A STUDY OF RELATIONSHIPS AMONG
SELECTED PERSONALITY VARIABLES
PERCEIVED LOCUS OF CONTROL
AND STUDENT PREFERRED
LEARNING STYLES

DISSERTATION

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By

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The problem of this study was to search for relationships between selected learning styles as measured by the Grasha-Riechmann Learning Style Scales and personality variables as measured by the Eysenck Personality Inventory and Rotter's Internal-External Locus of Control Scale. An additional problem was to test for differences along the male-female dimension among the personality and attitude variables.

Subjects for the study were one hundred undergraduate education majors at a state university. The sample consisted of thirty-seven males and sixty-three females.

The subjects who agreed to participate in the study were given the Grasha-Riechmann Learning Style Scales, the Eysenck Personality Inventory, and Rotter's Internal-External Locus of Control Scale. With the instructors' permission, they were tested in groups during scheduled class meeting periods. The order in which the tests were administered was varied in the six classes utilized.
Previous research has been directed toward discovering interactions between alternative instructional programs and various personality variables. A partial explanation for the failure to achieve definitive results in this research as well as the failure to find useful predictors of college success may be that individual preferences as to how students feel they learn most effectively has not been emphasized.

The present study was designed to determine if the personality variables measured by the Eysenck and Rotter scales were differentially related to the various learning styles of the Grasha-Riechmann Scale. The factors of the Eysenck and Rotter scales have been shown in other studies to differentially affect student motivation and achievement. The value of the Grasha scales for use in differentiating various learning styles might have been increased by discovering relationships between its scales and personality variables measured by the Eysenck and Rotter scales.

Hypothesis I stated that there would be a significant relationship between scores on the Grasha-Riechmann Learning Style Scales and scores on the Eysenck Personality Inventory. This hypothesis was not generally supported by the inter-correlation analysis. The two exceptions were (1) a significant negative correlation between the Eysenck extroversion scale and the Grasha participant subscale ($r = -0.213, p = 0.022$); and (2) a significant positive correlation between the Eysenck neuroticism scale and the
Hypothesis II stated that there would be a significant relationship between scores on the Grasha-Riechmann Learning Style Scales and scores on Rotter's Internal-External Locus of Control Scale. This hypothesis was not supported by the intercorrelation matrix analysis.

Hypothesis III, which stated that there would be a significant difference between the scores of male and female subjects on the three scales, was supported in these areas; sex was significantly correlated with the Grasha avoidant subscale (-0.1915, p = 0.028), the collaborative subscale (0.1675, p = 0.048), the dependent subscale (0.1801, p = 0.037), and the participant subscale (0.2699, p = 0.003). Sex was not correlated with either the Rotter or the Eysenck scales.

The results indicate that the Grasha-Riechmann Learning Style Scales tap subject factors which are independent of the personality variables measured by the Eysenck and Rotter scales. However, the six Grasha sub-scales were found to be highly intercorrelated in their present form. This would suggest that the value of the Grasha scales for use in differentiating student learning styles would be increased if they were further refined so that the overlap between the subscales is decreased or eliminated.
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CHAPTER I

INTRODUCTION

There is considerable agreement that no one instructional process is optimal for all students (3, 4, 7). Given a common set of objectives, some students will learn more with one instructional program and others with alternative programs. Thus, an important goal for educators is to adapt instructional methods to individual students. This goal has resulted in considerable research aimed at discovering interactions between alternative instructional programs and various personality variables. Although studies in this area have been conducted for several decades, few, if any, striking results have been reported.

McKeachie (9) suggests that a partial explanation for the failure to find useful predictors of college success is that individual preferences as to how students consider they learn most effectively has not been emphasized in the area of aptitude-treatment interaction research. A prerequisite for the correct placement of students in alternative learning environments is to discover valid ways of differentiating students who learn in different ways. The investigation here reported was directed toward the validation of a measure to effect such differentiations.
Statement of the Problem

The problem of this study was to search for relationships between selected learning styles as measured by the Grasha-Riechmann Learning Style Scales (1) and personality variables as measured by the Eysenck Personality Inventory (5) and Rotter's Internal-External Locus of Control Scale (12). An additional problem was to test for differences along the male-female dimension among the personality and attitude variables. The subjects were undergraduate students in elementary and secondary education classes at North Texas State University.

Purpose of the Study

The purpose of the study was to increase the value of the Grasha-Riechmann Learning Style Scales (GRLSS) for use in differentiating various learning styles by discovering relationships between its scales and personality variables measured by the Eysenck Personality Inventory (EPI) and Rotter's Internal-External (I-E) Locus of Control Scale. The factors of these last named two tests have been shown in other studies to affect motivation and achievement. In order to carry out this purpose, the following questions were formulated.

1. Is there a significant relationship between scores on the Grasha-Riechmann Learning Style Scales and scores on the Eysenck Personality Inventory?
2. Is there a significant relationship between scores on the Grasha-Riechmann Learning Style Scales and scores on Rotter's Internal-External Locus of Control Scale?

3. Will there be a significant difference between the scores of male and female subjects on any of the three tests?

Hypotheses

The hypotheses tested in this study were as follows.

1. There is a significant relationship between scores on the Grasha-Riechmann Learning Style Scales and scores on the Eysenck Personality Inventory.

2. There is a significant relationship between scores on the Grasha-Riechmann Learning Style Scales and scores on Rotter's Internal-External Locus of Control Scale.

3. There is a significant difference between the scores of male and female subjects on the three tests.

Background and Significance of the Study

There is considerable information available to college educators about their students. They have access to high-school and college grades, aptitude test data, and scores on achievement tests, to list some of the information. On the whole, this data is of a cognitive nature and is valuable because it accounts for much of the variance in learner achievement in college courses. However, a good deal of the variance is still unaccounted for by this information.
McKeachie (10) states that intelligence and achievement tests have proved to have significant correlations with criteria of college success, but these correlations seldom exceeded .5. Research has also shown that noncognitive factors such as personality variables and affective factors (those which govern a person's feelings) account for some of the variance in learner achievement. Another area of study has been directed toward finding methods of distinguishing the preferred learning styles of different students, and matching these styles with compatible instructional methods.

A prerequisite to the effective matching of student learning styles to instructional methods is to determine if certain personality variables, which have been found to affect motivation and achievement, are also differentially related to certain learning styles. This could also result in the use of a smaller number of predictive instruments, since many of the variables that were not independent of one another would be classified together.

The noncognitive or affective factors whose relationship to academic performance has been explored have included extraversion-introversion, neuroticism (or anxiety), and locus of control. Relationships with all three factors have produced varying but predominately significant results.

The Eysenck Personality Inventory gives measures along the continuums of extraversion-introversion, and neuroticism-stability. Furneaux (6) states that, with both stability-
neuroticism and introversion-extroversion, it is important to realize that they are not descriptive dichotomies, but measurements along a continuous scale. Only a small number of people obtain extreme scores (high or low); the great majority cluster around the center of the categories and incline by only fairly small amounts toward one pole or the other of the two systems. For experimental purposes, however, people are usually divided into the categories of neurotic or stable, and introverted or extraverted, by giving those labels to all who are above or below average in respect to either characteristic.

The EPI has been used in a number of studies to measure the personality dimensions of neuroticism and extraversion-introversion and their relationship to learning, achievement, or teaching strategy. Neuroticism and extraversion-introversion are considered to be unrelated aspects of personality (2,8). Thus, most studies have studied learning in relation to both extraversion-introversion and to neuroticism-stability. The relationships found have varied in different studies. However, a study done by Wankoski and Cox (13) did make these generalizations: Essentially, high neuroticism and extroversion combined inhibit academic achievement and boost failure and withdrawl. The likelihood of stable introverts successfully completing a course was more than three times that for the overall course population. However, there were differences between male and female populations. Among
female students the stable extroverts gained high honors degrees, but for males it was the stable introverts who gained these degrees.

As previously mentioned, locus of control is another personality construct which has been studied in relation to learning and academic achievement. Since the locus of control dimension is usually studied by comparison to scales stressing academic interests, or by comparing I-E scale scores to some aspect of academic performance, it would seem likely that learning skills and achievement behaviors would be related to locus of control.

Bar-Tal and Bar-Zohar (1) state that a review of the literature concerning the relationship between perception of locus of control and academic achievement indicates that internal perception of control is positively related to academic achievement. They suggest that mediating motivational, emotional, and cognitive reactions, which differentiate internals from externals, may account for this relationship. Furthermore, on the basis of data which indicates that the perception of locus of control is a changeable disposition, they suggest structuring learning environments in a way which will induce and maintain realistic internal perception of locus of control.

The EPI and the I-E scales measure personality constructs that are relevant to a wide variety of behaviors in the non-academic as well as the academic environment.
In addition to personality dimensions, there have been attempts to focus specifically on individual learning styles as predictors of academic achievement. The determination that different people learn in different ways has resulted in the use of several methods of differentiating individual learning styles and their relationship to various teaching methods.

One such method, the Grasha-Riechmann Learning Style Scales shows promise as a predictive instrument for relating student response styles to teaching goals and classroom methods. Riechmann and Grasha (11) state that the potential contribution of considering individual student characteristics to the understanding and enhancing of classroom learning is suggested by several studies. In most of these studies, standardized personality tests have been used to identify student characteristics. However, they feel such tests are not always reliable predictors of classroom performance, nor do they give adequate indications of which characteristics interact with academic achievement or with instructional formats. They suggest that, if teachers are to innovate and take student learning needs into consideration, methods of assessing students' learning styles which are relatively easy to use and interpret are needed.

In the present study the Eysenck and Rotter scales were used as a criterion reference to determine if the personality variables they measure were differentially
related to the various learning styles of the Grasha-Riechmann scale. There is some evidence that the relationships of the Eysenck and Rotter scales to learning achievement are further influenced by the instructional methods used. It is possible that individuals whose scores on the Eysenck and the Rotter scales predict lower achievement levels in the traditional classroom could succeed in alternative educational settings.

The relationships between personality variables and preferred learning styles could provide valuable information for college educators and counselors in curriculum planning, and for the appropriate placement of students in alternative programs. The College of Education at North Texas State University is presently offering several alternative programs for students in secondary education. The findings of this study could be of value as a possible placement criterion for the various alternative programs. In addition, personality characteristics previously seen as predictive of poor academic performance may be more accurately characterized as related to different learning styles which are mis-matched with the traditional type of learning environment. Teachers and counselors could use this information to suggest to North Texas State University students who are having problems in their courses that they take the Learning Style Scales and then select the most suitable learning environment available.
Definition of Terms

1. **Learning style** refers to students' characteristic attitudes and feelings regarding how they best process information when learning course material.

2. The **Eysenck Personality Inventory** refers to a theoretically based instrument designed to measure the two pervasive and relatively independent personality dimensions of extraversion-introversion and neuroticism-stability. It is often referred to as the EPI.

3. **Neuroticism** refers to mild, general, emotional instability and overresponsiveness (5).

4. **Extraversion** refers to outgoing, uninhibited, impulsive, and sociable inclinations (5).

5. **Introversion** refers to a tendency to withdraw into oneself, to value thoughts and feelings above action and objects (5).

6. **Locus of control**. In Rotter's (12) theory this refers to a generalized expectancy, operating across a large number of situations, that relates to whether or not an individual possesses or lacks power over what happens to him.

7. **Internal control** refers to an individual's belief that he is usually able to influence the outcome of situations, that his actions produce the reinforcements that follow his efforts (12).
8. **External control** refers to an individual's belief that the rewards and punishments meted out to him are at the discretion of others, or are in the hands of luck or fate (12).

Limitations of the Study

1. This study is limited to the preferred learning styles defined by the Grasha-Riechmann Learning Style Scales.

2. Relationships obtained between learning style scores and personality variables are limited to the personality constructs defined and measured by the Eysenck Personality Inventory and Rotter's Internal-External Locus of Control Scale.

3. The findings obtained in this study are limited to undergraduate education majors in elementary and secondary education classes at North Texas State University who served as subjects in the study.

Procedures for Collecting Data

Subjects for this study were 100 undergraduate education majors at North Texas State University. Fifty-six subjects were enrolled in EDEE 331 courses and 44 were enrolled in EDSE 343 courses. Five of the professors teaching EDEE 331 and EDSE 343 were asked, and gave, their permission for students to be asked to volunteer to take the battery of three tests. They also agreed to allow the tests to be administered during scheduled class meeting periods. The order in which the tests were administered was varied in the
six classes utilized. The total testing time was approximately 45 minutes for each class.

Procedures for Treating Data

The analysis consisted of an intercorrelation matrix which yielded a series of statements about the relationship between each of the six Grasha scales, the three Eysenck scales, the Rotter internal-external score, and sex of subject with each of the other scores mentioned above.

A stepwise multiple linear regression was also done, using the Grasha scale scores, the Eysenck neuroticism and extraversion scores, the Rotter internal-external score, and sex of subject to find the best set of predictor variables for each of the Grasha scale scores. This allowed an examination of the relationships between personality variables to ascertain which best accounted for the variability in each of the six Grasha scales.

Possible sex differences were examined through a series of t-tests on the scores of male and female subjects on the three tests.
CHAPTER BIBLIOGRAPHY


CHAPTER II

REVIEW OF THE LITERATURE

The review of related literature is presented in the following sections: (1) EPI studies related to academic performance, motivation, and teaching methods, (2) locus of control studies which have investigated its relationship to various aspects of education, (3) learning style: its interaction with instructional methods, and (4) inter-relationships among different personality factors.

EPI Studies Related to Academic Performance, Motivation, and Teaching Methods

Since the EPI was introduced in England in 1959, where it was originally titled the Maudsley Personality Inventory (17), it has been used in many studies related to academic learning. Broadbent (4) has shown that students who did well at Cambridge were significantly more introverted than those who did badly. This study also showed that the two groups of students did not differ in intelligence and suggests, therefore, that introversion-extroversion acts independently of intelligence in affecting educational attainment. A study conducted by Furneaux (19) showed that British university students who did well in their courses scored more highly on neuroticism and higher on introversion. Together,
these two investigations showed that good students differed from poor students on the dimensions of extraversion and neuroticism.

Savage (38) investigated the hypothesis that personality factors, in particular neuroticism and extraversion, are important determinants of academic performance. The EPI was given to a total of 168 first-year university students, both male and female, over a three year period. Scores on the test were related to academic performance at the end of their first year. The results of this investigation showed that high scores on both factors were negatively related to academic performance. The groups with the highest neuroticism scores showed the poorest academic performance. In regard to the relationship found between extraversion and academic performance, the most successful group was that with the lowest extraversion scores and the other groups were ordered in the same direction.

Brenglemann, Hahn, Pedley, and Amato (3) designed a pilot study in order to obtain empirical predictions for further investigations into the general problem of personality and learning. The Figure Reconstruction Test was used as the learning task. Personality variables were measured by three questionnaires: The Eysenck Personality Inventory, the Taylor Manifest Anxiety Scale, and the Nighniewitzky Rigidity Scale. Significant correlations were found to exist between learning error and rigidity. Correlations with extraversion
were insignificant, while the results for measures of neuroticism and manifest anxiety varied between those obtained for rigidity and extraversion.

Hargie, Tittmar and Dickson (24) investigated personality correlates of student attitudes to microteaching as part of an investigation and evaluation of microteaching at Ulster College. The EPI was chosen for three reasons: (1) Microteaching places the student in a position of self-exposure, and such situations may be stressful to students who display a high incidence of neuroticism, (2) small group interactions, which are often a feature of microteaching, would tend to favor the more extroverted students, (3) negative feedback, which can often be received by students in microteaching, would favor extroverted students, while introverts should feel ill at ease under such conditions. Subjects were 23 physical education students who were enrolled in a ten week microteaching clinic at Ulster College. In addition to the EPI, the students completed a Microteaching Attitude Inventory (MAI). Both the EPI and the MAI were administered several months after the students had terminated their microteaching. The relationship between extroversion and attitude toward microteaching was positively correlated. Neuroticism was negatively correlated with student attitudes.

The relationship of the EPI scales to serial rate learning was studied by Jenson (28). The EPI was given to 130 students in an introductory course in educational
psychology. Most of the subjects were in the 19 to 21 age range; approximately two-thirds were women. The learning task consisted of learning by the anticipation method a series of nine colored geometric forms. Difficulty was controlled by varying the rate of serial presentation. Students scoring either high or low on the neuroticism (N) and extraversion scales of the EPI were compared on the serial learning task. A highly significant interaction between task difficulty and neuroticism was found. At the slow rate of presentation the high and low N groups did not differ appreciably in learning. The fast rate of presentation, however, greatly hindered the learning of the high N group but had hardly any adverse effect on the learning of the low N group. Extraversion did not show a statistically significant interaction with the learning variables.

The relationship between academic motivation, study methods, introversion, and neuroticism was investigated by Entwistle and Entwistle (16). One hundred and thirty-nine first-year university students and 118 first-year students at a college of education were given the EPI and a questionnaire relating to academic motivation and study methods. Correlational analysis of these scores in relation to academic performance at the end of the first year showed the superiority of introverts and students with good study methods. Introverts also tended to have better study
methods, but this only partially explained their high academic performance. There was no significant relationship between neuroticism and attainment. An additional approach identified the characteristics of successful students by an item analysis. Discrimination indices were also calculated against the internal criteria of motivation, study methods, extraversion and neuroticism. This analysis revealed that items which identified good students were also positively related to stability and introversion.

A number of studies have investigated the relationship between extraversion-introversion, neuroticism, and teaching methods. In a review of these investigations Leith (32) stated that overall extroverts do better on more ambiguous tasks in loosely structured learning situations whereas introverts are more successful in closely guided learning sequences. Leith also suggests that the repeated finding of teaching methods X extroversion-interactions also suggests why many of the methods comparisons in educational research have given "no difference" results. He feels it is not that the different methods are interchangeable, rather that each is successful with different kinds of pupils.

Rowell & Renner (37) administered the EPI to 136 full-time postgraduate Diploma in Education students. The relationships between personality, choice of method of assessment, and achievement in four theory courses were investigated. The hypotheses that introverts are more successful
in structured courses and extraverts more so in relatively unstructured ones were tested and supported. Rowell & Renner state that "the results suggest that EPI scores might be used to show how best to organize a set of parallel systems of teaching and assessing, in line with the course objectives, so that all students may have the opportunity to benefit to their fullest capacity" (p. 236).

Shadbolt (39) conducted two studies in which two comparable teaching strategies were employed to teach students in a college of education material from two different subject areas. Both experiments were designed to investigate the hypothesis that students scoring high on extroversion scales (HiE) would achieve a higher criterion test score after following an unstructured teaching program while LoE students would perform better with a structured program. Additionally, that high anxiety (HiA) students would achieve a better test score after following a structured program which would offer them less stress than an unstructured program. In Experiment One there was a significant first order interaction of extroversion and teaching strategy on a test of problem-solving. In Experiment Two there was a significant first order interaction of neuroticism and teaching strategy on a test of recall. The higher order interactions of extroversion and neuroticism/anxiety with teaching strategy were not significant and gave no indication that a particular cluster of personality characteristics were successful.
Shadbolt (35, p. 230) concluded that

The present state of empirical evidence does not provide a sound basis for developing an adequate program leading to successful aptitude-treatment interactions. Clarification of the nature and form of the critical personality variables (or clusters of variables) is needed; treatments require careful definition in operational terms and the measures of learning outcomes must be clearly specified and clearly discriminated.

Locus of Control Studies Which Have Investigated its Relationship to Various Aspects of Education

Another personality construct which has been studied in relation to learning and academic achievement is locus of control. Since the locus of control dimension is usually studied by comparison to scales stressing academic interests, it would seem likely that learning skills and achievement behaviors would be related to locus of control.

Crandall, Katkovsky and Crandall (10) developed the Intellectual Achievement Responsibility Questionnaire (IAR) which assesses children's beliefs in their own control of reinforcements in intellectual-academic achievement situations. Studies using the IAR with grade school children have shown that internals spent more time in intellectual activities, exhibited more interest in academic pursuits, and scored higher on intelligence tests and other academic tests than did externals (7, 10, 11). One of the findings of the Coleman Report (9) was that children of
minority groups who showed a sense of control of the environment had higher academic achievement than those who did not. Furthermore, internal control was reported to be related to achievement for all minority groups (with the exception of Oriental Americans) at grades 6, 9, and 12.

Several studies have reported significant relationships using college students as subjects. Brown and Strickland (5) examined the cumulative grade point average of seventy-six college seniors and found a significant correlations of .47 between GPA and internality on the Rotter I-E scale in males; a correlation of .16 for females was not significant.

Hammer (23) investigated the effects of differential, written teacher comments on student performance, and the relationship of locus of control of reinforcement with the previously mentioned variables. Exam papers of eighty-seven CCNY undergraduates were assigned to one of three treatment groups: no comment (NC) specified comment (SP), or specified comment/grade expectation considered (SPGE). The Rotter I-E scale was administered to the subjects one week later. Treatment effects were judged by performance on the next exam. Results indicated that (1) SP and SPGE subjects performed better than NC subjects, (2) SPGE subjects performed better than SP subjects and (3) a positive correlation existed between I-E scores and subjects' performance on the second exam. Hammer emphasized the efficacy of adapting feedback to the individual student.
Keller, Goldman and Sutterer (3) examined locus of control in relation to academic attitudes versus study habits, rate of progress, and final achievement based on differential predictions derived from social learning theory and attribution theory. Rotter's I-E scale and the Survey of Habits and Attitudes were administered to 138 undergraduate students in a personalized system of instruction course in introductory psychology. The results of multiple regression analysis indicated that the I-E scale is related only to academic attitudes and that study habits are related to both the performance measures. It was inferred that attribution theory provides the best explanation for these results.

The hypothesis of a linear relationship between sense of control over the environment, measured by Rotter's Scale, and time utilization as indicated by response latency on a computer-administered, computer-recorded verbal ability test was tested with a sample of 63 university students by Gozali, Cleary, Walster and Gozali (21). The hypothesis was supported. "Internals" but not "externals" used time in a manner systematically related to item difficulty. The authors suggest that "their results add to the knowledge that achievement tests measure more thanintellective variables. Most achievement tests have a time limit, and good use of time is important to test performance" (p. 12).
Nord, Connelly and Diagnault (34) studied the relationships among academic achievement in graduate school, perceived locus of control, and the Admissions Test for Graduate Study in Business (ATGSB). Grades in 15 individual courses and overall grade point average were used as the criteria of academic success. The subjects were 50 entering MBA students. It was found that both the ATGSB and I-E scales accounted for significant and often complementary portions of variance in GPA and grades in individual courses. It was suggested that, since the predictive power of the instruments complemented each other, admissions decisions of professional schools could be improved by the addition of a personality measure, such as locus of control. It was also felt that: "locus of control might be a useful predictor of academic success, but that no simple pattern exists. Rather, course content and such factors as teacher behavior may interact with perceived locus of control to determine academic achievement" (p. 960).

The evidence on locus of control differentially affecting academic performance is, however, mixed. Eiseman and Platt (14), Hjelle (25), and Prociuk and Breen (36) found no relationship.

The interaction between teaching strategy and locus of control has also been a part of the area of research directed toward adapting instructional methods to individual differences of students. Johnson and Croft (29) examined the relationship
between locus of control and performance in a personalized system of instruction (PSI) course. The hypotheses tested were (a) internals would complete the course faster and earn higher grades than externals, and (b) change to a more internally directed locus of control subsequent to course participation would be evident. The Rotter I-E scale was administered to 179 college students prior to and upon completion of a PSI course in personality. The hypothesized relationship between locus of control and course performance was not confirmed, but a significant shift toward an internal direction was observed (p. 01).

Relationships between locus of control, teaching strategies, student performance, and student satisfaction were studied by Parent, Forward, Canter and Mohling (35). Fifty-four college students were pre-measured on the I-E scale and randomly assigned to two teaching conditions. In the high discipline condition, students took a 2-hour "mini-course" on computer programming. The course was highly structured, the instructor was formal and strict, and the pace was quite rapid. In the low discipline condition, students were given identical computer programming materials and told to proceed at their own pace with no rules. Results showed that students high on internal locus of control performed better under low discipline conditions, while high external control students performed better under high discipline conditions.
Daniels and Stevens (12) investigated the interaction between internal-external locus of control and two methods of college instruction. Sixty-eight undergraduate subjects were classified as external or internal. Approximately half of the external and half of the internal subjects were given a traditional, teacher controlled method of instruction, the remaining subjects were involved in a contract for grade plan. Both were eight week courses in introductory psychology. At the conclusion of the course all subjects were given a 75 item multiple choice test. Analysis of covariance was used to test the hypothesis of an interaction between I-E and method of instruction. A strong disordinal interaction was found, with internals performing better under the contract plan and externals performing better under the teacher controlled method.

Learning Style; Its Interaction With Instructional Methods and Student Characteristics

Talmadge and Sherrer (40) investigated relationships among instructional methods, the nature of learning experiences, and learning styles. They operationally defined learning style as "an attribute of an individual which interacts with instructional circumstances in such a way as to produce differential learning as a function of these circumstances" (p. 222). The subjects were 231 Navy enlisted men. Learning style was measured by the
administration of a battery of aptitude, interest and personality tests. Two separate subject matter areas which represented two distinctly different learning situations were selected. Two separate courses were selected for each area, one which reflected an inductive instructional approach and the other a deductive method. The primary finding was a significant (p .001) interaction among instructional methods, learner characteristics, and subject matters. It was felt that this finding supported the existence of learning styles.

In a study by Domino (13), one hundred college freshmen were grouped in accordance with their perceptions of how they learning. Some of the groups were then taught in a manner consonant with their perceived learning style while others were taught in a manner dissonant with their orientation. The test data revealed that the students who had been exposed to a teaching style consonant with the ways they believed they learned best then scored higher on tests, fact knowledge, attitude, and efficiency of work than the dissonant groups.

Brown (5) studied the effects of congruency between learning style and teaching style on college student achievement. The subjects were 71 undergraduate education majors. Learning style was measured by an instrument consisting of 28 adjectives on a nine point agree-disagree
continuum. The respondents were to indicate, by means of the adjectives, teaching style characteristics that they perceived to be important if their individual learning were to be maximized. The test was administered at the beginning of an introductory education class and again just prior to the first exam. On the second administration the subjects were told to use the adjectives to indicate the teaching style they had received to that point in the course. It was found that students enter a learning situation with a preconceived notion of what teaching style is best for them. For those subjects who perceived congruency between their preferred style and the teaching style actually received, achievement was greater than for those perceiving incongruency.

Jellema (27) conducted a study to measure the learning styles of students, and to provide evidence of the effectiveness of matching the learning style of the student with an instructional mode. The four objectives of the study were (1) to identify the learning styles of students in various occupational areas; (2) to measure the effectiveness of achievement of the experimental matching of learning style with instructional mode; (3) to measure the extent to which the student characteristics of sex, age, reading comprehension level, and computation skill relate to achievement; and (4) to identify and recommend the directions
for curriculum development in the light of the measured learning styles of the students. One hundred students from the Capital Area Career Center in Michigan served as subjects. The preferred learning styles of the students were measured with the Learning Activities Survey. This instrument measures learning on two continua, concrete/symbolic and structured/unstructured. The two selected instructional modes were direct-detailed and direct discovery. The learning task chosen related to the metric system of measurement. The results showed a preference for "hands-on" learning activities with a mixture of teacher centered/student centered learning environments. The matching of learning style with instructional mode yielded inconclusive results. The student characteristics of sex and reading comprehension level do appear to influence overall achievement as measured in this study.

The Grasha-Riechmann Student Learning Style Scales have been used, to date, in three studies. The first was conducted by Grasha (22) to assess the effectiveness of his learning style scales. The subjects were students in four sections of the same undergraduate psychology course. Two sections were taught by the traditional lecture and general class discussion technique. The other two sections were taught utilizing classroom activities devised to overcome problems associated with the response styles specified by
the Grasha-Riechmann Student Learning Style Scales (GRSLSS). The GRSLSS was administered at the beginning of the quarter. At the end of the quarter, questionnaires were distributed to all four classes to assess the degree to which the students perceived the classes as developing collaborative, participatory, and independent behaviors and attenuating competitive, avoidance, and dependent responses in their classroom-related behaviors. Two general predictions were made. First, that scores on each response style pairing (competitive-collaborative, dependent-independent, avoidance-participant) should be inversely related to each other. Second, that a Classroom Procedure X Response Style interaction would occur. Students in the two experimental sections were expected to judge their behaviors as less competitive, avoidant, and dependent and more collaborative, participatory and independent than those in the two traditional sections. Results showed that both predictions were supported.

Kraft (31) administered the GRSLSS to a random sample of 88 college students enrolled in a school of education. The students were enrolled in physical education and general education classes. Thirty-five of the subjects were males and 53 were females. Thirty-seven students were over age 25 and 51 under 25. The survey was administered during scheduled classes. Subjects were asked to formulate their answers with regard to how they felt about college classes in general, not just the one in which they responded to the
survey. Analysis of the test results revealed the following findings.

1. Males were more independent in their learning style than females; students over age 25 were slightly more independent than those under 25.

2. Males were more avoidant of classroom work than females; students over 25 were less avoidant than those under 25.

3. There was little difference in the collaborative learning style between males and females.

4. Females were more dependent on teachers and peers than males; students over 25 were less dependent than those under 25.

5. Males were far more competitive in the classroom than females; students under 25 were slightly more competitive than those over 25.

6. Females scored higher in the participant category than males; students over 25 scored higher in participation than those under 25.

As there is considerable agreement that no one instructional process is optimal for all students (2, 8, 20), an important goal for educators is to adapt instructional methods to individual differences of the students. As mentioned earlier, McKeachie (33) suggests that a partial explanation for the failure, in
spite of an extensive amount of research, to find useful predictors of college success is that individual preferences as to how students consider they learn most effectively has not been emphasized in the area of aptitude-treatment interaction research.

In the present study the Eysenck and Rotter scales will be used as a criterion reference to determine if the personality variables they measure are differentially related to the various learning styles of the Grasha-Riechmann scale. The Eysenck and the Rotter scales have both been found to relate to learning achievement. In addition, there is some evidence that these relationships are further influenced by the instructional methods used.

Interrelationships Among Different Personality Scales

Thompson, Finkler and Walker (40) designed a study which attempted to answer the following questions: What are the relationships between scores on five cognitive styles tests, and between scores on these tests, student characteristics, and achievement in different disciplines for college students? The subjects were 378 students enrolled in experimental Learning Analysis courses. This is a primarily freshman level course intended to help students understand their own learning reactions in a variety of instructional contexts. The subjects were enrolled in the course at four different institutions in Nebraska. The cognitive style measures used were the Group Embedded Figures Test (GEFT),
a group measure of field independence/dependence; the
Grasha-Riechmann Student Learning Style Scales (GRSLSS); the
Adult Norwicki and Strickland Locus of Control Scale (ANS-IE)
which is a locus of control measure for college and non-
college adults which attempts to identify the degree of
internal or external locus of generalized expectancies of
reinforcement as defined by Rotter; and the Mehrakian Stimulus
Screening Test (MSST) which is a measure of individual
differences in sensitivity to or ability to screen out
irrelevant verbal stimuli; and the Kolb Learning Style
Inventory (LSI) which is designed in a manner that allows
the student to respond to it in a way similar to responding to
a learning situation. Data collected concerning student
characteristics included: sex, age, major, and self-ratings
of interest in taking courses in 12 discipline areas. The
results indicated that the GEFT, ANS-IE, and the MSST scales
appear to contribute independent information. The Kolb LSI
appears to be relatively independent of these scales as well
and reasonably internally consistent across subscales. The
GRSLSS subscales relate variably across schools to the other
measures of cognitive style, and relate inconsistently among
themselves. The 2 x 6 ANOVA's for the six GRSLSS subscales
did yield three instances where main effects for both sex
and major were significant. This was true for the Avoidant,
Participant, and Competitive subscales. It was concluded
that each measure may be important to explore further in
other academic settings. More information is needed as to whether they contribute independently to students' understanding of their learning styles and whether they provide redundant information, or are not related to educational outcomes.

Bertinot (1) conducted a study to investigate the relationship between choice of learning format and personality type, cognitive construct and locus of control. The major problem was to determine if choice of learning format was a function of selected individual characteristics. A sample of 70 undergraduate university students were tested using the Myers-Briggs Type Indicator which is a personality inventory, the Group Embedded Figures Test, and Rotter's I-E Scale. The results indicate that subjects in the traditional educational format and subjects in the non-traditional educational format are samples from the same population as defined by the Myers-Briggs Type Indicator. Thus, this study indicates that the personality characteristics measured by this inventory do not predict choice of learning format. No significant relationships were indicated between scores on the GEFT or the I-E Scale and choice of format.

Fontenot (18) conducted an investigation to determine the relationship between personality variables (high anxiety vs low anxiety, extraversion vs introversion, tough poise vs responsive emotionality, independence vs dependence) and
course performance of senior elementary education majors within three competency-based models of instruction. An evaluation was conducted in order to ascertain which instructional treatment afforded the most effective and efficient learning when interacted against identified personality variables. Results indicated that there were no significant relationships between the three instructional treatments x personality interaction on the following measures: (1) treatment x anxiety interaction, (2) treatment x tough poise-responsive emotionality interaction. Further analysis indicated that there was a significant relationship among treatment x introversion-extraversion interaction and treatment x independence-dependence interaction. In addition, the analysis indicated significant differences in personality factors main effects for the following measures: (1) anxiety, (2) extraversion-introversion, and (3) independence-dependence.

Although the interaction and grouping of a number of student characteristics appears to result in a more complete picture of the successful student, the correlations are often small. The real fault may lie in the nature of the statistical approach. Entwistle and Brennan (15) attempted to rectify the faults of earlier statistical techniques by using cluster analysis. In this classification, procedures compare similarities between people and indicate groups of people that have the same pattern of scores. Automatic interaction
detection allows subgroups to be produced on the basis of these interactions rather than on arbitrary or subjective decisions. In their study, they found twelve such clusters of university graduates: three associated with high achievement (1 to 3), through seven clusters of average achievement, to those associated with students of low attainment (10 to 12). The student characteristics measured included: numerical and verbal ability, motivation, study methods and examination taking techniques, introversion, stability-instability, tough vs tender mindedness, religious values, and neuroticism.

Based on experience with hundreds of college students, Hunter (26) suggests that measurable personality factors such as learning style, anxiety, and locus of control are related to academic achievement, and that mode of presentation of instructional content is also a powerful predictor of the success of students in college courses. It would appear, on the basis of the studies previously described, that there are many researchers in agreement with Hunter. The studies also suggest that the question of the interrelationships among these personality factors is a relevant precursor to any attempts to match students, on the basis of their individual characteristics, to alternative educational programs.
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CHAPTER III

METHOD

Subjects

The subjects involved in this study were 100 undergraduate education majors enrolled in two EDEE 331 and four EDSE 343 courses in the Department of Education at North Texas State University. There were 37 male and 63 female subjects in the sample. These classes were not selected according to a prescribed sampling plan. They were chosen because of their availability for research use at the time this study was being conducted. The sample was obtained by visiting classes, with the instructor's permission, and by asking for volunteers.

Description of Instruments

The Grasha-Riechmann Student Learning Style Scale (13) was specifically designed to assess six learning styles:

1. Competitive, (2) Collaborative, (3) Avoidant,
(4) Participant, (5) Dependent, and (6) Independent (31).

The six learning styles are defined as follows:

1. Competitive. This response style is exhibited by students who learn material in order to perform better than others in the class. They feel they must compete with other students in the class for the rewards of the classroom, such
as grades or teachers' attention. They view the classroom as a win-lose situation, where they must always win.

2. **Collaborative.** This style is typical of students who feel they can learn the most by sharing ideas and talents. They cooperate with teachers and peers and like to work with others. They see the classroom as a place for social interaction as well as content learning.

3. **Avoidant.** This response style is typical of students who are not interested in learning course content in the traditional classroom. They do not participate with students and teachers in the classroom. They are uninterested or overwhelmed by what goes on in classes.

4. **Participant.** This style is characteristic of students who want to learn course content and like to go to class. They take responsibility for getting the most out of class and participate with others when told to do so. They feel that they should take part in as much of the class related activity as possible and little that is not part of the course outline.

5. **Dependent.** This style is characteristic of students who show little intellectual curiosity and who learn only what is required. They see teacher and peers as sources of structure and support. They look to authority figures for guidelines and want to be told what to do.

6. **Independent.** This response style is characteristic of students who like to think for themselves. They prefer to
work on their own, but will listen to the ideas of others in the classroom. They learn the content they feel is important and are confident in their learning abilities.

The scales consist of 90 statements, 15 for each subscale. They provide a profile of an individual rather than a single preferred style (5). The total score for each category is the sum of the scores for the 15 questions in that scale. Large scale scores indicate the student's learning style is characteristic of that category.

Reliability and validity of the Grasha-Riechmann Student Learning Style Scales. According to Grasha (13), to select items for the GRSLSS each of 34 undergraduate college students, 21 females and 13 males, were asked to pick 48 items from an 84 item pool. The 84 items had been designed by Riechmann and Grasha to tap dimensions in each of the six scale definitions. This was done in such a way as to yield 1r items for each of the six scales. Students were used to select the best items from this pool to use in the instrument, since they were deemed to be the best judges of student classroom behaviors and preferences. Support for the use of students as item judges in another context is provided in a study by Strickler, Jacobs and Kogan (15). In Grasha's study, the criterion for inclusion of an item in the scales was set at 70 per cent agreement among subjects. With the use of this criterion, it was possible to obtain eight items for each of the scales except the Participant
scale. The criterion was lowered to 59 per cent to obtain eight items for that scale. Of the 48 items selected for the GRSLSS, 28 were consistently sorted into a category 80 per cent of the time. The remaining seven items in each scale were chosen in the same way at a later date.

A "rational approach" was used to evaluate the construct validity of the GRSLSS, which also yielded relatively high temporal reliability coefficients (range across scales $r = .76$ to $r = .83; N = 269$). A crucial problem in collecting construct validity data was to decide what constituted an appropriate criterion measure as there seemed to be no obviously related, pretested criterion measure available. The hypothesized constructs underlying the learning styles were not easily related to traditional personality variables. In view of these considerations, it seemed reasonable that a measure of classroom behavior would be the best criterion.

The development of such an instrument was as follows: In phase one, 21 undergraduate student volunteers worked in small groups to suggest criterion items. Each student was given six cards with the definition of a scale on each. On the basis of these definitions, they were asked to predict specific classroom behaviors and preferences students with each of the styles would exhibit. In phase two, 71 items were written from the approximately 575 suggestions generated by the small groups. Items were written to reflect those behaviors and preferences consistently suggested to be
appropriate for each style. In phase three, 264 sophomore psychology students responded to both the GRSLSS and the Criterion Item Questionnaire. The correlations of the scales with the criterion items provided evidence for the construct validity of the learning style scales. In the area of predictive validity, it was hypothesized that the Avoidant student would be likely to get low grades, and the correlation between the Avoidant scale and grade point average was found to be -.34. A large number of the predicted correlations for the Participant scale were also found to be statistically significant. It was hypothesized that this type of student would function effectively in the classroom environment. This hypothesis was supported by the positive correlation ($r = .23$) between this scale and grade point average and also by the correlations between the scale and the criterion items. The Collaborative scale correlated with 67 per cent of the criterion items with which it was predicted to correlate. Because the emphasis in this scale is on interpersonal behavior rather than on behaviors related directly to content learning, no significant correlations between the scale scores and grade point average was expected. None was found. The validity evidence on the Dependent, Competitive and Independent scales was not as strong as for the other three.

In regard to reliability, in the initial study, the test-retest reliability coefficients ($N = 93$) ranged from
.64 for the Independent and Competitive scales to .78 for the Participant scale and .79 for the Avoidant scale. Significant male-female differences were not noted. It was on the basis of the data from this study that the number of items per scale was increased in the second study from eight to fifteen. The test-retest reliabilities (seven-day interval between testings) on the expanded instrument increased over those on the eight item instrument. The new reliability coefficients for males (N = 119) were as follows: Independent, .84; Avoidant, .82; Collaborative, .81; Dependent, .81; Competitive, .84; Participant, .89. The reliability of the scales were slightly lower for females. Coefficients for females (N = 150) were: Independent, .82; Avoidant, .76; Collaborative, .78; Dependent, .73; Competitive, .81; Participant, .74. Total sample coefficients (N = 269) were: Independent, .83; Avoidant, .79; Collaborative, .80; Dependent, .76; Competitive, .82; and Participant, .82. The scale is reproduced in Appendix B.

The Eysenck Personality Inventory (1) is a brief and highly reliable measure of two relatively independent broad factors of personality, neuroticism and extraversion-introversion. Each of these traits is measured by means of 24 questions, selected on the basis of item and factor analyses, to which the examinee answers "yes" or "no." A response distortion (Lie) scale consisting of 9 items is also included to detect attempts to falsify responses. None of
the items can be viewed as socially objectionable; thus it can be used with individuals in many settings. According to Jensen (7) the reliability of the EPI is among the highest to be found for personality inventories. In regard to its validity, Jensen states that no other personality test is based upon a body of psychological theory so diligently and ably researched. The test-retest reliability of the EPI was studied in two groups of normal English subjects. The time between test and retest was approximately one year for one group and nine months for the other. The test-retest reliabilities ran between .84 and .94 for the complete test and between .80 and .97 for the separate forms (A and B). If individual decisions are to be made on the basis of the EPI, both forms should be used; for experimental studies one form alone is sufficient. In an American college sample correlations between the scales were -.01 for form A (N = 1,003) and -.11 for form B (N = 231). Farley (3) investigated the relationship between extraversion and neuroticism in seven separate English samples with a total sample size of 1478. No significant correlations were obtained, the values ranging from .12 to -.16. These values are near enough to zero to make the scales, for all practical purposes, independent.

The factorial validity of the EPI was studied in a large scale analysis by Eysenck and Eysenck (2). This study provided evidence of the existence and orthogonality of the
two dimensions of neuroticism and extroversion-introversion. The obtained correlations between the scales were again virtually zero. In the matter of concurrent validity, the E and N scales from the MPI and the present EPI are highly correlated with other measures purporting to measure these dimensions. In a study related to smoking habits Keutzer (9) related the EPI form A to Cattell's IPAT Anxiety scale and obtained a correlation of .74 in a sample of 146. Correlations of the EPI against the Multiple Affect Adjective Checklist have been obtained under the two different test sets upon which the MAACL has been standardized by Zuckerman (16). The EPI is related to the MAACL trait measures of affect but is not related to specific states of affect. The predictive validity of the EPI is suggested by three studies. Furneaux (4) investigated the personality dimensions of neuroticism and extraversion and failure rate on examinations by students in various branches of engineering. Examination failure rate varied greatly, with the neurotic introvert group showing the lowest failure rate (21 per cent) and the stable extravert group showing the highest failure rate (60 per cent).

Lynn (10) and Lynn and Gordon (11) found that good academic achievers were characterized by high neuroticism and by introversion. Lynn and Gordon have also predicted and obtained a positive and significant correlation between introversion and persistence at a mental task. Finally, the
scales have been shown to be independent of intelligence but are related to overall emotional adjustment and to outgoingness of the personality. The different personality qualities of introverts and extraverts make it probable that they will be best adapted to different types of work. The scale is reproduced in Appendix C.

The Rotter Internal-External Locus of Control Scale (14) is a 29 item forced-choice test including 6 filler items intended to make the purpose of the test somewhat more ambiguous. It is considered to be a measure of the subject's generalized expectancy about the nature of the world. The items deal exclusively with the subject's belief about the nature of the world, none of the items is directly addressed to the preference for internal or external control. Research on the I-E scale was reviewed by Joe (8). He states that the test-retest reliability of the I-E scale is consistent and acceptable, varying between .49 and .83 for varying samples and intervening time periods. Discriminant validity is indicated by the low relationships with such variables as intelligence, social desirability, and political liberalness. For discriminant validity Rotter (14) reported that correlations with the Marlow-Crowne Social Desirability Scale range from -.07 to -.35. In addition, correlations with Edward's Social Desirability Scales have been found to range between -.23 and -.70. Hersch and Scheibe (6) found nonsignificant correlations between I-E Scale total scores
and three different measures of intelligence; and Minton (12) reported that the internal-external scores of sixty-nine males were unrelated to political liberalism or conservatism, "left" versus "right" ideology, or attitudes or international relations.

An internal consistency coefficient for reliability (Kuder-Richardson) of .70 was obtained from a sample of four hundred college students (14). For two subgroups of Rotter's (14) sample, test-retest reliability coefficients were computed, with a value of .72 for sixty college students. Subsequent retest coefficients were somewhat lower (.55) as a result of passage of time (two months) and differences in administration-group versus individual. The scale is reproduced in Appendix D.

Procedures for Collecting Data

Permission was granted by each instructor for their students to participate on a volunteer basis in this study during class time. The size of the groups varied according to the number of students in each class who agreed to participate.

Prior to administering the three scales, the following statement was read to each group:

As part of my dissertation study I want to determine the ways in which different people feel they learn best, and what other personality factors may relate to individual learning styles. The results are for my study only, they will not be used for any other purpose. I don't want your names, just your social security number and your sex on each questionnaire. However, if any
of you should want to know your results put your name and address on the first inventory and I will send you a summary of your results when I have scored them.

The summary form is reproduced in Appendix A.

The order in which the three scales were administered was varied in the different groups to avoid the possibility of an order effect. The instructions for each instrument were those provided with each scale. The total testing time for each group was approximately forty-five minutes.

Procedures for Treating Data

The analysis consisted of an intercorrelation matrix which yielded a series of statements about the relationship between each of the six Grasha scales, the three Eysenck scales, the Rotter internal-external score and sex of subject with each of the other scores mentioned above.

A stepwise multiple linear regression was also done, using the Grasha scale scores, the Eysenck neuroticism and extraversion scores, the Rotter internal-external score and sex of subject to find the best set of predictor variables for each of the Grasha scale scores. This allowed an examination of the relationships between personality variables to ascertain which best accounted for the variability in each of the six Grasha scales.

Possible sex differences were examined through a series of t-tests on the scores of male and female subjects on the three tests.
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CHAPTER IV

RESULTS

Introduction

The data collected during the experimental procedure were subjected to analysis by three statistical techniques: (1) Pearson's product moment correlation, (2) t-tests, and (3) stepwise multiple linear regression. A probability level of .05 was chosen as the criterion for rejecting or retaining the hypotheses. Correlation coefficients were generated by the SPSS (2) subprogram Pearson product moment correlation. For this study, the Program output an 11 by 11 matrix of intercorrelations which included the relationships between the 6 Grasha subscales, the 3 Eysenck scales, the Rotter scale, and sex of the subjects.

Testing of Hypotheses

Hypothesis 1. There is a significant relationship between scores on the Grasha-Riechmann Learning Style Scales and scores on the Eysenck Personality Inventory. Relationships between the EPI, which has been shown in earlier research to affect motivation and achievement, and the Grasha scales might have augmented the utility of the Grasha scales for use in differentiating various learning styles.
Table I presents the correlations between the Grasha subscales and the Eysenck extraversion scale. It can be seen from this table that only the Grasha participant subscale showed a significant correlation with the Eysenck extraversion scale.

**TABLE I**

CORRELATION BETWEEN THE GRASHA-RIECHMANN LEARNING STYLE SCALES AND THE EYSENCK PERSONALITY INVENTORY EXTROVERSION SCALE (N = 100)

<table>
<thead>
<tr>
<th></th>
<th>Eysenck Extroversion Scale</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>r</td>
<td>p</td>
</tr>
<tr>
<td>Grasha Independent</td>
<td>0.270</td>
<td></td>
<td>N.S.</td>
</tr>
<tr>
<td>Grasha Avoidant</td>
<td>0.1031</td>
<td></td>
<td>N.S.</td>
</tr>
<tr>
<td>Grasha Collaborative</td>
<td>0.1539</td>
<td></td>
<td>N.S.</td>
</tr>
<tr>
<td>Grasha Dependent</td>
<td>0.1408</td>
<td></td>
<td>N.S.</td>
</tr>
<tr>
<td>Grasha Competitive</td>
<td>0.034</td>
<td></td>
<td>N.S.</td>
</tr>
<tr>
<td>Grasha Participant</td>
<td>-0.2013*</td>
<td>0.022</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05
Table II presents the correlations between the Grasha subscales and the Eysenck neuroticism scale. The data presented in Table II indicates that the only significant correlation was between the Grasha competitive subscale and the Eysenck neuroticism scale.

### TABLE II

**CORRELATION BETWEEN THE GRASHA-RIECHMANN LEARNING STYLE SCALES AND THE EYSENCK PERSONALITY INVENTORY NEUROTICISM SCALE**

*(N = 100)*

<table>
<thead>
<tr>
<th></th>
<th>Eysenck Neuroticism Scale</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><em>r</em></td>
<td><em>p</em></td>
</tr>
<tr>
<td>Grasha Independent</td>
<td>-0.1378</td>
<td>N.S.</td>
<td></td>
</tr>
<tr>
<td>Grasha Avoidant</td>
<td>0.1499</td>
<td>N.S.</td>
<td></td>
</tr>
<tr>
<td>Grasha Collaborative</td>
<td>0.0432</td>
<td>N.S.</td>
<td></td>
</tr>
<tr>
<td>Grasha Dependent</td>
<td>0.0842</td>
<td>N.S.</td>
<td></td>
</tr>
<tr>
<td>Grasha Competitive</td>
<td>0.1900*</td>
<td>0.029</td>
<td></td>
</tr>
<tr>
<td>Grasha Participant</td>
<td>-0.0820</td>
<td>N.S.</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05*
It can be seen from Tables I and II that there were only two significant effects between the Grasha subscales and the Eysenck Personality Inventory. Thus, research hypothesis 1 was, for the most part, not supported.

Hypothesis 2. There is a significant relationship between scores on the Grasha-Riechmann Learning Style Scales and scores on Rotter's Internal-External Locus of Control Scale. Rotter's scale has also been shown in other studies to affect motivation and achievement. It was felt that the value of the Grasha scales for differentiating various learning styles might also be increased if relationships were discovered between the Grasha scales and Rotter's I-E Scale.

Table III presents the correlations between the Grasha subscales and Rotter's I-E Scale. Examination of this table shows that there were no significant correlations between the I-E Scale and any of the Grasha subscales. Rotter's scale is scored in the external direction, that is, a high score on the scale indicates a highly external orientation.

Hypothesis 3. There is a significant difference between the scores of male and female subjects on the three scales. Sex (see Table IV) correlated significantly with four of the Grasha subscales (avoidant, collaborative, dependent, and participant), but not with the Rotter or Eysenck scales.
TABLE III

CORRELATION BETWEEN THE GRASHA-RIECHMANN LEARNING STYLE SCALES AND ROTTER'S INTERNAL-EXTERNAL LOCUS OF CONTROL SCALE

\(N = 100\)

<table>
<thead>
<tr>
<th>Grasha Learning Style</th>
<th>Rotter's I-E Scale r</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>-0.1432</td>
<td>N.S.</td>
</tr>
<tr>
<td>Avoidant</td>
<td>0.1600</td>
<td>N.S.</td>
</tr>
<tr>
<td>Collaborative</td>
<td>-0.0588</td>
<td>N.S.</td>
</tr>
<tr>
<td>Dependent</td>
<td>0.0514</td>
<td>N.S.</td>
</tr>
<tr>
<td>Competitive</td>
<td>0.1063</td>
<td>N.S.</td>
</tr>
<tr>
<td>Participant</td>
<td>-0.1414</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

Table III indicates that research hypothesis 2 was not supported.
### TABLE IV

**CORRELATIONS BETWEEN SEX AND THE SIX GRASHA-RIECHMANN LEARNING STYLE SUBSCALES**  
(N = 100)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Grasha Independent</th>
<th>Grasha Avoidant</th>
<th>Grasha Collaborative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.0076</td>
<td>-0.1915*</td>
<td>0.1675*</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.221</td>
<td>0.028</td>
<td>0.048</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>Grasha Dependent</th>
<th>Grasha Competitive</th>
<th>Grasha Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.1801*</td>
<td>-0.0949</td>
<td>0.2699**</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.037</td>
<td>0.174</td>
<td>0.003</td>
</tr>
</tbody>
</table>

* p<.05  
** p<.01
The significant positive correlations between sex and the Grasha collaborative, dependent, and participant subscales indicate that female subjects were most likely to have high scores on those three subscales. The significant negative correlation between sex and the Grasha avoidant subscale indicates that male subjects were most likely to have high avoidant scores. These results are in agreement with those of Kraft (1), with the exception of the finding regarding the collaborative subscale. In Kraft's study there was little difference between males and females in the collaborative learning style.

T-tests for significant differences between the male and female scores were also calculated. Sex differences on the Eysenck and Rotter scales did not reach significance. The only significant test for mean sex differences was the one involving the Grasha participant subscale \( (t = -2.55, \ df \ 58, \ p = 0.013) \). The reduction in degrees of freedom (98 down to 58) was necessitated by a significant test on the homogeneity of sample variances (reject null; \( F = 1.93, \ p = 0.022 \)) which requires that a separate variance estimate instead of an exact \( t \) be computed. The result of this test indicated that males were significantly less participant, as measured by the Grasha participant subscale, than females. Sex differences on two other subscales approached, but did not reach, significance. These two subscales were the Grasha avoidant \( (t = 1.93, \ df = 98, \)
p = 0.056) and Grasha dependent (t = -1.81, df = 98, p = 0.073). The t-tests for male and female scores and the Grasha subscales are shown in Table V.

The results of the t-tests on all three scales as discussed above indicate that, in most instances, the null hypothesis was retained for hypothesis 3.

Due to the lack of relationships between the Grasha subscales and the Eysenck and Rotter scales, little in the way of meaningful regression equations were found. The only significant predictor equation involved Rotter's I-E Scale, sex, and the Eysenck extraversion scale which predicted scores on the participant subscale of the Grasha (F = 4.77605, df = 3/96, p<.01). They were, at best a poor predictor set as they accounted for only 13 percent of the total variance.
### TABLE V

**T-TESTS FOR SIGNIFICANT DIFFERENCES BETWEEN THE MALE AND FEMALE SCORES ON THE SIX GRASHA- RIECHMANN LEARNING STYLE SUBSCALES (M=37, F=63)**

<table>
<thead>
<tr>
<th>Grasha Style</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>F Ratio</th>
<th>T Value</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4.4595</td>
<td>0.960</td>
<td>2.04</td>
<td>0.77</td>
<td>0.013</td>
</tr>
<tr>
<td>Female</td>
<td>4.3333</td>
<td>0.672</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoidant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3.0000</td>
<td>0.816</td>
<td>1.06</td>
<td>1.93</td>
<td>0.056</td>
</tr>
<tr>
<td>Female</td>
<td>2.6667</td>
<td>0.842</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaborative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4.7838</td>
<td>1.109</td>
<td>1.81</td>
<td>-1.68</td>
<td>0.040</td>
</tr>
<tr>
<td>Female</td>
<td>5.1111</td>
<td>0.825</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4.5135</td>
<td>0.804</td>
<td>1.06</td>
<td>-1.81</td>
<td>0.073</td>
</tr>
<tr>
<td>Female</td>
<td>4.8095</td>
<td>0.780</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3.7838</td>
<td>0.672</td>
<td>1.45</td>
<td>0.94</td>
<td>0.232</td>
</tr>
<tr>
<td>Female</td>
<td>3.6349</td>
<td>0.809</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4.8919</td>
<td>1.220</td>
<td>1.93</td>
<td>-2.55*</td>
<td>0.013</td>
</tr>
<tr>
<td>Female</td>
<td>5.4762</td>
<td>0.877</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

* *p<.05*
CHAPTER BIBLIOGRAPHY


CHAPTER V

SUMMARY

The purpose of this study was to test the relationships between the Grasha-Riechmann Learning Style Scales, the Eysenck Personality Inventory, and Rotter's Internal-External Locus of Control Scale. Additionally, tests for sex differences among the personality and attitude variables were conducted. The reason for this procedure was to determine whether the Grasha-Riechmann Learning Styles Scales add unique information to an assessment battery, or whether there are relationships between these scales and personality variables measured by the Eysenck Personality Inventory and Rotter's Internal-External Locus of Control Scale.

Subjects for the study were one hundred undergraduate education majors selected from courses in EDEE 331 and EDSE 343 in the College of Education at North Texas State University. The sample was comprised of thirty seven male and sixty three female subjects.

The instruments used in the study were: the Grasha-Riechmann Learning Style Scales, the Eysenck Personality Inventory, and Rotter's Internal-External Locus of Control Scale.
Hypothesis I, which predicted in the research form that there would be a significant relationship between scores on the Grasha-Riechmann Learning Style Scales and scores on the Eysenck Personality Inventory, was not generally supported by the intercorrelation analysis. The sole exceptions were: (1) a significant correlation between the Eysenck extroversion scale and the Grasha participant subscale. These two factors yielded a significant negative correlation. This indicated that the more extroverted the subjects were, the less likely they were to be participant as depicted by the Grasha participant subscale; and (2) a significant positive correlation between the Grasha competitive subscale and the Eysenck neuroticism scale.

Hypothesis II, which predicted in the research form that there would be a significant relationship between scores on the Grasha-Riechmann Learning Style Scales and scores on Rotter's Internal-External Locus of Control Scale was not supported by the intercorrelation matrix analysis. This means that there was no relationship between the dimension of internality-externality and any of the Grasha subscales.

Hypothesis III, which predicted in the research form that there would be a significant difference between the scores of male and female subjects on the three scales was supported in these areas; sex was significantly correlated with the Grasha avoidant, collaborative, dependent, and participant subscales, but not correlated with the Rotter or Eysenck scales.
The stepwise multiple linear regression, using the Rotter scale, sex, and the three Eysenck scales (extraversion, neuroticism, and lie) as predictors of the Grasha scales, yielded meager findings. Only the multiple correlations involving the Grasha participant subscale were significant. The best three variable predictor equation of the participant subscale involved the Rotter, sex, and the Eysenck extroversion scale. Adding more predictor variables did not increase efficiency. The best single predictor was sex. Female subjects were more participant-oriented than male subjects.

Conclusions

The following conclusions were formulated, based on the findings of this study.

1. There was a significant relationship between the Grasha participant subscale and the Eysenck extraversion scale.

2. There was a significant relationship between the Grasha competitive subscale and the Eysenck neuroticism scale.

3. There were significant relationships between sex and the following four Grasha subscales: avoidant, collaborative, dependent, and participant.

4. The Grasha-Riechmann Learning Style Scales tap subject factors which are not related to personality variables as measured by the Eysenck and Rotter Scales.
This finding is in accordance with the opinion of Riechmann and Grasha (4) in regard to a criterion measure for the scales. They concluded that the hypothesized constructs underlying the six learning styles were not easily related to traditional personality variables.

5. The Grasha scales appear to tap an independent dimension in this group of subjects. However, the Grasha subscales were found, in the present study, to be highly intercorrelated (see Table VI).

TABLE VI

INTERCORRELATIONS AND PROBABILITY LEVELS FOR THE SIX GRASHA SUBSCALES

(N = 100)

<table>
<thead>
<tr>
<th>Grasha IN</th>
<th>Grasha AV</th>
<th>Grasha CL</th>
<th>Grasha DP</th>
<th>Grasha CP</th>
<th>Grasha PT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasha IN</td>
<td>-0.1823*</td>
<td>0.4510***</td>
<td>0.1188</td>
<td>0.1477</td>
<td>0.5014*</td>
</tr>
<tr>
<td></td>
<td>p=0.035</td>
<td>p=0.000</td>
<td>p=0.119</td>
<td>p=0.071</td>
<td>p=0.000</td>
</tr>
<tr>
<td>Grasha AV</td>
<td>0.1823</td>
<td>---</td>
<td>-0.3055***</td>
<td>-0.0495</td>
<td>0.2119*</td>
</tr>
<tr>
<td></td>
<td>p=0.035</td>
<td></td>
<td>p=0.001</td>
<td>p=0.312</td>
<td>p=0.071</td>
</tr>
<tr>
<td>Grasha CL</td>
<td>0.4510</td>
<td>0.3055</td>
<td>---</td>
<td>0.3967***</td>
<td>0.1076</td>
</tr>
<tr>
<td></td>
<td>p=0.000</td>
<td>p=0.001</td>
<td></td>
<td>p=0.000</td>
<td>p=0.014</td>
</tr>
<tr>
<td>Grasha DP</td>
<td>0.1188</td>
<td>-0.0495</td>
<td>0.3967</td>
<td>---</td>
<td>0.3110***</td>
</tr>
<tr>
<td></td>
<td>p=0.119</td>
<td>p=0.312</td>
<td>p=0.000</td>
<td></td>
<td>p=0.001</td>
</tr>
<tr>
<td>Grasha CP</td>
<td>0.1477</td>
<td>0.2119</td>
<td>0.1076</td>
<td>0.3110</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>p=0.071</td>
<td>p=0.017</td>
<td>p=0.143</td>
<td>p=0.001</td>
<td></td>
</tr>
<tr>
<td>Grasha PT</td>
<td>0.5014</td>
<td>-0.5300</td>
<td>0.5199</td>
<td>0.4677</td>
<td>0.1144</td>
</tr>
<tr>
<td></td>
<td>p=0.000</td>
<td>p=0.000</td>
<td>p=0.000</td>
<td>p=0.000</td>
<td>p=0.128</td>
</tr>
</tbody>
</table>

* * * * p<.05
*** p<.001
Recommendations

1. It is recommended that the Grasha subscales be further refined so that they are less related. In their present form there appears to be too much overlap between the subscales.

2. Another direction for further research would be to determine if there are correlations between the Grasha scales and other personality variables which have been found to be related to academic achievement but which were not utilized in the present study. Some instruments which might be studied in relation to the Grasha scales are: the Mehrabian Stimulus Screening Test (3) which is a measure of individual differences in spontaneous response to the rate of environmental information, what Mehrabian calls sensitivity to or ability to screen out irrelevant stimuli; Gough's (1) Achievement via Conformance and Achievement via Indépendence scales from the California Psychological Inventory; and the Human Trait Inventory (5), a personality instrument which was constructed from items which previous research had found to differentiate between discrepant achievers.

3. The sex differences found in this study were not strong. It is recommended that if the scales are further refined, additional research to determine the extent and direction of sex differences be undertaken.
4. As the present results may hold true only for the sample of undergraduate education majors used in this study, it is recommended that the study be replicated using students in other academic fields. An additional factor which might be included would be to add an external criterion, such as grade point average, to a replication.
CHAPTER BIBLIOGRAPHY


APPENDIX A

Summary of Results Form

Grasha-Riechmann Student Learning Styles Questionnaire

The six student learning styles identified by Tony Grasha and Sheryl Riechmann are listed below:

Competitive. This response style is exhibited by students who learn material in order to perform better than others in the class. They feel they must compete with other students in the class for the rewards of the classroom, such as grades or teachers' attention.

Collaborative. This style is typical of students who feel they can learn the most by sharing ideas and talents. They cooperate with teachers and peers and like to work with others. They see the classroom as a place for social interaction as well as content learning.

Avoidant. This response style is typical of students who are not interested in learning course content in the traditional classroom. They do not participate with students and teachers in the classroom. They are uninterested or overwhelmed by what goes on in classes.

Participant. This style is characteristic of students who want to learn course content and like to go to class. They take responsibility for getting the most out of class and participate with others when told to do so. They feel that they should take part in as much of the class related
Appendix A-Continued

activity as possible and little that is not part of the course outline.

Dependent. This style is characteristic of students who show little intellectual curiosity and who learn only what is required. They see teacher and peers as sources of structure and support. They look to authority figures for guidelines and want to be told what to do.

Independent. This response style is characteristic of students who like to think for themselves. They prefer to work on their own, but will listen to the ideas of others in the classroom. They learn the content they feel is important and are confident in their learning abilities.

According to Dr. Grasha, "The scale gives a profile of an individual. It does not lead to a single preferred style since students are to varying degrees combinations of these styles."

Rotter I-E Scale

Rotter developed from social learning theory a concept of internal-external control of reinforcement (reward) which describes two generalized expectancies concerning reinforcement. Internal control refers to an individual's view that reinforcements are products of his/her own actions, traits, or capacities. External control refers to the view that reinforcements are under the control of powerful others, luck, chance, etc. Individuals vary along the locus of
Appendix A—Continued

control dimension. The scale is scored for external choice answers. The total external score possible is 23.

Eysenck Personality Inventory

The EPI is a measure of two relatively independent broad factors of personality—anxiety and extraversion-introversion. It is not a general personality test. The EPI is used almost exclusively as a research instrument in educational and industrial settings. The total possible extraversion score is 24 and the total anxiety score is also 24.

Note.—After the description of each scale, a summary of results was written and sent to each student who had requested it.
APPENDIX B

Grasha-Riechmann

Student Learning Styles Questionnaire

1. Most of what I know, I learned on my own.
2. I have a difficult time paying attention during class sessions.
3. I find the ideas of other students relatively useful for helping me to understand the course material.
4. I think a teacher who lets students do whatever they want is not doing his job well.
5. I like other students to know when I have done a good job.
6. I try to participate as much as I can in all aspects of a course.
7. I study what is important to me and not necessarily what the instructor says is important.
8. I feel that I have to attend class rather than feeling that I want to attend.
9. I think an important part of classes is to learn to get along with people.
10. I accept the structure a teacher sets for a course.
11. To get ahead in class, I think sometimes you have to step on the toes of the other students.
12. I do not have trouble paying attention in classes.
13. I think I can determine what the important content issues are in a course.
14. If I do not understand course material, I just forget about it.
15. I think students can learn more by sharing their ideas than by keeping their ideas to themselves.
16. I think teachers should clearly state what they expect from students.
17. I think students have to be aggressive to do well in school.
18. I get more out of going to class than staying at home.
19. I feel that my ideas about content are often as good as those in a textbook.
20. I try to spend as little time as possible on a course outside of class.
21. I like to study for tests with other students.
22. I like tests taken right out of the book.
23. I feel that I must compete with the other students to get a grade.
24. I attend classes because I want to learn something.
25. I am confident in my abilities to learn important course material.
26. School does not really interest me.
27. I think students should be encouraged to work together.
Appendix B—Continued

28. I feel that facts presented in textbooks and lectures are correct.
29. I like the teacher to notice me.
30. I feel that classroom activities are generally interesting.
31. I like to think things through for myself before a teacher lectures on course material.
32. I seldom get excited about material covered in a course.
33. I prefer not to work alone on assignments.
34. Before working on a class project, I try to get the approval of the instructor.
35. To do well in a course, I have to compete with the other students for the teacher's attention.
36. I do my assignments before reading other things that interest me.
37. I do not like a lot of structure in a class.
38. I have given up trying to learn anything from going to class.
39. I like to hear what other students think about the issues raised in class.
40. I think teachers are the best judges of what is important in a course.
41. During class discussions I feel that I have to compete with the other students to get my ideas across.
42. I think classes are very worthwhile.
Appendix B-Continued

43. I work on class related projects (e.g., studying for exams, preparing term papers) by myself.

44. I feel that classroom activities are generally boring.

45. I prefer to work in groups rather than alone on class projects.

46. I try my best to do assignments the way the professor says they should be done.

47. I like to see if I can get the answers to problems or questions before anybody else in class does.

48. I am eager to learn about areas covered in class.

49. I do assignments my own way without checking with other students about how they are going to do them.

50. I do not feel that I miss anything if I cut class.

51. I like to talk to other students outside of class about the ideas and issues raised in class.

52. I tend not to think or work on problems or issues in a field unless they were first covered in the text or lectures.

53. I think a student is hurting himself if he shares his notes and ideas with other students before an exam.

54. I feel that I can really learn something in a course.

55. I feel that too much assigned work keeps students from developing their own ideas.

56. I am in school only to get a degree.

57. I try to get to know other students in my classes on a personal level.
Appendix B-Continued

58. I think too much class discussion prevents the teacher from covering enough required material.

59. I like to know that I have done better than other students in my class.

60. I do my assignments whether I think they are interesting or not.

61. My ideas about content issues are often as good as those of the instructor.

62. I sit where the teacher is unlikely to notice me.

63. I feel that students and teachers should develop the kind of relationship where a student can tell his teacher if he feels a course is not going well.

64. I feel that I can learn what is important by doing what the professor says.

65. I think students should be graded according to how well they do in a class.

66. I try to do the best that I can in my courses.

67. I do not like a teacher to tell me what I have to learn.

68. I study just hard enough to get by in a course.

69. I like courses where students are encouraged to discuss course material.

70. I seldom try to learn things related to the course that are not covered in the text or lectures.
Appendix B-Continued

71. I like to know how well the other students are doing on exams.

72. I feel that I can get something out of going to class.

73. I like courses where students are allowed to pursue topics that interest them.

74. I prefer that the teacher never calls on me.

75. I think learning should be a cooperative effort between faculty and students.

76. I think the teacher should emphasize the content that I must learn.

77. I only help other students when I feel it will not hurt me.

78. I sit where I can be sure to hear the professor and see what he writes.

79. If a topic raised in class interests me, I will go out on my own to find out more about it.

80. I think one of the most important things about a course is how easy it is for me to get a good grade.

81. I try to help other students when they have a hard time understanding course material.

82. I enjoy class sessions that are highly organized.

83. I do not like the instructor to deviate from his lectures.

84. I work on reading assignments until I feel I understand the material.
Appendix B-Continued

85. I have my own ideas about how a course should be run.
86. I feel that school is not relevant to what I want to do when I graduate.
87. I feel a responsibility to help other students learn.
88. I try my best to write in my notes everything the teacher says.
89. I try to do assignments better than other students.
90. I do my assignments as soon as possible after assignments are made.
APPENDIX C

Eysenck Personality Inventory

1. Do you often long for excitement? . . . . . . . Yes No
2. Do you often need understanding friends to
cheer you up? . . . . . . . . . . . . . . . . . . . Yes No
3. Are you usually carefree? . . . . . . . . . . . Yes No
4. Do you find it very hard to take no for an
answer? . . . . . . . . . . . . . . . . . . . Yes No
5. Do you stop and think things over before
doing anything? . . . . . . . . . . . . . . Yes No
6. If you say you will do something do you always
keep your promise, no matter how inconvenient
it might be to do so? . . . . . . . . . . . . . Yes No
7. Does your mood often go up and down? . . . Yes No
8. Do you generally do and say things quickly
without stopping to think? . . . . . . . . . . Yes No
9. Do you ever feel "just miserable" for no
good reason? . . . . . . . . . . . . . . . . . Yes No
10. Would you do almost anything for a dare? . . Yes No
11. Do you suddenly feel shy when you want to
talk to an attractive stranger? . . . . . . Yes No
12. Once in a while do you lose your temper and
get angry? . . . . . . . . . . . . . . . . . . Yes No
13. Do you often do things on the spur of the
moment? . . . . . . . . . . . . . . . . . . Yes No
Appendix C-Continued

14. Do you often worry about things you should not have done or said? . . . . . . . . . . . . . . Yes No

15. Generally do you prefer reading to meeting people? . . . . . . . . . . . . . . . . Yes No

16. Are your feelings rather easily hurt? . . . Yes No

17. Do you like going out a lot? . . . . . . . . . Yes No

18. Do you occasionally have thoughts and ideas that you would not like other people to know about? . . . . . . . . . . . . . Yes No

19. Are you sometimes bubbling over with energy and sometimes very sluggish? . . . . . . Yes No

20. Do you prefer to have a few but special friends? . . . . . . . . . . . . . . . . Yes No

21. Do you daydream a lot? . . . . . . . . . . . Yes No

22. When people shout at you, do you shout back? Yes No

23. Are you often troubled about feelings of guilt? . . . . . . . . . . . . . . . . Yes No

24. Are all your habits good and desirable ones? Yes No

25. Can you usually let yourself go and enjoy yourself a lot at a gay party? . . . . . . Yes No

26. Would you call yourself tense or "highly-strung"? . . . . . . . . . . . . . . . . Yes No

27. Do other people think of you as being very lively? . . . . . . . . . . . . . . . . Yes No
Appendix C-Continued

28. After you have done something important, do you often come away feeling you could have done better? Yes No

29. Are you mostly quiet when you are with other people? Yes No

30. Do you sometimes gossip? Yes No

31. Do ideas run through your head so that you cannot sleep? Yes No

32. If there is something you want to know about, would you rather look it up in a book than talk to someone about it? Yes No

33. Do you get palpitations or thumping in your heart? Yes No

34. Do you like the kind of work that you need to pay close attention to? Yes No

35. Do you get attacks of shaking or trembling? Yes No

36. Would you always declare everything at the customs, even if you knew that you could never be found out? Yes No

37. Do you hate being with a crowd who play jokes on one another? Yes No

38. Are you an irritable person? Yes No

39. Do you like doing things in which you have to act quickly? Yes No
Appendix C-Continued

40. Do you worry about awful things that might happen? . . . . . . . . . . . . . . . . . Yes  No
41. Are you slow and unhurried in the way you move? . . . . . . . . . . . . . . . . . Yes  No
42. Have you ever been late for an appointment or work? . . . . . . . . . . . . . . . Yes  No
43. Do you have many nightmares? . . . . . . Yes  No
44. Do you like talking to people so much that you would never miss a chance of talking to a stranger? . . . . . . . . . . . . . Yes  No
45. Are you troubled by aches and pains? . . . Yes  No
46. Would you be very unhappy if you could not see lots of people most of the time? . . . Yes  No
47. Would you call yourself a nervous person? Yes  No
48. Of all the people you know are there some whom you definitely do not like? . . . . Yes  No
49. Would you say you were fairly self-confident? . . . . . . . . . . . . . . . . Yes  No
50. Are you easily hurt when people find fault with you or your work? . . . . . . . . Yes  No
51. Do you find it hard to really enjoy yourself at a lively party? . . . . . . . . Yes  No
52. Are you troubled with feelings of inferiority? . . . . . . . . . . . . . . . . Yes  No
53. Can you easily get some life into a rather dull party? . . . . . . . . . . . . . . Yes  No
54. Do you sometimes talk about things you know nothing about? Yes No
55. Do you worry about your health? Yes No
56. Do you like playing pranks on others? Yes No
57. Do you suffer from sleeplessness? Yes No
Internal Versus External Control of Reinforcement

The I-E Scale

1. a. Children get into trouble because their parents punish them too much.
   b. The trouble with most children nowadays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.
   b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
   b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.
   b. Unfortunately, an individual’s worth often passes unrecognized no matter how hard he tries.

5. a. The idea that teachers are unfair to students is nonsense.
   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
Appendix D-Continued

6. a. Without the right breaks one cannot be an effective leader.
   b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try some people just don't like you.
   b. People who can't get others to like them don't understand how to get along with others.

8. a. Heredity plays the major role in determining one's personality.
   b. It is one's experiences in life which determine what they're like.

9. a. I have often found that what is going to happen will happen.
   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
   b. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
   b. Getting a good job depends mainly on being in the right place at the right time.
Appendix D-Continued

12. a. The average citizen can have an influence in government decision.

b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.

b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. a. There are certain people who are just no good.

b. There is some good in everybody.

15. a. In my case getting what I want has little or nothing to do with luck.

b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.

b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

b. By taking an active part in political and social affairs the people can control world events.
Appendix D-Continued

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.
   b. There really is no such thing as "luck."

19. a. One should always be willing to admit mistakes.
   b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.
   b. How many friends you have depends upon how nice a person you are.

21. a. In the long run the bad things that happen to us are balanced by the good ones.
   b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort we can wipe out political corruption.
   b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.
   b. There is a direct connection between how hard I study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.
   b. A good leader makes it clear to everybody what their jobs are.
Appendix D-Continued

25. a. Many times I feel that I have little influence over the things that happen to me.
   
b. It is impossible for me to believe that chance or luck plays an important role in my life.

26. a. People are lonely because they don't try to be friendly.
   
b. There's not much use in trying too hard to please people, if they like you, they like you.

27. a. There is too much emphasis on athletics in high school.
   
b. Team sports are an excellent way to build character.

28. a. What happens to me is my own doing.
   
b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why politicians behave the way they do.
   
b. In the long run the people are responsible for bad government on a national as well as on a local level.

Note.—Score is number of underlined items. The external choice is underlined.
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