

AN INVESTIGATION OF READING SKILLS, GENERAL MENTAL
ABILITY AND PERSONALITY VARIABLES USED
IN THE SELECTION OF PRACTICAL
NURSING STUDENTS

By

ALBERT GRANT McCORMICK

Bachelor of Science
University of Tulsa
Tulsa, Oklahoma
1953

Master of Education
University of Tulsa
Tulsa, Oklahoma
1959

Submitted to the faculty of the Graduate College of
the Oklahoma State University
in partial fulfillment of the requirements
for the degree of
DOCTOR OF EDUCATION
July, 1966

JAN 26 1967

AN INVESTIGATION OF READING SKILLS, GENERAL MENTAL
ABILITY AND PERSONALITY VARIABLES USED
IN THE SELECTION OF PRACTICAL
NURSING STUDENTS

Thesis Approved:

Harry K. Probst

Thesis Adviser

Charles E. Larsen

Bernard H. Kinsley

Frank J. Frederick

J. H. Boyce

Dean of the Graduate College

627108

PREFACE

Recent societal pressures have focused attention upon the need to identify the characteristics of successful students of practical nursing. Much research has been conducted in the past concerning the selection of likely candidates for the professional levels of nursing care, with limited regard for the systematic selection of the individuals who elect to enter the subprofessional levels. With the licensed practical nurse representing one of the most rapidly expanding areas of the health occupations, the problem of selection and identification of successful candidates has had a parallel expansion. This problem has been compounded by the extreme heterogeneity of characteristics within the student practical nurse population; it is a vocation open to individuals of diverse age range, educational experiences and socio-economic backgrounds. The purpose of this study is to examine characteristics felt to be common in this heterogeneous population.

I wish to acknowledge the valuable assistance and guidance of my graduate advisory committee, Drs. Harry K. Brobst, Charles E. Larsen, Barry A. Kinsey and Franz Frederick. Invaluable assistance in the collection and organization of data was gratefully received from Mrs. Ruth Burris, State Supervisor for Health Occupations Training and from Mrs. Wenonah Tidwell of that office. Indebtedness is

also acknowledged to the following Coordinator-Instructors of the Oklahoma schools of practical nursing who participated in this study: Mrs. Josephine Ferry, Ada; Mrs. Catherine Sievers, Bartlesville; Miss Ladye Ruth Pruitt, Clinton; Mrs. Edna Hill, Lawton; Sister Mary Aquin Odneal, McAlester; Mrs. Adelaide Blandin, Miami; Mrs. Stella Wetz, Muskogee; Mrs. Pearl Hill, Shawnee; and Mrs. Merlene Board, Woodward.

I wish to express my appreciation to Mrs. Grace Peebles for the typing of this dissertation.

TABLE OF CONTENTS

Chapter	Page
I. THE NATURE OF THE PROBLEM	1
Introduction	1
General Background and Need for the Study.	1
Limitations of the Study	6
Definition of Terms	6
Underlying Assumptions of the Study.	7
II. BACKGROUND FOR THE PRESENT STUDY	9
Introduction	9
Review of the Literature	9
Summary of the Literature	20
III. DESIGN AND METHODOLOGY	25
Introduction	25
Description of the Population.	25
The Criterion Category	26
The Predictor Category	29
Statistical Treatment	38
Statement of Hypotheses.	39
IV. RESULTS	41
Introduction	41
Correlation Analysis: The Predictor Category with the Criterion Category	41
Discriminant Analysis Results.	44
Disposition of the Hypotheses.	48
Discussion of the Results	52
V. SUMMARY, RECOMMENDATIONS AND CONCLUSION	57
Recommendations	58
Areas for Additional Research.	59
Conclusion	60
BIBLIOGRAPHY	61
APPENDIX	68

LIST OF TABLES

Table	Page
I. Enrollment of Practical Nursing Students Within the United States	3
II. Correlation Coefficients of Reading Scores, Otis Scores and LPN Achievement Tests	42
III. Intercorrelations of the MMPI Subscales and the LPN Achievement Tests	43
IV. First Run Discriminant Analysis	45
V. First Run Classification Matrix	46
VI. Second Run Discriminant Analysis	47
VII. Second Run Classification Matrix	48
VIII. A Comparison of Attrition-Survival MMPI Profiles	56
IX. Intercorrelations of the Total Predictor Category with the Total Criterion Category	69

CHAPTER I

THE NATURE OF THE PROBLEM

Introduction

A purpose of this study is to examine several criteria used in the selection of candidates for practical nursing training. An additional purpose of this investigation is to determine the relationships between achievement in practical nursing programs and personality variables as measured by an appropriate instrument.

It is hoped this study will contribute to the solution of the problem concerning decision-making in selecting prospective students for this particular health occupation in Oklahoma. A natural desire on the part of the training schools is to have student positions filled with applicants for whom the chances of succeeding are maximal. The need for developing entry screening devices and establishing optimum cutting scores in schools for practical nursing is clearly evident from the following discussion.

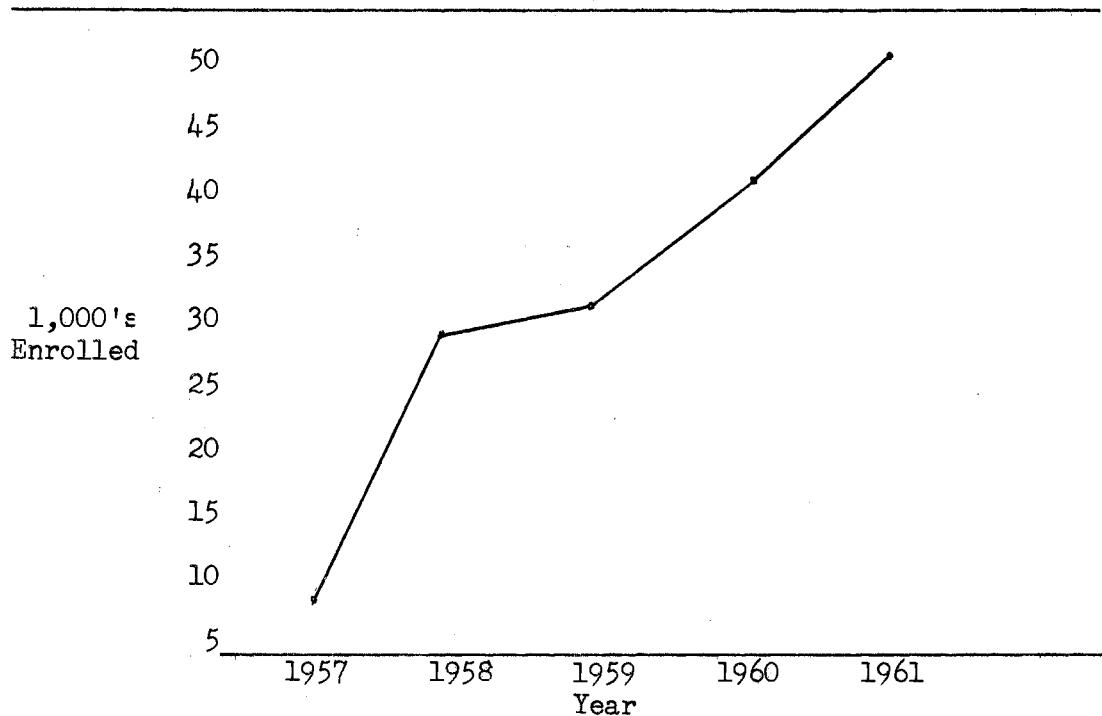
General Background and Need for the Study

The role and status of the licensed practical nurse reflect a clearly defined emerging profession. The practical nurse can trace her development from the pioneer days when hospitals and cities were not readily available and it befell the lot of the pioneer woman to

nurse her own family to the best of her ability. As hospital facilities increased and the demand for trained personnel at all levels increased accordingly, around-the-clock nursing care became prohibitively expensive. Routine bedside nursing care, which once was the province of the registered nurse, slowly evolved to become the duty of the practical nurse. The licensed practical nurse today assumes a greater share in the responsibility of caring for the sick and aged. In comparing job descriptions of the licensed practical nurse (LPN) in the 1949 edition of the Dictionary of Occupational Titles (DOT) and the 1965 edition of the same publication, the escalated role and function of the LPN are obvious (83). The essence of the older edition's description is concerned with housekeeping duties associated with the patient, with skills in these areas being acquired primarily through a preceptorship process. The 1965 edition of the DOT reflects greater emphasis upon medications, record-keeping, formal training in classes; job locations have expanded to include clinics, public health work and industrial plants in addition to hospitals. Federal legislation (Medicare), which affords medical benefits to the aged, and the general increase in longevity have added to the problem of securing adequately trained personnel for work in nursing homes.

The U. S. Bureau of Labor and Statistics estimates that the need for the LPN represents the fastest growing need in the health occupations (84). The following chart reflects the burgeoning enrollment of practical nursing students on a national basis:

TABLE I
 ENROLLMENT OF PRACTICAL NURSING STUDENTS
 WITHIN THE UNITED STATES



(Source: Office of Education Publication No. 80021
 U. S. Dept. of Health, Education & Welfare)

As an emerging profession, licensed practical nursing falls heir to the implicit meanings found in the definition of "profession." The establishment of minimum standards, the adherence to a common ethic, proscribed curriculum and state licensing are common controls established by a profession (31). Research is needed at all levels of any profession - the selection of likely candidates for the profession, the training and evaluation of the training and the evaluation of the finished product. Wallace (85), in an address to the Health Occupations Educational Panel Discussion, made this statement:

One area of importance and frequent research in health Occupations education, as well as in just about every other branch of education, is that of the prediction of

success of students in the training program. This has particular relevance for the selection of students for admission to the program. Identifying those applicants least likely to succeed is obviously desirable in order to discourage them from wasting time, money, effort and hopes in an endeavor where they will probably meet failure, and in order to utilize the limited facilities of the educational institution for those more likely to complete the training satisfactorily and join the ranks of productive practitioners. Here, then, is a real and continuing problem which research can help solve.

Wallace also suggests that one deficiency in the current state of testing programs is that they often omit the assessment of non-intellective (affective) factors.

Further need for research within this level of the health occupations is seen in the report of the Surgeon General's Consultant Group which estimated that in 1962 licensed practical nurses totaled 225,000 and that by 1970 the need will reach 350,000 (82).

Levine (48) points up the real need for research in practical nursing to impart to the profession a greater reality. He cites the phenomenal growth of the LPN profession and suggests that research has not kept pace with this growth. Levine further states:

It is interesting to note that while the number of graduates from schools of practical nursing has multiplied 13 times since 1950, the output from schools of professional nursing has remained static over the past fifteen years at a level of about 30,000 graduates per year. If the present trend continues, the number of graduates from practical nursing programs will exceed that from professional programs by 1970.

West and Hawkins (87) write that personnel needs in the health occupations will continue to increase, as will the problems associated with this growth. They suggest that not only is the problem concerned with who shall be admitted to training schools but, how well

shall they be trained.

Additional incentive for this study is observed in the problem which confronts admission committees of almost any school. When the number of applicants exceed the number of positions available, decision-making on the part of the admission committee must necessarily follow an actuarial approach in order to reduce the number of "misses" and elevate the number of "hits" among admitted students. Studies suggest that the actuarial prediction of academic prognosis as well as clinical prognosis tend to excel over "intuitive" or "personal judgements."

Several studies are available in the literature examining the efficiency of clinical or intuitive predictions vs. statistical or actuarial prediction. Meehl (55), Meehl and Rosen (56), Sarbin (69), Oskamp (64), Holt (42), Mischel (58), Halbower (55) offer strong evidence supporting an objective, actuarial approach to predictions over intuitive techniques. It is hoped that this study will identify certain characteristics such as reading skills, general ability and personality dimensions which are related to academic measures within the LPN curriculum. These data could then be utilized by an admission committee as an adjunct to the decision-making process when admitting prospective students.

The present dropout rate for practical nursing students in Oklahoma is over 20%, representing a real loss, both financial and societal. The current cost in Oklahoma of providing adequate space, teachers and equipment employed in training each student is slightly over \$1,000. The personal entry fee, which is as much as \$150 in some

Oklahoma LPN schools, averages \$75 for the nine schools participating in this study (17). Society's loss may be expressed in a more subtle fashion, by the increasing gap between the demand for LPN services and the short supply of available personnel.

Limitations of the Study

This study is limited to the nine participating schools of practical nursing within Oklahoma. Geographically, the schools are located in the Eastern and Northern portions of the state and are found near major population centers. Test scores were obtained from individuals who expressed a desire to enter LPN training and these tests were limited to a test of general mental ability, a reading-skills test and an inventory of personality dimensions.

Definition of Terms

Within the structure and limitations of this dissertation, the following terms are utilized as defined.

LPN: This represents an individual who has successfully completed a course of study as proscribed by standardization authorities (both state and national) and who, upon completion of the proscribed curriculum, has successfully passed a state board licensing examination.

survival group: This represents those entrants who completed the proscribed course and earned a satisfactory score on the licensing examination.

attrition group: This represents those entrants who, for any reason,

failed to complete the program and dropped out or failed the licensing examination and received no credit for the course.

IQ: This term is used interchangeably with "intelligence," "learning aptitude" or "ability" and is construed to be indicative of the individual's relative capacity to profit from an educational experience and to perform adequately in an academic environment.

personality: The frame of reference here is the model suggested by Shaffer and Shoben (71). They offer a dynamic interpretation of personality as "the persistent tendency to make certain qualities and kinds of adjustments." Implicit in this definition is that responses (adjustments) to a stressful situation may be integrative or nonintegrative, that is, related to problem solving or designed to defend. Shaffer and Shoben further suggest that personalities vary quantitatively with respect to certain areas of adjustment. They perceive these adjustments interacting to form a relatively organized system.

PNB: This represents the practical nurse basic achievement test.

PNA: This represents the practical nurse achievement test.

PNL: This represents the state board licensing examination.

Underlying Assumptions of the Study

A major assumption underlying the need for this study is that adequate screening of practical nursing candidates would insure a greater chance of selected candidates completing the program and would encourage those students whose competencies lie in other directions to

seek alternate vocational goals.

A second major assumption underlying this study is that a limited number of basic trait measurements will adequately predict success as defined herein. It is suggested by Horst (43) that "for reasons of parsimony, the number of fundamental measures used in the selection process should be as small as possible and each one should be significantly related to only a few criteria." Bechtoldt (12) states that tests recommended for use in prediction could be nearly homogeneous measures of a slight functional unity.

A third underlying assumption in this study is that, of the population of students admitted to the training program on a no-prior-selection basis, some will tend to fail while others will successfully complete the proscribed curriculum. More precisely, the tendency to pass or fail is assumed to be evenly distributed within the investigative population (86, p. 264).

CHAPTER II

BACKGROUND FOR THE PRESENT STUDY

Introduction

This chapter consists of a review of relevant literature leading to the reasons for the selection of the assessment devices and a statement and discussion of the rationale of the study. Included are contributing constructs and the general frame of reference leading to the statement of the hypotheses to be investigated.

Review of the Literature

Research specifically oriented toward identification of predictive factors in the selection of practical nursing students has been limited in the past, but with the increasing societal demand and the ascending role of the LPN, a corresponding increase in studies is noted. Within the framework of this survey, those studies dealing with the LPN are discussed first, followed by studies which are concerned with the registered professional nurse and which contain material relevant to this study. Studies designed to investigate the relationships between academic achievement and personality characteristics seem to be fairly prevalent and a selected number are presented here.

In an assessment of students for practical nursing schools, Meadow, (52) employed a population of 244 female students who were admitted to the Shapero School of Practical Nursing in Detroit, Michigan, between September, 1957, and March, 1959. Based on observations of previous attrition rates, it was presumed that one-third of the 244 students would not graduate. Using standardized psychological tests to assess assumed important predictive variables, Meadow investigated age, marital history, emotional stability, motivation, socio-economic background, race, religion, family history, previous educational achievement, work experiences, occupational aptitudes, vocational interest patterns and specific scores on intellectual, numerical, clerical and mechanical ability. Instruments employed were the National League for Nursing (NLN) Pre-Admission and Classification Examination, the General Aptitude Test Battery (GATB), the Psychological Corporation Pre-Entrance Examinations including the Bennett Mechanical Comprehensive Test, and the Personal Preference Schedule (PPS). In addition to this rather sweeping approach to the problem, Meadow used a questionnaire for demographic data and he employed a "probing personal interview" designed to elicit as much as possible about the personality of the student, hypothesizing that emotional factors play an important role in the success or failure of the student. At the termination of the investigative period, there were 71 dropouts, 37 of whom were due to "failing course work" and 12.7% due to "emotional instability" (not elsewhere defined). The best predictors were the GATB, the NLN Pre-Admission and Classification Examination and the Psychological Corporation Pre-Entrance Examination with achievement test scores and state board examination

scores as the criteria variables. This would not appear to be unusual, since the three instruments employed appear to measure various aspects of intelligence. The use of the PPS to sample data of a clinical nature is subject to question by some writers (79). In addition, the assessment of emotional instability by a single personal interview is also questionable and is recognized by Meadow in his study. Evidence of the relative inefficiency of this particular technique is seen in the percentage of dropouts due to emotional difficulty. Meadow concludes with the statement "continuing efforts to use only measures of academic ability, intelligence and interest may be of limited value . . . the importance of emotional and social variables should be considered in the dropout process."

In an effort to determine what factors were essential to success in a practical nursing curriculum, the National League of Nursing Education (NLNE) began the validation of entry examination scores earned by 613 entrants of 87 schools of practical nursing. The NLNE administered the NLNE Pre-Admission and Classification Examination (PACE) and a personal data questionnaire. Shortly before completing their programs, the students who were still in school took the NLNE Practical Nurse Achievement Test (PNA). Correlation coefficients were run on the PACE subtest scores, the PNA achievement test scores and the state board licensing examination. Significant positive relationships were found among the scores on the PACE, PNA and licensing examination. Of the 416 students remaining, 50% of those scoring in the highest one-fourth of the PACE scores also had PNA scores in the upper one-fourth of the group. In the demographic data, those

students who were married tended to make better scores on the PNA; the highest relationship was found between age and scores on the PNA and the licensing examination. Students above the age of twenty-three tended to perform better on all criteria than did students below twenty-three years of age. Respondents who stated their reason for entering practical nursing training as a desire "to help people" earned lower scores on the PNA and the state board examination. The authors presumed this to reflect an idealistic reason for entering training which may suggest that the entrant did not have a realistic, pragmatic grasp of the training program. The authors concluded that the PACE provides a series of measures which are extremely useful in predicting success both in academic programs and licensing examinations. It was evident that for this group of entrants, the higher the PACE, the more likely it was that the student would finish the program (62).

Meadow and Edelson (53) studied the relationships of age, marital status and general intelligence with achievement test scores in a practical nursing school. With an N of 244 practical nursing students, they found a significant positive relationship between age-marital status and achievement tests. Age-marital status were compared with several criteria variables - final theory grade, state board examination results, scores from the NLN Psychological Corporation achievement tests, and supervisor's ratings concerning "personal adjustment." It was found that age-marital status had, in all cases, a high positive relationship. Meadow and Edelson also found a significant positive relationship between age-marital status and three dimen-

sions of the Personal Preference Schedule - achievement, orderliness, and respectfulness. They presumed these "personality traits" to be natural concomitants with the development of maturity in the student. Meadow and Edelson further presumed these traits to be functionally related to the mature, married woman, i.e., a need to keep the home neat and orderly, a need to be respectful (conform to custom) and a need to achieve or "amount to something." It was their conclusion that age and marital status should be factors in the prediction of success in a practical nursing program.

Cliff, Newman and Howell (21), in the selection of 150 LPN's in a United States Public Health Service hospital, administered nine ability tests to the applicants. Eighteen 12-point scales (performance) served as the criterion measure. Entrants were rated by five professional nurses. It was found that the validity of the predictors appeared to be primarily due to general ability rather than abilities specific to individual tasks. Tests were used to screen out applicants of too low an ability to adapt successfully to the task performance. In addition, they found that "emotional control" was significant in the success of the entrants.

McCullough (50) surveyed the practices of 1,146 schools of nursing throughout the United States for an analysis of testing procedures for entrants. She found a definite trend toward the use of local test batteries. In the 810 responses to her inquiry, she found a thread of commonality within the assessment devices, namely, intelligence (potential scholastic ability) testing, manual dexterity tests, interests and personality adjustment tests, as well as personal inter-

view data. As an additional part of her dissertation, McCullough mailed questionnaires to 181 nursing graduates of Los Angeles County General Hospital. These nurses, who had been admitted to nursing school upon the results of their California Test of Mental Maturity (an IQ test), the California Reading test, the McQuarrie Test for Mechanical Ability, the Lee-Thorpe Occupational Interest Inventory, the California Test of Personality and the Survey of Spatial Relation Ability, were divided into two groups of high achievers and low achievers. Employer ratings were compared to these scores and the nurses were judged "most successful" or "least successful" contingent to the employer's responses. McCullough found that high scholastic ability and high achievement were not deciding factors as to the success in nursing jobs. Self-adjustment and social adjustment were found to be significant factors in determining success in nursing. Her recommendations for admissions committees were for a well-organized counseling and guidance program to utilize cognitive, non-cognitive and demographic data as criteria in the selection of nursing candidates.

Haney, Michael and Jones (39) developed and validated a test battery for the selection of nursing students at the Los Angeles County School of Nursing. Their prime objective was to secure an assessment battery which would assist the admissions committee in the selection of nursing entrants and reduce the school's 40% attrition rate by establishing realistic cutting scores. Employing both concurrent and predictive techniques of test validation, hypotheses were formulated and achievement and aptitude tests were given. Reading tests which

sampled vocabulary, comprehension and rate were used in conjunction with tests of general intelligence, and general reasoning. The MMPI was utilized to assess personal adjustment. Criteria variables were achievement scores in nursing arts, pharmacology and licensing examination test scores. Results showed that vocabulary scores were statistically significant in the prediction of achievement and state board scores. Highest predictive validities were found in the intelligence test scores. MMPI variables found to be significant in the detection of dropouts were hysteria, hypochondriasis and psychasthenia. The incidence of academic failure during the freshman year dropped from 40%, prior to tests, to 5% after the application of multiple cutoff procedures. The authors concluded that although cognitive measures were demonstrated to be successful in reducing attrition rates in freshmen nursing students, the dropout rates for personal reasons suggested the need for evaluation of motivational and personality characteristics.

In a study designed to develop a predictor scale from the Minnesota Multiphasic Personality Inventory (MMPI), Anderson (6) posited that specific personality factors are related to specific types of failures in a nursing program, in that personality variables would be very likely to influence success or failures. The MMPI and the School and Colleges Achievement Test (SCAT) were routinely administered to all incoming freshmen at the University of Missouri School of Nursing. A curriculum area (clinical practicum) which proved to be particularly difficult from both an academic standpoint and human relations aspect, seemed to be the nemesis for those students who did not graduate. Although the correlation of the SCAT scores and grade point average was

high (.79), school administrators were not able to predict which student would graduate and which would fail. Hypothesizing that girls who fail clinical practicum have specific personality factors in common, Anderson evolved, by item analysis, a 46-item "washout" (WO) scale on the MMPI answer sheets from the classes entering in 1959 and 1960. Applying his WO scale to the responses of two equated groups (equated for SCAT scores), he found the failure group significantly higher on the WO scale than the success group. Anderson found a logical consistency in the response patterns of girls who tend to drop out of the clinical practicum. These areas of commonality were: a general rebelliousness and a dislike of taking directions, a tendency to worry excessively, an extreme concern with physical symptoms, a general irritability and an unusual desire for excitement. He assumed these characteristics to be evenly distributed in the population but significantly magnified in the dropout group.

Jensen (44) administered the MMPI to all incoming freshmen at Brigham Young University during the autumn quarter of 1955-1956. Using an N of 458, he divided the students into: (1) achieving students of low scholastic ability, (2) non-achieving students of low scholastic ability, (3) achieving students of high scholastic ability, (4) non-achieving students of high scholastic ability. The major assumption of his study was that students of low scholastic ability and achieving poorly would also likely be maladjusted as measured by the MMPI. He utilized only the nine clinical scales of the test, constructing an elevated point score on any scale indicative of maladjustment. By a comparison of mean scores among the traits on the MMPI, with a t-

ratio test of significance, he found that students with low ability and non-achievement consistently scored higher on the various scales. Students with high ability and high achievement scored consistently lower than students with high ability and low achievement except on one scale - the *Mf*. This appears to be supported by parallel research which suggests that the MMPI *Mf* scale is positively correlated with intelligence. Jensen's general conclusion was that there appeared to be a significant relationship between intellectual capacity and academic achievement. He cautions that these findings were based on a large group and not on individuals and application of these data to individual counseling cases would be hazardous.

Altus (2), using two groups of 25 equated students, found a general trend toward maladjustment on the part of the non-achieving students. Utilizing the MMPI as the personality instrument, Altus suggested that even with a small group of cases, adjustment items can be found which will be associated with academic achievement and which have no relationship whatever to intelligence as it is currently measured.

Congdon (22) utilized Murray's Thematic Apperception Test (TAT) to examine possible functional relationships between intellectual capacity and adjustment-maladjustment. His study was concerned with variations in human functioning in response to required academic tasks. Two groups, equated for intelligence but differing in academic achievement, were asked to respond to the TAT in the usual manner. The responses were checked for feelings of defensiveness, identification (both developmental and defensive) task avoidance and interper-

sonal behavior. With an N of 30, Congdon found the non-achievers to be more generally maladjusted and lacking in socialization skills.

Kirk (47) postulated that emotional maladjustment, of whatever severity, affected mental functioning in such a way as to impair it. After examining 1,500 MMPI records at the Student Health Center (Berkeley), she found a profile most frequently associated with poor academic achievement and termed it "psychoneurosis with compulsive and depressive features." Students with the characteristic MMPI profile of mild K elevation, distinct D spike, elevated Pt as high or higher than Sc, tended to be generally lacking in autonomy, made a facade of working hard, were unduly meticulous and, as measured by their grade point average, non-achieving academically.

Stating as her problem the investigation of personality factors and academic achievement relationship, Sutherland (80) administered the Incomplete Sentence Blank (ISB) to twenty underachieving male subjects of high intelligence. A control group was selected in a random fashion from the school population. Selecting three dimensions of personality as her criteria, Sutherland scored the ISB for answers relevant to aggression, guilt, and father-son conflict. It was demonstrated that the male non-achievers tended to give more ISB responses reflecting maladjustment in these areas than did the control group. The conclusion was made that these subjects, although "bright," had aggressive feelings which were a source of anxiety and guilt and which seemed to interfere with adequate functioning in an academic environment.

Projective techniques were employed by Steinzor (77) to demon-

strate different personality characteristics in achieving and non-achieving capable students. Postulating that unsuccessful students have more signs of emotional disturbances than do equated, "normal" students, he employed Rorschach's Ink Blot test to tap this presumed difference. He further postulated that intelligence dynamically interacted with the total basic personality in such a manner as to be inhibited by maladjusted responses. Selecting as his criteria of high ability the Ohio State Psychological Test percentile scores of 85 or better, he selected two equated groups of males; one group with a grade point average of 3.2 or better and the other group with a grade point average of 1.7 or less. Steinzor administered each group the Rorschach, using the scoring procedure as advocated by Klopfer and Kelly. He found significant differences in that non-achievers tended to demonstrate more symptoms of maladjustment. High achievers were able to select and integrate stimuli from the cards into meaningful wholes and, in general, manifested fewer symptoms of maladjustment. It was concluded that maladjusted students tend to be restricted in their responses to environmental stimuli, or that their overt responses may tend to be inappropriate to the stimulus material.

Morgan (59) did a psychometric comparison between achieving and non-achieving college students of higher ability. Personality variables were assessed by the MMPI, TAT and Strong Vocational Interest Blank (SVIB). He found no significant difference between achievers and non-achievers on the total MMPI profile but with experimental tests made up from subscores on the MMPI, he did find significant difference between the equated groups. Non-achievers further differ-

ed from achievers on TAT stories and vocational interests as measured by the SVIB. Non-achievers tended to cluster their interests in Group VIII of the Strong (CPA, accountant, purchasing agent, mortician) while achievers tended to cluster in Group V (personnel director, teacher, minister). The significance of this differential clustering was not explicated. Non-achievers tended to be inclined toward maladjustment as measured by the TAT stories and the experimental tests from the MMPI subscales.

Summary of the Literature

Numerous studies have been done wherein the investigators appear to exhibit some degree of commonality of constructs, techniques and results. A concern is apparent in the studies for the possible relationship between personality factors and intelligence. One might construe an implicit concern with the totality of the individual rather than assessment of a single-factor variable as a predictor. The writers also show concern about the inadequacy of assessed intelligence as an ultimate predictor of achievement; maladjusted subjects who score high on intelligence tests do not seem to exploit their potentiality. Writers involved in validation studies express the need for screening techniques which actuarially maximize the chances of an entrant finishing the selected program and, concomitantly, afford greater utilization of the physical facilities provided by the school.

Certain assumptions appear to be prevalent in the validation studies surveyed. One assumption concerns the concept of transituation-

al intelligence as defined by Wechsler (76), who states that "intelligence may be construed as a global or aggregate capacity to think rationally, act purposefully and deal effectively with one's environment." Implicit here is the composite nature of intelligence which recognizes the abstract educational aspects, the practical and social ramifications. If an individual scores above certain minimal limits on an appropriate test, we assume that he will respond adaptively and integratively in an academic environment. Another assumption is that individuals whose responses on personality tests suggest the presence of a maladjusted personality or a constellation of nonintegrative adjustments, tend to perform poorly in an academic environment in spite of "adequate intelligence."

Examiners investigating validations of screening batteries have utilized appropriate achievement scores from examinations administered periodically to the entrants, as well as scores earned on terminal or licensing examinations, as criteria variables. Predictor variables have been IQ scores, high school achievement scores, reading scores, mechanical comprehension scores and various demographic data. Instruments sampling these data consist chiefly of multiple-choice, paper-and-pencil exercises administered in a group situation.

In the assessment of personality characteristics, techniques vary and appear to be contingent upon the size of the population under assessment, time involved in the administration, and interpretation of the results. Projective devices such as the Thematic Apperception Test, the Rorschach and the Incomplete Sentence Blank have been employed with some measure of success; however, increased time require-

ments seem to restrict their use to small samplings.

A major criticism of the LPN validation studies surveyed concerns the selection of test instruments employed as screening devices. Cronbach (24) argues that a "shotgun approach" to test selection is of questionable value. He advocates the selection of instruments following a carefully construed rationale instead of the random selection of numerous tests in the hope of finding some predictor variables. Cronbach also notes that in screening populations of high scholastic heterogeneity, achievement tests tend to reflect a skewed value favoring those applicants whose educational experiences reflect high school graduation and one or two semesters of college, while less academically experienced individuals are exposed to discrimination. He suggests the use of general ability tests in order to screen applicants with lack of uniform high school experiences, widely divergent ages and wide range of time lapse since their last formal education.

Instruments designed to assess personality variables are subject to several criticisms, not the least of which is the subjectiveness of the scoring techniques. Respondents presented with relatively unstructured stimuli must, per force, contribute a greater portion of their own internal personality structure in order to complete a quantifiable response pattern. The difficulty lies in the interpretation of the response by the examiner and this, according to some writers, requires unusual psychological sophistication. In addition, interpretations and evaluations may vary widely as a function of the scoring technique employed by the examiner. Utilization

of projective devices such as the Rorschach and the TAT as screening instruments for large populations would appear to be unwieldy and while they might increase the efficiency of the institution, the high cost in time, money and administrative demands would prohibit their use as routine devices.

From the review of the literature concerning LPN studies, RN studies and investigations dealing with intellectual-affective interactions, certain concepts and postulates emerge which provide this study with tenable guides. These postulates not only suggest areas to be investigated but include suggestions for the selection of appropriate types of instruments needed to carry out an investigation. The postulates are:

(1) A need exists for evaluating both intellectual ability and personal adjustment when selecting applicants for training programs.

(2) Poor personal adjustment of an individual appears to interact with intellectual factors in an inhibitory manner.

(3) Paper-and-pencil measurements of personal adjustment would, all things considered, be preferable to projective techniques in assessing large populations for screening purposes.

(4) A test of general mental ability should be the preferable treatment when screening populations with highly heterogeneous academic backgrounds.

(5) An assessment of an individual's reading ability would be of considerable value in predicting success in academic course work requiring reading skills.

Chapter three will include a discussion of the instruments

selected to expedite this study, a description of the population in question and a statement of hypotheses which have evolved from the postulates stated above.

CHAPTER III

DESIGN AND METHODOLOGY

Introduction

This chapter contains a description of the population involved in this dissertation and the instruments selected to measure characteristics presumed to be critical in predicting success in the LPN program. The criteria category is presented and discussed; hypotheses evolving from presumed relationships between predictors and criteria variables are presented.

Description of the Population

The LPN applicant represents a population highly heterogeneous in several dimensions. Their origin and evolution reflect divergent backgrounds in socio-economic status, marital status, race, age, educational levels and work experiences. Although the range of age has as its extremes 17 years and 55 years, the mean age is 39.6 years. Applicants are predominantly female; however, males occasionally participate in the training. Within this study, males were excluded as there were only four in the investigative population of over 400 entrants.

Participants reflect a wide range of educational levels with a

mean grade completion of 11.3, although some younger students have completed as many as two semesters of college. Inspection of the various transcripts suggests that applicants tend to be products of relatively small school districts; some have obtained high school equivalency by the General Education Development examination.

The marital status of the applicants represents an almost even division; 52% of the subjects were married. There were 22 widows and 26 divorcees in the total group.

The heterogeneity of the background suggests that general ability tests would be indicated as the instrument of choice, and the personality test should be an instrument which is fairly stable in a wide-range sample.

In the construction of screening batteries designed to provide multiple cut-off scores, certain guide lines are suggested by Cronbach (24), Anastasi (4) and Glesser (24). These authors argue that antecedent to test selection, certain goals should be clearly defined and tests then selected which presumably would predict success in the attainment of these goals. Major factors to be considered are the nature of the population in question, the predictor category and the criterion category.

The Criterion Category

A terminal exercise in the training of the LPN is the State Board Examination for Practical Nurse Licensure (PNL). PNL results are expressed in standard scores with a national mean of 500, and a standard deviation of 100. The test is a nationally standardized instru-

ment designed by the NLN as a "safety device." Low in content validity, it assesses the candidates' ability to make decisions and to exercise appropriate judgments relevant to caring for the sick and aged (83). A successful candidate must score 350 or higher on this examination in order to be licensed. In taking the test, the student is presented with a series of hypothetical medical situation questions which must be answered by selecting the most appropriate of four possible responses. The examination is designed in such a manner as to demand a judgmental response based upon the student's interpretation of the case plus her ability to make a rational decision. It is possible for some candidates, although they have successfully passed preceding course work, to fail the PNL examination; these students are classed as "failures" and are denied a license.

Shortly before the termination of her training period, the LPN candidate takes the Practical Nurse Achievement Test (PNA). High in content validity, the test purports to measure the student's retention of subject matter (anatomy, physiology and pharmacology) plus the knowledge gleaned from the practical experience phase of training. Achievement scores on the PNA reflect the performance of the student in lecture courses as well as learning situations of an applied nature. Performance on this test requires the student to integrate her lecture courses with her practical training in order to respond correctly to the multiple choice items.

The first phase of the LPN training is concerned chiefly with basic materia medica presented by lecture, discussion and reading assignments. Curriculum material within this initial training phase

is generally covered in 560 clock-hours wherein anatomy, physiology, principles and practices of basic nursing, together with basic sociology principles (the family structure) constitute the core. Reading skills are necessarily demanded during this phase for much material is covered by reading assignments. Text books adopted for this portion compare favorably with high school text books as to level of difficulty. At the termination of this training period the student takes the Primary Nursing Basic Achievement Test (PNB). Scores on this instrument serve a dual purpose; they reflect the students' relative mastery of essential basic principles upon which additional training is structured, and they provide the instructors with some indication of the students' potential in the succeeding level of training.

The fourth criteria variable represents the students' adjustment pattern relative to the training situation. The manner in which she relates to others, her willingness to follow orders and take directions, and, in general, adapt her behavior to conform to the role of the student practical nurse, is assessed at each of her training stations. The evaluation is made by RN instructors and these observations are entered on the student's permanent record. Remarks are based upon attributes presumably relevant to success within the LPN program. Examples of these observations are included here; these are quoted from the records of students who were dismissed from the program: "She refuses to follow directions"; ". . . student lied about the temperature-pulse-respiration of the patient and falsified the chart entry"; ". . . student cannot take criticism, is

far too sensitive"; "student has a drug problem"; ". . . causes trouble on the ward, can't get along with fellow students nor with patients"; ". . . student refuses to follow dormitory rules and stays out beyond hours"; ". . . is too quiet and withdrawn, will not ask questions nor participate in discussions"; ". . . student is openly hostile to the instructors." Within the frame of reference of this dissertation, these behavioral manifests are construed to reflect a general maladjusted personality pattern.

The criterion category, then, is composed of the two achievement test scores (the PNB and the PNA), and the State Board examination score (PNL).

The Predictor Category

Characteristics and attributes of the individuals were selected for their presumably high degree of criterion-relevancy. Stuit (78) states that generally, a criterion category is a classification based upon a performance characteristic but in contrast, the predictor category may represent any attribute of the individual, what he can do, how he appears to others, or what he has done in the past. The isolation of factors or individual attributes that are relevant to the criterion variables is a crucial problem in prediction studies, and can be compared with the stimulus-response "laws" sought in experimental studies (43).

Three principle guides were followed in the selection of the instruments of the predictor category. The tests should be relatively

inexpensive, yet provide the examiner with maximum data from which hypotheses could be formulated. Tests should require little or no psychological or psychometric sophistication on the part of the administrator as the geographic distribution of the nursing schools precluded the applicants' travel to a central testing agency. In addition to having a high criterion-relevancy, the tests should provide maximum differentiation among the applicants. With this rationale as a guide, the following instruments were selected.

1. The Otis Quick-Scoring Mental Ability Test: GAMMA (OTIS)
Copyright 1939, 1954, by Harcourt, Brace & World, Inc., New York. Purported by the author to "measure mental ability - thinking power or the degree of maturity of the mind." The test is not designed to provide mere measures of achievement. Within the framework of this study, we are interested in assessing the intelligence of an individual who is a member of a population highly heterogeneous for academic experiences. By utilizing an instrument which tends to depend less upon achievement data and more upon general mental ability, this interest is clearly met. The score from the Otis provides the examiner with what the authors term a "Gamma IQ" which is, in effect, a deviation IQ. Reliability and validity results reported by the author are the following: for grades 10, 11, and 12, the reliability coefficient (odd vs. even items) corrected by Spearman-Brown formula are .90, .91, .85. A corrected split-half reliability coefficient of .88 was obtained on the Gamma Test based upon 489

college freshmen entering the College of Holy Cross, Worcester, Massachusetts, in 1953 (66). The authors of the Otis provide the examiner with several possible applications of the results of the test. The test requires 30 minutes to administer.

2. The Nelson-Denny Reading Test (NDRT) Revision by James I. Brown; Houghton Mifflin Co. Written for grades 9 through 16, with norms established for appropriate grade levels. Copyright 1929 and 1960. This is a 30-minute test with a 100-item vocabulary section and a 36-item reading comprehension section of the traditional multiple-choice types. It provided the examiner with three scores - vocabulary (NDRT-V), comprehension (NDRT-C) and reading rate (NDRT-R). It is of reasonable cost and is one of the better reading tests (16). The authors of the NDRT refer to only one validation study wherein the instrument was utilized as a predictive device. Garrett (36) investigated several factors related to academic success and found the NDRT showed an r of .67 with academic achievement. Crites (16) suggests that the "NDRT appears quite reliable and there is some evidence of its validity for a number of purposes." Writers in Buros' Sixth Mental Measurements Yearbook are highly critical of the NDRT rate scale, pointing out two major flaws: the reading rate sentences are poorly written and overly complex; and, the word-count provided at the end of each sentence is not necessarily an accurate count of the words contained in the sentence. Test respondents are asked to mark

their own rate score at the completion of the one-minute reading time which, according to some critics (16), affords two additional shortcomings of the test - there is no suitable method of determining whether the respondent marked the correct level and a one-minute reading period is regarded as insufficient time for a reading rate score. Because of these limitations, the rate score was not included in this study. Buros, however, maintains that the reliability and validity of the test indicate that part-scores may be used with considerable confidence. The rationale for selecting a reading test as a possible predictor variable is the presumed relationship between reading skills and achievement levels during the basic program phase. It is hoped the Nelson-Denny will provide additional selective dimensions relevant to success in the LPN curriculum.

3. The Minnesota Multiphasic Personality Inventory (MMPI)

Copyright 1943, 1951 by the University of Minnesota and published by the Psychological Corporation, New York. This instrument consists of 566 statements, each requiring one of three possible answers, "True," "False," or "Cannot Say." Written by S. R. Hathaway and J. C. McKinley, the test "is a psychometric instrument designed ultimately to provide, in a single test, scores on all the more important phases of personality." The clearest advantage of utilizing the MMPI rather than available projective instruments is that the role

of the examiner is minimal in determining personality inferences. Little and Shneidman (49), in examining the validity of MMPI interpretations, argue that any framework of theory requiring subjective judgments from the examiner is open to serious error. The difficulty in replicating studies which employ projective devices is the examiner bias in making interpretations from the subjects' responses. The MMPI boasts a superior dimension not found in many psychological devices, in that the examiner is provided with four validity scales which afford some measure of confidence in interpreting the clinical scale patterns. These validity scales - the Cannot Say score, the L scale, the F scale and the K scale - supply a measure of the degree of consistency of responses to the test items. According to the authors, the MMPI has been "used in scores of settings against hundreds of different criteria." The MMPI handbook (27) lists approximately 75 studies which utilize this instrument as a screening device covering such highly divergent provinces as high school populations, college groups, military problems, medical situations and vocational placement. Although originally constructed to identify clinical patients, the MMPI has a massive background of experimental support in dealing with the normal individual. Personality characteristics are assessed on the basis of the following scales (27):

(1) The Question Score (?)

The Question score is a validating score consist-

ing simply of the total number of items put in the Cannot Say category; the size of this score affects the significance of the other scores. Large Question scores invalidate all others.

(2) The Lie Score (L)

The L score is also a validating score that affords a measure of the degree to which the subject may be attempting to falsify his scores by always choosing the response that places him in the most acceptable light socially. A high L score does not entirely invalidate the other scores but indicates that the true values are probably higher than those actually obtained. In some cases the L score may be of interest in its own right as a measure of a special personality trend.

(3) The Validity Score (F)

The F score serves as a check on the validity of the whole record. A low F score is a reliable indication that the subject's responses were rational and relatively pertinent.

(4) The K Score (K)

The K score is used essentially as a correction factor to sharpen the discriminatory power of the clinical variables measured by the Inventory. As such, K acts as a suppressor variable.

(5) Hypochondriasis Scale (H_s)

This scale is a measure of amount of abnormal concern about bodily functions. Persons with high scores are unduly worried about their health. They frequently complain of pains and disorders which are difficult to identify and for which no organic basis can be found. They tend to be immature in their approach to adult problems.

(6) Depression Scale (D)

The D scale measures the depth of the clinically recognized symptom complex, depression. Depression may be the chief disability of the subject or it may accompany other personality problems. A high D score indicates poor morale of the emotional type with feelings of uselessness and inability to assume a normal optimism with regard to the future. High scale scores here are characterized by lack of self confidence, a

tendency to worry, narrowness of interests and introversion.

(7) Hysteria Scale (Hy)

The Hy scale measures the degree to which the subject is like patients who have developed conversion type hysteria symptoms. Such symptoms may be general systemic complaints or more specific complaints such as paralysis, gastric or intestinal complaints or cardiac symptoms. Definite symptoms may never appear in a person with a high score, but under stress he is likely to become overtly hysterical and solve his problems by the development of symptoms.

(8) Psychopathic Deviate Scale (Pd)

The Pd scale measures the similarity of the subject to a group of persons whose main difficulty lies in their absence of deep emotional response, their inability to profit from experience, and their disregard of social mores. Except by the use of an objective instrument of this sort, their trend toward the abnormal is frequently not detected until they are in serious trouble. They may often go on behaving like perfectly normal people for several years between one outbreak and another. Their most frequent digressions from social mores are lying, stealing, alcohol or drug addiction and sexual immorality.

(9) Interest Scale (Mf)

This scale measures the tendency toward masculinity or femininity of interest pattern; separate T scores are provided for the two sexes. In either case, a high score indicates a deviation of the basic interest pattern in the direction of the opposite sex. The Mf is often important in vocational choice. Generally speaking, it is well to match a subject vocationally with work that is appropriate to his Mf level.

(10) Paranoia Scale (Pa)

The Pa scale was derived by contrasting normal persons with a group of clinic patients who were characterized by suspiciousness, oversensitivity and delusions of persecution, with or without expansive egotism. Very few paranoid persons have successfully avoided betraying themselves in the items of the scale.

(11) Psychasthenia Scale (Pt)

The Pt scale measures the similarity of the subject to psychiatric patients who are troubled by phobias or compulsive behavior. The compulsive behavior may be either explicit, as expressed by excessive hand-washing, vacillation or other ineffectual activity or implicit, as in the inability to escape useless thinking or obsessive ideas. The phobias include all types of unreasonable fear of things or situations as well as overreaction to more reasonable stimuli.

(12) Schizophrenia Scale (Sc)

The Sc scale measures the similarity of the subject's responses to those who are characterized by bizarre and unusual thoughts or behavior. There is a splitting of the subjective life of the schizophrenic person from reality so that the observer cannot follow rationally the shifts in mood or behavior.

(13) Hypomania Scale (Ma)

The Ma scale measures the personality factor characteristic of persons with marked overproductivity in thought and action. The word hypomania refers to a lesser state of mania. The hypomanic person seems just slightly off normal. The hypomanic is active and enthusiastic but may undertake too many things. His activities may interfere with other people through his attempts to reform social practice.

(14) Social I.E. Scale (Si)

The Si scale aims to measure the tendency to withdraw from social contact with others. The Si scale is not a clinical scale; it is, however, valuable for use with normals and has been widely used in counseling and guidance work.

The MMPI is not timed, although most respondents complete the 566 items in about one hour. Little or no instruction and supervision are required. The original normative data were derived from a sample of 700 individuals and were adequate for the ages 16 to 55 (18). The rationale for selecting the MMPI as the instrument for personality assessment involves the heterogeneity of the subjects wherein diversity

of age, socio-economic status and educational experiences necessarily restrict the available personality devices. Further, the MMPI purports to measure individual attributes which can be considered as continuous in that the attributes differ in magnitude. For example, the "normal" individual may, from time to time, be suspicious of another person or event. However, when suspiciousness becomes exaggerated and out of proportion to the event, the person may be considered maladjusted along that dimension (57). The MMPI provides the examiner with several classifications of the population in question and thereby meets the requirement of selection processes in general (12).

The selection of the predictor category has been influenced by considering dimensions deemed relatively persistent and stable in the individual's total spectrum of identifiable characteristics. It is presumed that reading skills, general ability and personality variables remain fairly constant once fixed, barring deliberate efforts to alter these traits and disregarding organic debilitation.

Practical nursing applicants took the three examinations at their respective schools, supervised by the local admitting officer. The tests were then mailed to Oklahoma State University, Bureau of Tests and Measurements, for scoring and preparation of the MMPI profile. Applicants scoring below 70 on the Otis were excluded from the training program as it was assumed that scores below this point reflected little chance of survival, especially within those areas covering nursing theory and mastery of academic demands. Data were

collected from the 1962 to 1965 classes and divided into two groups, those who completed the program and obtained their state license (survival group) and those who failed or dropped out of the program (attrition group). There was a group of 15 entrants from the total N who passed LPN course work and failed the state board examination; these 15 were classified as belonging to the attrition group. The total N, including both attrition and survival groups, was 488. Each entrant's test score was transferred to IBM cards and the IBM 7040 computer was utilized to carry out the statistical procedures.

Statistical Treatment

A coefficient of correlation was used to determine relationships between the independent variables (predictor category) and the dependent variables (the criterion category). A second statistical treatment (discriminant analysis) was carried out to determine whether the scores of the independent variables would classify the selected population in a pass-fail dichotomy. One distinct advantage of the discriminant analysis is that it considers the entire constellation of variables which, by themselves, provide no distinction but when considered in conjunction with other variables, maximize the separation along a desired classification. Another advantage of the discriminant analysis is that it has the effect of spreading the means of the group while reducing the scatter of individual points about the group mean. This tends to reduce overlap in the distribution and, concomitantly, reduce misclassification of the individual. Two major assumptions must be met in the discriminant analysis:

(1) that the tendency to drop out or complete a program is normally distributed, and (2) the relationship between the numerical variable and the dichotomous variable is linear (86).

Statement of Hypotheses

The issue under investigation within this study concerns the presumed relationships between selected predictor variables consisting of general mental ability, reading skills and personality dimensions; and achievement tests in the LPN program. Specifically, are these variables related to the achievement tests and will these variables identify individuals who tend to drop out of the program in addition to identifying potential passers? The following hypotheses are based upon the postulates stated in Chapter II and are designed to provide a statistical inference in decision-making. The term "major hypothesis" indicates those relationships under investigation which require several subhypotheses for complete analysis. This is done in order to expedite the writing of the hypotheses and avoid unnecessary repetition.

Hypothesis I: There will be a positive coefficient of correlation between the OTIS scores and the PNL scores.

Hypothesis II: There will be a positive coefficient of correlation between the OTIS scores and the PNA scores.

Hypothesis III: There will be a positive coefficient of correlation between the OTIS scores and the PNB scores.

Hypothesis IV: There will be a positive coefficient of correlation between the NDRT-V scores and the PNL, PNB and PNA scores.

Hypothesis V: There will be a positive coefficient of correlation between the NDRT-C scores and the PNA, PNB and PNL scores.

Major Hypothesis VI: The attrition group will score significantly lower on the NDRT-V, NDRT-C and the OTIS than will the survival group.

Hypothesis VII: The total means of the survival group scores will be significantly different from the total means of the attrition group scores.

Major Hypothesis VIII: The attrition group will score significantly higher on the MMPI subscales than will the survival group.

For the coefficient of correlation treatment, the total N of the survival group was utilized. In order to compute the discriminant analysis, it was necessary to reduce the size of the total N to 269, the capacity of the computer program. This was accomplished by the random selection of 175 subjects from the survival group plus the 94 members of the attrition group. Chapter IV indicates the results of these treatments.

CHAPTER IV

RESULTS

Introduction

The results of the statistical treatments of the data are presented in this chapter under four major divisions; the correlation analysis, discriminant analysis, the dispositions of the hypotheses and a discussion of the results. Conclusions, recommendations and a summary will be presented in Chapter V.

Correlation Analysis: The Predictor Category With the Criterion Category

The various test scores of the predictor category were considered to be significantly correlated with the criterion category if the two following specifications were met:

- (1) The obtained r value must equal or exceed the tabled value at the .10 level of probability and appropriate degree of freedom.
- (2) The obtained r value must exhibit the direction predicted in the hypothesis; inverse relationships must have negative signs.

Results of the relationships between the predictor intellectual variables and the criterion variables are shown in Table II.

TABLE II
 CORRELATION COEFFICIENTS OF READING SCORES,
 OTIS SCORES AND LPN ACHIEVEMENT TESTS
 N = 394

	PNB	PNA	PNL
NDRT-Vocabulary	29	38	41
NDRT-Comprehension	20	21	26
OTIS	24	38	40

(All decimals omitted)

A coefficient of .12 is significant at the 1% level

Although the scores of the intellectual tests screening battery indicate a significant degree of positive correlation with the criterion category, the question arises concerning the practical significance or the relative efficiency of these obtained r's considering the large N. The size of the r is, of course, highly dependent upon, among other things, the degree of heterogeneity or the variability of the characteristic under examination. The survival mean IQ is 97.43, with a standard deviation of 9.8. The relatively low degree of variability of this characteristic suggests that a low r could be expected.

The reading test vocabulary mean was 31.72 with a standard deviation of 15.71, and the reading test comprehension mean was 32.72 with a standard deviation of 14.02. There is a slowly increasing gradient of r with the increased variability of these two scores.

Table III shows the intercorrelations of the MMPI subscales and

TABLE III
 INTERCORRELATIONS OF THE MMPI SUBSCALES
 AND THE LPN ACHIEVEMENT TESTS
 N=394

	L	F	K	H _s	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
PNB	.01	-.18	.18	-.00	-.14	.10	-.02	-.10	.08	-.11	-.04	-.09	-.11
PNA	-.04	-.28	.20	-.00	-.12	.09	-.03	-.12	-.09	-.01	-.08	-.07	-.08
PNL	-.12	-.27	.15	-.01	-.19	.11	-.07	-.16	.00	-.05	-.09	-.12	-.07

A coefficient of .11 is significant at the .05 level (34, p. 201)

the LPN achievement tests.

In the analysis of Table III, certain scales emerge as being inversely related to the criterion triad. Scales F and Mf indicate significance at the .01 level while D is at the .05 level with the three achievement scales. Scale Hs reflects little or no numerical value with the criterion; the signs are included to show slight inclination only. Low Mf scores suggest the endorsement of culturally feminine occupations and would, presumably, be expected to be inversely related to scores earned in a nursing curriculum. The implications of these findings will be discussed more fully in the final portion of this chapter.

Discriminant Analysis Results

For this portion of the statistical treatment, 17 variables, as listed in Table IV, were entered in the equation. (Discriminant Analysis - several groups - version of May 27, 1964, Health Sciences, U. C. L. A.). Results of the first run are as listed.

The first-run distribution indicates that the variables employed would, in fact, dichotomize the population into a pass-fail category. Employing the generalized Mahalanobis D^2 as a X^2 value of 53.01572, with 17 degrees of freedom, the null hypothesis that the mean values are the same in both groups is rejected at the 1% level of confidence. The results of the first classification, showing hits and misses, are indicated in Table V.

TABLE IV
 FIRST RUN DISCRIMINANT ANALYSIS
 N = 269

Variable	Fail Group Means	Pass Group Means	t Level
Age	28.15	32.69	.05
OTIS	94.31	99.13	.01
NDRT-Vocabulary	26.59	35.96	.05
NDRT-Comprehension	30.82	35.52	.10
MMPI L	54.15	53.44	Not Significant
F	51.46	49.09	.001
K	56.74	58.22	Not Significant
H _s	48.96	47.94	Not Significant
D	50.96	49.04	.05
Hy	53.63	53.45	Not Significant
Pd	59.82	57.33	.05
Mf	50.61	49.00	Not Significant
Pa	54.29	53.24	Not Significant
Pt	52.65	51.98	Not Significant
Sc	53.23	51.43	.02
Ma	54.81	50.72	.01
Si	53.27	53.89	Not Significant

TABLE V
 FIRST RUN CLASSIFICATION MATRIX
 N = 269

Group	Function		Total
	Fail	Pass	
Fail	64	30	94
Pass	55	120	175

In the analysis of Table V, there are 64 failers whose scores on the 17 variables logically place them in the fail category; the function has correctly identified 68% of the total failers. However, 30 members of the fail group had scores resembling passers and represent false positives. The function, in this case, is incorrectly identifying about 30 % of the failers. The function correctly identifies 120 passers who resemble passers (true positives or "hits") and incorrectly identifies 55 failers whose scores resemble passers (false positives or "misses"). The function correctly identified 63% of the passers and incorrectly identified about 32 % of the passers.

Even though the two groups are clearly different according to their total mean scores on all variables, a t test was utilized and each of the various means was examined for a significance of difference (Ostle, p. 119, formula 7.13, et seq.). Taking a maximum level of acceptable probability of .10, nine variables were found to be contributing to the discrimination. The discriminant analysis was

run again, utilizing only these nine variables.

TABLE VI
SECOND RUN DISCRIMINANT ANALYSIS
N - 269

Variable	Fail Group Means	Pass Group Means
Age	28.15	32.69
OTIS	94.31	99.13
NDRT-Vocabulary	26.59	35.96
NDRT-Comprehension	30.82	35.52
MMPI F	51.46	49.09
D	50.96	49.04
Pd	59.82	57.33
Sc	53.23	51.43
Ma	54.81	50.72

The second run distribution yielded a generalized Mahalanolis D^2 as a X^2 value of 47.73279 with 9 degrees of freedom. The null hypothesis that the mean values are the same for the two groups was rejected at the 1% level. The second run also yielded slightly better identification of the failers as indicated in Table VII.

The second run classification, dropping those variables which were not contributing significantly to the discrimination, yielded

better identification of the failers (68% on the first run and 69% on the second run) with no change in identification of the passers.

TABLE VII
SECOND RUN CLASSIFICATION MATRIX

Group	Function		Total
	Fail	Pass	
Fail	66	28	94
Pass	55	120	175

Disposition of the Hypotheses

Hypothesis I: There will be a positive coefficient of correlation between the OTIS scores and the PNL scores.

results: $r = .40$

Disposition of hypothesis I: accept

Hypothesis II: There will be a positive coefficient of correlation between the OTIS scores and the PNA scores.

results: $r = .38$

Disposition of hypothesis II: accept

Hypothesis III: There will be a positive coefficient of correlation between the OTIS scores and the PNB scores.

results: $r = .24$

disposition of hypothesis III: accept

Hypothesis IV: There will be a positive coefficient of correlation between the NDRT-V scores and the PNL, PNB and PNA scores.

results: NDRT-V and PNL, $r = .41$
 NDRT-V and PNB, $r = .29$
 NDRT-V and PNA, $r = .38$

disposition of hypothesis IV: accept

Hypothesis V: There will be a positive coefficient of correlation between the NDRT-C scores and the PNA, PNB and PNL scores.

results: NDRT-C and PNA, $r = .21$
 NDRT-C and PNB, $r = .20$
 NDRT-C and PNL, $r = .26$

disposition of hypothesis V: accept

Major Hypothesis VI: The attrition group will score significantly lower on the NDRT-V, NDRT-C and the OTIS test than will the survival group.

statistical treatment: discriminant analysis followed by a t test (65, p. 119, formulas 7.13, et seq.)

results:

subhypothesis (1)

survival \bar{x} , NDRT-V, 35.96
 attrition \bar{x} , NDRT-V, 26.59 $t = .05$

disposition, subhypothesis (1): accept

subhypothesis (2)

survival \bar{x} , NDRT-C, 30.82
 attrition \bar{x} , NDRT-C, 35.52 $t = .10$

disposition, subhypothesis (2): accept

subhypothesis (3)

survival \bar{x} , OTIS, 99.13
 attrition \bar{x} , OTIS, 94.31 $t = .01$

disposition, subhypothesis (3): accept

disposition of major hypothesis VI: accept

Hypothesis VII: The total means of the survival group scores will be significantly different from the total means of the attrition group scores.

statistical treatment: discriminant analysis followed by a X^2 test with 17 degrees of freedom.

results: significant at .001 level

disposition of hypothesis VII: accept

Major Hypothesis VIII: The attrition group will score significantly higher on the MMPI subscales than will the survival group.

statistical treatment: discriminant analysis followed by a t test (65, p. 119, formulas 7.13, et seq.)

results:

subhypothesis (4)

survival \bar{x} , L scale, 53.44
attrition \bar{x} , L scale, 54.15 not significant

disposition, subhypothesis (4): reject

subhypothesis (5)

survival \bar{x} , F scale, 49.09 $t = .001$
attrition \bar{x} , F scale, 51.46

disposition, subhypothesis (5): accept

subhypothesis (6)

survival \bar{x} , K scale, 58.22
attrition \bar{x} , K scale, 56.74 not significant

disposition, subhypothesis (6): reject

subhypothesis (7)

survival \bar{x} , H_s scale, 47.94
attrition \bar{x} , H_s scale, 48.9 not significant

disposition, subhypothesis (7): reject

subhypothesis (8)

survival \bar{x} , D scale, 49.04 $t = .05$
attrition \bar{x} , D scale, 50.96

disposition, subhypothesis (8): accept

subhypothesis (9)

survival \bar{x} , Hy scale, 53.45
 attrition \bar{x} , Hy scale, 53.63 not significant

disposition, subhypothesis (9): reject

subhypothesis (10)

survival \bar{x} , Pd scale, 57.33
 attrition \bar{x} , Pd scale, 59.82 $t = .05$

disposition, subhypothesis (10): accept

subhypothesis (11)

survival \bar{x} , Mf scale, 49.00
 attrition \bar{x} , Mf scale, 50.61 not significant

disposition, subhypothesis (11): reject

subhypothesis (12)

survival \bar{x} , Pa scale, 53.24
 attrition \bar{x} , Pa scale, 54.29 not significant

disposition, subhypothesis (12): reject

subhypothesis (13)

survival \bar{x} , Pt scale, 51.98
 attrition \bar{x} , Pt scale, 52.65 not significant

disposition, subhypothesis (13): reject

subhypothesis (14)

survival \bar{x} , Sc scale, 51.43
 attrition \bar{x} , Sc scale, 53.23 $t = .02$

disposition, subhypothesis (14): accept

subhypothesis (15)

survival \bar{x} , Ma scale, 50.72
 attrition \bar{x} , Ma scale, 54.81 $t = .01$

disposition, subhypothesis (15): accept

subhypothesis (16)

survival \bar{x} , Si scale, 53.89 not significant
 attrition \bar{x} , Si scale, 53.27

disposition, subhypothesis (16): reject

disposition of major hypothesis VIII: reject

There is insufficient support for the hypothesis, neither in magnitude nor direction of the prediction.

Discussion of the Results

Reading skills, as measured by the Nelson-Denny reading test, appear to be important characteristics of the student in terms of the three LPN achievement tests. Of the two skills sampled - comprehension and vocabulary - vocabulary reflects the higher criterion relevancy than does comprehension. Construing description and prediction as merely different aspects of the same thing, entrants who score higher on the reading test vocabulary would tend to do proportionately better on the LPN achievement tests. In comparing the difference in the reading scores of the two groups, it is noted that the mean vocabulary score of the survival group is slightly more than 10 points above the mean vocabulary score of the attrition group while the comprehension mean scores are less discriminating with a difference of 4.7 points. The inference can be made that students who survive the practical nursing curriculum tend to be better readers, especially in vocabulary skills.

The discriminating ability of age presents an intriguing pattern. The mean age of the attrition group is 28.15, while the mean age of the survival group is significantly higher, 32.69. This appears to

be generally similar to findings of previous investigators in that the role and duties of the LPN seem to parallel the characteristics associated with the "mature" woman. More precise implications cannot be inferred from the data gathered here, however, evidence seems to favor the older applicant.

Although the total attrition MMPI profile is not significantly higher than the survival profile, there is, empirically, some degree of consonancy between overt behavior of dropouts as described earlier in this study, and the descriptions of elevated scale scores which are discriminating.

Some personality or behavioral attributes of the attrition group, as measured by the MMPI, are significantly different from the survival group and tend to suggest dimensions reflecting personal conflicts which could, conceivably, interfere with the individual's progress in the LPN program. The F scale reflects a high degree of sensitivity in identifying potential failers. Although originally developed as a validity scale for the MMPI, subsequent research suggests that the F scale is the most critical scale on the test profile (27). According to the authors of the test, the F scale deals with peculiar thoughts and beliefs, apathy, lack of interest in things or a denial of social ties. These peculiar thoughts may be in reference to attitudes toward law and a lack of comfortable control over impulses. The F scale is the longest scale on the MMPI; when a subject responds to the F items with a response set different from the normal reference group, the F score often reflects this difference.

Gough, McKee and Yandell (27) and Block and Bailey (27) offer,

through their studies of the implications of the F scale, a list of adjectives which best describe high F scorers and low scorers. On an adjective check list and Q sort, low F scorers were seen as unpretentious, sincere, calm, dependable, honest, moderate, simple, slow, unassuming, loyal, patient, and spunky. In contrast, high F's were seen as complex, restive, affected, curious, moody, opportunistic, changeable, dissatisfied, opinionated, restless, talkative, unstable, rebellious and generally lacking in conformity. These descriptive terms appeared in the subjects in a variety of nonpathological ways.

The attrition group is significantly different from the survival group (at the .05 level of confidence) on the MMPI D scale, in that they tended to score higher. Terms which describe women scoring high on D were found by Black (27) to be self-depreciative, inadequate, aloof, indecisive, moody, not self-controlled, quiet and secretive.

An additional MMPI dimension which discriminated at the .05 level of confidence was the Pd scale. Hovey (27) suggests, from a study of high Pd scorers in student nurses, that descriptive terms of lack of adequate control, not industrious and not working persistently, seemed to best characterize the students when judged against a standard of conformity and professional responsibility. The major feature of this scale, purported by the authors of the test, is that it reflects a disregard for social customs and mores, with inability to profit from punishing experiences.

Scale 8 (Sc) discriminated the attrition group from the survival group at the .02 level of confidence. This particular scale of the

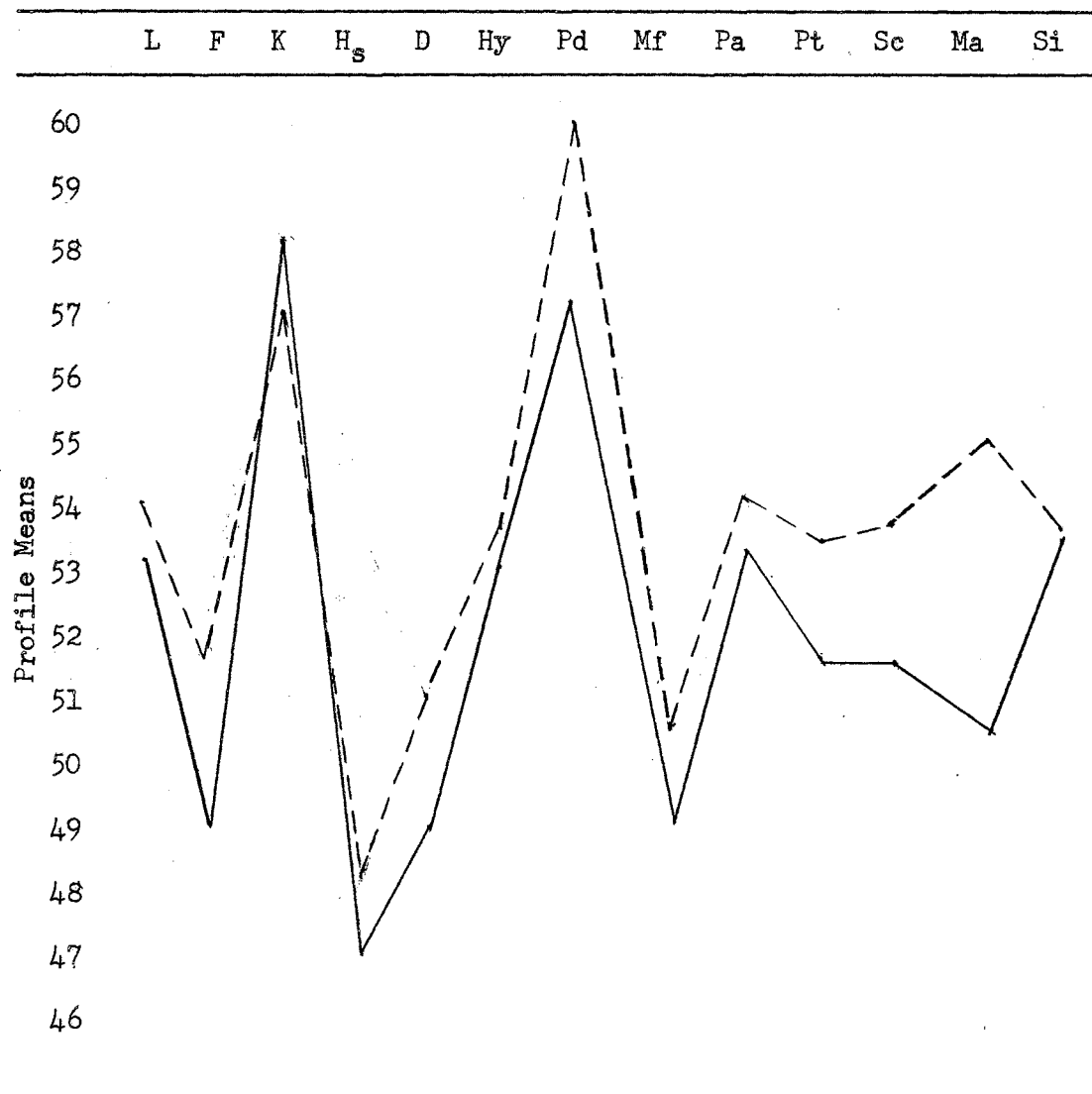
MMPI appears to measure highly heterogeneous behavior patterns; terms which best characterize high Sc scorers are: constrained, cold and apathetic or indifferent; other people may see them as remote and inaccessible.

Scale 9 (Ma) discriminated at the .01 level of confidence and suggests that individuals who score high along this dimension may be characterized by overactivity, resulting in inefficient and unproductive work. A tendency toward irritableness and temper outbursts contributes further to difficulties in relating to others.

To help clarify the above discussion, Table VIII has been prepared; the attrition-survival mean scores have been superimposed. The broken line (attrition group) reflects a generally elevated profile.

TABLE VIII

A COMPARISON OF ATTRITION-SURVIVAL MMPI PROFILES
 N = 269



Broken Line = Attrition Group

Solid Line = Survival Group

CHAPTER V

SUMMARY, RECOMMENDATIONS AND CONCLUSION

The purpose of this study was to investigate the presumed relationships of general mental ability, reading skills and personality dimensions with achievement test scores earned by students in a practical nursing program. Subjects utilized for this study were the entrants of nine practical nursing schools in Oklahoma. Three assessment instruments were utilized - a test of general mental ability, a reading-skills test and a personality inventory - and applicants were admitted on a no-prior-selection basis except for those individuals who scored below 70 on the IQ test. Upon completion of the gathering of the data, the subjects were divided into two groups: group one was composed of those subjects who, for any reason, dropped out of the program and failed to receive credit for the course or a state license; group two was composed of those subjects who successfully completed the practical nurse curriculum and obtained the status of licensed practical nurse.

A coefficient of correlation was computed to determine the level of relatedness between the reading scores, general mental ability scores, personality assessment scores and the achievement tests. Significant levels of interrelatedness were found between the intellec-

tive scores and the achievement tests. Elevated personality scale patterns were construed to be reflective of some degree of maladjustment; these scores were hypothesized as being inversely related to achievement test scores. Although some findings were in the direction predicted, there was insufficient evidence to completely support this hypothesis.

The attrition group was found to be significantly different from the survival group in that their intellectual scores were lower and their personality assessment scores were higher (suggesting some degree of maladjustment) on 5 of the 13 scales. Discriminant analysis results suggest that the screening test battery successfully identified 69% of the attrition group and 68% of the survival group.

Recommendations

The need for this study evolved from the problem concerning decision making in selecting candidates for practical nurse training in Oklahoma and the fact that applications for such training are rapidly increasing. In reviewing an applicant's scores on the test battery, a committee would, hopefully, consider the intersection of a number of dimensions rather than a single vector. In general, mental ability and reading scores appear to be related favorably to the achievement test scores and it follows that elevation of these scores would appear to magnify the probability of the individual's chances of survival. While there is some evidence of a statistical relationship between elevated MMPI scores and attrition, certain precautions are clearly needed. Results obtained in this study are based upon large groups

and generalizations to a single individual is hazardous. The recommended use of the personality assessment in this case is as a screening device evaluating the need for more extensive interviewing or collateral counseling. Additional limitations in the use of these psychometric instruments are suggested in that results quoted are applied solely to the criterion population in question and the efficiency with other groups would probably be lower. These results should be restricted to the selection of practical nursing students within the regions specified earlier in this study. When correlation coefficients are offered as evidence of interrelatedness, the need for additional research should be stressed.

Areas for Additional Research

Research directed toward the cross-validation of these obtained data with a different population of practical nursing students could yield a dual contribution. Replication of validity studies would, hopefully, provide greater confidence in the data. Additional research could lead to the construction of attrition-survival tables of probability. Such tables, in the light of research cited elsewhere in this paper, would be of value in decision-making. An additional area of research could be directed toward the construction of dropout predictor scales from the MMPI. For example, the F scale has demonstrated some degree of sensitivity in identifying members of the attrition group. Since this scale is one of the longest scales on the MMPI, incorporation of these items with other discriminating scale items would appear to be a tenable area of research.

Conclusion

Results of this investigation suggest that, for the population in question, (i.e., highly heterogeneous in age, educational experiences and personality characteristics) evaluation of general mental ability and reading skills as well as personality assessment, seems to be of some value. As for predictive value, especially the prediction of individual subjects, limitations should be applied until future research, conducted on similar populations, has been carried out.

BIBLIOGRAPHY

- (1) Allport, Gordon W. "The General and the Unique in Psychological Science." Journal of Personality. Vol. 30, 1962.
- (2) Altus, W. D. "A College Achiever and Nonachiever Scale for the MMPI." Journal of Applied Psychology. Vol. 32, 1948, pp. 385-397.
- (3) Altus, W. D. and J. H. Clark. "The Effect of Adjustment Patterns Upon the Intercorrelation of Intelligence Subtest Variables." Journal of Social Psychology. 1949, 30, pp. 39-48.
- (4) Anastasi, Anne. Psychological Testing. The MacMillan Company, New York, 1959.
- (5) _____. "The Nature of Psychological 'Traits'." Psychological Review. 1948, 55, pp. 127-138.
- (6) Anderson, Wayne. "An MMPI Scale for Predicting Failure in Nursing Practicum." University of Missouri Testing and Counseling Service Report. Vol. 18, No. 5, June, 1964.
- (7) Applezweig, M. H. "Educational Levels and MMPI Profiles." Journal of Clinical Psychology. 1953, 9, pp. 340-344.
- (8) Auld, F. "Influence of Social Class on Personality Test Responses." Psychological Bulletin. 1952, 49, pp. 318-332.
- (9) Barnes, E. H. "Response Bias and the MMPI." Journal of Consulting Psychology. 1956, 20, pp. 371-374.
- (10) Barron, E. M. and H. H. Donohue. "Psychiatric Aide Selection Through Psychological Examination: A Preliminary Report of the Screening of Applicants at the Arkansas State Hospital." American Journal of Psychiatry. 1951, 107, pp. 859-865.
- (11) Bass, B. M. and I. A. Berg (Eds) Objective Approaches to Personality Assessment. Princeton: Van Nostrand, 1959.
- (12) Bechtoldt, H. P. "Problems in Establishing Criterion Measures." D. B. Stuit (Ed.) Personnel Research and Test Development in the Bureau of Naval Personnel. Princeton: Princeton University Press, 1947.

- (13) Bieri, J. E.; Blachapsky and J. W. Reid. "Predictive Behavior and Personal Adjustment." Journal of Consulting Psychology. 1955, 19, pp. 351-356.
- (14) Brogden, H. E. "On the Interpretation of the Correlation Coefficient as a Measure of Predictive Efficiency." Journal of Educational Psychology, 1946, 37, pp. 65-76.
- (15) Brower, D. "The Relationship Between Intelligence and MMPI Scores." Journal of Social Psychology, 1947, Vol. 25, pp. 243-245.
- (16) Buros, Oscar Krisen (Ed.) The Sixth Mental Measurements Yearbook. 1965, p. 1353.
- (17) Burris, Ruth E. "Analysis of Vocational Practical Nursing School Graduates, Employer-Employee." State Board for Vocational Education Division of Health Occupations Training, 1964 (Mimeograph).
- (18) Calden, G. and J. E. Hokanson. "The Influence of Age on MMPI Responses." Journal of Clinical Psychology. 1959, 15, pp. 194-195.
- (19) Calvin, A. D.; P. B. Koons, J. L. Bingham and H. H. Fink. "A Further Investigation of the Relationship Between Manifest Anxiety and Intelligence." Journal of Consulting Psychology. 1955, 19, pp. 280-282.
- (20) Clark, J. H. "Grade Achievement of Female College Students in Relation to Non-Intellective Factors: MMPI Items." Journal of Social Psychology. 1953, 37, pp. 275-281.
- (21) Cliff, Norman; Sidney Newman and Margaret A. Howell. "Selection of Subprofessional Hospital Care Personnel." Journal of Applied Psychology, 1959, 43, pp. 42-66.
- (22) Congdon, Robert. "Personality Factors and the Capacity to Meet Curricular Demands." Personnel and Guidance Journal. April, 1964, pp. 767-775.
- (23) Cottle, W. C. "A Factorial Study of Selected Instruments for Measuring Personality and Interest." American Psychologist. 1948, 3, p. 300.
- (24) Cronbach, L. J. Essentials of Psychological Testing. Harper and Brothers, New York, Second Ed., 1960.
- (25) _____. "Response Sets and Test Validity." Educational and Psychological Measurements. 1946, 6, pp. 475-499.

- (26) Cronbach, L. J. and Goldine C. Glesser. Psychological Tests and Personnel Decision. Urbana: University of Illinois Press, 1957.
- (27) Dahlstrom, W. Grant and George Schlager Welsh. An MMPI Handbook: A Guide to Use in Clinical Practice and Research. The University of Minnesota Press, Minneapolis, Minn, 1960.
- (28) Daniels, E. E. and W. A. Hunter. "MMPI Personality Patterns for Various Occupations." Journal of Applied Psychology. 1949, 33, pp. 559-565.
- (29) Downie, N. M. and R. W. Heath. Basic Statistical Methods. Harper and Brothers, New York, 1959.
- (30) Drake, L. E. and Eugene Oetting. "An MMPI Pattern and Suppressor Variable Predictive of Academic Achievement." Journal of Counseling Psychology, 1957, 4, pp. 245-247.
- (31) Etzioni, Amitai. Modern Organizations. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1965.
- (32) Evaluation and Guidance Service of the National League for Nursing. "Practical Nursing Schools and Their Students." Nursing Outlook, January, 1953, Vol. 1, No. 1.
- (33) Fitzgerald, Bernard J. "Some Relationships Among Projective Test, Interview and Sociometric Measures of Dependent Behavior." Journal of Abnormal and Social Psychology, 1958, Vol. 56. pp. 199-204.
- (34) Garrett, Henry E. Statistics In Psychology and Education. Longmans, Green and Co., New York, 1959.
- (35) _____. "The Discriminant Function and Its Use in Psychology." Psychometrika. 1943, 8, pp. 65-79.
- (36) Garrett, Harley F. "A Review and Interpretation of Investigations of Factors Related to Scholastic Success in Colleges of Arts and Science and Teachers Colleges." Journal of Experimental Education. December 1949, p. 130.
- (37) Goff, R. M. "Trait Identification as a Means of Predicting Academic Goal Attainment." Journal of Experimental Education, March, 1963.
- (38) Gough, H. G. "Diagnostic Patterns on the Minnesota Multiphasic Personality Inventory." Journal of Applied Psychology, 1946, 2, pp. 23-37.

- (39) Haney, Russell; William B. Michael and Robert A. Jones. "The Development and Validation of a Test Battery for Selection of Student Nurses." Educational and Psychological Measurement. 19, pp. 641-643, Winter, 1959.
- (40) Hathaway, S. R. and J. C. McKinley. Minnesota Multiphasic Personality Inventory: Manual. Revised, 1951. The Psychological Corporation, New York, New York.
- (41) Holt, Robert R. "Clinical and Statistical Prediction: A Reformulation and Some New Data." Journal of Abnormal and Social Psychology, 1958, Vol. 56.
- (42) Holt, Robert R. "Individuality and Generalization in the Psychology of Personality." Journal of Personality, Vol. 30, 1962, p. 402.
- (43) Horst, P. "The Prediction of Personal Adjustment." New York: Social Science Research. Council Bulletin, 48, 1941.
- (44) Jensen, Vern H. "Influence of Personality Traits on Academic Success." Personnel and Guidance Journal, March, 1958, pp. 497-500.
- (45) Kassebaum, Gene G.; Arthur S. Couch and Philip E. Slater. "The Factorial Dimension of the MMPI." Journal of Consulting Psychology, Vol. 23, No. 3, 1959.
- (46) Katzel, Mildred E. "Research in Health Occupations Educations Past, Present and Future." A paper presented at the Convention of the American Vocational Association, Minneapolis, Minnesota. December 9, 1964.
- (47) Kirk, Barbara A. "Tests Versus Academic Performance in Malfunctioning Students." Journal of Consulting Psychology. 1952, Vol. 16, pp. 213-216.
- (48) Levine, Eugene. "Research in Practical Nursing as a Health Manpower Resource." A paper presented at the Health Occupations Education Program of the American Vocational Association Convention, Minneapolis, Minnesota. December 9, 1964.
- (49) Little, Kenneth B. and Edwin S. Shneidman. "The Validity of MMPI Interpretations." Journal of Counseling Psychology. Vol. 18, No. 6, 1954.
- (50) McCullough, Mildred Katherine. "Factors Related to Success in Nursing." Unpublished Doctor's Dissertation, University of Southern California, Los Angeles, 1952.

- (51) McNemar, Quinn. Psychological Statistics. John Wiley and Sons, Inc., New York, New York, 1962.
- (52) Meadow, Lloyd. "Assessment of Students for Schools of Practical Nursing." Journal of Nursing Research, Summer 1964, Vol. 13, No. 3.
- (53) Meadow, Lloyd and Ruth B. Edelson. "Age and Marital Status - and Their Relationship to Success in Practical Nursing." Nursing Outlook. April, 1963, Vol. II, No. 4.
- (54) Meehl, Paul E. Clinical vs. Statistical Prediction: A Theoretical Analysis and a Review of the Evidence. University of Minnesota Press, Minneapolis, Minnesota, 1956.
- (55) _____. "Wanted - A Good Cookbook." Journal of the American Psychologist. April, 1956.
- (56) Meehl, Paul and Albert Rosen. "Antecedent Probability and the Efficiency of Psychometric Signs, Patterns, or Cutting Scores." Psychological Bulletin. Vol. 52, No. 3, 1955.
- (57) Menninger, Karl; Martin Mayman and Paul Pruyser. The Vital Balance. The Viking Press, New York, 1963.
- (58) Mischel, T. "Personal Constructs, Rules, and the Logic of Clinical Activity." Journal of Psychological Review. 1964, Vol. 71, No. 3, pp. 180-192.
- (59) Morgan, Henry. "A Psychometric Comparison of Achieving and Nonachieving College Students of High Ability." Journal of Consulting Psychology. Vol. 16, p. 152.
- (60) Mosier, Charles I. "Problems and Designs of Cross Validation." Educational and Psychological Measurements. 1951, Vol. 11, pp. 5-11.
- (61) Mowrer, O. H. Learning Theory and Personality Dynamics. Ronald Press, New York, 1950, pp. 590-596.
- (62) National League of Nursing Education. "Factors in the Success of Students in Schools of Practical Nursing." Nursing Outlook. August, 1954, Vol. 2, No. 8.
- (63) _____. "Test Plan for State Board Test Pool Practical Nurse Examination." Series 558, 1963 (Mimeograph).
- (64) Oskamp, Stuart. "The Relationship of Clinical Experience and Training Methods to Several Criteria of Clinical Prediction." Psychological Monographs. 1962, Vol. 76, No. 28.

- (65) Ostle, Bernard. Statistics in Research: Basic Concepts for Research Workers. 1954, Iowa State College Press, Ames, Iowa.
- (66) Otis, Arthur S. Manual of Directions for the Gamma Test. Copyright 1939, 1954. Harcourt, Brace and World, Inc., New York.
- (67) Phares, Jerry and Julian B. Rotter. "An Effect of the Situation on Psychological Testing." Journal of Consulting Psychology. Vol. 20, 1956, pp. 291-293.
- (68) Sarason, Irwin G. (Ed.). Contemporary Research in Personality. D. Van Nostrand Co., Inc., 1962, pp. 111-124.
- (69) Sarbin, Theodore R. "A Contribution to the Study of Actuarial and Individual Methods of Prediction." The American Journal of Sociology. 1943, 48, pp. 593-603.
- (70) Savage, R. D. "Personality Factors Related to Academic Performance." British Journal of Educational Psychology. November, 1962, Vol. 32, pp. 251-253.
- (71) Shaffer, Laurance F. and Edward Joseph Shoben. The Psychology of Adjustment. Boston, Houghton Mifflin Co., 1956, 2nd. Ed.
- (72) Siegel, Sidney. Nonparametric Statistics for the Behavioral Sciences. McGraw-Hill Book Company, Inc., New York, 1956.
- (73) Sines, Lloyd K. "The Relative Contribution of Four Kinds of Data to Accuracy in Personality Assessment." Journal of Consulting Psychology. Vol. 23, No. 6, 1959.
- (74) Small, L. "Personality Determinants of Vocational Choice." Psychological Monographs. 1953, Vol. 67.
- (75) Solkoff, Norman. "Effects of a Variation in Instructions and Pictorial Stimuli on Responses to TAT-Like Cards." Dissertation Abstracts. 1957.
- (76) Spiker, Charles and Boyd R. McCandless. "The Concept of Intelligence and the Philosophy of Science." Psychological Review. Vol. 61, No. 4, 1954, p. 255.
- (77) Steinzor, Bernard. "Rorschach Responses of Achieving and Non-achieving College Students of High Ability." American Journal of Orthopsychiatry. Vol. 14, 1944, pp. 494-504.

- (78) Stuit, D. B. "The Effect of the Nature of the Criterion Upon the Validity of Aptitude Tests." Educational Psychological Measurements. 1947, 7, pp. 671-676.
- (79) Super, Donald E. and John O. Crites. Appraising Vocational Fitness by Means of Psychological Tests. University of Iowa Press, 1962.
- (80) Sutherland, Barbara K. "The Sentence Completion Technique in a Study of Scholastic Underachievement." Journal of Consulting Psychology. Vol. 16, 1952, 353-358.
- (81) Tiedman, David V. "The Multiple Discriminant Function - A Symposium." Harvard Educational Review. Vol. 21, No. 2, Spring, 1951.
- (82) U. S. Department of Health, Education and Welfare. Office of Education Publication No. 80021.
- (83) U. S. Department of Labor. Dictionary of Occupational Titles, 1965 Definitions of Titles, Third Edition.
- (84) U. S. Department of Labor. Occupational Outlook Handbook 1966-67. Bureau of Labor Statistics, Bulletin No. 1450.
- (85) Wallace, Wimburn L. "Research in Health Occupations Education." A paper presented at the Health Occupations Education Panel Discussion, American Vocational Association Convention, Minneapolis, Minnesota, December 9, 1964.
- (86) Wert, James E; Charles O. Neidt and J. Stanley Ahmann. Statistical Methods in Educational and Psychological Research. New York, Appleton-Century-Crofts, Inc., 1954.
- (87) West, Margaret D. and Christy Hawkins. "Research in Health Occupations Education." A paper presented at the Health Occupations Education Program, American Vocational Association Convention, Minneapolis, Minnesota, December 9, 1964.

APPENDIX

List of Participating Vocational Schools
of Practical Nursing

- (1) Valley View Hospital
Ada, Oklahoma
- (2) The Jane Phillips Episcopal Hospital
Bartlesville, Oklahoma
- (3) Oklahoma General Hospital
Clinton, Oklahoma
- (4) Memorial Hospital
Lawton, Oklahoma
- (5) Saint Mary's Hospital
McAlester, Oklahoma
- (6) Northeastern Oklahoma A & M College
Miami, Oklahoma
- (7) Muskogee General Hospital
Muskogee, Oklahoma
- (8) Mission Hill Memorial Hospital
Shawnee, Oklahoma
- (9) Woodward Memorial Hospital
Woodward, Oklahoma

TABLE IX
 INTERCORRELATIONS OF THE TOTAL PREDICTOR CATEGORY
 WITH THE TOTAL CRITERION CATEGORY
 N = 394

	Age	IQ	ND Voc	ND Com	L	F	K	Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si	PNA	PNB	PNL
Age	-19		18	-07	04	-14	09	05	13	16	-08	-05	-01	-06	-17	-19	04	14	11	16
IQ		47	43	-13	-11	16	07	07	-19	11	03	-19	10	02	10	04	-11	38	24	40
ND-V			75	-13	-19	16	04	04	-17	09	05	-13	07	06	03	-05	-09	38	29	41
ND-C				-11	-12	13	06	06	-15	09	06	-08	06	-02	14	02	-10	21	20	26
L					-05	50	23	12	24	10	08	00	00	06	-13	00	-04	01	01	-12
F						-30	08	18	-08	12	07	15	16	28	23	17	-28	-18	-27	-27
K							39	-12	49	32	04	02	09	26	-13	-38	20	18	15	15
Hs								30	65	41	04	19	36	43	-00	00	00	-00	-01	-01
D									16	23	-02	17	45	19	-18	45	-12	-14	-19	-19
Hy										42	-06	22	25	30	-03	-18	09	10	11	11
Pd											08	19	38	46	29	-24	-03	-02	-07	-07
Mf												-14	-07	02	09	-08	-12	-10	-16	-16
Pa														38	34	02	04	09	08	00
Pt															56	11	26	-01	-11	-05
Sc																33	-02	-08	-04	-09
Ma																	-32	-07	-09	-12
Si																		-08	-11	-07
PNA																				60
PNB																				
PNL																				

VITA

Albert Grant McCormick

Candidate for the Degree of

Doctor of Education

Thesis: AN INVESTIGATION OF READING SKILLS, GENERAL MENTAL ABILITY AND PERSONALITY VARIABLES USED IN THE SELECTION OF PRACTICAL NURSING STUDENTS

Major Field: Student Personnel and Guidance

Biographical:

Personal Data: Born in Cotter, Arkansas, September 20, 1924, the son of Robert L. and Ruth Mary McCormick.

Education: Attended grade school in Batesville, Arkansas; graduated from Central High School, Tulsa, Oklahoma, in 1943; received the Bachelor of Science degree from the University of Tulsa in June, 1953, with a major in secondary science education; received the Master of Education degree, with a major in educational administration, from the University of Tulsa, in August, 1959; completed requirements for the Doctor of Education degree in July, 1966.

Professional experience: Served in China as an instructor with the Chinese-American Air Force during World War II; served as an independent-duty medical corpsman during the Korean Conflict; taught general science in Woodrow Wilson Junior High and physiology-psychology in Will Rogers High School, Tulsa Public Schools; guidance counselor for two years, school psychologist for two years, Tulsa Public Schools; Vocational Counselor for the Veterans Administration, 1964-1966; member of Phi Delta Kappa and American Personnel and Guidance Association.