

PERSONALITY CORRELATES OF PSYCHOMETRIC
RESPONSE STYLES

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PREFACE

During the last decade, a large number of studies have dealt with the phenomenon of response style in psychometric tests. There has been some disagreement as to whether or not the various response styles are personality variables. Most of the studies have related single response styles to various personality variables.

It is the purpose of this study to investigate several response styles and several personality variables simultaneously to see if response style is related to personality.

In order to carry out this investigation, it was necessary to have a statistical tool which would analyze sets of data consisting of multiple criteria as well as multiple predictors. The method of canonical correlation answered the need, but the method is difficult to use. One of the major problems in doing this study was related to the statistical treatment of the data.

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CHAPTER I

THE PROBLEM

"The roots of the measurement of man lie in antiquity" (Thorndike and Hagen, 1961, p. 1). It is probably true, as the authors of the above statement indicate, that man has always appraised his fellows in one way or another. Plato recognized that no two persons are alike, and he proposed different tests by which the soldiers of his ideal state could be chosen (Anastasi, 1958).

Throughout the centuries there have been those who have sought to test or evaluate the personalities and skills of others. However, prior to the last 150 years, these attempts were highly subjective and little attempt was made to assess psychological characteristics scientifically.

Since Galton, there have been a great many persons whose names have been associated with the testing movement. These include such names as: Cattell, Binet, Terman, Wechsler, Guilford, and many others. Today, the testing movement is tremendous in its scope. Thousands of tests are on the market, and new tests are coming out of research laboratories everyday.

The goal of all who work with personality tests is to devise and perfect instruments which will assess personality characteristics accurately so that predictions of behavior can be made. Much progress has been made, and today's tests are far more reliable and valid than

the subjective opinions of our early ancestors. However, the measurements made with these instruments still contain a great deal of variance which is difficult to interpret and which limits their effectiveness as predictors of behavior. Many investigators have attempted to identify the factors which make up true variance and error variance. While some success has been achieved, there are still many variables which cannot be clearly classified as one or the other. One such variable is response style.

Statement of the Problem

Response style has been the subject of a large number of investigations during the last two decades, and a great volume of literature has been written about it. Some investigators view response style as entirely a subject variable, i.e., they believe that subjects consistently manifest the same response tendencies over all tests regardless of content. Others view response style as a function of both the subject and item content. If this is the case, it would be expected that the response style would be present for some scales but not for others.

One point that seems to have been overlooked is that differences in subjects might cause them to view content differently. Response style may be a function of both subject and item content even when the subjects are given the same test.

It is the purpose of this study to investigate the relationship of personality variables to response styles. The main question asked is, Does response style vary as a function of differences in personality?

Limitations of the Study

There are many other sources of error variance in currently used tests. However, this study will deal only with those aspects of tests, subjects, and test situations which are related to response style. This study is confined to the following response styles: social desirability, acquiescence, lying, and defensiveness.

It would obviously be impossible to deal with every known personality variable. This thesis will deal with the following: verbal aptitude, anxiety, conformity, neuroticism, and extraversion. Socioeconomic status, sex, and age are included, also. These variables will be measured by the use of psychometric instruments rather than by measures of nonpsychometric behavior.

A further limitation of this study is related to the choice of subjects. The subjects have been taken from two sources: Oklahoma State University and Bethany Nazarene College. This obviously limits the scope of the study, especially with reference to socioeconomic status.

Clarification of Terms

Personality

There are some who will disagree with the writer's use of the term "personality." This is to be expected. Allport (1937), in surveying the literature, found fifty different definitions of this term. Hall and Lindzey (1957, p. 9) stated, "It is our conviction that no substantial definition of personality can be applied with any generality." For the purpose of this thesis, an operational definition of personality was taken from Hilgard. Personality is defined as, "The individual

characteristics and ways of behaving which in their organization and patterning account for an individual's unique adjustments to his total environment" (1962, p. 627).

It can readily be seen that this definition is very general and includes a person's appearance, abilities, temperaments, motives, etc. For this reason, measures of various kinds of traits have been referred to as measures of personality variables.

Response Style

By response styles the writer means those constructs referred to by other investigators as response bias (Guilford, 1954) and response set (Cronbach, 1946, 1950). The word "style" has been used to avoid confusing the term with other meanings of "bias" and "set." Response style was defined by Cronbach (1946, p. 491) as, "any tendency causing a person consistently to make different responses to test items that he would have made had the same content been presented in a different form." Diers (1964, p. 71) defined response sets as, "tendencies on the part of the subjects to respond according to a style or pattern which persists over a variety of testing situations." Response style, then, is a generalized tendency to respond to psychometric test items in a particular way. The specific response styles are briefly defined below. These concepts are discussed more fully in Chapter III.

Social desirability is the tendency to endorse items whose content is socially and/or ethically desirable. This concept is primarily Edwards'. The procedure used in developing social desirability scales is one of choosing items which have been submitted to judges and have been judged to be socially desirable or acceptable. The assumption is

made that there is a close relationship between judged desirability and probability of endorsement (Edwards, 1957).

In general, acquiescence is the tendency to indicate agreement with an item by marking "true," "yes," "agree," etc. The measure of acquiescence used in this study was specifically designated by its author as a measure of social acquiescence. This has been defined by Bass (1956, p. 296) as "acquiescence to (or agreement with) a wide variety of generalizations concerning how persons behave or should behave." The approach taken by many investigators is that acquiescence is a mechanical type of agreement which is manifested by certain personality types over a wide range of test content. A great deal more will be said about this idea later.

Lying is the tendency to answer items in a favorable manner, the answers to which are clearly desirable, but which are seldom given by most people. This concept does not imply any conscious attempt on the part of the subject to deceive. The underlying mechanism may be a defense mechanism which is assumed to be operating at an unconscious level. Whatever the reason for endorsing Lie items, it is generally assumed that such endorsement gives a false impression and invalidates the subject's responses.

Defensiveness is the tendency to answer items in such a way as to make one's self appear good by getting a high score on the test. It has often been referred to as "test taking attitude."

CHAPTER II

REVIEW OF THE LITERATURE

Historical Background

Interest in response style dates back at least as far as 1927 when Fritz published an article entitled, "Guessing on a True-False Test." Fritz surveyed data from 19 true-false tests which were given by four instructors. These tests contained almost an equal number of true and false statements (211 true and 209 false). The subjects made 3065 errors. Sixty-four percent of these errors were "false" statements which had been marked "true." Only 36 percent were "true" statements which had been marked "false."

Fritz made up a very difficult test using technical questions from the Encyclopedia Medica. He balanced the number of "true" and "false" statements. Eight easy statements were presented to keep up the subjects' interest. The test was administered to two groups. One group answered 60.9 percent "true," and the other group answered 62 percent "true."

The main objective of Fritz's study was to justify the practice of deducting two points for each error in true-false tests. He drew no conclusions from his results. While his article showed the existence of a response style, later called acquiescence, it did not seem to stir much interest as to why people respond in this way.

In 1937, Lorge reported a classic study in which he found positive correlations between the number of "yes" answers on the "Bernreuter," the number of checks on the "Thurstone," the number of "L"s on the Strong, and the number of "1"s and "2"s on the "Thorndike" scale. He found a similar relationship between the number of "no"s, "crosses," "D"s, and "8"s and "9"s on the same tests. (Lorge's report of his study appeared as an abstract and the full names of the tests were not given.) There was a significant relationship between the neutral responses, also. Lorge inferred from his findings that the method of rating items introduces a halo effect and that the tendency to respond with a consistent rubric may be "symptomatic of a special aspect of personality" (p. 546).

Lentz (1938) reported a study in which he sought to evaluate the effect of acquiescence in distorting measures. He used two methods of attack: (1) he presented all items stated both negatively and positively, which he called a double form, and noted the correlation between the double form and the single form; (2) he intercorrelated the halves of a single test which had been divided so as to "put the acquiescence factor antithetically in the two halves or equally in the two halves" (p. 659). He concluded that acquiescence is very distorting and suggested that its effect could be partially controlled by balancing the number of positive and negative items in a test. He recognized that this might spuriously force a zero correlation between acquiescence and a trait when there might be a natural correlation present. He felt that the use of a double form was not practicable.

Cronbach was interested in this effect, also, and in 1942 published a study of acquiescence as a factor in the true-false test. He stated,

"When students enter an examination room they do not leave their personalities at the door" (p. 401). Cronbach concluded that the tendency to respond "true" more often than "false" affects the score of a true-false test. This tendency reduces the range of test scores when "true" and "false" items are equal, increases mean scores when the majority are "true," and lowers scores when the majority are "false."

In 1946, Cronbach published one of two articles which were to create a "snowballing" interest in what he called "response sets." He defined response sets as "any tendency causing a person consistently to make different responses to test items than he would have made had the same content been presented in a different form" (p. 491). He listed six response sets. These were: (1) a tendency to gamble, (2) definition of judgment categories, (3) inclusiveness, (4) bias, (5) speed versus accuracy, and (6) miscellaneous response sets on essay tests.

Cronbach made some statements that shaped the course of a great deal of future research. He believed that individual differences in response sets are reliable and that they have their greatest effect in ambiguous situations. He felt that they could either raise or lower both reliability and validity, but that they always reduced logical validity and should be eliminated. He was not certain if response sets were general or specific. He made a number of suggestions for eliminating the effect of response sets.

The second article by Cronbach on response sets was published in 1950. He reported further evidence which confirmed his previous findings and discussed the nature of response sets. After reviewing several studies he concluded that response sets are consistent from

test to test when similar situations are presented, but that they are not consistent over widely different situations. He felt that the evidence indicated that response sets might be "real" variables of personality rather than merely incidental sources of error. He presented four sources of variance due to response sets, one of which he believed was "true" variance, but said that the four kinds of variance are so entangled as to be inseparable. He recommended that, except when one is interested in studying the personality characteristic reflected in the response set, these sets should be avoided or eliminated, if possible. Several recommendations were made, the primary one being the use of multiple-choice items as a control for response set.

The studies mentioned above served to pave the way for future studies and to give a measure of direction to them. However, it was not until Allen Edwards published The Social Desirability Variable in Personality Assessment and Research (1957) that interest became widespread. This was the beginning of a controversy that has filled the journals with a large number of articles defending or attacking response styles, such as social desirability and acquiescence, and attempting to define the relationship between them. The plan of the rest of this section will be to take up the various response styles of concern to this investigation and to present the pertinent findings relative to each. Many of the problems alluded to above will be dealt with in more detail below.

Summary of the Literature

Social Desirability

It is difficult to talk about social desirability without discussing

the work of Allen Edwards. In addition to the many studies done by him, there have been a great many more which have been undertaken as a result of his studies. The first part of this section will be given to a discussion of these investigations.

Edwards (1957) accepts as the primary unit of personality description, "a statement about a person." He contends that all statements about people can be placed along a continuum of social desirability. He proposes that each statement can be judged according to any of the psychological scaling methods and its position on this dimension so located.

Edwards believed, also, that the probability of endorsing an item, i.e., saying that it reflects a characteristic of one's own personality, is directly and highly correlated with the scale value of the item. To test this hypothesis, he presented 140 personality statements to a group of 152 judges (Edwards, 1953a) and obtained scale values by the method of successive intervals. The statements were then administered to a new group of 140 students. The correlation between scale values and probability of endorsement was .87. Edwards (1957) reported seven other studies which reported correlations ranging from .82 to .92.

Edwards recognized that the tendency to give socially desirable responses to personality inventory items varied among individuals. In order to be able to test the degree of this tendency he developed what has come to be known as the Social Desirability Scale (SD Scale). He chose items which were heterogeneous in content, but which had high social desirability scale values. These items were chosen from several of the Minnesota Multiphasic Personality Inventory (MMPI) scales. The original SD Scale contained 79 items. The scale was later

shortened to 39 items. Edwards reasoned that since the SD Scale was an independent measure, any correlation of it with another scale should indicate the degree to which the social desirability variable is operating in that test at that time.

Edwards felt that the tendency to give socially desirable responses is a fairly stable personality characteristic, i.e., if a person responds in this way on one inventory he will consistently respond in this way on other inventories.

DeSoto, Kuethe, and Bosley (1959) attempted a redefinition of Edwards social desirability concept. They gave the SD Scale under three sets. For the first condition the instructions were the same as those of Edwards. Social approval instructions were used for condition two and social well-being instructions were used for the third condition. A significant difference was found between responses in conditions one and two but not for conditions one and three. The investigators concluded that Edwards' SD Scale actually measures social well-being instead of social approval. They felt that the desire for social well-being was more salient than social desirability.

Couch and Keniston (1960), using factor analysis, developed a 360 item Over-All-Agreement Scale (OAS). These investigators believed that this scale was a pure measure of acquiescence. Taylor (1961) criticized the OAS, and suggested that it might be another measure of the social desirability set similar to Edwards' SD Scale rather than a measure of agreeing response set. Edwards and Walker (1961a) correlated the correlations between MMPI scores and OAS scores with the percent of scale items keyed socially undesirable. Partialling out the percent of scale items keyed true, the correlation was .69. The correlation

between MMPI correlations and percent of items keyed true with social undesirability partialled out was .80. They concluded that the OAS correlations with MMPI scales are consistent with both the acquiescence and the social desirability hypothesis, and thus, the two are confounded in the OAS.

Couch and Keniston (1961) factor analyzed 32 MMPI scales, the SD Scale, and scales from the OAS. They concluded that the results supported their contention that the agreeing response tendency, as measured by the OAS, is independent of social desirability, but that the SD Scale was contaminated by an agreeing response set.

In a rejoinder, Edwards and Walker (1961b) argued that the negative correlation of the SD Scale and OAS found by Couch and Keniston was due to the fact that subjects who obtained high scores on OAS were giving more socially undesirable responses. In other words, the OAS has many socially undesirable items. The reason the correlation (-.34) was not higher, according to Edwards and Walker, was because of the presence of many neutral items in the OAS. Edwards and Walker criticized the method by which Couch and Keniston rotated the factor loadings, also. They used the same data in a factor analysis and came up with nearly opposite results.

The relationship between the SD Scale and acquiescence was further investigated by Solomon and Klein (1963). The purpose of their study was to "provide a further test of Edwards' and Walker's (1961a) hypothesis that scores on the OAS (and MMPI scales) are influenced by ... social desirability tendencies" (p. 176). They administered three measures of response set and five content scales to 125 schizophrenic patients and 135 college subjects and found that OAS is significantly and

negatively correlated with social desirability. They then carried out a factor analysis of the scales and found two factors: (I) Agreeableness and (II) Social Desirability. Factor I seemed to contain an element of nonsocial desirability, but Factor II did not seem to contain an agreeableness component, indicating support for Edwards' and Walker's hypothesis that OAS contained a component of social undesirability, but the SD Scale did not contain acquiescence.

Webster (1962), in reviewing the findings relative to acquiescence and social desirability concluded, "Arguments concerning whether the 'response set effect' is due to acquiescence (or denial) or instead to social undesirability (or desirability), have seemed strange if not trivial For it has long been obvious that these two 'dimensions' are functionally integrated into a larger syndrome within personality" (p. 790). Webster argued that "denial" and social desirability are positively correlated, and that acquiescence is correlated with endorsing socially undesirable items. This conclusion is partly based upon results of his own investigation in which 21 "social desirability" items correlated $-.58$, or $-.92$ after correction for attenuation, with 20 "overall agreement items."

Another explanation of the relationship between social desirability and acquiescence is to be found in a study by Carol Jean Diers (1964). She constructed 10 40-item scales with varying percentages of social desirability content present. Prediction regarding correlations were made on the basis of both the social desirability hypothesis and the acquiescence hypothesis. Of the 45 predicted intercorrelations, 35 were different for the two hypotheses. Twenty-one of the 35 obtained correlations supported the social desirability hypothesis and 14

supported the acquiescence hypothesis. In every case where the social desirability hypothesis predicted a significant correlation the prediction was confirmed. The acquiescence hypothesis was confirmed only when the predictions based upon the social desirability hypothesis were zero. Diers concluded, "It seems that social desirability considerations outweigh other response sets, but that for some types acquiescence does account for some of the variance" (p. 76).

Edwards (1961) reviewed some of the arguments concerning the social desirability and acquiescence hypotheses and stated that he agreed with Cronbach that acquiescence operates only when items are difficult and ambiguous. He suggested that when items are neutral, i.e., social desirability is not obvious, the social desirability set cannot operate and the response becomes much more influenced by acquiescence tendencies.

Edwards reported in his 1953 study that he found no differences in social desirability values as a function of age, sex, or education. With reference to socioeconomic differences he said, "What is considered socially desirable or undesirable in the way of personality statements is culturally determined. Social desirability scale values of personality statements may, therefore, vary from culture to culture or from judging group to judging group" (1957, p. 8). Edwards took this into consideration in developing his scales and used statements which would be generally stable over many groups. Klett (1957a), Lovaas (1956), and Fujita (1956) all found high correlations between scale values of items used in the Edwards' Personal Preference Schedule and the scale values given to the same items by other groups. Fujita used Japanese-American subjects and found a correlation of .95. Lovaas used Norwegian subjects and reported a correlation of .78. Klett used

high school subjects composed of varying socioeconomic groups and found no differences between the groups as to the median value of their social desirability judgments.

Mehlman and Warehime (1962) used the Index of Social Position (Hollingshead and Redlick, 1958) to indicate socioeconomic status and found no significant differences between groups on the SD Scale for socioeconomic status or sex.

Messick (1960) reported results from his study which disagree with those reported above. Messick explored the dimensionality of social desirability judgments and pointed out that the high correlations reported by Edwards (1957) and Klett (1957b) may be due to the fact that successive intervals scale values represent a kind of average rating for the groups involved. He reanalyzed the data from Klett, using the original ratings rather than the normalized ratings used by Klett, and found nine factors. He concluded that social desirability is multidimensional. He argued that finding this many factors with a restricted sample of 42 items and 108 cases indicated that these dimensions were due to differences in individual points of view and were not just cultural differences. Messick pointed out that his study dealt with dimensions of judged desirability, and this may or may not be related to the dimension of the tendency to respond in desirable ways. The major criticism of this study is that the subjects were manifestly disturbed mental hospital patients. These results may or may not apply to normal subjects.

A number of studies have shown significant correlations between the SD Scale and some of the variables included in this study. Edwards (1957) reported a correlation of $-.60$ between the SD Scale and the

Taylor Manifest Anxiety Scale. Merrill and Heathers (1956) found an even higher correlation of $-.84$. They found a correlation of $-.90$ between the SD Scale and Drake's Social Introversion Scale. A correlation of $-.50$ was reported between the SD Scale and Winne's Neuroticism Scale. The same authors reported a correlation of $.14$ between the SD Scale and the MMPI Lie Scale.

Stricker (1963) reported a significant interaction between sex and the SD Scale for the variables of confidence, learning time, and immediate recall. However, he concluded that this effect may have been due to an interaction of the females with the male examiner. Stricker reported in this same article that persons with high SD scores had greater confidence and greater recall in a learning task. He conceded that his results lend some support to Edwards' belief that anxiety and learning are related. Edwards argued that those who report low anxiety tend to make a good impression on personality scales (high SD) and make a good impression in learning situations. Edwards (1957) believes that those who score high on the SD Scale and score low on the Manifest Anxiety Scale are really highly anxious. This is contrary to Taylor's (1953) assumptions about her anxiety scale. Stricker pointed out that Edwards' reinterpretation does not explain results of many studies of anxiety and learning. However, since social desirability and anxiety do seem to be related, it might be more meaningful to consider social desirability, at least on personality scales, as simply a reflection of anxiety.

Adams and Kirby (1963) studied the relationship of manifest anxiety, social desirability, and acquiescence. They made positively and negatively keyed scales for the Manifest Anxiety Scale and the SD Scale and reversed

scales for both. The subjects were given an SD Scale and a Manifest Anxiety Scale (either positive or negative) and the reversed scale two weeks later. Correlations were computed as were response set and content scores. They concluded that the Manifest Anxiety Scale is relatively free of response set and that the SD Scale is measuring both response set and social desirability due to ambiguity of items. This study can be criticized on the grounds that the reversed scales and the positive and negative scales may not be psychologically equivalent (cf. Christie, et al., 1958).

Edwards, et al. (1962) did a factor analysis of 61 personality scales, including the Manifest Anxiety Scale, the MMPI K Scale, the SD Scale, the Agreement Response Scale (from Couch and Keniston's OAS Scale, 1960), and the Marlowe-Crowne SD Scale. The three primary factors found were: (I) Social Desirability, (II) Acquiescence, and (III) Lie. The loadings reported are given in Table I. The results indicate that Manifest Anxiety is indirectly related to Social Desirability. This supports Edwards' hypothesis. The MMPI K Scale is heavily loaded with Social Desirability, but it is contaminated with many neutral items, hence the heavy loading on Factor II. The Marlowe-Crowne SD Scale seems to be acting more like a lie scale than a social desirability scale. Agreement Response Set seems to be heavily loaded on Acquiescence, but also loads heavily and negatively on Social Desirability.

The Marlowe-Crowne Social Desirability Scale was developed as an alternative to Edwards' SD Scale (Crowne and Marlowe, 1960). All evidence seems to indicate that this scale is similar in function to a lie scale and may not be measuring the same thing as Edwards' SD

Scale (Marlowe and Crowne, 1961). The authors of this scale feel that social desirability responding is a function of a need for social approval. They have provided some empirical evidence for its construct validity (Crowne and Strickland, 1961).

TABLE I
ROTATED FACTOR LOADINGS (From Edwards, et al, 1962)

Scale	Factor I	Factor II	Factor III
MAS	-.94	.25	.15
K	.73	-.56	-.06
L	.25	-.61	-.65
SD	.97	-.18	.01
M-C SD	.28	-.55	-.61
ARS	-.44	.69	-.11

Acquiescence

Cronbach (1950) stated that acquiescence is most influential as items become difficult or ambiguous, and indicated that his response set is not a general characteristic which shows up in all tests, but is affected by test content. This contention has been the basis of a great deal of the research done with this response style. Most of the evidence seems to support this position.

Berg and Rapaport (1954) investigated acquiescence in an unstructured questionnaire. They administered a form which was similar to the questionnaire form, but which had no actual questions. The subjects

were required to imagine the correct answer when various options, such as "true," "false," "yes," "uncertain," and "no," were presented to them. They found that acquiescence appeared at a high level of significance. The investigators indicated that there was evidence of a slight position preference, but this was not a major factor. The major preference was for "culturally valued aspects of option content," i.e., "yes," "true," "agree," etc. These results may be interpreted as supporting Cronbach's statement concerning ambiguity of items, but they are not evidence against the hypothesis that acquiescence is a general personality variable.

Support for acquiescence as a personality variable was presented by Couch and Keniston (1960) in an article previously discussed. After developing and testing their Over-All-Agreement Scale, they concluded that the agreeing response tendency (acquiescence) is based upon a central personality syndrome.

The study by Liberty (1963) reported earlier sought to test Couch and Keniston's hypothesis in a specific area of item content, that of value achievement. He concluded from his results that no general attribute of response acquiescence exists independently of the measures used to assess it. Liberty stated that acquiescence appears to be a function of certain situational variables, and in particular, the perceived desirability of the statement.

Foster (1961a) investigated acquiescent response set as a measure of acquiescence in a behavioral situation. His measure of acquiescence was an aphorism questionnaire and a difficult true-false test adapted from the Information True Test by Gage (1957). The behavioral measure was an Asch-like conformity situation in which the subjects knew the

supposed group answer and were to indicate their judgment of stimuli by closing a switch. Foster found only one significant relationship between agreement response set and the behavioral measure. He concluded that this was a Type I error. Foster's results were interpreted as contradicting the assumption that agreement response set is a measure of a generalized tendency to acquiesce. The major criticism of this study centers around whether or not acquiescence and behavioral conformity are the same thing. Whatever this behavior may be called, it does not seem to be related to psychometric acquiescence.

In 1963, Foster repeated the essential aspects of his 1961 study using different measures of agreement response set and found essentially the same results. He concluded that agreement response set is not a generalized tendency to acquiesce (cf., Foster, 1961b).

Peabody (1961) studied attitude content and agreement set in scales of authoritarianism, dogmatism, anti-semitism, and economic conservatism and concluded that agreement response set is not a mechanical process, but operates only insofar as the subject is uncertain.

Husek (1961) administered eight tests of acquiescence, including an extra sensory perception test in which the subjects were asked to guess what answer the experimenter was thinking. He used rating scales, vocabulary tests, and Bass's (1956) Social Acquiescence Scale, also. His conclusion was that no support was found for the role of acquiescence as a general personality variable, but that acquiescence may be related to specific content material.

Banta (1961) investigated social attitude and response styles. He developed seven response style scales which were essentially acquiescence

measures and found that the degree of acquiescence increased with referent ambiguity for five of the seven measures.

Hanley (1959) concluded that there is no general trait of response acquiescence independent of specific instruments used to measure it. He used six new scales of 20 items each. He came up with a newly stated conclusion that there are different "acquiescences" and these may include responses to the specific type of item wording.

McGee (1961) administered seven measures of response acquiescence and two behavioral tasks. All the measures reliably measured something, but were not measuring a common variable. McGee concluded from his results that it could not be demonstrated that response acquiescence was a stable behavioral tendency, or that acquiescence measures could be used to predict performance in an independent behavior task. He suggested that two different dimensions of acquiescence exist: (1) social acquiescence, denoting conformity, suggestibility, and persuasibility, and (2) response acquiescence, operationally defined as a tendency to agree with psychometric test items irrespective of their content. This study was a dissertation study and was published in two parts (McGee, 1962a, 1962b).

Extensive reviews of response style studies have been made by Jackson and Messick (1958) and by McGee (1962c). Both reviewers are of the opinion that acquiescence is related to personality variables. At first thought, this seems to be contradictory to all of the studies which have shown that acquiescence is not a personality variable which is present regardless of content. The key lies in the words "a personality variable" and "related to personality variables." Acquiescence is not "a personality variable," as has already been indicated, but it

does seem to be "related" to certain personality variables. In other words, persons with certain personality traits seem to have a greater tendency to acquiesce than do persons without these traits. Couch and Keniston (1960) related acquiescence to "Impulsivity, Dependency, Anxiety, Mania, Anal Preoccupation, and Anal Resentment" (p. 173).

The relationship of acquiescence to some of these variables is supported by the work of Adorno, et al., (1950) and others who followed up his work on the authoritarian personality. The measure of authoritarianism was the California F Scale. The authoritarian person is seen as one who lacks self-confidence, is weak in ego-strength, and is highly dependent upon "authority." Since the F Scale and acquiescence are quite highly related (Adorno, et al., 1950; Chapman and Campbell, 1959; Jackson, 1957) it may be concluded that acquiescence is one of a family of traits included in authoritarianism (Gage, et al., 1957).

The relationship of acquiescence to some of the personality variables used in this thesis has been investigated by a number of authors. Eysenck (1962) investigated acquiescence in the Maudsley Personality Inventory. He used as his measure of acquiescence the California F Scale. He found that this measure was not correlated with either the Extraversion Scale or the Neuroticism Scale of the Maudsley Personality Inventory. He stated:

It is ... possible that many different acquiescence response sets exist, each confined to one type of material; if this were so, questionnaires relating to personality items might form a class independent of the response set generated by social attitude items (p. 20).

Eysenck later investigated this hypothesis (Eysenck, 1963).

He developed two simplified neuroticism scales and four simplified

extraversion scales and keyed them so that significant correlations of congruent scales would be indicative of response set. He found significant, but very low, correlations of .12 and -.14, respectively. Eysenck concluded that acquiescent response set was operating, but was of little importance. It might be noted that simplification of item content could have accounted for the low correlation.

Gaier and Bass (1959) administered measures of authoritarianism, acquiescence, and ethnocentrism to subjects in three different geographical regions. The subjects were students at the University of Washburne, Topeka (Midwest); University of Maryland (Middle Atlantic); and Louisiana State University (Southern). Differences in means for the three groups were found to be significant at the .01 level. The means of the Southern group were highest, while the means of the Midwest group were lowest on all three scales. The Southern group showed a greater tendency to acquiesce.

Several investigators studied the relationship of acquiescence and intelligence. The California F Scale has been found to be highly correlated with acquiescence and is often used as a measure of this response style. Several investigators have found significant negative correlations between the F Scale and intelligence (Adorno, et al., 1950; Gough, 1951; Cohn, 1952). Bass (1956) reported significant, low, negative correlations between his Social Acquiescence Scale and "various ability measures."

Shaw (1961) found a negative correlation between Social Acquiescence and intelligence, also. In the same study, Shaw found correlations significant at the .01 level between Social Acquiescence and both age and sex. The measure of intelligence used was the Concept Mastery Test.

No correlation was found between Social Acquiescence and education.

Chapman and Campbell (1959) used the Ohio State Psychological Exam and the verbal and mathematics parts of the College Boards exams and reported negative correlations of $-.26$ and $-.35$ between these variables and the California F Scale.

Nunnally and Husek (1958) reported a high negative correlation between education and acquiescence ($-.69$). Their measure of acquiescence was very different from measures used by other investigators. Randomly chosen foreign words were substituted for meaningful components of test items and subjects were asked to agree or disagree with the statements. The statements were stated as cause and effect relationships and, as indicated, "persons with more education tend to disagree with causal explanations of all kinds" (p. 281).

It was mentioned earlier that Shaw (1961) found significant sex differences for the Social Acquiescence Scale. Berg and Rapaport (1954) found sex differences for their unstructured "questionnaire," also. However, they attributed these differences to the role and sex of the examiner.

Defensiveness

The primary measures proposed to measure defensiveness are the MMPI K Scale and the Hanley Sx Scale. The literature concerning defensiveness is somewhat confusing. Edwards (1953b) reported a correlation of $.81$ between the SD Scale and the K Scale. Fordyce (1956) reported a correlation of $.69$ between these variables. Hanley (1956, 1957) found similar results. These authors concluded that the K Scale was actually a measure of set to respond in terms of social desirability

and that defensiveness is probably just another name for this response style.

Fricke (1956) argued that the K Scale is actually a measure of acquiescence, since a scale developed by him to measure acquiescence correlated highly with the K Scale.

Couch and Keniston (1960) found a significant correlation between the K Scale and acquiescence. However, the relationship was negative (-.38), indicating that the K Scale is a measure of denial.

Rosen (1956) administered the MMPI using the usual directions and later with a set for personal desirability, i.e., the subjects were asked to answer "'true' if the item described a behavior which was personally considered desirable in a person of one's own age or sex" (p. 158). He counted the number of items on which each subject answered discrepantly between the two conditions. He found a correlation of .87 between the number of subjects who answered "true" to each of the items in the self-appraisal condition and the number who answered "true" to each item in the personal desirability condition. The number of discrepancies was correlated with the MMPI K Scale results from the self-appraisal form.

Rosen argued:

If K can be taken as a measure of defensiveness, then a high correlation can be taken as evidence for the hypothesis that the previously reported correlation - that between self-endorsement and desirability - is at least in part due to the conscious or unconscious attempt to give good self-impressions (p. 157).

The correlation was -.60 for males and -.65 for females. Rosen concluded:

The degree of defensiveness defined by K is a fairly good predictor ... of the tendency not to call traits and behaviors undesirable if

they are believed to be present in oneself, and not to call them desirable if they are believed absent.

Jackson (1957) found evidence that the K Scale contains both acquiescence and social desirability.

Still another view of the K Scale is that given by Comrey (1958). Comrey factored the K Scale with age, sex, and hospitalization. He found factors of Cynicism, Euphoria, Shyness, Hospitalization, Hostility, Family Dissension, Feelings of Inadequacy, and Worry. He concluded that the K Scale was not measuring defensiveness and should not be used as a correction device.

More recently, Bendig (1962) found that among 12 scales which he factored (previously named), defensiveness was found to be a factor separate from both social desirability and acquiescence. The K Scale was the only scale to load heavily on this factor. It loaded .52.

Lying

Lie scales have not been studied extensively as measures of response style. The Lie Scale of the MMPI was developed as a validating score for use with the other scales of the Inventory (Hathaway and McKinley, 1951). The authors suggested that it might be of interest as a measure of a special personality trend.

Many investigators of response style have correlated the MMPI Lie Scale with the various response styles discussed previously, with varying results. Fordyce (1956) found a low, but significant, correlation (.24) of the Lie Scale with Edwards' SD Scale. Merrill and Heathers (1956) reported a correlation between these two variables of .14.

Hanley (1957) found significant correlations of the Lie Scale with the K Scale (.40), his Sx Scale (.57), and Edwards' SD Scale (.35). Hanley concluded that these scales are all measuring social desirability.

Couch and Keniston (1960) found a correlation of $-.42$ with their OAS Scale, which is supposed to be measuring acquiescence. If the Lie Scale is related to social desirability (cf. Messick and Ross, 1962), this would tend to support Edwards' argument that the OAS test is confounded with social desirability. Bendig (1960) factor analyzed 12 anxiety and neuroticism inventories, including Edwards' SD Scale and the Lie Scale. The Lie Scale loaded heavily on one factor, only. The SD Scale loaded $.39$ on this same factor, but loaded $-.57$ on emotionality, also. There is apparently considerable communality between the Lie Scale and the SD Scale. However, these scales seem to have quite a bit of specificity, also.

Evidence that these factors are not the same comes from Edwards, Diers, and Walker (1962). These authors found the three factors of Social Desirability, Acquiescence, and Lie. The SD Scale loaded $.97$, $-.18$, and $.01$ on the three factors, respectively. The Lie Scale loaded $.25$ on Social Desirability and $-.65$ on Lie. To further confuse the issue, the Lie Scale loaded $-.61$ on acquiescence.

Bendig (1962) built three lie scales using 13 items from the MMPI Lie Scale and six "motivational distortion" items from the MD Scale of Cattell's NPF questionnaire. These three scales loaded moderately on the Test-taking Acquiescence Factor. The scales were named Lie-ED, Lie-SF, and Lie-Ex. Lie-ED loaded $.18$, Lie-SF loaded $.29$, and Lie-Ex loaded $.32$. Lie-ED loaded $.21$ on Sex and Lie-Ex loaded $.29$ on defensiveness.

Crowne and Marlowe (1960) attempted to develop a social desirability scale which was somewhat different from Edwards' SD Scale. The items for their test were drawn from a population defined by behaviors which are culturally approved, but which are relatively unlikely to occur. The similarity to the Lie Scale is obvious, and it is not surprising that this scale correlated .54 with the Lie Scale. The Crowne-Marlowe SD Scale correlated .40 with the K Scale and .65 with Edwards' SD Scale. In both, their 1960 study and a later study (Marlowe and Crowne, 1961), these authors argued that Edwards' SD Scale was a measure of the willingness to admit to symptoms indicative of maladjustment. The Crowne-Marlowe SD Scale was designed to be free from pathological implications.

Gibson (1962) investigated the Lie Scale of the Maudsley Personality Inventory and its relationship to the Extraversion Scale and the Neuroticism Scale of the same inventory. He found no relationship between the Lie Scale and Extraversion. In a sample of American college students he found a negative and nonlinear relationship between the Lie Scale and Neuroticism. Gibson cross-validated the study on 244 Maryland subjects and 100 British apprentices. The Lie Scale and the Neuroticism Scale were negatively and nonlinearly related for the Maryland subjects, but were negatively and linearly related for the British apprentices. Gibson felt that the latter subjects may have perceived that their future in the company would be affected by their performance on these tests, since they were given on company time.

Summary

Since the publication of two articles by Cronbach (1946, 1950),

there has been an ever increasing amount of interest in response styles. The majority of the work done in this area has been with social desirability and acquiescence. Other styles that have been investigated are defensiveness and lying.

Several questions have been raised relative to response style. What are response styles? Are they general personality variables? Are they ways of responding to specific content? Are they both of these? How many styles are there? Why do people respond in these different ways?

The answers have been more numerous than the questions. Edwards (1957) developed a response style measure which he contends measures social approval, or social desirability. DeSoto, Kuethe, and Bosley (1959) redefined the SD Scale as a measure of desire for well-being. Others argued that the SD Scale was contaminated with another style, acquiescence. Much debate has centered around the existence of these two styles and their relationship to one another. In general, results seem to support the arguments for both social desirability and acquiescence as response styles. These styles seem to operate under different circumstances. When items are relatively easy to understand, the social desirability response is found. If the item is difficult or ambiguous, the tendency seems to be to agree.

Defensiveness seems to be very closely related to social desirability and similar motives are probably basic to both of these styles. The scales designed to measure defensiveness seem to be contaminated with other factors, notably, acquiescence.

Lying appears to be a type of social desirability responding in which the items represent behaviors which are clearly socially desirable, but which are seldom performed.

This writer feels that response styles are not personality variables as such, although they are related to and produced by certain personality characteristics. Cronbach (1950, p. 17) stated that response-set variance contains three elements:

1. Chance variance; resulting from purely random excess of choice of one or another alternative.
2. Internally consistent but momentary response tendencies; sets operating throughout one testing, but shifting on a retest at another time.
3. Stable response tendencies; sets operating consistently even when the same test is given at different times.

Cronbach (1950, p. 18) stated that Type 3 variance should be divided into:

- 3a. Valid variance, the portion of 3 that correlates with the criterion the test is intended to predict and
- 3b. Invalid variance, the portion of 3 that does not correlate with the criterion.

Response-set variance of Type 1 is simply error variance and may be controlled by lengthening the test. Variance of Type 2, as Cronbach states, "is unquestionably harmful." It is generally treated as error variance. While it cannot be controlled by lengthening the test, it can be partially controlled by so structuring the test situation as to produce the same set in each examinee for each administration of the test. Type 3 variance is of special interest to this study. Part 3a gives no trouble. It is probably no more than another measure of the criterion masquerading under another name. Cronbach believed 3b to be harmful. However, if response set is a manifestation of a complex of personality traits, its effect can be evaluated by improvement of the

criterion. To do this, we would need a method for breaking a heterogeneous criterion down into its component parts.

Hypotheses

The problems with which this thesis is concerned is embodied in the following questions: Does response style vary as a function of difference in personality? What factors have the greatest effect on response style?

In answer to these questions, three general hypotheses and 18 specific hypotheses are proposed.

General Hypotheses

I. Response style is significantly related to personality differences.

Canonical correlation is the method of statistical analysis used to test the hypotheses of this study. This method correlates two sets of variables. The two sets used in this study have been defined as response style variables and personality variables. Hypothesis II and III are related to the relative weights of the variables within each set.

II. In the relationship between response style variables and personality variables, the personality variables with the greatest influence are anxiety and verbal ability.

The reference to anxiety and verbal ability as personality variables is defended on the basis of the definition of personality presented earlier. Personality was defined as, "The individual characteristics and ways of behaving which in their organization and patterning account

for an individual's unique adjustment to his total environment" (Hilgard, 1962, p. 627).

III. In the relationship between response style variables and personality variables, the response style with the greatest influence is social desirability.

Specific Hypotheses

1. Verbal aptitude, as measured by the Wide Range Vocabulary Test, is directly related to social desirability, lying, and defensiveness.

2. Verbal aptitude, as measured by the Wide Range Vocabulary Test, is inversely related to acquiescence.

3. Anxiety, as measured by the Taylor Manifest Anxiety Scale, is directly related to acquiescence.

4. Anxiety, as measured by the Taylor Manifest Anxiety Scale, is inversely related to social desirability, lying, and defensiveness.

5. Conformity, as measured by Barron's Independence of Judgment Scale, is directly related to acquiescence.

6. Conformity, as measured by Barron's Independence of Judgment Scale, is inversely related to social desirability, lying, and defensiveness.

7. Extraversion, as measured by the Maudsley Personality Inventory Extraversion Scale, is directly related to social desirability, lying, and defensiveness.

8. Extraversion, as measured by the Maudsley Personality Inventory Extraversion Scale, is inversely related to acquiescence.

9. Neuroticism, as measured by the Maudsley Personality Inventory Neuroticism Scale, is directly related to acquiescence.

10. Neuroticism, as measured by the Maudsley Personality Inventory Neuroticism Scale, is inversely related to social desirability, lying, and defensiveness.

11. Socioeconomic Status, as determined by Center's Occupational Index, is directly related to acquiescence.

12. Socioeconomic Status, as determined by Center's Occupational Index, is inversely related to social desirability, lying, and defensiveness.

13. Acquiescence is greater for males than for females.

14. Social desirability, lying, and defensiveness are lower for males than for females.

15. Age is directly related to acquiescence.

16. Age is inversely related to social desirability, lying, and defensiveness.

17. Those in attendance at Bethany Nazarene College score higher on social desirability, lying, and defensiveness than students in attendance at Oklahoma State University.

18. Those in attendance at Bethany Nazarene College score lower on acquiescence than those in attendance at Oklahoma State University.

The predicted direction of each of the relationships hypothesized is presented in Table II. While the relationships among the various response styles and among the various personality variables are not of primary concern, the predicted directions of these relationships are included.

CHAPTER III

METHOD AND PROCEDURE

Scales

In this chapter, a brief description will be given of each of the scales used. The actual scale items are presented in Appendix A.

Social Desirability

Two scales were used to measure social desirability: Edwards' SD Scale and the Crowne-Marlowe SD Scale. Edwards chose items from the Minnesota Multiphasic Personality Inventory (MMPI) scales which were heterogeneous in content and presented them to judges to be rated as to social desirability. Those items which were judged by all the judges as being high in social desirability, i.e., representing behavior which is acceptable to people in general, were selected for the SD Scale. The original scale contained 79 items. The number of items was reduced to 39 later. The scale was validated by construct validity. It was theorized that the social desirability scale value of the items would correlate highly with the probability of endorsement. As previously reported, correlations between these two variables ranged from .82 to .92. The reliability of the scale was checked by Husek (1959). He reported a reliability coefficient of .79. The SD Scale contains 22 items which are contained in the Taylor Manifest Anxiety Scale (Taylor,

1953). Bendig (1959a) presented evidence that the 22 overlapping items and the 17 non-overlapping items correlate differentially with other "anxiety" scales. Therefore, the scale used in this study contained the 17 non-overlapping items, only.

The developers of the Crowne-Marlowe Social Desirability Scale have proposed an alternative model to Edwards' conception of social desirability. Their approach was to select items reflecting behaviors which are obviously culturally acceptable and approved, but which are relatively unlikely to occur. Their criteria for selection of items included the requirement that the item have minimal pathological or abnormal implications. The final test form included 33 items. Thirty of these items were used in the present study. Crowne and Marlowe (1960) reported a reliability of .88 using the Kuder-Richardson formula 20 (K-R 20) and a test-retest correlation of .89.

Acquiescence

The Bass Social Acquiescence Scale was used as the measure of acquiescence (Bass, 1956). This scale was developed to measure social acquiescence, i.e., agreement with a wide variety of generalizations concerning how persons behave or should behave. Three hundred heterogeneous items were administered to 200 college subjects. By item analysis, 56 items were chosen which were accepted by at least 40 percent more of the upper 25 percent of the subjects than by the lower 25 percent. The entire 56 item scale is presented in Appendix A. Two of these items are presented here by way of clarification: "Obedience is the mother of success." "Amusement is the medicine for worry." All items are keyed "Agree." The corrected split-half reliability of

the scale was reported as .92 for a sample of 50 West Coast residents and 50 Southern college students. The K-R 21 reliability was .81 for a more homogeneous sample composed of 1491 Louisiana college students. Husek (1959) reported a reliability of .84 for the subjects in his study.

Lie Scales

The Lie Scale of the MMPI was designed as a validating scale for the MMPI scales (Hathaway and McKinley, 1951). Its purpose was to measure "the degree to which the subject may be attempting to falsify his score by always choosing the response that places him in the most acceptable light socially" (p. 18). The scale contains 15 items which represent socially desirable behaviors which are of such an extreme nature as to be unlikely to occur. A reliability coefficient of .46 was reported for this scale by Cottle (1950). Cottle gave the Lie Scale to 100 normal subjects. He used the Individual Form alternately with the Group Form. Both testings occurred within one week. Holzberg and Alessi (1949) reported a reliability coefficient of .85 for 30 psychiatric patients. He used the complete Individual Form alternately with a shortened version of the Individual Form. Both tests were given within three days.

The Lie Scale of the Maudsley Personality Inventory was developed by Eysenck and his coworkers to help them in their study of the dimension of Extraversion-Introversion and Neuroticism (Eysenck, 1956a). This scale was developed to detect subjects who attempt to present themselves in a more favorable light by falsifying their answers. It contains 20 items. Since the primary interest of the authors was in Extraversion and Neuroticism, reliability coefficients and correlations with other

measures were not reported for the Lie Scale. The Lie Scale was studied by Gibson (1962), who reported a split-half reliability of .66 for 18 of the 20 items. Only 15 of the items were used in this study since five items were worded similarly to items from the MMPI Lie Scale.

Defensiveness Scales

The MMPI K Scale was developed by Meehl and Hathaway (1946) as a correction scale, or suppressor variable, for the other scales of the MMPI. It was developed by item analysis of the response of 50 patients in a psychopathic hospital who were diagnosed as abnormal, but had normal MMPI profiles. The scale was applied to a new sample and it was discovered that depressives and schizophrenics scored lower on the scale than would be expected on the basis of diagnoses from other sources. Eight items were added to correct for this tendency. Test-retest reliabilities of .72 and .74 were reported by the authors. Cottle (1950) reported a reliability of .76 for his normal subjects.

Hanley (1957) reasoned that it should be possible to make a scale in which desirability and endorsement of items was unrelated when responses are honest and which can measure both defensiveness and plus-getting. He wanted a scale for which intermediate scores would reflect honest answers, high scores would reflect an attempt to make a good impression, and low scores would indicate an attempt to "fake bad." Hanley selected 53 items which had been endorsed by from 36 to 64 percent of Hathaway's normative group (Meehl and Hathaway, 1946). Ten items which had been previously rated for social desirability were added. The items were presented to 39 males and 53 female judges who rated them on a nine point scale for social desirability. Items were chosen

which fell into either the undesirable or the desirable category. Consistency of judging was checked by comparing the scale values of the ten items which had been judged twice. Twenty-four items were selected. Two other items from a previous study were added. This 26 item scale was referred to as the Ex Scale. The K-R 20 reliability of the Ex Scale was .48. Evidence of validity was indirect. The Ex Scale correlated .64 with the MMPI K Scale and .69 with Edwards' SD Scale. Fricke (1956) had reported a relationship between the K Scale and acquiescence. In order to remove any acquiescence effect for the Ex Scale, the number of items keyed true and false was balanced. This necessitated the removal of eight "false" items. The final 18 item scale was called the Sx Scale. The K-R 20 reliability of this scale was .31. This is low, but it is in line with Hanley's theory for developing the test. He theorized that reliability by an internal consistency method would be, possibly, even zero for normals and higher for more homogeneous groups of plus-getters or defensive subjects. Hanley's predictions are correct, and his logic is sound. However, these results tell us very little about the usefulness of the scale. He should have determined the test-retest reliability of the scale, also. This should be relatively high, regardless of the internal consistency of the test, if the test is to be useful as a predictor of behavior.

Verbal Ability

The Wide Range Vocabulary Test (Atwell and Wells, 1945) was chosen as the measure of verbal aptitude because it was quick and easy to use and because the vocabulary factor correlates highly with general intelligence (Wechsler, 1941; French, et al., 1963). This scale

originally consisted of the vocabulary words of the 1916 Stanford-Binet Scale (Terman, 1916). Two other scales were produced, subsequently. Form B was first published in 1937 and contains 100 words arranged in order of difficulty. Form C was first published in 1945. It contains 100 words, also. However, the words in Form C are arranged alphabetically. The range of each is eight years through superior adult. Form C was used in this study.

Anxiety

The Taylor Manifest Anxiety Scale is the most widely used anxiety scale in existence and is one of the best known of all the personality scales used in research. This scale was developed by Taylor (1953) from items selected from the MMPI scales. Two hundred MMPI items were submitted to clinicians to be judged according to a definition of manifest anxiety given to them by Taylor. Sixty-five items were chosen on which there was agreement among 80 percent of the judges that the items were indicative of manifest anxiety. These items, along with "buffer" items, were administered to 352 college subjects. Through item analysis, the number of items in the scale was reduced to 50. The test is usually administered with 175 buffer items. Taylor reported test-retest reliabilities ranging from .68, when the retesting was done after 18 weeks and the items were scored from MMPI protocols, to .89, when the retesting was done after three weeks using the Biographical Inventory (the name given to the 50 anxiety items plus the 175 buffer items). A test-retest reliability of .82 was reported using the Biographical Inventory and with five months between testings. Indirect evidence of the validity of the Taylor Manifest Anxiety Scale was given

by Holtzman, et al., (1952). The scale was correlated with Winne's Neuroticism Scale. A correlation of .74, or .86 when corrected, was reported. Higher correlations were reported when only the items appearing in the neurotic triad of the MMPI were used. This correlation was .81, or .99 when corrected. This is not surprising when it is noted that the Taylor Scale was made up of 30 items from scales other than the triad, and Winne's Scale was composed of items from the triad, only. There is a great deal of overlap between the shortened Manifest Anxiety Scale and the Winne's Neuroticism Scale. In the present study, only 28 of the items from the Manifest Anxiety Scale were used because of the overlap of these items with Edwards' SD Scale.

Socioeconomic Status

During the last 50 years, several investigators have developed scales which could be used to classify people according to socioeconomic status. The best single index has been found to be occupational level (Warner, Meeker, and Eells, 1949). One such scale was developed by Centers (1949; cf, Barber, 1957, p. 174). It contains nine different categories with the highest occupational level being one and the lowest nine. Center's Index is presented in Appendix C.

Extraversion

The Extraversion Scale of the Maudsley Personality Inventory was developed by Eysenck and his coworkers (Eysenck, 1956b). The Extraversion Scale contains 24 items, and all 24 items were used. Reliability coefficients reported by Jensen (1958) range from .74, using the K-R 20 formula with American university subjects, to .85, using the split-half

method and normal adult males. Eysenck (1956a) reported a reliability of .77. Keehn (1961) reported coefficients of .65 for Arab subjects and .71 for British subjects.

Neuroticism

The Neuroticism Scale was taken from the Maudsley Personality Inventory. The full scale contains 24 items. Only 23 items were used, since one item was worded almost exactly the same as an item in the Taylor Manifest Anxiety Scale. Reliabilities range from .78 for Arabs (Keehn, 1961) to .90 for normal adult males (Eysenck, 1956b).

Conformity

The Barron Independence of Judgment Scale was used as the measure of Conformity. This scale was developed from 200 items chosen by Barron as items which seem to be related to Independence of Judgment. These were reduced, logically, to 84. By item analysis, the number of items chosen for the final scale was reduced to 22. All 22 items were used in the study. For the purpose of the present study, the items were scored for conformity, rather than for independence.

Sex

The correlation of sex with the various scales was performed by arbitrarily assigning all males to the "one" category and all females to the "zero" category. The correlations should be interpreted with this in mind. A positive correlation of a variable with sex indicates that the variable is more closely related to males than to females. A negative relationship with sex indicates that the variable is more

closely related to females than to males.

College

The correlations of college attended with the various scales was computed by assigning all students from Bethany Nazarene College to the "one" category and all Oklahoma State University students to the "zero" category. Positive relationships reflect traits more closely associated with Bethany Nazarene College students, and negative relationships reflect traits more closely associated with Oklahoma State University students.

Subjects

Subjects were students attending the summer session at Oklahoma State University, Stillwater, Oklahoma and Bethany Nazarene College, Bethany, Oklahoma. There were 171 Oklahoma State University students. Of these, 42 were males and 129 were females. All were enrolled in undergraduate courses in psychology and education. Their ages ranged from 16 to 43, with mean age being 20.7. The socioeconomic status ranges from 1 to 9. The median rank was 4.

There were 95 subjects from Bethany Nazarene College. There were 46 males and 49 females. These subjects were enrolled in various courses, including: biology, history, education, psychology, and mathematics. They ranged in age from 17 to 47, with a mean age of 21.5. Their socioeconomic status ranged from 1 to 9, with a median of 5. Figure 1 gives a comparison of the number of subjects from each category for both of the schools. The number of cases in each category has been changed to a proportion in order that direct comparisons may

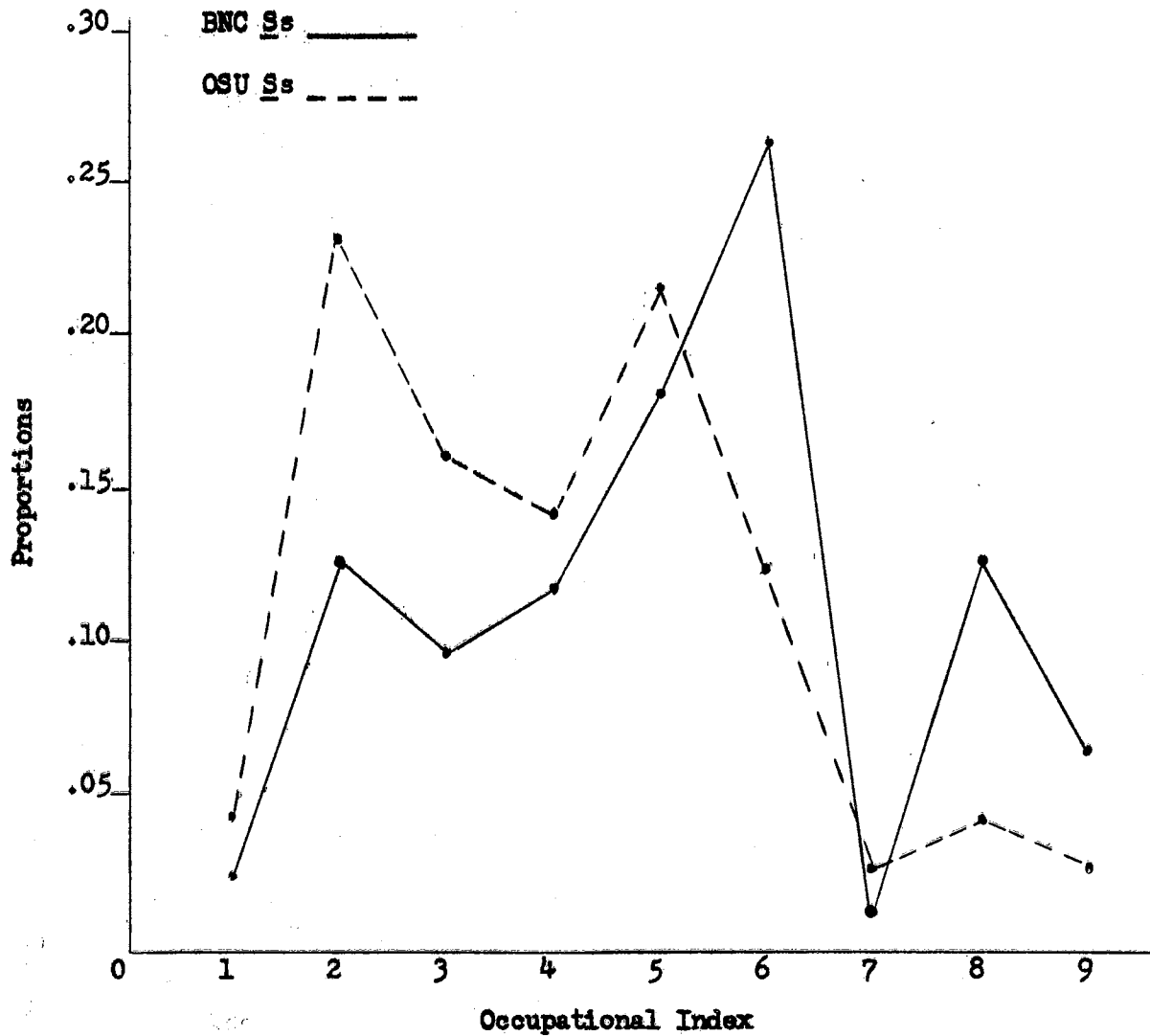


Figure 1. A comparison of Bethany Nazarene College students and Oklahoma State University students for socioeconomic status. Based on Center's Occupational Index (N = 95 BNC Ss; 171 OSU Ss).

be made. The greatest differences are for categories 2, 6, and 8. There are noticeable differences for categories 3 and 9, also. The proportion of parents in classes 2 and 3 is greater for the parents of students from Oklahoma State University. The proportion of parents in classes 6, 8, and 9 is greater for the parents of Bethany Nazarene College students.

Administration of the Scales

The various scales, with the exception of the Wide Range Vocabulary Test and the Center's Occupational Index, were put together into a single inventory and named the RSC Scale. RSC stands for Response Style Correlates. The subjects never saw the complete name, since only the initials appeared on the inventory. The RSC Scale was administered to groups ranging from approximately 20 to approximately 45. Subjects were given IBM answer sheets and marking pencils for indicating their answers. This was done so that the answers could be machine scored. The directions printed on the inventory and read to each section are presented in Appendix B. Each of the subjects were asked to indicate their age, sex, and father's occupation on their answer sheets. They were asked to be as specific as possible in giving their father's occupation. This information was scaled according to Center's Index.

The Wide Range Vocabulary Test was administered separately to the Oklahoma State University students by a colleague of the writer. Arrangements were made with the Chairman of the Department of Psychology at Bethany Nazarene College to have the Wide Range Vocabulary Test administered at that institution.

Treatment of the Data

The data were analyzed by the canonical correlation method developed by Hotelling (1935, 1936). This method is similar to other multiple prediction techniques. These methods provide two kinds of information. They provide an index which indicates the degree of relationship between a criterion and two or more predictor variables (multiple correlation) and weights, or coefficients, which can be used to estimate the criterion from the predictors (multiple regression). When the test scores have been normalized, the resulting coefficients (called beta weights) enable the investigator to determine from these values the relative weight with which each independent variable contributes to the criterion, independently of the other factors.

Canonical correlation is an extension of these methods to situations in which there are multiple criteria variables as well as multiple predictor variables. The problem is to determine that linear combination of the predictor variables and that linear combination of the criteria variables which will yield the highest possible correlation between the two composites. The model for this problem is as follows:

$$a_1x_{N1} + a_2x_{N2} + \dots + a_px_{Np} = \hat{x}_N; \hat{y}_N = b_1y_{N1} + b_2y_{N2} + \dots + b_qy_{Nq}$$

where a and b are the weights for the predictors and criteria, respectively; x is the symbol for the score values for the predictors; y is the symbol for criteria score values; p is the number of predictor variables; q is the number of criteria variables; N is the subject number; and \hat{x} and \hat{y} are the composites for the predictors and criteria, respectively.

The canonical correlation is the correlation between the \hat{x} values and the \hat{y} values. The number of possible pairs of linear combinations is p or q , whichever is smaller. Each pair is maximally correlated, subject to the restriction that each canonical variate be orthogonal to all other canonical variates on its side of the equation. Computationally, it does not matter whether the variables on the left or the variables on the right are considered as the criteria variables. However, it saves computational time if the left- and right-hand sets are defined so that the number of criteria variables is less than the number of predictor variables.

The canonical equation used in solving this problem is:

$$(R_{22}^{-1}R_{21}R_{11}^{-1}R_{12} - \lambda I)b_i = 0$$

where R_{11}^{-1} = the inverse of the matrix of intercorrelations among the predictors

R_{22}^{-1} = the inverse of the matrix of intercorrelations among the criteria

R_{12} = the matrix of intercorrelations of predictors with criteria

R_{21} = the transpose of R_{12}

I = an identity matrix

b = the criteria weights

λ = the unknown latent root

The formula for the predictor weights is:

$$a_i = (R_{11}^{-1}R_{12}b_i)/\sqrt{\lambda_i}$$

The formulas may also be written substituting a for b and b for a .

The derivation of these formulas is given by Anderson (1958).

The vectors a_i and b_i are applied to standard score vectors to obtain the canonical variates. The canonical correlation is the square root of λ . The canonical correlation has a lower limit of 0.0 and an

upper limit of 1.00. It is interpreted in the same manner as other correlation coefficients. The significance of the canonical correlations can be tested with a chi-square procedure outlined by Bartlett (1941).

The IBM 1410 computer installation located in the Computer Center of the Oklahoma State University was used for the computations. The program was adapted from one given by Cooley and Lohnes (1962). The output of the program includes means, standard deviations, correlation matrices for predictors and criteria, a correlation matrix for predictors against criteria, canonical correlation coefficients, and left-hand and right-hand weights. The program presented by Cooley and Lohnes (1962) was written in Fortran language for the IBM 709 computer. It was necessary to modify the program considerably before it could be used with the smaller IBM 1410 computer. The modified program was tested by using an example given by Anderson (1958, pp. 303-305). The accuracy of the computation was checked by calculating all means with a desk calculator. Two of the standard deviations and one correlation coefficient were checked on the desk calculator, also. All of these statistics were found to be incorrect on the first computer run. It was discovered that some of the cards had gotten out of place. When they were put in correct order, the statistics checked.

CHAPTER IV

RESULTS

Means and Standard Deviations

Means and standard deviations for the response style variables are presented in Table III. Table IV contains the means and standard deviations for the personality variables. These statistics are given for the total group and for each of the college populations sampled.

TABLE III

MEANS AND STANDARD DEVIATIONS FOR RESPONSE STYLE VARIABLES
(N = 95 BNC Ss; 171 OSU Ss; 266 Total)

	SD	M-C SD	SA	MMPI L	MPI L	K	Sx
Means							
BNC	13.34	16.45	33.38	5.55	4.14	5.83	8.61
OSU	13.20	13.95	32.08	3.14	3.03	5.16	8.19
Total	13.25	14.85	32.54	4.00	3.42	5.40	8.34
Standard Deviations							
BNC	1.76	5.62	7.76	2.62	2.44	1.75	1.96
OSU	2.46	4.84	8.03	2.11	1.94	1.93	1.95
Total	2.24	5.27	7.96	2.58	2.20	1.90	1.97

TABLE IV
 MEANS AND STANDARD DEVIATIONS FOR PERSONALITY VARIABLES
 (N = 95 BNC ss; 171 OSU ss; 266 Total)

	VA	MAS	EI	Con	N	SES	AGE
Means							
BNC	71.37	11.73	12.79	13.04	11.14	5.15	21.49
OSU	72.95	12.32	12.68	12.29	11.98	4.06	20.71
Total	72.39	12.22	12.72	12.56	11.68	4.45	20.99
Standard Deviations							
BNC	7.11	4.88	4.65	2.47	5.37	2.10	4.48
OSU	7.46	4.92	4.25	2.62	5.20	1.90	4.19
Total	7.37	4.92	4.39	2.60	5.28	2.04	4.31

Canonical Variates

Hypothesis I stated that response style is significantly related to personality differences. This hypothesis was definitely supported. Table V presents the results of Chi-square tests of successive latent roots. Three of the canonical correlations are significant beyond the .001 level. The largest of these is .72. This indicates that three pairs of linear functions can be determined from these sets of scales, each of which will yield two composites maximally correlated with each other, but which correlate zero with each of the other pairs of composites. In other words, there are three significant ways in which the two domains of response style and personality are related.

TABLE V
CHI-SQUARE TESTS OF SUCCESSIVE LATENT ROOTS

Number of Roots Removed	Largest Latent Root Remaining	Corresponding Canonical R	Lambda	Chi- Square	df	P
0	.51	.72	.23	373.6	63	.001
1	.31	.56	.48	189.5	48	.001
2	.23	.48	.70	93.5	35	.001
3	.05	.22	.91	25.4	24	*
4	.03	.17	.95	12.4	15	*
5	.01	.11	.98	4.4	8	*
6	.00	.06	1.00	1.0	3	*

*Significance level is greater than .05

Canonical vectors containing the weights associated with the maximum canonical correlation are presented in Table VI. The weights are arranged in order of size, beginning with the largest positive number and continuing through the largest number. The canonical vectors for the other two pairs of linear functions whose canonical correlations were significant are presented in Appendix D.

These weights give partial support to Hypothesis II, i.e., in the relationship between response style variables and personality variables, the personality variables with the strongest influence are anxiety and verbal ability. The most influential variable among the personality variables, according to these data, is neuroticism. Manifest anxiety is second. Verbal ability is third among the positive weighted variables. However, college affiliation is more influential than verbal ability.

Conformity and extraversion are more influential than verbal ability, also. The signs for the weights are determined by the signs of the correlations involved. Had these scales been keyed in the opposite direction, e.g., OSU instead of BNC, independence instead of conformity, and introversion instead of extraversion, the variables would be positively weighted. Therefore, all of these variables are more influential in this relationship than verbal ability.

TABLE VI

*CANONICAL VECTORS FOR RESPONSE STYLE AND
PERSONALITY VARIABLES (N = 266)

Personality Variable Weights	Response Style Weights
.71 MPI Neuroticism Scale	.01 Bass SA Scale
.50 Manifest Anxiety Scale	-.06 Hanley's Sx Scale
.18 Verbal Ability	-.15 Maudsley Lie Scale
.09 Sex	-.26 MMPI K Scale
.06 Age	-.46 Marlowe-Crowne SD Scale
-.06 Socioeconomic Status	-.51 MMPI Lie Scale
-.21 MPI Extraversion Scale	-1.00 Edwards' SD Scale
-.24 Conformity	
-.32 College Affiliation	

*Canonical Correlation = .72

Hypothesis III is supported by the weights given in the right-hand vector of Table VI. Hypothesis III predicted that in the relationship between response style and personality variables the most influential of

the response style variables would be social desirability. The only positive weight is for the Bass SA Scale, but its weight is quite small. The largest weight, disregarding sign, is for Edwards' SD Scale. The MMPI L Scale and the Marlowe-Crowne SD Scale are second and third.

The weights of Table VI are the equivalents of beta weights in multiple regression techniques. The difference is that for canonical correlations there are two sets of weights instead of one, i.e., one set for the predictors and another set for the criteria.

The canonical vectors associated with the other two significant canonical correlations are presented in Appendix D. The finding that there are three ways of arranging Response Style Variables and Personality variables so that significant canonical correlations result further verifies Hypothesis I, i.e., that response style is significantly related to personality differences. These vectors also support Hypotheses II and III. Hypothesis II predicted that the most influential personality variables would be anxiety and verbal aptitude. Hypothesis III predicted that the most influential response style variable would be social desirability. The test of these hypotheses lies in the determination of the arrangement of the variables which leads to the highest canonical correlation. When the variables are arranged in different order with different weights, variables other than those predicted have the greatest weight. This is to be expected, since the subsequent canonical variates must be orthogonal to all other canonical variates. However, since the effectiveness of each of these combinations, as determined by the canonical correlations, is less than for the first combination, it can be concluded that their influence is less.

Intercorrelations

Response Styles

The intercorrelation of the response style variables are presented in Table VII. Fourteen of the 21 correlations are significant beyond the .01 level and one is significant at the .05 level.

TABLE VII
INTERCORRELATIONS OF RESPONSE STYLE VARIABLES (N = 266)

	SD	M-C SD	SA	MMPI L	MPI L	K	SX
Edwards' SD Scale	**(,44)	** ,34	-.11	** ,16	.10	** ,41	** ,27
Marlowe-Crowne SD Scale		(,76)	.07	** ,63	** ,52	** ,40	** ,34
Bass SA Scale			(,80)	.01	.03	** -,33	-.07
MMPI Lie Scale				(,60)	** ,55	** ,36	** ,27
Maudsley Lie Scale					(,49)	** ,26	* ,16
MMPI K Scale						(,13)	** ,25
Hanley's Sx Scale							(-,01)

*Significant at the .05 level. **Significant at the .01 level.

Note: Values shown on the diagonal (in parentheses) represent the reliabilities of the scales as computed by the K-R 21 formula.

Edwards' SD Scale correlates the highest with the MMPI K Scale. It is also significantly correlated with the Marlowe-Crowne SD Scale, Hanley's Sx Scale, and the MMPI Lie Scale. These correlations are all in the directions predicted.

The Marlowe-Crowne SD Scale correlated quite significantly and positively with all the scales except the Bass SA Scale. There was no

significant relationship between these scales, although, a negative relationship was predicted.

The Bass SA Scale correlated significantly with only one scale, the MMPI K Scale. This correlation (-.33) was in the predicted direction. It was expected that the SA Scale would correlate negatively with the Lie scales. However, the coefficients were so close to zero that no statement with reference to trends is justified.

In addition to the significant correlation with the Marlowe-Crowne SD Scale, the MMPI Lie Scale correlated quite significantly with the Lie Scale of the Maudsley Personality Inventory (.55). This would indicate that these scales are measuring a common variable. This is the result predicted. Significant correlations are shown between the MMPI Lie Scale and the two defensiveness scales. This may be taken as evidence that the K Scale and Hanley's Sx Scale are measuring something in common with the Lie scales. This is further supported by significant correlations between the Maudsley Personality Inventory Lie Scale and the two defensiveness scales. All of these correlations were predicted.

The correlation between the K Scale and Hanley's Sx Scale is significant beyond the .01 level. However, it is not so high as might be expected (.25), since both scales are supposedly measuring defensiveness. Since the reliabilities of both of these scales are quite low (.13 for K and -.01 for Sx), it is impossible to tell what the "true" relationship is between these two variables. This relationship may be due to chance, or the "true" relationship may be considerably higher (Johnson, 1944; 1950). The low reliabilities of these scales should be kept in mind in considering the correlation of the MMPI K Scale and Hanley's Sx Scale with the other variables, also.

Personality Variables

The intercorrelations of the personality variables are presented in Table VIII. There are nine correlations which are significant at the .05 level. Of these, four are significant at the .01 level.

Verbal aptitude, as measured by the Wide Range Vocabulary Test appears to be slightly and negatively correlated with anxiety, conformity, neuroticism, and socioeconomic status. All of these correlations are in the predicted direction. The correlations of verbal ability with extraversion and college affiliation were not significant. The directional trend was opposite of that predicted.

The Manifest Anxiety Scale was significantly correlated with only three factors. In addition to verbal ability, it correlated highly with neuroticism and was negatively related to extraversion. Both of these correlations are in the predicted direction. The correlations of the Manifest Anxiety Scale with sex and age approached significance, and both were negative, the predicted direction.

Conformity, as measured by the Barron Scale, was related to two factors. It was significantly and negatively related to verbal ability at the .01 level and positively related to the college factor at the .05 level. The former was in the predicted direction, but the latter was not.

The Extraversion Scale was significantly related to only one variable. Extraversion correlated with the Manifest Anxiety Scale $-.18$. It was predicted that this relationship would be negative.

TABLE VIII
 INTERCORRELATIONS OF PERSONALITY VARIABLES (N = 266)

	VA	MAS	Con	EI	N	SES	Sex	Age	Coll
Verbal Aptitude	(.64)	*-.15	**-.27	-.08	*-.13	*-.12	-.05	*.15	-.10
Manifest Anxiety		(.74)	.10	**-.18	**-.72	.03	-.11	-.11	-.06
Conformity			(.21)	.10	.07	.06	-.07	.04	.14
Extra- version				(.72)	-.08	-.07	-.01	-.06	.01
Neurot- icism					(.83)	.00	-.09	-.12	-.08
Socio- economic Status							.03	.04	**-.25

Note: The five values shown on the diagonal (in parentheses) are reliability coefficients computed with the K-R 21 formula.

The Neuroticism Scale was significantly correlated with verbal ability and anxiety. The correlation with verbal ability was $-.27$. The correlation with the Manifest Anxiety Scale was $.72$.

Socioeconomic status was related to college affiliation. Both, means and medians indicate that the socioeconomic status for Bethany Nazarene College students is slightly lower than that for Oklahoma State University students (cf. Figure 1).

The scales used to measure the various personality variables seemed to be fairly reliable with the exception of Conformity. There is no evidence from this study that they are, or are not, measuring what they are supposed to be measuring. The greatest overlap seems to be between

the Manifest Anxiety Scale and the Neuroticism Scale. Five of the scales seem to be slightly correlated with verbal ability.

Reliabilities

Reliability coefficients for the various scales are presented on the diagonals of Tables VII and VIII. The reliability coefficients are generally high, considering the small number of items in each scale and the method used to compute them. The most reliable scales were the Neuroticism Scale (.83) and the Bass SA Scale (.80). The least reliable scales were Hanley's Sx Scale (-.01) and the MMPI K Scale (.13). These reliabilities were computed with the Kuder-Richardson formula 21 (K-R 21). The Kuder-Richardson formulas are indicators of internal consistency and probably underestimate the reliability of a test. These formulas assume items of equal difficulty and item intercorrelation. If items are heterogeneous, the reliability computed by this method is greatly reduced. This is probably the reason for such low reliabilities for Hanley's Sx Scale and the MMPI K Scale. It may be the reason for a low reliability for the Conformity Scale, also. It is probable that all of the coefficients presented here are lower than they would be if computed by other methods (Guilford, 1956).

Response Style Variables Correlated With Personality Variables

The intercorrelations of the response style variables with the personality variables are directly related to the specific hypotheses made earlier. These correlations are given in Table IX.

TABLE IX
 INTERCORRELATIONS OF RESPONSE STYLE VARIABLES WITH
 PERSONALITY VARIABLES (N = 266)

Personality Variables	Response Style Variables							
	SD	M-C SD	SA	MMPI L	MPI L	K	SX	
VA	.06	**-.18	**-.22	**-.24	-.11	.10	-.03	
MAS	**-.50	**-.40	** .21	**-.29	**-.19	**-.42	**-.24	
Con	.07	** .27	** .45	* .14	* .13	-.10	.05	
EI	** .29	* .15	.06	.00	.03	.11	* .12	
N	**-.54	**-.39	** .25	**-.32	**-.28	**-.44	**-.23	
SES	.01	.05	.04	** .19	.05	.02	.11	
Sex	.04	-.01	-.02	.10	-.01	.03	.03	
Age	.01	.03	-.10	.07	-.08	.04	.01	
College	.03	** .23	.08	** .45	** .24	** .17	.10	

* Significant at the .05 level. **Significant at the .01 level.

It was predicted in hypothesis one that verbal aptitude would be directly related to social desirability, lying, and defensiveness. Hypothesis two predicted an inverse relationship between verbal ability and acquiescence. A significant negative correlation (-.22) was found for verbal ability with the Bass SA Scale, as hypothesized. However, contrary to hypothesis one, significant negative correlations were found for verbal aptitude with the Marlowe-Crowne SD Scale and the MMPI Lie Scale. A trend in the negative direction was noted for the Maudsley Lie Scale. The Edwards' SD Scale, the MMPI K Scale, and Hanley's Sx Scale were not significantly correlated with verbal aptitude.

The predictions of hypotheses three and four that anxiety would be inversely related to acquiescence and directly related to social desirability, lying, and defensiveness were supported. The Manifest Anxiety Scale correlated significantly and negatively with all the scales except the Bass SA Scale. It correlated significantly, but positively, with this scale.

The prediction of hypothesis five that conformity is directly related to acquiescence was supported. The Barron Scale correlated .45 with the Bass SA Scale. Contrary to hypothesis six, that conformity is inversely related to social desirability, lying, and defensiveness, significant positive correlations were found between the Conformity Scale and the Marlowe-Crowne SD Scale and between the Conformity Scale and both of the lie scales. The correlations for the Conformity Scale with Edwards' SD Scale and the defensiveness scales were not significant.

Partial support was found for hypothesis seven, that extraversion is directly related to social desirability, lying, and defensiveness. The Extraversion Scale correlated significantly and positively with both of the social desirability scales and with one of the defensiveness scales (Hanley's Sx Scale). The other correlations were not significant. The prediction that extraversion is inversely related to acquiescence was not supported.

Hypotheses nine and ten were completely supported. Highly significant and negative correlations were found between the Neuroticism Scale and all of the response scales except the Bass SA Scale. A significant positive correlation between the SA Scale and the Neuroticism Scale were found, as predicted.

Hypotheses eleven and twelve, which predicted a direct relationship

between socioeconomic status and acquiescence and an inverse relationship between socioeconomic status and social desirability, lying, and defensiveness, were not supported. Socioeconomic status correlated significantly with one of these variables. It correlated positively with the MMPI Lie Scale. This is opposite the direction predicted.

The predictions of hypotheses thirteen and fourteen that the various response style variables are related to sex was not supported.

No support was found for the relationships predicted by hypotheses fifteen and sixteen between age and the various response styles.

Hypothesis seventeen predicted a direct relationship between attendance at Bethany Nazarene College and social desirability, lying, and defensiveness. This hypothesis was supported. However, not by all scales. The Marlowe-Crowne SD Scale was significantly correlated with the college factor, but Edwards' SD was not. Since both lie scales were significantly correlated with the college factor, this would give further evidence that the Marlowe-Crowne SD Scale is functioning as a lie scale. If this interpretation is given to the Marlowe-Crowne Scale, social desirability and the college factor are not related in this study. One of the defensiveness scales (the MMPI K Scale) was related to the college factor, and the other defensiveness scale approached significance.

Hypothesis eighteen predicted an inverse relationship between the college factor and acquiescence. No support was found for this hypothesis.

Correction for Attenuation

Guilford (1956) wrote, "When two fallible measures are correlated, the errors of measurement, if uncorrelated among themselves, always

serve to lower the coefficient of correlation as compared with what it would have been had the two measures been perfectly reliable (pp. 475-476). The implications for the present study is that the correlations presented in Tables VII, VIII, IX are too low and should be corrected for attenuation. The desirability of this correction is emphasized and its use illustrated by Block (1963). Table X presents these correlations after correcting for attenuation.

TABLE X
CORRELATION COEFFICIENTS AFTER CORRECTION FOR ATTENUATION

	M-C SD	MMPI L	MPI L	VA	MAS	Con	EI	N
SD	.59	.31			-.88		.52	-.89
M-C SD		.93	.85	-.26	-.53	.68	.20	-.49
SA				-.31	.27	1.10		.31
MMPI L			1.00	-.39	-.44	.39		-.45
MPI L					-.32	.41		-.44
VA						-.74		-.18
MAS							-.25	.92

The use of correction for attenuation can give a more accurate picture of relationships existing between the various traits if "true" scores were available. However, a few words of caution relative to their interpretation are in order.

Johnson (1944) pointed out the inaccuracy of the generalization that errors of measurement, if uncorrelated, always reduce the value of a correlation coefficient. Johnson pointed out that "errors of measurement

have two important effects on correlation. First, they tend to lower the value of an obtained below that of the true coefficient; and again, they cause obtained coefficients to fluctuate widely" (p. 521). He indicated that this second effect could cause obtained coefficients to be higher than true coefficients.

Johnson stated that there are three factors which are responsible for fluctuations in correlation coefficients: (1) differences in magnitude of the errors, (2) chance correlations among them, and (3) chance increases and decreases in the differences between corresponding scores. He argued that:

... random errors of measurement do not always lower a coefficient, there is merely a tendency in that direction. As the true coefficient approaches zero the greater the frequency of obtained coefficients which are higher than the true coefficient. For very high correlations the frequency is low (p. 521).

In reference to Johnson (1944), Guilford (1954) indicated that Johnson's conclusions "should be a warning to use large samples, reducing sampling errors as much as possible, and also to interpret with reservations corrected validity coefficients when reliabilities are low" (p. 402).

Guilford (1956) pointed out another limitation of correction for attenuation which is due to the type of reliability coefficient used. If the reliability for either of the two measures is underestimated, the corrected coefficient will be overestimated. Guilford stated that all internal-consistency formulas probably underestimate reliability, and the Kuder-Richardson formulas underestimate reliability the most of all.

It may be concluded from the above statements that the validity of

correcting coefficients which were very low before correction is dubious. For this reason, no corrected coefficients are presented in Table X for correlations which were not significant before correction for attenuation. No further interpretation should be made for those tests which were quite unreliable. This would include the Conformity Scale, the MMPI K Scale, and the Hanley's Sx Scale. Corrected coefficients are not given for the K Scale nor for the Sx Scale. They are included for the Conformity Scale, but caution is urged in interpreting them. Since the K-R 21 formula was used to compute the reliabilities reported in this study, it is probable that all the corrected coefficients are higher than they should be. On the other hand, they are, undoubtedly, higher than indicated by the original computations.

The interrelationships of the response style variables are made much clearer by looking at the corrected coefficients. It is obvious the Edwards' SD Scale and the Marlowe-Crowne SD Scale are both measuring a common variable. However, well over half of the variance of one is left unaccounted for by the other. The argument that the Marlowe-Crowne SD Scale is operating as a lie scale is strengthened when it is noted that this scale correlates .93 with the MMPI Lie Scale and .85 with the Maudsley Lie Scale. The corrected correlation between the MMPI Lie Scale and the Maudsley Lie Scale is 1.00, indicating that these scales are measuring the same variable.

The corrected correlations for the Edwards' SD Scale with the Manifest Anxiety Scale (-.88) and Neuroticism (-.89) further attest to the inverse relationship between these variables.

The corrected correlation of .92 between the Manifest Anxiety Scale and the Neuroticism Scale gives support to the argument that these scales are measuring a common variable.

Factor Analysis

It was not originally planned that the data from this study would be factor analyzed. However, in the course of the investigation, the writer developed some hypotheses relative to the factors. If response style variables and personality variables are related, they should correlate highly with the same factors. It was hypothesized that all of the measures could be accounted for by the following factors: Social Desirability, Acquiescence, Verbal Ability, Sex, Age, and Socioeconomic Status.

The data were factor analyzed using the varimax method. The results are presented in Table XI. Six factors emerged. Factor I seems to be a social desirability variable. Edwards' SD Scale, the Marlowe-Crowne SD Scale, the MMPI K Scale, and Hanley's Sx Scale load moderately to highly on this factor. The Extraversion Scale loaded the highest on this factor, also.

Factor II is a lie factor. Both lie scales correlated highly with this factor. The Marlowe-Crowne SD Scale loaded the highest on Factor II. This is in line with previous remarks regarding the functioning of this scale as a lie scale.

Factor III seems to be a denial factor. The Bass Social Acquiescence Scale loaded $-.69$ on this factor, and Conformity loaded $-.68$. The MMPI K Scale loaded $.35$ on Factor III.

Factor IV is probably a sex factor. The sex variable loaded $-.48$ on this factor and the college variable loaded $-.48$ on it, also. Since the proportion of females in the two colleges was not the same, it is possible that some of the relationship with this variable is due to sex differences.

The college variable cannot be entirely accounted for by the sex factor. It loaded $-.38$ on Factor V. Since socioeconomic status loaded $-.38$ on Factor V, this factor may be tentatively referred to as a socioeconomic factor.

The composition of Factor VI is not as clear as the composition of the other factors. Since age loaded $-.44$ on Factor VI, it is suggested that this might be designated as an age factor.

No factor of verbal ability emerged. The variance from this measure is spread over several factors. The Wide Range Vocabulary Test seemed to have quite a bit of specificity. Factor II, the Lie factor, was not hypothesized. It was believed that lying was an extreme form of social desirability. The evidence seems to indicate that it is a separate factor.

The factor analysis data provide information concerning the factorial validity of the various measures. Edwards' SD Scale has high validity as a measure of Factor I. It loaded $.75$ on this factor. Nearly all the communality of this scale can be accounted for by Factor I. However, 56 percent of the variance of the SD Scale is error variance.

The Marlowe-Crowne SD Scale has moderate to high validity for Factor II. Its loading on this factor was $.66$. This finding verifies the conclusions made earlier that this scale is acting more like a lie scale than like a social desirability scale. It does have a moderate

loading on Factor I. This is an indication of moderate validity for social desirability. It is also an indication that this is not a "pure" measure, factorially speaking.

The Bass Social Acquiescence Scale seems to be fairly homogeneous and has moderate to high validity as a measure of Factor III. It loaded $-.69$ on this factor. Its highest loadings on the other factors were $-.15$ for Factor I and $.13$ for Factor VI. About 29 percent of this scale's variance is specific variance and about 20 percent is due to error.

The MMPI Lie Scale has high validity for Factor II ($.78$). About 15 percent of its communality is accounted for by the other five factors. Approximately 40 percent of the variance of this scale is error variance.

The Maudsley Lie Scale has moderate to high validity on Factor II. Its loading is less than the loading for the MMPI Lie Scale. Nearly all of its communality is accounted for by this one factor. The error variance for the Maudsley Lie Scale was equal to the entire uniqueness component.

The MMPI K Scale loaded moderately on Factors I, II, and III ($.47$, $.32$, and $.35$). Most of its communality can be attributed to these three factors. Because of the very low reliability of this scale, most of the variance is error variance (87 percent).

Hanley's Sx Scale seems to have neither validity nor reliability. Its highest loading was on Factor I ($.37$), but this loading is probably due to error. In considering this data, the predictions by Hanley of low reliability for normal populations should be remembered (Hanley, 1957).

The Wide Range Vocabulary Test did not have a large amount of communality with the other measures of this study. Its communality was .27 and its specificity was .37. The error variance was .36.

The communality of the Manifest Anxiety Scale was .70. This was accounted for by a loading of $-.68$ on Factor I and small loadings on each of the other five factors. The proportion of error variance was .26.

The communality of .52 for conformity can be largely accounted for by a loading of $-.68$ on Factor III. However, the proportion of error variance was .79. This would indicate that the loading was probably too high due to the low reliability of the test.

The communality for Extraversion was relatively low (.23). The highest loadings are .37 for Factor I and .26 for Factor VI. The specificity for this scale was .49. This would indicate that this scale is measuring something not being measured by the other scales in this analysis.

The communality of the Neuroticism Scale (.68) can be accounted for by a high negative loading ($-.65$) on Factor I and low to moderate loadings on all the other factors with the exception of Factor IV. The loading on this factor was negligible (.09). There is a small amount of specific variance (.15) in this scale, also.

In summary, both social desirability scales, the Bass Social Acquiescence Scale, both lie scales, the Manifest Anxiety Scale, and the Neuroticism Scale have moderate to high validity for one of the six factors which emerged from a factor analysis of the variables of this study. The MMPI K Scale and Hanley's Sx Scale do not seem to possess adequate validity. The validity of the Conformity Scale

is questionable because of the high proportion of error variance present. The Wide Range Vocabulary Test and the Extraversion Test do not have high validity for any of the six factors found. Both tests have moderate amounts of specificity.

TABLE XI
 FACTOR ANALYSIS OF RESPONSE STYLE VARIABLES
 AND PERSONALITY VARIABLES (N = 266)

	Factors						H ²
	I	II	III	IV	V	VI	
Scales							
Edwards' SD	.75	.04	.01	.02	-.03	-.02	.56
Marlowe-Crowne SD	.43	.66	-.19	.04	-.11	.01	.67
Bass SA	-.15	.02	-.69	-.05	.04	.13	.51
MMPI Lie	.15	.78	-.04	-.19	-.29	-.01	.75
Maudsley Lie	.10	.69	-.05	.00	-.02	.07	.50
MMPI K	.47	.32	.35	.01	-.15	-.09	.47
Hanley's Sx	.37	.19	.02	.03	-.23	.03	.23
Wide Range	.05	-.17	.32	.05	.18	-.32	.27
Manifest Anxiety	-.68	-.29	-.17	.15	-.25	.18	.70
Conformity	.07	.11	-.68	.08	-.16	-.07	.52
Extraversion	.37	-.08	-.12	-.09	.01	.26	.23
Neuroticism	-.65	-.35	-.19	.09	-.17	.26	.68
Socioeconomic Status	-.02	.08	-.06	-.09	-.38	-.02	.16
Sex	.05	.00	.02	-.48	-.05	-.08	.24
Age	.05	-.02	.01	-.16	-.06	-.44	.23
College	-.01	.31	-.06	-.48	-.38	-.08	.48

CHAPTER V

INTERPRETATION OF RESULTS

Discussion

The major result of this study is the discovery of a highly significant relationship existing between personality variables and response styles. This relationship indicates that much of the variance attributed to response style may actually be a result of individual personality differences. The primary personality factors in this relationship appear to be neuroticism and anxiety. The evidence seems to indicate that these two variables are measuring a common variable. When corrected for attenuation, they correlated .93. The relationship of these variables to response style is an inverse one. There are at least two ways of explaining this relationship. Edwards (1957) takes the position that social desirability is a personality variable and the higher a person scores on the SD Scale the less will he endorse responses which are undesirable. Since scales such as the Manifest Anxiety Scale and the Maudsley Neuroticism Scale contain many undesirable items, a person with a high SD score will score low on these scales. Edwards seems to take the position that people respond to test items in terms of social desirability, only. If Edwards is correct, a person who is highly anxious would score high on the SD Scale and low on the Taylor Manifest Anxiety Scale. This is opposite the interpretation

given by Taylor, and it does not agree with many learning studies (Stricker, 1963). Edwards may have the cart before the horse. An anxious person might use a psychometric scale as a device for asking for help. Instead of responding by endorsing socially desirable items, such a person would endorse socially undesirable items. If this was the case the inverse relationship between the Manifest Anxiety Scale and the Edwards' SD Scale would still exist, but the interpretation is quite different. If this same line of thought is followed a little further, the person who is not anxious or neurotic would score high on the SD Scale because he is normal and does those things which are socially desirable. In other words, the differences may not be due to differences in social desirability responding, but to differences in other personality characteristics.

The inverse relationship between the Manifest Anxiety Scale and the Edwards' SD Scale is better understood when it is noted that in the original scales there are 22 overlapping items. Of these, 21 of the keyed responses for the Manifest Anxiety Scale are the opposite of the keyed responses for the SD Scale. It may be that the SD Scale is actually a reflection of normality. If responding one way is a defense mechanism and responding the opposite way is abnormal, the test-taker is put on the horns of a dilemma. It is probably true that neither extreme position is correct. People do not respond entirely on the basis of social desirability. Neither do they always answer "honestly." The contention of this study is that there is a reason for their responding the way they do, and that the reason lies within their personality.

A consideration of the rest of the personality variables, taken in order of their influence, further supports this position. The next highest weight, disregarding sign (Table VI), is the college factor. Students at Bethany Nazarene College seem to be more defensive and to score higher on lie scales and on social desirability scales than students at Oklahoma State University. The usual interpretation would be that the scores for the Bethany students are contaminated with response style. Another way of interpreting the situation is to say that students at Bethany Nazarene College are different in personality structure from the students at Oklahoma State. Some support for this viewpoint comes from the author's personal observations. Bethany Nazarene College is a church related college which holds to a fairly conservative, but orthodox, religious philosophy. Most of the students come from homes of members of the Church of the Nazarene and are Church members themselves. Most of their lives they have been taught to believe that it is "wrong" to "get into a movie without paying" (item 34 of the RSC Scale). In fact, they do not attend movies. They sincerely believe it is wrong to "get angry" (item 37), to "not always tell the truth" (item 51), to swear (item 52), to "laugh at a dirty joke" (item 104), and to "gossip" (item 108). For them to endorse these items would be to admit to doing wrong and would violate their self-concept. It would be contrary to what is expected of them by members of their subculture and would threaten their acceptance by others. Furthermore, it has been the author's observation that the incidence of these behaviors is actually less among these students than among students at other colleges. However, if they mark these items "false" in line with their beliefs, they will score high on the lie

scales. The differences in these scales may be due to real differences in personality. These responses reflect differences in values, beliefs, ideals, practices, self-concepts, etc. The reason the correlations are not higher is due to the fact that even in a church related college there is a wide range of personality differences. It is also true that many of the items of the RSC Scale do not reflect differences as clear cut as those on the MMPI Lie Scale. The fact that the MMPI Lie Scale has the highest correlation with the college factor supports this line of reasoning. In fairness to Edwards, it should be stated that the Bethany Nazarene College students may be responding partially on the basis of social desirability. However, the concept of what is socially desirable may be quite different from the concepts held by Oklahoma State University students. If this is so, it would only tend to invalidate the usefulness of any single social desirability scale.

This viewpoint is also supported by a consideration of the personality variable with the next highest weight, i.e., Conformity. Students at Bethany Nazarene College, in general, have undergone an informal program of indoctrination which has taught them to conform to the regulations of their Church and home. The reason the correlation is not higher may be due to several factors. Probably many of the students at Oklahoma State University have been similarly trained. Obviously, all Bethany Nazarene College students have not been reared alike, either. Furthermore, the scale used to measure Conformity was not functioning very reliably in this study. This places serious limitations on any interpretations based upon this scale.

This writer is not arguing that response styles do not exist, rather, that response styles reflect more basic personality differences,

i.e., they can be explained, at least partially, by differences in personality. The point is, response style is not a mechanical something which functions regardless of item content or automatically in every test situation. It is a reflection of differences in personality.

Some support for this argument was reported in the literature. Messick (1960) concluded that social desirability varied according to individual points of view. Liberty (1963) stated that acquiescence appears to be a function of certain situational variables and in particular the perceived desirability of the statement. Gaier and Bass (1959) found significant regional differences in acquiescence. Gibson (1962) felt that differences which he found for American students and British apprentices might be due to the fact that the latter perceived their future in the company would be affected by their performance on the tests.

The response style which is most clearly related to personality is Edwards' Social Desirability variable. The MMPI Lie Scale and the Marlowe-Crowne SD Scale are also highly weighted in the relationship between response style and personality. All of the social desirability scales, lie scales, and defensiveness scales have high intercorrelations. This is especially true of the Marlowe-Crowne SD Scale and the two lie scales. These intercorrelations indicate that these scales are all related to common variables. It may be noted from Table VII and Table X that all six scales are quite significantly and negatively related to manifest anxiety and to neuroticism. Four of the six scales are positively related to conformity, and three are negatively related to verbal aptitude. Four scales are related to the college factor. The general conclusion seems to be that of the seven response style scales

used, six are probably closely related. There seem to be two dimensions associated with these six scales, viz., social desirability and a lie factor. These conclusions are supported by the factor analysis data, also.

The Bass Social Acquiescence Scale seems to be measuring something quite different from that measured by the other scales. It correlates $-.33$ with the MMPI K Scale. This is not surprising since the evidence seems to indicate that the K Scale is contaminated with several factors (Comrey, 1958; Jackson and Messick, 1958). In this study, the K Scale correlated significantly with all six of the other response style scales and with three personality scales. Also, the relationship between the Bass SA Scale and the K Scale is not clear because of the low reliability of the K Scale.

The Bass SA Scale is significantly related to four of the personality scales. It correlated $.45$ with the Conformity Scale (1.00 when corrected), $.21$ with the Manifest Anxiety Scale, $.25$ with the Neuroticism Scale, and $-.22$ with the Wide Range Vocabulary Test. It would appear that much of the variance of this response style can be explained by reference to other personality factors, also. Acquiescence seems to be correlated with undesirable factors. This may be the reason for its correlation with the K Scale. Some evidence from the literature supports this view. Most notable in this regard is the work of Adorno, et al., (1950) in relation to the authoritarian personality. Authoritarianism is measured by the California F Scale. This scale has been shown to be highly related to acquiescence. The authoritarian personality as described by Adorno is not a desirable type. Couch and Keniston (1960) describe the "Yeasayer," or acquiescer, as characterized by "Impulsivity,

Dependency, Anxiety, Mania, Anal Preoccupation, and Anal Resentment" (p. 173). If social desirability items reflect normal personality traits and acquiescence reflects abnormal personality traits, this would explain why social desirability and acquiescence are not always found together. It would also explain why social desirability and acquiescence are always inversely related when they are found together.

It was expected that verbal aptitude would be closely related to the response styles. It was predicted that verbal aptitude would be positively correlated with social desirability, lying, and defensiveness and that it is negatively correlated with acquiescence. These predictions were based upon the argument of several authors that the more ambiguous an item is the more likely it will be that the test-taker will acquiesce. The more intelligent person should more readily recognize the socially desirable responses and the items would be more ambiguous for the less intelligent. Several authors reported significant negative correlations between intelligence and acquiescence (Adorno, et al., 1950; Gough, 1951; Cohn, 1952; Bass, 1956; Shaw, 1961). The results of this study do seem to indicate that the less intelligent acquiesce more. Verbal aptitude was negatively correlated with the Marlowe-Crowne SD Scale and the MMPI Lie Scale, also. The fact that there was no significant relationship between verbal aptitude and the Edwards' SD Scale or the defensiveness scales indicates that social desirability and defensiveness are functioning equally, if at all, over all levels of verbal ability.

The significant correlations of the Extraversion Scale with Edwards' SD Scale and with the Marlowe-Crowne SD Scale confirms the results reported by Merrill and Heathers (1956), although the present

correlations are not so high. A significant negative relationship which was predicted for Extraversion with the Bass SA Scale was not verified. This prediction was made in order to be consistent with other predictions. The nonsignificant relationship does agree with the results found by Eysenck (1962; 1963).

Of all the predictions made, the most completely supported were those related to the Neuroticism Scale and the Manifest Anxiety Scale. The comments made earlier relative to the Manifest Anxiety Scale would apply to the Neuroticism Scale, also. These results do not give evidence of the validity of these scales, but, whether or not the Manifest Anxiety Scale is a measure of anxiety, it certainly seems to be functioning in the same manner as the Neuroticism Scale of the Maudsley Personality Inventory.

The predictions relative to socioeconomic status were not made on the basis of the literature. Only one investigator reported a significant relationship between the Edwards' SD Scale and socioeconomic status (Messick, 1960). Edwards (1957), Klett (1957a), Lovaas (1956), Fujita (1956), and Mehlman and Warehime (1962) all reported no significant group differences. The nonsignificant relationships of this study agree with the results from these studies. The significant correlation of socioeconomic status with the MMPI Lie Scale was as predicted. This was predicted in order to be consistent with the hypothesis of a positive relationship between verbal aptitude and the other response styles. The negative correlation for these variables makes the relationship of socioeconomic status and the MMPI Lie Scale difficult to interpret.

Gaier and Bass (1959) found significant differences in acquiescence between regional groups. No significant relationship was found in the

present study. This study was not adequately designed to test the socioeconomic status relationship since only college students were used. The fact that all the subjects were attending college would tend to indicate similar interests and values. Furthermore, the socioeconomic status index used is rather crude. Its use violates the assumption of an equal interval scale thought to be necessary for the statistical computations performed.

No significant correlations were reported for age or sex with any of the response styles. In general, this supports the literature. Edwards (1957) found no relationship for age or sex with the SD Scale. Mehlman and Warehime (1962) found no significant relationship between sex and the SD Scale. Stricker (1963) reported a relationship between sex and the SD Scale, but stated that this may have been due to interaction with the examiner. Shaw (1961) found significant relationships for acquiescence with both age and sex. These findings were not supported by this study. Berg and Rapaport (1954) attributed a significant relationship which they found between acquiescence and sex to interaction with the examiner.

The finding that the college factor was significantly related to the Marlowe-Crowne SD Scale, both Lie Scales, and the MMPI K Scale was interpreted earlier as evidence supporting the argument that response styles are a reflection of personality differences. Since the lie scales and the Marlowe-Crowne SD Scale correlated highest with the college factor, it appears that these scales contain items which reflect the different philosophy and viewpoints held by Bethany Nazarene College students as compared with Oklahoma State University students.

The $-.33$ correlation of the Bass SA Scale with the MMPI K Scale is

contrary to the results reported by Fricke (1956). Fricke reported high positive correlations. This result does agree with Couch and Keniston (1960) who reported a correlation of $-.38$ between their Over-All-Agreement measure and the MMPI K Scale.

The correlation of the K Scale with Edwards' SD Scale supports Edwards (1953b), Fordyce (1956), and Hanley (1956; 1957), although the correlation is not so high as those reported by these authors.

The evidence from this study and from the literature seems to support the contention that the MMPI K Scale is contaminated with several factors, including social desirability, acquiescence, and defensiveness. This scale also reflects some of the personality variables related to these response styles.

The significant correlation of the Maudsley Lie Scale with the Neuroticism Scale supports Gibson (1962). Gibson found no relationship between the Maudsley Lie Scale and the Extraversion Scale. This result was supported, also.

Marlowe and Crowne (1961) reported a correlation of $-.54$ between their SD Scale and Barron's Independence of Judgment Scale. When it is remembered that in the present study the latter scale was keyed for conformity, the positive correlation of $.27$ ($.68$ when corrected) supports this relationship.

Summary and Conclusions

Summary

The purpose of this study was to investigate the relationship of response styles to personality variables. The questions asked were:

Does response style vary as a function of differences in personality?
Can differences in response style be explained by differences in measurable personality variables? If so, what variables have the greatest influence in this relationship?

After reviewing the literature, three general hypotheses were proposed in answer to the above questions. These were:

I. Response style is significantly related to personality differences.

II. In the relationship between response style variables and personality variables, the personality variables with the greatest influence are anxiety and verbal aptitude.

III. In the relationship between response style variables and personality variables, the response style with the greatest influence is social desirability.

Eighteen specific hypotheses were proposed relative to the inter-relationships between the various response styles investigated and the personality variables used.

The social desirability variable was measured by Edwards' SD Scale and the Marlowe-Crowne SD Scale. Acquiescence was measured by the Bass SA Scale. The lie scales used were the Minnesota Multiphasic Personality Inventory (MMPI) Lie Scale and the Maudsley Personality Inventory Lie Scale. The defensiveness scales were the MMPI K Scale and the Hanley Sx Scale.

The personality scales used were: Barron's Independence of Judgment Scale (keyed for conformity), the Neuroticism Scale and the Extraversion Scale of the Maudsley Personality Inventory, The Wide Range Vocabulary Test, Taylor's Manifest Anxiety Scale, and Center's Occupational Index.

Other variables included in the study were: sex, age, and a college factor. The college factor was made possible by using two different types of schools.

Ninety-five subjects were used from Bethany Nazarene College, a conservative, church related, liberal arts college. There were 171 subjects taken from classes at the Oklahoma State University. The subjects were administered the tests in two different parts. The data were analyzed by the canonical correlation method, using the 1410 computer located at Oklahoma State University.

The general hypotheses I and III were completely supported. Hypothesis II was partly supported. It was found that there are at least three different ways in which the domains of response style and personality, as measured by the scales used in this study, are related. Six of the 18 specific hypotheses were completely supported. Two more were partially supported. There was no support found for the other ten.

Conclusions

It was concluded that response style is significantly related to personality.

Manifest anxiety, as measured by Taylor's Manifest Anxiety Scale, and Neuroticism, as measured by the Neuroticism Scale of the Maudsley Personality Inventory, are very closely related to response style. This relationship is an inverse one.

Verbal aptitude is inversely related to both acquiescence and lying.

Manifest anxiety and neuroticism, as measured by the scales used in this study, are very closely related to each other.

The response style most closely related to personality is social desirability.

The Marlowe-Crowne Scale is probably functioning as a lie scale.

There is a close relationship between psychometric measures of social desirability, lying, and defensiveness. These scales may be measuring different aspects of a common personality trait.

Acquiescence is a characteristic somewhat different from the other response style variables. It is probably closely related to undesirable personality traits.

Suggestions for Future Study

One contribution of this study has been its use of the canonical correlation method of analysis. This method has been used very little since its development. This is probably due to the fact that the mathematics of the method are quite complicated. The canonical correlation technique involves the use of several matrices, inverse matrices, determinants, identity matrices, and eigenvalues. It certainly would not be feasible to attempt to use this analysis if only a desk calculator were available. However, it is a very powerful tool which should be used more in the behavioral sciences. Since it has been shown that it can be used with computers of the intermediate range, this should be an encouragement for others to use the method.

This program should be very useful in comparing different batteries of tests (cf. Cooley and Lohnes, 1962), for investigating the relationship of physical factors, and in other situations in which it is desirable to compare linear combinations of two sets of variables.

This study has shown that there is a relationship between specific

personality measures and specific response style measures. Other measures of response style and personality could be treated in this same manner.

More important, would be an investigation of the relationship of response styles to behavior other than psychometric behavior, e.g., behavior in situational tests.

The canonical correlation technique could be used to study the relationship of a battery of tests to a multiple criteria, e.g., in an industrial setting, pilot training, etc.

One reason why the validity of many of today's tests is relatively low, may be because of the difficulty of specifying the criteria. There is a need to break criteria down into its various components. If the canonical correlation technique is used, higher validity may be possible.

Another implication for future research has to do with the response style variables themselves. The intercorrelations in this study would indicate that the present scales are not doing a very adequate job of measuring "pure" response styles. Add to this the fact that much of the "response style" variance may be due to other measurable personality factors, and the whole response style concept becomes blurred. It remains for investigators to find techniques for measuring "pure" response style, or to find some other explanation and to abandon the whole response style concept.

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APPENDIX A

SCALES

The scales used in this investigation are presented in this section. The number preceding each item refers to its position in the RSC Scale. The keyed response follows the item. No keyed responses are given for the Bass Social Acquiescence Scale since all of the items are keyed "true." All items of the Minnesota Multiphasic Personality Inventory L Scale are keyed "false."

Edwards' Social Desirability Scale

9. Criticism or scolding hurts me terribly. (False)
26. When in a group of people I have trouble thinking of the right things to talk about. (False)
28. It does not bother me particularly to see animals suffer. (False)
30. I am never happier than when alone. (False)
38. My family does not like the work I have chosen. (False)
49. I am not afraid to handle money. (True)
53. No one cares much what happens to you. (False)
62. I am liked by most people who know me. (True)
66. Most any time I would rather sit and daydream than to do anything else. (False)
75. I can easily make other people afraid of me, and sometimes do for the fun of it. (False)
96. I usually expect to succeed in things I do. (True)

113. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things. (False)
122. I have had periods in which I carried on activities without knowing later what I had been doing. (False)
127. I have reason for feeling jealous of one or more members of my family. (False)
140. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important. (False)
146. My parents and family find more fault with me than they should. (False)
148. People often disappoint me. (False)

Marlowe-Crowne Social Desirability Scale

1. I have almost never felt the urge to tell someone off. (True)
8. I am sometimes irritated by people who ask favors of me. (False)
12. I am always courteous, even to people who are disagreeable. (True)
15. There have been many occasions when I have felt like smashing things. (False)
17. I always try to practice what I preach. (True)
19. I don't find it particularly difficult to get along with loud mouthed obnoxious people. (True)
24. It is sometimes hard for me to go on with my work if I am not encouraged. (False)
31. I have never deliberately said something that hurt someone's feelings. (True)
32. I sometimes feel resentful when I don't get my way. (False)
33. I sometimes try to get even rather than forgive and forget. (False)
44. At times I have really insisted on having things my own way. (False)
46. I would never think of letting someone else be punished for my wrongdoings. (True)
47. I have never felt that I was punished without cause. (True)

50. I never make a long trip without checking the safety of my car. (True)
56. I never resent being asked to return a favor. (True)
59. I am always careful about my manner of dress. (True)
61. No matter who I'm talking to, I'm always a good listener. (True)
64. I can remember "playing sick" to get out of something. (False)
69. I'm always willing to admit it when I make a mistake. (True)
72. There have been times when I have been quite jealous of the good fortune of others. (False)
91. On occasion I have had doubts about my ability to succeed in life. (False)
95. When I don't know something I don't mind admitting it. (True)
99. There have been times when I have felt like rebelling against people in authority even though I knew they were right. (False)
106. I have never been irked when people expressed ideas different from my own. (True)
107. I have never intensely disliked anyone. (True)
111. Before voting I thoroughly investigate the qualifications of all the candidates. (True)
112. I sometimes think when people have a misfortune they only got what they deserved. (False)
125. I never hesitate to go out of my way to help someone in trouble. (True)
126. On a few occasions, I have given up doing something because I thought too little of my ability. (False)
138. There have been occasions when I took advantage of someone. (False)

Bass Social Acquiescence Scale

4. Destroyers of tyranny have contributed the most to mankind.
13. What we win through authority we lose; what we win through consideration we keep.

16. To be happy, always stay within the law.
20. Obedience is the mother of success.
25. Pity is the touch of God in human hearts.
27. Sleep is loved by everyone.
39. The only known cure for fear is faith.
48. Happiness must be won through great effort.
55. Giving is always better than receiving.
60. Only a statue's feelings are not easily hurt.
63. The feeling of a friendship is like that of being comfortably filled with roast beef.
68. Love of the opposite sex makes the world go round.
70. The grass is always greener in the other fellow's yard.
71. Every man is blind to his own defects.
76. Next to love sympathy is the most divine passion of the human heart.
84. There is no satisfaction without a companion to share it.
85. Most big cows have little horns.
94. Seeing is believing.
98. We like best that which lies beyond our reach.
100. Wild colts make good horses.
102. The restless sleeper blames the couch.
105. The greatest of fortunes are for those who leave the common path and blaze a new trail for themselves.
110. Love is the greatest of the Arts.
114. Make yourself honey and the flies will eat you.
116. Amusement is the medicine for worry.
118. One false friend can do more harm than one hundred enemies.
119. Still water runs deep.

120. Never trust a flatterer.
123. Count your sheep and the wolf will eat them.
129. Sweet is the sleep of the man with virtue.
130. You can't teach an old dog new tricks.
131. Better one safe way than a hundred on which you are not sure.
133. Life is a struggle from beginning to end.
139. No principle is more noble or holy than that of true obedience.
144. He who laughs last laughs longest.
145. He conquers all who conquers himself.
150. One should feel the failures of his friends as if the failures were his own.
152. Empty heads go with loud talk.
155. He that has many friends need never fear disaster.
156. They never fail who die in a great cause.
159. You only injure yourself when you take notice of despised critics.
161. 'Tis vain to quarrel with your destiny.
165. A sense of duty is the basis of character.
167. Stay away from the proud man who is ashamed to weep.
169. Our chief want in life is someone who will make us do what we can.
172. Who does not love the opposite sex remains a fool the whole life long.
173. Success against odds is the greatest of American ideals.
176. He that loses his conscience has nothing left that is worth keeping.
180. Those in high places are in greater danger than those in lowly places.
184. Virtue is a struggle in which we overcome our weaknesses.
186. No gift is more precious than good advice.

189. It is difficult to do excellent work without great strain.
191. There is nothing which the body suffers which the soul may not profit by.
195. You should give more than you want to give.
197. The victory always remains with those who admire rather than with those who criticize.

Minnesota Multiphasic Personality Inventory L Scale

5. I would rather win than lose in a game.
11. Once in a while I think of things too bad to talk about.
18. Once in a while I put off until tomorrow what I ought to do today.
34. If I could get into a movie without paying and be sure I was not seen I would probably do it.
37. I get angry sometimes.
51. I do not always tell the truth.
52. At times I feel like swearing.
78. I do not like everyone I know.
87. Sometimes when I am not feeling well I am cross.
90. I do not read every editorial in the newspaper every day.
97. Sometimes at elections I vote for men about whom I know very little.
103. I like to know some important people because it makes me feel important.
104. Once in a while I laugh at a dirty joke.
108. I gossip a little at times.
143. My table manners are not quite as good at home as when I am out in company.

Maudsley Personality Inventory L Scale

198. Are you completely free from prejudice of any kind? (Yes)

200. As a child, did you always do as you were told, immediately and without grumbling? (Yes)
209. Once in a while do you lose your temper and get angry? (No)
211. Have you ever been late for an appointment or work? (No)
217. Do you always feel genuinely pleased when a bitter enemy achieves a merited success? (Yes)
221. Do you sometimes boast a little? (No)
223. Would you always declare everything at the Customs, even if you knew that you could never be found out? (Yes)
224. Have you money worries at times? (No)
225. Are all your habits good and desirable ones? (Yes)
227. At times, have you ever told a lie? (No)
228. If you say you will do something do you always keep your promise, no matter how inconvenient it might be to do so? (Yes)
232. Do you occasionally have thoughts and ideas you would not like other people to know about? (No)
248. Do you always answer a personal letter as soon as you can after you have read it? (Yes)
249. Do you sometimes talk about things you know nothing about? (No)
257. Do you sometimes get cross? (No)

Minnesota Multiphasic Personality Inventory K Scale

154. I think nearly everyone would tell a lie to keep out of trouble. (False)
158. At times I feel like smashing things. (False)
162. It takes a lot of argument to convince most people of the truth. (False)
164. Often I can't understand why I have been so cross and grouchy. (False)
168. I often think, "I wish I were a child again." (False)
171. I am against giving money to beggars. (False)

- 175. At periods my mind seems to work more slowly than usual. (False)
- 178. I have very few quarrels with members of my family. (True)
- 181. I find it hard to make talk when I meet people. (False)
- 187. I get mad easily and then get over it soon. (False)
- 192. At times I am full of energy. (False)
- 193. I like to let people know where I stand on things. (False)
- 196. At times my thoughts have raced ahead faster than I could speak them. (False)

Hanley's Sx Scale

- 151. I have never felt better in my life than I do now. (True)
- 153. Sometimes without any reason or even when things are going wrong I feel excitedly happy, "on top of the world." (True)
- 157. My feelings are not easily hurt. (True)
- 160. Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right. (False)
- 163. I think a great many people exaggerate their misfortunes in order to gain the sympathy and help of others. (False)
- 166. I have never been in love with anyone. (False)
- 170. At times I feel that I can make up my mind with unusually great ease. (True)
- 174. It bothers me to have to have someone watch me at work even though I know I can do it well. (False)
- 177. I am often sorry because I am so cross and grouchy. (True)
- 179. What others think of me does not bother me. (False)
- 182. I find it hard to set aside a task that I have undertaken, even for a short time. (True)
- 183. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it. (False)
- 185. I have never done anything dangerous for the thrill of it. (True)

188. I have often met people who were supposed to be experts who were no better than I. (False)
190. I have periods in which I feel unusually cheerful without any special reason. (True)
194. I am apt to hide my feelings in some things, to the point that people may hurt me without their knowing about it. (False)

Taylor's Manifest Anxiety Scale

2. I have nightmares every few nights. (True)
7. I practically never blush. (False)
14. I believe I am no more nervous than most others. (False)
21. I have very few headaches. (False)
22. I am often afraid that I am going to blush. (True)
29. I am certainly lacking in self-confidence. (True)
35. I work under a great deal of tension. (True)
41. Sometimes I become so excited that I find it hard to get to sleep. (True)
43. I have periods of such great restlessness that I cannot sit long in a chair. (True)
45. I worry over money and business. (True)
52. I have diarrhea once a month or more. (True)
65. At times I am no good at all. (True)
67. I wish I could be as happy as others seem to be. (True)
80. I certainly feel useless at times. (True)
82. Sometimes when embarrassed, I break out in a sweat which annoys me greatly. (True)
83. I am a high strung person. (True)
88. I am entirely self-confident. (False)
89. I am usually calm and not easily upset. (False)

92. I am more sensitive than most other people. (True)
93. I am inclined to take things hard. (True)
101. I have sometimes felt that difficulties were piling up so high that I could not overcome them. (True)
121. I frequently find myself worrying over something. (True)
132. I have had periods in which I lost sleep over worry. (True)
136. I must admit that I have at times been worried beyond reason over something that really did not matter. (True)
137. I have a great deal of stomach trouble. (True)
142. I hardly ever notice my heart pounding and I am seldom short of breath. (False)
149. I have very few fears compared to my friends. (False)

Barron's Independence of Judgment Scale
(Keyed for Conformity)

3. What the youth needs most is strict discipline, rugged determinism, and the will to work and fight for family and country. (True)
6. The happy person tends to be poised, courteous, outgoing, and emotionally controlled. (True)
10. Perfect balance is the essence of all good composition. (True)
23. I acquired a strong interest in intellectual and aesthetic matters from my mother. (True)
36. I don't understand how men in some European countries can be so demonstrative to one another. (True)
40. Some of my friends think that my ideas are impractical, if not a bit wild. (False)
54. I would rather have a few intense friendships than a great many friendly but casual relationships. (False)
58. I believe you should ignore other people's faults and make an effort to get along with almost everyone. (True)
73. Kindness and generosity are the most important qualities for a wife to have. (True)

74. Young people sometimes get rebellious ideas, but as they grow up they ought to get over them and settle down. (True)
77. I have seen some things so sad that I almost felt like crying. (True)
79. I must admit that I would find it hard to have for a close friend a person whose manners or appearance made him somewhat repulsive, no matter how brilliant or kind he might be. (True)
81. I could cut my moorings - quit my home, my family, and my friends - without suffering great regrets. (False)
86. A person should not probe too deeply into his own and other people's feelings, but take things as they are. (True)
109. It is easy for me to take orders and do what I am told. (True)
115. I like to fool around with new ideas, even if they turn out later to be a total waste of time. (False)
117. The unfinished and the imperfect often have greater appeal to me than the completed and the polished. (False)
128. What this country needs most, more than laws and political programs, is a few courageous, tireless, devoted leaders in whom the people can put their faith. (True)
135. Science should have as much to say about moral values as religion does. (False)
141. The best theory is the one that has the best practical applications. (True)
147. I prefer team games to games in which one individual competes against another. (True)

Maudsley Personality Inventory EI Scale

199. Do you like work that requires considerable attention to details? (No)
201. Do you like to mix socially with people? (Yes)
203. Do other people regard you as a lively individual? (Yes)
204. Do you ever take your work as if it were a matter of life or death? (No)
207. Do you prefer action to planning for action? (Yes)

208. Do you like to have many social engagements? (Yes)
212. Do you usually take the initiative in making new friends? (Yes)
214. Are you inclined to be overconscientious? (Yes)
215. Would you be very unhappy if you were prevented from making numerous social contacts? (Yes)
216. Are you happiest when you get involved in some project that calls for rapid action? (Yes)
218. Are you inclined to take your work casually, that is, as a matter of course? (Yes)
220. Are you inclined to limit your acquaintances to a select few?
(No)
226. Would you rate yourself as a lively individual? (Yes)
230. Do you like to play pranks upon others? (Yes)
233. Is it difficult to "lose yourself" even at a lively party? (No)
235. Would you rate yourself as a talkative individual? (Yes)
238. Are you inclined to keep in the background on social occasions?
(No)
242. Do you nearly always have a "ready answer" for remarks directed at you? (Yes)
243. Do you generally prefer to take the lead in group activities? (Yes)
245. Are you inclined to be quick and sure in your actions? (Yes)
246. Are you inclined to be shy in the presence of the opposite sex?
(No)
250. Are you inclined to keep quiet when out in a social group? (No)
251. Can you usually let yourself go and have a hilariously good time at a gay party? (Yes)
254. Would you rate yourself as a happy-go-lucky individual? (Yes)

Maudsley Personality Inventory N Scale

202. Are you often troubled with feelings of guilt? (Yes)
205. Would you rate yourself as a tense or "high-strung" individual?
(Yes)

206. Have you often felt listless and tired for no good reason? (Yes)
210. After a critical moment is over, do you usually think of something you should have done but failed to do? (Yes)
213. Do you like to indulge in a reverie (daydreaming)? (Yes)
219. Does your mind often wander while you are trying to concentrate? (Yes)
222. Are you inclined to be moody? (Yes)
229. Are you sometimes bubbling over with energy and sometimes very sluggish? (Yes)
231. Do you often experience periods of loneliness? (Yes)
234. Have you often lost sleep over your worries? (Yes)
236. Do you have frequent ups and downs in mood, either with or without apparent cause? (Yes)
237. Do you often find that you have made up your mind too late? (Yes)
239. Are your feelings rather easily hurt? (Yes)
240. Do you often feel disgruntled? (Yes)
241. Do ideas run through your head so that you cannot sleep? (Yes)
244. Do you spend much time in thinking over good times you have had in the past? (Yes)
247. Are you touchy on various subjects? (Yes)
252. Are your daydreams frequently about things that can never come true? (Yes)
253. Do you ever feel "just miserable" for no good reason at all? (Yes)
255. Are you frequently "lost in thought" even when supposed to be taking part in a conversation? (Yes)
256. Have you been bothered by having a useless thought come into your mind repeatedly? (Yes)
258. Are you inclined to ponder over your past? (Yes)
259. Do you sometimes feel happy, sometimes depressed, without any apparent reason? (Yes)

APPENDIX B

INSTRUCTIONS FOR THE RSC SCALE

General Instructions

This inventory consists of two parts. Read the instructions given before each part and then answer the numbered statements.

You are to mark your answers only on the separate answer sheets provided. In marking your answers use only the special pencil provided. Be sure that the number of the statement agrees with the number of the answer sheet. Make your marks heavy and black. Erase completely any answer you wish to change. Do not make any marks on this booklet.

Work quickly and do not ponder too long about the exact shade of meaning of each question. There are no right or wrong answers, and no trick questions.

Instructions for Part I

Read each statement below and decide whether it is true as applied to you or false as applied to you. If a statement is TRUE or MOSTLY TRUE as applied to you, blacken between the lines in the column headed 1. If a statement is FALSE or NOT USUALLY TRUE as applied to you, blacken between the lines in the column headed 2. If a statement does not apply to you or it is something that you don't know about, make no mark on your answer sheet. Remember to give YOUR OWN opinion. Do not leave any blank spaces if you can avoid it.

Instructions for Part II

Please answer each of the following questions "Yes" or "No." If you simply cannot make up your mind, answer "?."

To indicate that your answer is "Yes," completely blacken the space between the lines under column 1 on your answer sheet. To indicate "?" as your answer, blacken the space under column 2. To indicate "No" as your answer, blacken the space between the lines under column 3.

Remember to answer each question.

APPENDIX C

*CENTER'S OCCUPATIONAL INDEX

<u>Category</u>	<u>Occupations Included</u>
1. Large business:	bankers, manufacturers, large department-store owners and managers, etc.
2. Professional:	physicians, dentists, professors, teachers, ministers, engineers, lawyers, etc.
3. Small business:	small retail dealers, contractors, proprietors of repair shops employing others, etc. Includes both owners and managers.
4. White-collar workers:	clerks and kindred workers, salesmen, agents, semiprofessional workers, technicians, etc.
5. Farm owners and managers:	includes any person who owns or manages a farm, ranch, grove, etc.
6. Skilled workers and foremen:	carpenters, machinists, plumbers, masons, printers, etc. Includes foremen. Also barbers, cooks, etc.
7. Farm tenants:	All farm tenants and sharecroppers.
8. Semiskilled workers:	truck drivers, machine operators, service-station attendants, waiters, countermen, etc.
9. Unskilled workers and farm laborers:	garage laborers, sweepers, porters, janitors, street cleaners, construction laborers, and all non-owning, non-renting farm workers except those who work on their own father's farm, etc.

*Taken from Barber, 1957.

APPENDIX D

ALTERNATE CANONICAL VECTORS

TABLE XII

FIRST ALTERNATE CANONICAL VECTORS FOR RESPONSE STYLES
AND PERSONALITY VARIABLES (N = 266)

Personality Variable Weights	Response Style Weights
.38 Verbal Aptitude	.52 Edwards SD Scale
.13 Extraversion	.42 MMPI K Scale
.07 Manifest Anxiety Scale	.15 Maudsley I Scale
.06 Age	.01 Hanley's Sx Scale
.00 Sex	-.49 Marlowe-Crowne SD Scale
-.03 Socioeconomic Status	-.78 MMPI L Scale
-.33 College Affiliation	-1.49 Bass SA Scale
-.39 Neuroticism	
-.75 Conformity	

Canonical Correlation = .56. Significance level is less than .001.

TABLE XIII

SECOND ALTERNATE CANONICAL VECTORS FOR RESPONSE STYLES
AND PERSONALITY VARIABLES (N = 266)

Personality Variable Weights	Response Style Weights
.56 Conformity	1.04 Marlowe-Crowne SD Scale
.39 Extraversion	.85 Edwards SD Scale
.29 Verbal Aptitude	.71 Bass SA Scale
.05 Sex	.19 Maudsley L Scale
-.02 Manifest Anxiety Scale	-.20 MMPI K Scale
-.10 Socioeconomic Status	-2.08 MMPI L Scale
-.20 Age	
-.62 College Affiliation	

Canonical Correlation = .48. Significance level is less than .001.

VITA

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Candidate for the Degree of

Doctor of Philosophy

Thesis: PERSONALITY CORRELATES OF PSYCHOMETRIC RESPONSE STYLES

Major Field: Psychology

Biographical:

Personal Data: Born in Wichita, Kansas, January 23, 1931, the son of Ernest L. and Mildred C. Wikoff.

Education: Attended grade school in Wichita, Great Bend, and Hays, Kansas; graduated from Palmer High School, Colorado Springs, Colorado in June, 1948; received the Bachelor of Arts degree from Bethany Nazarene College in May, 1960; attended Oklahoma University, fall semester, 1960-61; received the Master of Science degree from the Oklahoma State University with a major in psychology in May, 1963; completed the requirements for the Doctor of Philosophy degree in May, 1965.

Professional Organizations: Member of Phi Delta Lambda, national honor society of the colleges of the Church of the Nazarene; member of Psi Chi, national honor society in psychology; member Nebraska State Psychological Association; associate member of the American Psychological Association; member American Association of University Professors.

Experience: Associated with the Municipal University of Omaha as an Instructor in psychology, September, 1964 to present.