, Rinehert, and Winston, 1960.

Moran, L. J., Mefferd, R. B. Jr., and Kimble, J. P. Jr. Idiomatic sets in word association. Psychol. Monog., 1964, 78, entire No. 579.

Osgood, C. E. Method and theory in experimental psychology. New York: Oxford University Press, Inc., 1953.

Palermo, D. S. Word associations and children's verbal behavior. Advances in child development and behavior, 1963, Vol. 1, 31-68. New York: Academic Press.

Palermo, D. S., and Jenkins, J. J. Sex differences in word associations. J. general Psychol., 1965, 72, 77-84.

Peak, H. Psychological structure and psychological activity. Psychol. Rev., 1958, 65, 325-347.

Pollio, H. R. Word association as a function of conditioned meaning. J. exp. Psychol., 1963, 66, 454-460.

_____. Some semantic relations among word associates. Amer. J. Psychol., 1964a, 77, 249-256.

_____. Some characteristics of associative structure matrices. Unpublished paper, The University of Tennessee, 1964b.

_____. Associative structure and verbal behavior. In T. R. Dixon and D. L. Horton (Ed.) Verbal behavior and general behavior theory. Englewood Cliffs, N.J.: Prentice Hall, 1968a, 37-66.

_____. The assault on association. Review of: "Deese, The structure of associations in language and thought." Language, 1968b, in press.

Pollio, H. R., and Gerow, J. R. The role of congruent and incongruent evaluative contexts in word association. J. Verb. Lng. Verb. Beh., 1968, 7, 122-127.

Rappaport, D., (Ed.). Organization and pathology of thought. New York: Columbia University Press, 1951.

Rappaport, D., Gill, M., and Schafer, R. Diagnostic psychological testing: Vol. 2. Chicago: Year Book Publishers, 1946.

Reik, T. Of love and lust. New York: Farrar, Straus and Company, 1949.

Rosenberg, S., and Cohen, B. D. Referential processes of speakers and listeners. Psychol. Rev., 1966, 73, 208-231.

Rosenzweig, M. R., and Menahern, R. "Age, sexe, et niveaw d'instruction comme facteurs determinants dans les associations de mots." Anee. Psychol., 1962, 62, 45-61.

Silverstein, A. The prediction of individual association hierarchies from cultural frequencies. Amer. J. Psychol., 1967, 80, 88-94.

Terman, L. M., and Miles, C. C. Sex difference in the association of ideas. Amer. J. Psychol., 1939, 41, 165-206.

_____. Sex and personality: Studies in masculinity and femininity. New York and London: McGraw-Hill, 1936.

Woodrow, H., and Lowell, F. Children's association frequency tests. Psychol. Monog., 1916, 22, No. 5.

APPENDIXES

APPENDIX A

Table 5

Stimulus Words and Significant Sexually Different Responses from Jenkins and Palermo Norms as Reported in Experiment I

Stimulus	(M) Male	(F)	(M) Female	(F)
A (89)	(189) B	(118)	(153) an	(282)
	(103) thing	(74)	(175) one	(245)
			(68) the	(102)
AFRAID (85)			(45) frightened	(85)
			(33) scare	(53)
			(846) scared	(922)
AH (139)	(50) choo	(17)	(370) oh	(588)
			(18) sigh	(42)
ALTHOUGH (129)	(84) he	(47)	(104) because	(165)
ALWAYS (114)	(69) sometimes	(32)	(70) ever	(108)
			(193) forever	(313)
			(706) never	(813)
AM (92)			(116) are	(163)
AN (122)			(233) apple	(403)
			(27) one	(74)
AND (107)			(162) also	(227)
ANGER (90)			(46) mean	(94)
AT (94)	(312) there	(252)		
BABY (86)	(369) boy	(177)	(176) cry	(249)
			(95) mother	(160)
BATH (53)	(747) water	(662)	(536) clean	(690)
			(81) soap	(154)

Table 5 (continued)

Stimulus	(M) Male	(F)	(M) Female	(F)
BEAUTIFUL (102)	(276) girl	(173)	(21) gorgeous	(42)
	(34) girls	(5)	(94) lovely	(168)
	(129) nice	(56)	(416) pretty	(605)
BED (73)			(57) pillow	(121)
BIBLE (48)			(567) God	(661)
BITTER (86)	(135) taste	(87)	(398) sour	(577)
BLACK (52)			(886) white	(936)
BLOSSOM (48)			(106) apple	(173)
BLUE (70)			(21) pretty	(47)
BREAD (61)			(540) butter	(811)
BROADER (128)			(177) wide	(219)
BUTTER (51)	(150) food	(97)	(898) bread	(1075)
			(194) yellow	(269)
BUTTERFLY (67)	(218) bird	(165)	(95) pretty	(234)
			(71) yellow	(147)
BUYING (89)			(176) bought	(233)
BY (138)	(169) the	(94)		
CABBAGE (64)			(71) green	(157)
			(321) vegetable	(410)
CARRY (127)			(225) hold	(327)
CARS (121)			(35) ride	(82)
CHEESE (77)	(303) food	(182)		
CHILD (78)	(381) boy	(121)	(254) baby	(449)
	(146) kid	(73)	(44) girl	(131)
			(118) mother	(190)

Table 5 (continued)

Stimulus	(M) Male	(F)	(M) Female	(F)
CHILDREN (84)			(42) adults	(63)
			(37) babies	(101)
CITIZEN (83)	(229) man	(159)	(77) American	(122)
CITY (59)	(812) town	(678)	(156) state	(228)
CLEARER (143)	(124) than	(58)	(67) foggy	(118)
CLOSER (86)	(78) than	(24)	(494) farther	(616)
	(145) to	(94)	(248) nearer	(315)
COLD (59)			(307) snow	(347)
			(148) winter	(186)
COME (72)	(82) to	(41)	(513) go	(741)
COMFORT (98)			(167) bed	(222)
			(59) home	(96)
COMMAND (123)	(107) army	(60)	(110) do	(159)
COTTAGE (76)			(22) small	(53)
			(17) white	(44)
CRY (82)	(53) yell	(24)	(107) laugh	(176)
			(91) sad	(145)
			(68) weep	(86)
DEEP (68)	(150) down	(119)	(214) dark	(281)
	(90) far	(50)	(17) wide	(53)
	(384) shallow	(262)		
	(197) water	(158)		
DOCTOR (87)			(468) nurse	(636)
DOGS (54)	(432) cat	(253)	(63) bark	(106)
DOORS (94)			(471) window	(626)
DREAM (96)	(58) girl	(7)	(3) boy	(25)
			(3) lovely	(12)
			(95) wish	(162)

Table 5 (continued)

Stimulus	(M) Male	(F)	(M) Female	(F)
EAGLE (60)	(45) bald	(26)	(1446) bird	(1578)
	(14) eye	(3)		
EARTH (81)	(211) moon	(98)	(75) land	(106)
			(194) round	(236)
			(51) sky	(80)
EASIER (91)			(83) faster	(117)
			(598) harder	(780)
			(51) simple	(102)
EATING (72)			(136) hungry	(165)
FARTHER (83)	(67) dad	(32)	(211) away	(296)
	(311) mother	(183)	(194) closer	(292)
	(74) than	(31)	(98) far	(152)
			(117) nearer	(198)
FASTER (66)	(290) slow	(251)	(770) slower	(943)
	(103) speed	(58)		
	(92) than	(36)		
FIND (76)	(22) the	(7)	(243) lose	(275)
			(15) seek	(30)
FINGERS (92)			(65) nails	(115)
			(161) toes	(268)
FOOT (64)	(201) feet	(150)	(285) shoe	(365)
			(171) toes	(241)
			(87) walk	(114)
FOR (100)	(22) he	(8)		
	(297) what	(245)		
FROM (103)			(10) letter	(36)
			(313) to	(465)
FRUIT (62)			(72) banana	(105)
GET (106)	(79) it	(62)	(35) buy	(75)
	(16) the	(6)	(229) go	(261)
			(66) take	(105)

Table 5 (continued)

Stimulus	(M)	Male	(F)	(M)	Female	(F)
GIRL (66)	(44)	beautiful	(9)	(1205)	boy	(1349)
	(23)	man	(4)	(0)	me	(39)
	(105)	woman	(69)	(5)	sweet	(23)
				(30)	young	(54)
GO (73)	(97)	now	(74)	(207)	come	(301)
	(61)	slow	(38)	(31)	stay	(58)
	(70)	to	(37)			
GREEN (71)	(56)	black	(31)	(604)	grass	(814)
	(391)	color	(293)			
	(253)	red	(182)			
GUNS (107)	(51)	pistol	(20)	(23)	cowboys	(61)
				(79)	fire	(106)
				(332)	shoot	(461)
				(126)	shot	(189)
HAMMER (57)	(105)	head	(29)	(11)	hurt	(33)
	(156)	hit	(90)	(883)	nail	(980)
	(26)	steel	(5)	(65)	nails	(133)
				(154)	pound	(261)
HAND (80)	(20)	fist	(4)	(30)	ring	(83)
	(22)	wrist	(9)	(42)	soft	(105)
HARD (72)	(32)	head	(14)	(1017)	soft	(1069)
				(31)	wood	(56)
HARDLY (134)				(58)	any	(103)
				(23)	little	(42)
HAVE (109)	(197)	not	(158)	(236)	had	(331)
	(21)	what	(8)	(21)	something	(26)
HE (39)	(252)	him	(169)	(143)	boy	(294)
	(124)	is	(67)	(772)	she	(1058)
HEAD (88)	(202)	brain	(145)	(97)	eyes	(156)
				(248)	hair	(345)
HEALTH (97)				(8)	nurse	(22)
				(12)	safety	(19)
				(71)	well	(144)

Table 5 (continued)

Stimulus	(M) Male	(F)	(M) Female	(F)
HEAVY (81)	(20) steel	(4)	(3) carry	(21)
	(169) weight	(97)	(6) coat	(10)
	(45) work	(11)		
HERE (66)	(122) are	(96)	(1037) there	(1290)
	(193) is	(129)		
	(17) was	(4)		
	(24) you	(9)		
HIGH (70)	(30) far	(14)	(20) ladder	(48)
	(99) up	(75)		
HIM (50)	(33) person	(8)	(72) boy	(165)
	(47) you	(24)	(1098) her	(1273)
HIS (86)	(37) mother	(14)	(36) boy	(88)
			(378) her	(517)
HOTTER (58)	(383) cold	(313)	(659) colder	(801)
	(144) hot	(101)	(23) summer	(64)
HOUSE (107)	(31) shack	(16)	(85) big	(120)
			(70) live	(96)
			(30) people	(53)
			(56) white	(97)
HOW (104)	(46) did	(20)	(2) like	(12)
	(58) to	(35)		
HOWEVER (132)			(10) forever	(19)
			(24) so	(51)
I (65)	(162) am	(107)	(876) me	(967)
	(16) I'm	(8)	(336) you	(483)
	(59) was	(17)		
IF (90)	(225) you	(169)	(99) maybe	(181)
			(18) so	(49)
IN (71)	(143) it	(111)	(145) house	(202)
IS (101)	(45) on	(29)	(282) it	(344)

Table 5 (continued)

Stimulus	(M) Male	(F)	(M) Female	(F)
IT (82)	(38) its	(22)		
JOY (73)	(16) bad	(2)	(45) Christmas	(63)
	(225) fun	(107)	(838) happy	(970)
	(24) soap	(9)		
JUMP (88)			(88) hop	(201)
			(28) rope	(84)
			(50) skip	(129)
JUSTICE (89)	(587) law	(387)	(16) fair	(36)
	(66) police	(22)	(185) judge	(269)
			(9) order	(29)
			(347) peace	(496)
KING (94)	(79) man	(49)	(1106) queen	(1407)
	(14) me	(0)		
KITTENS (52)	(34) are	(6)	(19) cute	(54)
			(29) meow	(64)
			(29) soft	(77)
LAMP (50)			(1465) light	(1598)
LIFT (100)	(75) weight	(23)	(257) carry	(700)
			(82) high	(103)
			(30) hold	(65)
LION (84)	(26) bear	(15)	(29) fierce	(48)
	(165) cat	(99)		
	(55) king	(32)		
LIVE (81)	(204) dead	(140)	(2) happy	(17)
			(155) house	(294)
LONG (98)	(22) distance	(12)		
	(100) far	(48)		
	(14) pole	(3)		
LOUD (77)	(52) sound	(20)	(767) soft	(873)

Table 5 (continued)

Stimulus	(M)	Male	(F)	(M)	Female	(F)
MAKE (130)	(114)	build	(42)	(14)	bake	(48)
	(136)	it	(86)	(24)	buy	(61)
	(26)	work	(11)	(88)	do	(190)
				(4)	sew	(49)
MAN (59)				(16)	father	(43)
				(57)	lady	(121)
				(0)	love	(15)
				(67)	tall	(110)
ME (52)	(31)	boy	(1)	(3)	girl	(30)
	(44)	he	(30)	(998)	you	(1191)
	(36)	her	(21)			
MOON (75)	(107)	earth	(40)	(142)	night	(209)
	(24)	far	(10)	(342)	stars	(479)
	(149)	light	(106)	(305)	sun	(351)
	(30)	man	(11)	(50)	yellow	(79)
	(113)	planet	(40)			
	(69)	space	(23)			
MOUNTAIN (81)	(672)	hill	(567)	(442)	high	(603)
MUSIC (103)	(57)	horn	(19)	(98)	note	(147)
	(80)	noise	(28)	(71)	piano	(182)
				(134)	sing	(218)
				(45)	singing	(90)
MUTTON (105)	(230)	food	(163)	(321)	lamb	(471)
	(35)	glove	(13)	(143)	meat	(202)
	(341)	sheep	(309)			
MY (114)	(125)	his	(76)	(17)	goodness	(44)
	(56)	mother	(28)	(258)	me	(306)
	(78)	self	(48)	(238)	mine	(323)
				(100)	yours	(176)
NEEDLE (46)	(291)	pin	(234)	(103)	sew	(250)
	(410)	sharp	(250)	(57)	sewing	(85)
				(753)	thread	(1001)
NOW (90)	(31)	I	(11)	(6)	minute	(30)
				(169)	never	(222)
				(502)	then	(556)

Table 5 (continued)

Stimulus	(M) Male	(F)	(M) Female	(F)
NUMBERS (103)	(32) are	(11)	(342) letters	(427)
			(275) one	(353)
OCEAN (43)	(954) water	(1131)	(117) blue	(211)
			(24) river	(50)
			(27) waves	(61)
OF (104)			(7) because	(31)
OH (128)	(71) you	(28)	(18) dear	(54)
			(6) see	(23)
ON (91)	(17) go	(6)	(28) at	(46)
	(27) light	(12)	(8) under	(23)
			(23) upon	(45)
ONLY (101)			(6) child	(21)
OR (120)	(36) are	(19)	(161) nor	(225)
	(41) boat	(22)		
	(57) ore	(36)		
OVER (98)	(88) the	(33)	(579) under	(737)
	(376) there	(304)		
PEOPLE (131)	(34) boy	(15)	(61) animals	(105)
	(71) human	(47)	(46) children	(99)
PLAYING (104)	(155) play	(122)	(36) children	(62)
	(57) with	(30)	(4) dolls	(23)
			(346) fun	(399)
			(90) games	(130)
			(1) resting	(17)
			(16) toys	(41)
PRIEST (78)	(87) Bible	(35)	(152) Catholic	(233)
	(100) God	(72)	(205) minister	(250)
QUIET (81)	(239) noise	(176)	(50) peace	(89)
			(32) peaceful	(66)
			(4) soundless	(12)
QUICKLY (54)	(243) slow	(190)	(323) slowly	(362)

Table 5 (continued)

Stimulus	(M) Male	(F)	(M) Female	(F)
QUIETLY (98)			(166) loudly	(240)
			(80) noisy	(126)
			(178) softly	(232)
RED (71)	(127) green	(92)	(294) blue	(339)
	(284) white	(231)	(23) coat	(48)
			(2) dress	(33)
RELIGION (88)			(79) Catholic	(114)
			(92) Lutheran	(155)
			(12) Methodist	(24)
RIVER (66)	(692) water	(622)		
ROUGH (108)	(33) coarse	(10)		
	(22) riders	(6)		
RUNNING (75)	(23) hard	(9)	(7) skipping	(41)
	(103) run	(63)	(226) walking	(397)
SALT (75)	(42) lake	(8)	(649) pepper	(1318)
	(32) sweet	(11)	(16) seasoning	(32)
	(116) water	(86)	(2) tasty	(15)
SALTY (88)			(18) fish	(56)
			(166) pepper	(231)
			(52) peppery	(104)
			(4) popcorn	(17)
SCISSORS (49)	(51) cutting	(30)		
SEE (82)	(111) it	(57)	(120) eyes	(197)
	(169) me	(133)	(288) look	(400)
			(360) saw	(431)
SELL (98)	(105) money	(70)	(58) store	(105)
SHEEP (73)	(84) dog	(41)	(342) lamb	(444)
	(45) herd	(21)	(9) soft	(27)
			(51) white	(89)
SHOES (89)	(72) boots	(35)	(162) socks	(261)

Table 5 (continued)

Stimulus	(M)	Male	(F)	(M)	Female	(F)
SHORT (47)	(695)	long	(512)	(133)	fat	(239)
	(233)	small	(216)	(557)	tall	(688)
SLEEP (72)				(7)	eyes	(24)
SLOW (74)	(78)	car	(40)	(22)	pokey	(55)
SLOWLY (70)	(24)	down	(7)	(255)	faster	(405)
	(56)	jump	(25)			
SMOOTH (80)	(87)	flat	(52)	(46)	silk	(68)
				(524)	soft	(660)
				(16)	straight	(30)
SO (116)	(32)	ah	(12)	(34)	is	(46)
	(40)	I	(23)			
SOFT (88)	(773)	hard	(636)	(5)	kitten	(41)
				(28)	loud	(44)
				(63)	smooth	(101)
				(48)	warm	(59)
SOLDIER (91)	(106)	fight	(73)	(35)	boy	(77)
	(48)	fighter	(13)	(403)	man	(537)
				(1)	tall	(9)
SOUR (82)	(53)	hurt	(31)	(106)	cream	(158)
SPEAK (92)	(18)	dog	(2)	(2)	laugh	(10)
				(15)	listen	(26)
				(717)	talk	(846)
SPIDER (84)	(422)	insect	(355)	(68)	black	(140)
				(6)	ish	(60)
SQUARE (102)	(45)	head	(22)	(254)	circle	(325)
				(24)	dance	(44)
STAND (84)	(150)	by	(95)	(573)	sit	(807)
				(175)	still	(228)
STEM (69)	(68)	branch	(31)	(590)	flower	(1021)
	(417)	plant	(319)			
	(126)	tree	(32)			

Table 5 (continued)

Stimulus	(M)	Male	(F)	(M)	Female	(F)
STOMACH (101)	(49)	belly	(11)			
	(13)	man	(5)			
STOVE (55)	(369)	heat	(202)	(182)	cook	(326)
	(168)	pipe	(130)	(141)	oven	(225)
	(28)	wood	(14)	(9)	sink	(19)
STREET (95)	(65)	tar	(28)	(100)	cars	(155)
				(4)	houses	(19)
				(62)	sidewalk	(130)
				(64)	walk	(103)
SWEET (70)	(52)	girl	(20)	(9)	kind	(24)
	(258)	sugar	(204)			
SWIFT (67)	(288)	slow	(218)	(1092)	fast	(1191)
TABLE (50)				(1131)	chair	(1323)
TAKE (105)	(41)	get	(70)	(88)	bring	(152)
				(16)	carry	(35)
TELL (73)	(643)	me	(534)	(59)	say	(111)
	(47)	you	(28)	(13)	secret	(41)
				(116)	story	(189)
THAT (95)	(130)	it	(90)	(252)	this	(375)
THE (103)	(327)	boy	(244)	(52)	a	(97)
	(102)	thing	(64)	(67)	end	(115)
				(32)	then	(42)
THEN (96)	(58)	the	(18)	(49)	than	(105)
				(307)	when	(366)
THERE (76)	(64)	was	(34)	(592)	here	(703)
THEREFORE (116)	(33)	he	(18)	(34)	however	(110)
	(13)	to	(1)	(16)	never	(27)
	(171)	we	(123)	(77)	so	(160)
THEY (76)	(209)	are	(153)	(166)	people	(212)
				(1)	said	(11)
				(126)	we	(198)

Table 5 (continued)

Stimulus	(M) Male	(F)	(M) Female	(F)
THIEF (83)	(19) cop	(2)	(7) jewels	(34)
	(167) crook	(53)	(36) man	(65)
			(405) steal	(522)
THINNER (77)	(256) paint	(59)	(3) diet	(23)
	(79) than	(23)	(220) fat	(311)
	(30) water	(11)	(318) fatter	(641)
			(159) skinny	(294)
THIRSTY (46)	(13) drunk	(0)		
	(188) dry	(152)		
THIS (75)	(119) thing	(90)	(11) book	(22)
			(520) that	(713)
TO (97)	(45) it	(24)	(13) for	(25)
	(22) who	(11)	(317) from	(522)
			(180) go	(203)
TOBACCO (64)	(27) bad	(14)	(128) pipe	(176)
			(13) smell	(35)
TROUBLE (165)	(113) police	(50)	(51) mad	(70)
			(16) problem	(54)
			(18) sorrow	(54)
			(2) unhappy	(12)
			(6) worried	(18)
US (69)			(272) you	(348)
VERY (117)	(107) fast	(67)	(297) much	(427)
	(68) well	(38)		
WAS (110)	(19) never	(9)	(191) were	(278)
WE (78)	(283) are	(261)	(1) both	(10)
			(347) they	(428)
			(448) us	(546)
WHAT (97)	(32) the	(7)	(205) question	(526)
			(138) why	(176)
WHERE (71)	(139) are	(102)	(340) here	(384)
	(210) is	(166)	(204) when	(294)

Table 5 (continued)

Stimulus	(M)	Male	(F)	(M)	Female	(F)
WHISKY (74)	(60)	good	(18)	(695)	drink	(774)
WHISTLE (86)	(151)	loud	(125)	(103)	sing	(159)
	(99)	train	(84)	(54)	tune	(110)
	(46)	yell	(16)			
WHITE (62)	(46)	house	(23)	(16)	red	(27)
				(243)	snow	(276)
WHO (74)	(95)	him	(55)	(56)	person	(90)
	(225)	is	(172)			
WINDOW (81)	(80)	clear	(56)	(4)	curtain	(32)
	(680)	glass	(521)	(32)	open	(56)
WISH (111)	(23)	dish	(8)	(40)	star	(104)
	(40)	money	(19)	(49)	true	(80)
	(42)	wash	(19)	(206)	want	(255)
WITH (94)				(120)	me	(150)
				(290)	without	(341)
WOMAN (58)	(1100)	man	(1227)	(41)	child	(69)
				(124)	lady	(175)
				(26)	pretty	(62)
WORKING (107)	(101)	loafing	(60)	(25)	busy	(51)
	(96)	sleeping	(69)			
	(68)	sweat	(22)			
YELLOW (86)	(180)	black	(79)	(26)	butter	(59)
	(36)	chicken	(22)	(5)	dress	(37)
	(211)	red	(146)	(49)	sun	(134)
YOU (50)	(31)	and	(16)	(1143)	me	(1376)
	(80)	him	(52)			
	(36)	they	(20)			

Table 5 (continued)

Stimulus	(M)	Male	(F)	(M)	Female	(F)
YOUNGER (46)	(48)	boy	(15)	(41)	baby	(72)
	(123)	young	(78)	(136)	child	(219)
				(44)	children	(115)
				(38)	little	(78)
				(46)	sister	(82)

Note: Numbers in parenthesis after stimulus words indicate the number of different words that were given as responses to that particular stimulus. Numbers in parentheses around response words refer to the frequency of the response as given by males and females, as indicated.

APPENDIX B

SAMPLE DATA SHEET FOR THE DEMONSTRATION OF SEXUAL DIFFERENCES USED IN EXPERIMENT II

CHILD	boy	baby	mother	kid
DEEP	far	dark	shallow	wide
GIRL	sweet	beautiful	man	young
HAMMER	hurt	steel	pound	head
HAND	fist	ring	soft	wrist
HEAVY	steel	carry	work	coat
HIM	boy	person	you	her
JOY	Christmas	fun	happy	bad
JUSTICE	law	fair	order	police
MAKE	build	buy	work	do
MOON	night	earth	planet	star
MUSIC	piano	noise	sing	horn
MUTTON	food	lamb	meat	sheep
NEEDLE	pin	sew	sharp	thread

SAMPLE DATA SHEET (continued)

PEOPLE	animals	human	boy	children
PLAYING	children	with	fun	play
PRIEST	Bible	Catholic	minister	God
RED	green	coat	white	dress
RUNNING	skipping	run	hard	walking
SALT	pepper	sweet	seasoning	lake
SHEEP	lamb	dog	soft	herd
SHORT	long	fat	small	tall
SOLDIER	man	fighter	fight	tall
STOVE	oven	pipe	sink	heat
STREET	cars	houses	sidewalk	tar
TELL	me	say	you	secret
THIEF	jewels	crook	cop	steal
THINNER	diet	water	fat	paint
TROUBLE	fight	problem	sorrow	police
WHISTLE	loud	sing	train	tune

SAMPLE DATA SHEET (continued)

WINDOW	curtain	glass	clear	open
WISH	star	wash	want	money
YELLOW	black	butter	dress	chicken
YOUNGER	children	boy	young	little

APPENDIX C

Table 6

Chi Square Values by Each Stimulus Word Individually Across All Age Levels and Overall Analysis of Experiment II

	Elementary				High School				College				Overall	
Stimulus	C	I	X^2	Sig. Lev.	C	I	X^2	Sig. Lev.	C	I	X^2	Sig. Lev.	X^2	Sig. Lev.
CHILD	17	17	0	-	16	18	.12	-	20	14	1.06	-	1.18	-
DEEP	21	13	1.88	-	18	16	.12	-	20	14	1.06	-	3.06	-
GIRL	18	16	.12	-	21	13	1.88	-	24	10	5.71	$<.05$	7.71	$<.05$
HAMMER	18	16	.12	-	23	11	4.23	$<.05$	19	15	.47	-	4.82	-
HAND	14	20	1.06	-	26	8	9.00	$<.05$	24	10	5.71	$<.05$	15.77	$<.01$
HEAVY	16	18	.12	-	18	16	.12	-	21	13	1.88	-	2.12	-
HIM	16	18	.12	-	21	13	1.88	-	18	16	.12	-	2.12	-
JOY	24	10	5.71	$<.05$	19	15	.47	-	21	13	1.88	-	8.06	$<.05$
JUSTICE	16	18	.12	-	20	14	1.06	-	24	10	5.71	$<.05$	6.89	$<.05$

Table 6 (continued)

	Elementary				High School				College				Overall	
Stimulus	C	I	X^2	Sig. Lev.	C	I	X^2	Sig. Lev.	C	I	X^2	Sig. Lev.	X^2	Sig. Lev.
MAKE	22	12	2.94	-	19	15	.47	-	18	16	.12	-	4.47	-
MOON	17	17	0	-	20	14	1.06	-	14	20	1.06	-	2.12	-
MUSIC	20	14	1.06	-	19	15	.47	-	22	12	2.94	-	4.47	-
MUTTON	12	22	2.94	-	20	14	1.06	-	19	15	.47	-	4.47	-
NEEDLE	16	18	.12	-	22	12	2.94	-	23	11	4.23	$<.05$	7.29	$<.05$
PEOPLE	18	16	.12	-	16	18	.12	-	23	11	4.23	$<.05$	4.47	-
PLAYING	13	21	1.88	-	21	13	1.88	-	20	14	1.06	-	4.72	-
PRIEST	17	17	0	-	21	13	1.88	-	19	15	.47	-	2.35	-
RED	16	18	.12	-	22	12	2.94	-	21	13	1.88	-	4.94	-
RUNNING	22	12	2.94	-	19	15	.47	-	23	11	4.23	$<.05$	7.74	$<.05$
SALT	17	17	0	-	17	17	0	-	18	16	.12	-	.12	-
SHEEP	16	18	.12	-	15	19	.47	-	24	10	5.71	$<.05$	6.30	$<.05$

Table 6 (continued)

	Elementary				High School				College				Overall	
Stimulus	C	I	X^2	Sig. Lev.	C	I	X^2	Sig. Lev.	C	I	X^2	Sig. Lev.	X^2	Sig. Lev.
SHORT	15	19	.47	-	20	14	1.06	-	19	15	.47	-	2.00	-
SOLDIER	18	16	.12	-	14	20	1.06	-	20	14	1.06	-	2.24	-
STOVE	20	14	1.06	-	14	20	1.06	-	20	14	1.06	-	3.18	-
STREET	16	18	.12	-	19	15	.47	-	24	10	5.71	$<.05$	6.30	$<.05$
TELL	19	15	.47	-	14	20	1.06	-	18	16	.12	-	1.59	-
THIEF	20	14	1.06	-	14	20	1.06	-	22	12	2.94	-	5.06	-
THINNER	21	13	1.88	-	18	16	.12	-	23	11	4.23	$<.05$	6.23	$<.05$
TROUBLE	22	12	2.94	-	18	16	.12	-	23	11	4.23	$<.05$	7.29	$<.05$
WHISTLE	18	16	.12	-	15	19	.47	-	21	13	1.88	-	2.47	-
WINDOW	18	16	.12	-	25	9	7.53	$<.05$	20	14	1.06	-	8.71	$<.05$
WISH	20	14	1.06	-	16	18	.12	-	20	14	1.06	-	2.24	-

Table 6 (continued)

	Elementary				High School				College				Overall	
Stimulus	C	I	X^2	Sig. Lev.	C	I	X^2	Sig. Lev.	C	I	X^2	Sig. Lev.	X^2	Sig. Lev.
YELLOW	23	11	4.23	<.05	18	16	.12	-	17	17	0	-	4.35	-
YOUNGER	16	18	.12	-	22	12	2.94	-	19	15	.47	-	3.53	-

APPENDIX D

Table 7

Analysis of Variance Summary of Number of Associative Clues as a Function of Sex and Age Level to the Five Words in Experiment III

Word	Source	df	Sum of Squares	Mean Square	F	Significance level (P)
PLAYING	A (M-F)	1	0	0	-	-
	B (age)	2	13.8	6.9	4.6	$P < .05$
	A x B	2	5.7	2.9	1.9	-
	Within Subjects	24	38.0	1.5	-	-
	Total	29	57.5	-	-	-
THIEF	A (M-F)	1	9.6	9.6	4.6	$P < .05$
	B (age)	2	1.4	.7	< 1	-
	A x B	2	6.1	3.1	1+	-
	Within Subjects	24	51.2	2.1	-	-
	Total	29	68.3	-	-	-
JUSTICE	A (M-F)	1	9.4	9.4	14.5	$P < .01$
	B (age)	2	11.6	5.3	8.1	$P < .01$
	A x B	2	2.4	1.2	1.8	-
	Within Subjects	24	15.7	.65	-	-
	Total	29	38.1	-	-	-

Table 7 (continued)

Word	Source	df	Sum of Squares	Mean Square	F	Significance level (P)
STREET	A (M-F)	1	-	-	-	-
	B (age)	2	23.2	11.6	64.4	$P < .01$
	A x B	2	1.7	.9	5.0	$P < .05$
	Within Subjects	24	4.3	.18	-	-
	Total	29	-	-	-	-
DEEP	A (M-F)	1	.1	.1	< 1	-
	B (age)	2	3.3	1.7	< 1	-
	A x B	2	11.2	5.6	2.9	-
	Within Subjects	24	44.8	1.9	-	-
	Total	29	59.4	-	-	-

APPENDIX E

Table 8

Analysis of Variance Summary of Number of Associative Clues as a Function of Same or Different Sex and Age Level to the Five Words in Experiment III

Word	Source	df	Sum of Squares	Mean Square	F	Significance level (P)
PLAYING	A (S-D)	1	2.0	2.0	<1	-
	B (age)	2	14.6	7.3	3.3	P< .05
	A x B	2	20.1	10.5	4.8	P< .05
	Within Subjects	54	119.3	2.2	-	-
	Total	59	156.0	-	-	-
THIEF	A (S-D)	1	1.7	1.7	<1	-
	B (age)	2	1.7	1.7	<1	-
	A x B	2	5.8	2.9	1+	-
	Within Subjects	54	116.8	2.2	-	-
	Total	59	126.0	-	-	-
JUSTICE	A (S-D)	1	1.3	1.3	1+	-
	B (age)	2	22.6	11.3	12.6	P< .01
	A x B	2	17.2	8.6	9.7	P< .01
	Within Subjects	54	48.1	.89	-	-
	Total	59	89.2	-	-	-

Table 8 (continued)

Word	Source	df	Sum of Squares	Mean Square	F	Significance level (P)
STREET	A (S-D)	1	17.2	17.2	9.2	$P < .01$
	B (age)	2	13.6	6.8	3.2	$P < .05$
	A x B	2	.6	.3	< 1	-
	Within Subjects	54	110.0	2.1	-	-
	Total	59	141.4	-	-	-
DEEP	A (S-D)	1	6.0	6.0	1+	-
	B (age)	2	1.6	.8	< 1	-
	A x B	2	.9	.45	< 1	-
	Within Subjects	54	177.8	3.3	-	-
	Total	59	186.3	-	-	-

APPENDIX F

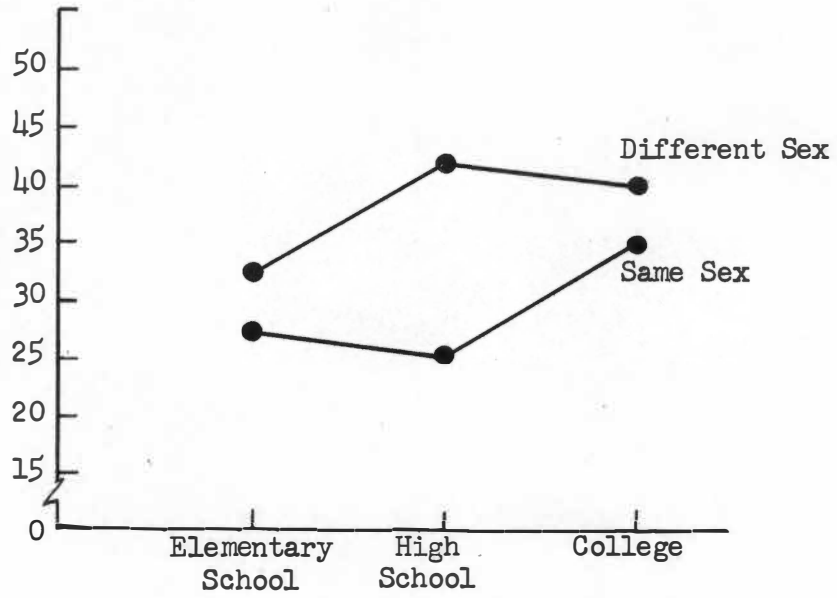

Figure 3. Total responses to correct solution by same sexed versus different sexed subjects for the three age levels for the stimulus word STREET.

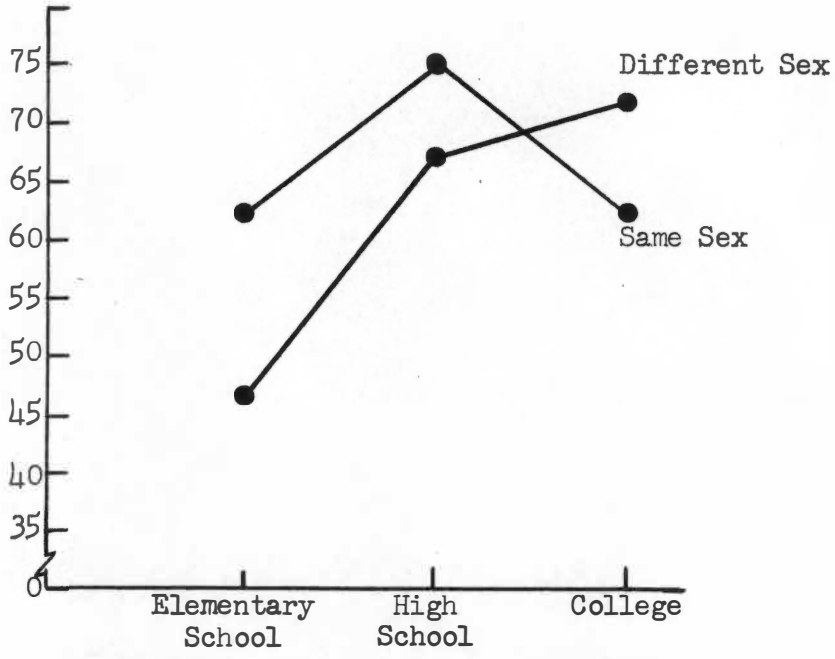

Figure 4. Total responses to correct solution by same sexed versus different sexed subjects for the three age levels for the stimulus word JUSTICE.

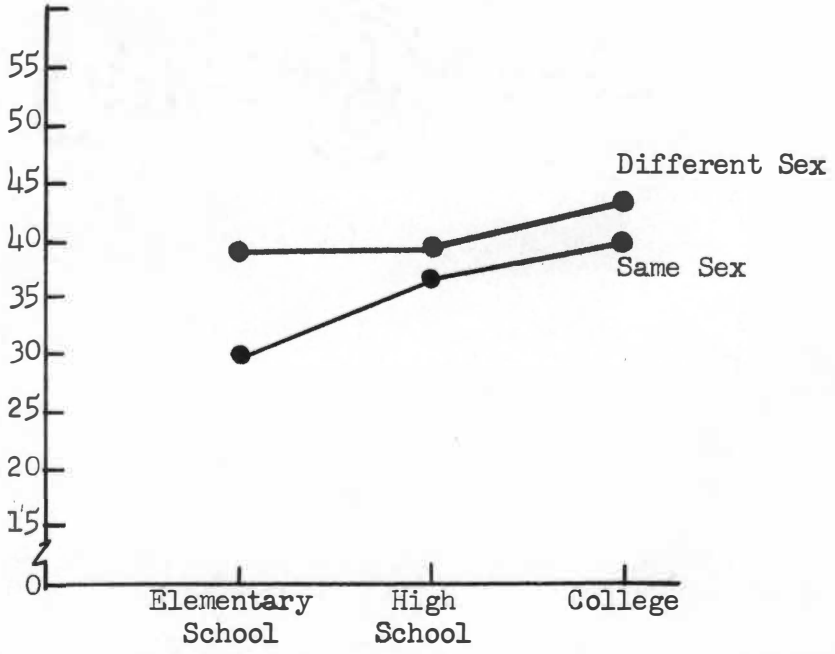

Figure 5. Total responses to correct solution by same sexed versus different sexed subjects for the three age levels for the stimulus word DEEP.

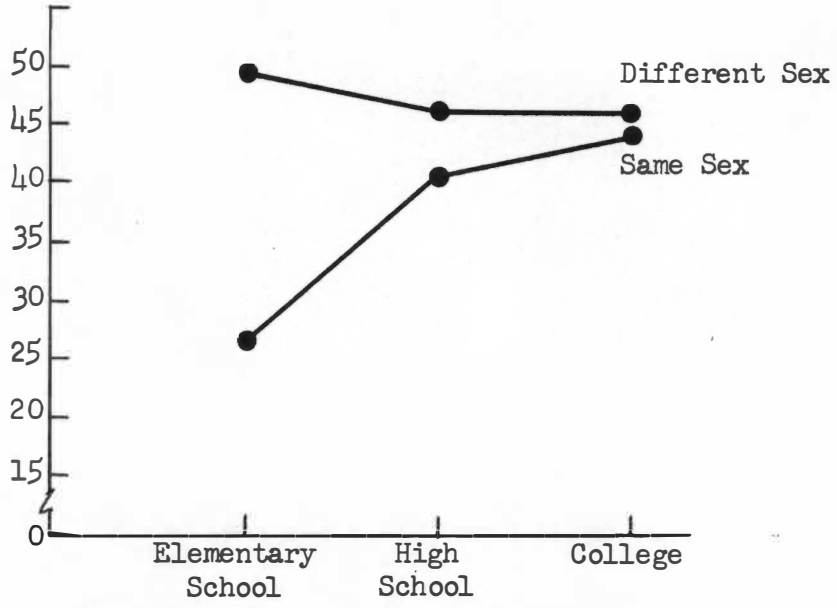

Figure 6. Total responses to correct solution by same sexed versus different sexed subjects for the three age levels for the stimulus word PLAYING.

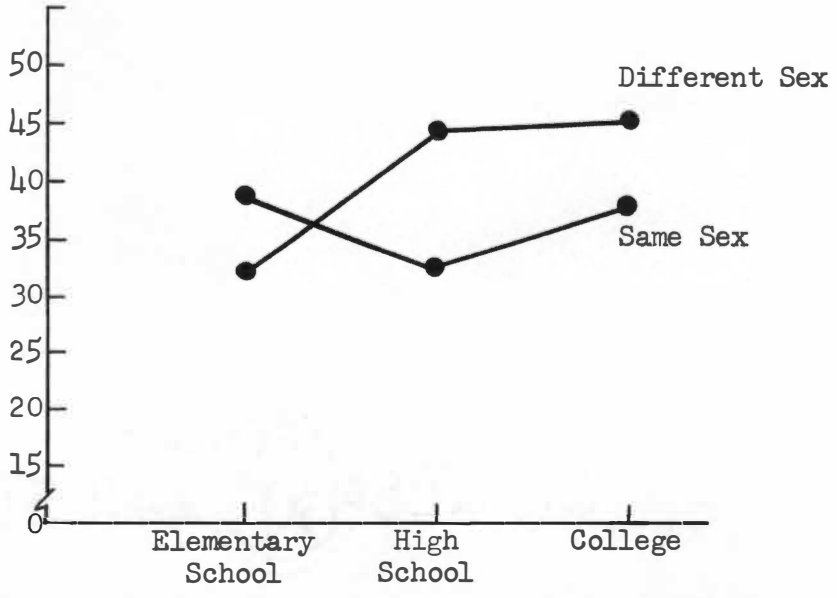

Figure 7. Total responses to correct solution by same sexed versus different sexed subjects for the three age levels for the stimulus word THIEF.

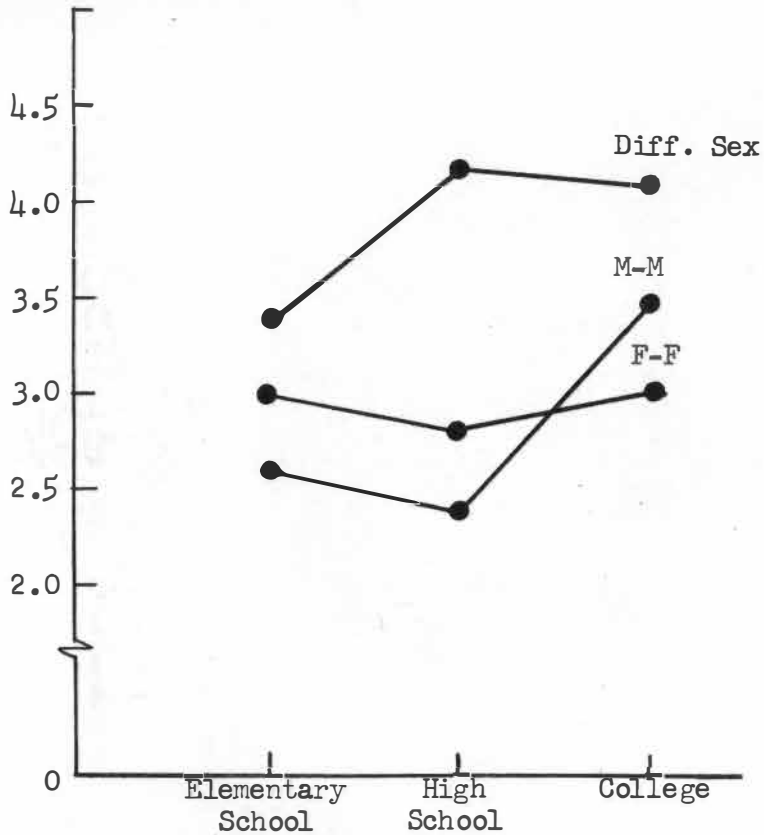

Figure 8. Average number of responses to correct solution by male-male, female-female, and different sexed subjects for the three age levels for the stimulus word STREET.

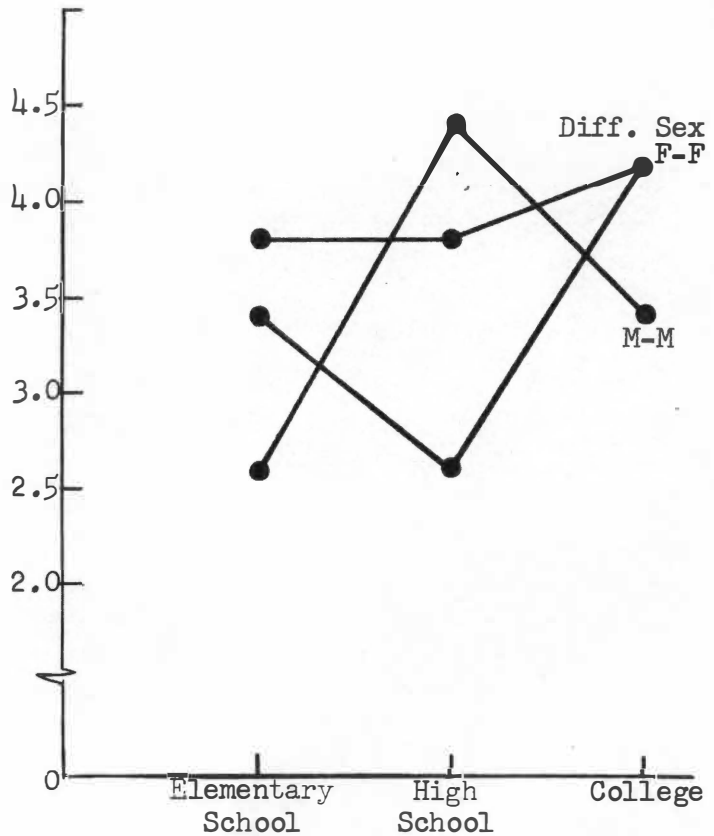

Figure 9. Average number of responses to correct solution by male-male, female-female, and different sexed subjects for the three age levels for the stimulus word DEEP.

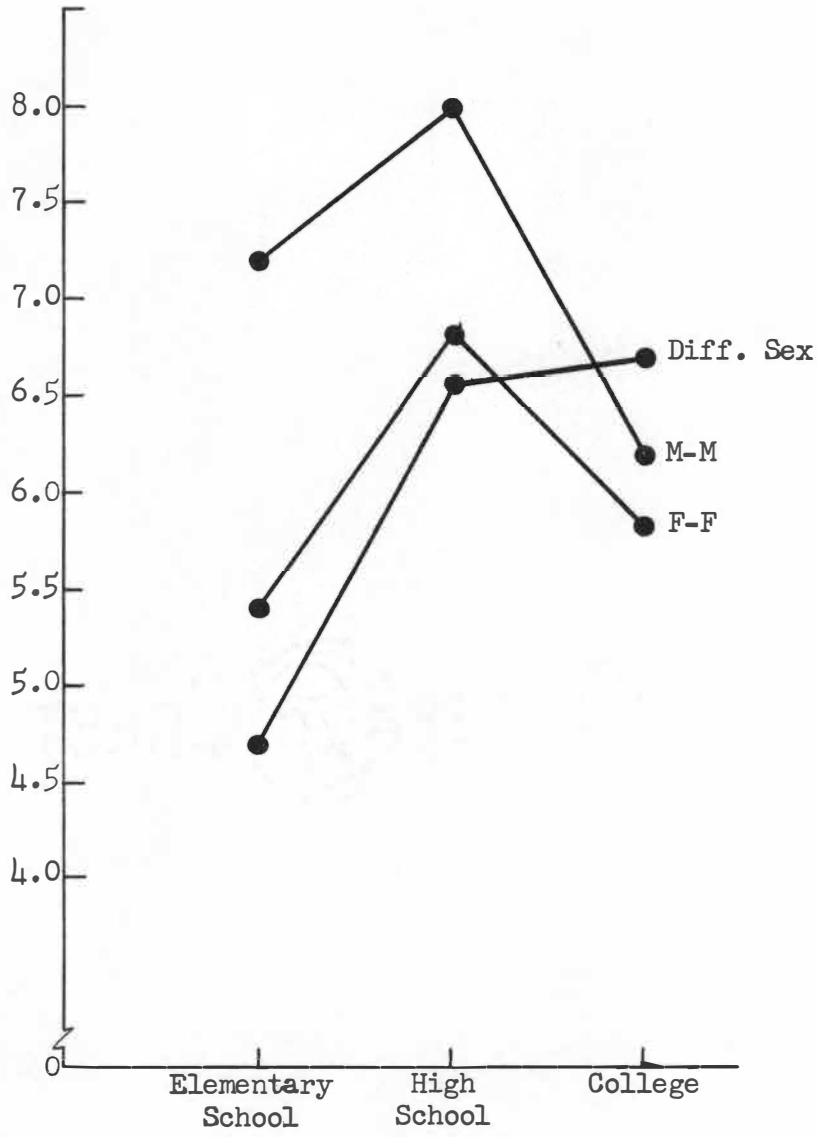

Figure 10. Average number of responses to correct solution by male-male, female-female, and different sexed subjects for the three age levels for the stimulus word JUSTICE.

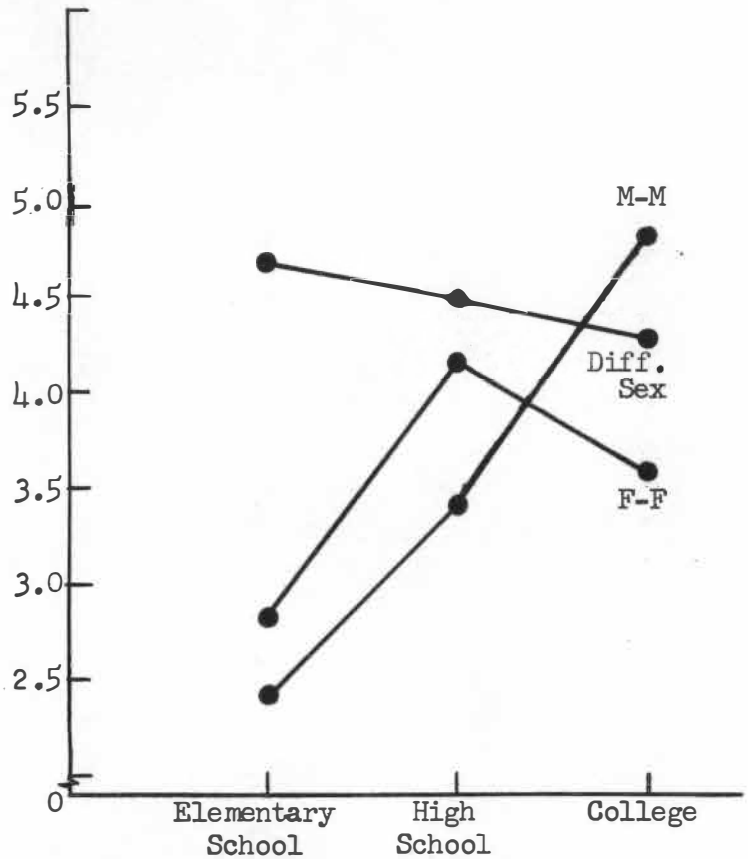

Figure 11. Average number of responses to correct solution by male-male, female-female, and different sexed subjects for the three age levels for the stimulus word PLAYING.

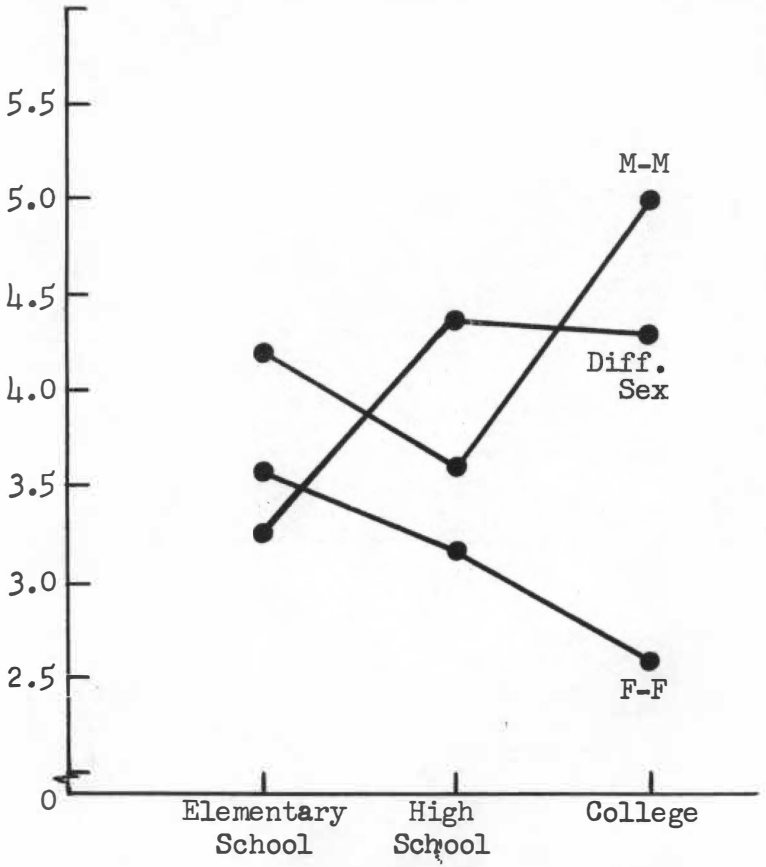

Figure 12. Average number of responses to correct solution by male-male, female-female, and different sexed subjects for the three age levels for the stimulus work THIEF.

VITA

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Publications:

With Wechkin, S., and Furchtgott, E. Motor performance in the rat as a function of age and prenatal x irradiation. J. Comp. and Physiol. Psych., 1961, 54, no. 6, 658-659.

With Cureton, E. E., et. al. Perseveration factor. Science, 1962, 135, no. 3506, 794.

With Dent, O. B. A vocational preference rank technique. Personnel and Guidance Journal, 1965, XLIII, no. 8, 801-803.