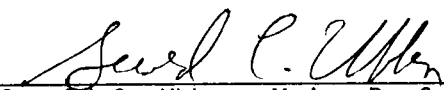
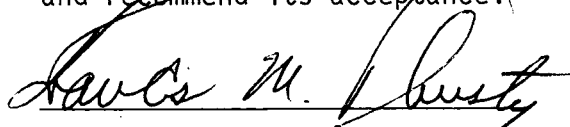


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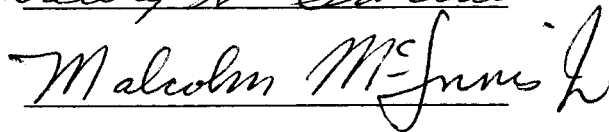
I am submitting herewith a dissertation written by Theresa Griffith Sharp entitled "An Analysis of the Relationships of Seven Selected Variables to State Board Test Pool Examination Performance of The University of Tennessee, Knoxville College of Nursing." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Educational Administration and Supervision.

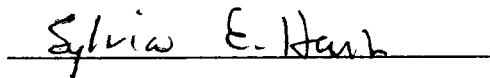

Gerald C. Ubben, Major Professor

We have read this dissertation
and recommend its acceptance:

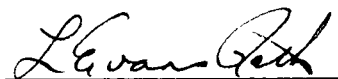








Accepted for the Council:


Vice Chancellor
Graduate Studies and Research

AN ANALYSIS OF THE RELATIONSHIPS OF SEVEN SELECTED VARIABLES
TO STATE BOARD TEST POOL EXAMINATION PERFORMANCE OF
THE UNIVERSITY OF TENNESSEE, KNOXVILLE,
COLLEGE OF NURSING

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Theresa Griffith Sharp

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ABSTRACT

The two-fold purpose of this study was to: (1) examine the relationship between each of the seven selected variables and State Board Test Pool Examination (SBTPE) performance, and (2) determine from the selected variables the strongest combination predictive of State Board Test Pool Examination performance.

The study was designed to determine whether any one of the seven selected variables or a combination of the variables is predictive of performance on the State Board Test Pool Examination. The selected variables to be studied were: high school grade point average (HSGPA), The University of Tennessee, Knoxville, College of Nursing grade point average (CNGPA), and American College Test Assessment (ACT) standard scores (English, ENG; mathematics, MA; social studies, SS; natural sciences, NSC; composite, COMP).

Data utilized were from graduates of the baccalaureate program of The University of Tennessee, Knoxville, College of Nursing from 1974 through 1979. The sample of 322 was selected from a total population of 572.

The Statistical Analysis System (SAS) was designed to accomplish analysis of the predictive relationship of each of the seven selected variables to State Board Test Pool Examination performance (result of pass or fail), a stepwise discriminant analysis was designed for determining the predictive relationship of the strongest combination of the independent variables to overall State Board Test Pool Examination

performance (result of pass or fail), and stepwise multiple regression analysis was designed to determine the strongest predictive combination of selected variables for each of the five subexams of the State Board Test Pool Examination.

The selected variables were each found to be predictive of SBTPE performance (result of pass or fail).

The strongest combination for predicting SBTPE performance (result of pass or fail) was found to be CNGPA, MA, and NSC.

The strongest combination of variables for predicting performance on the medical nursing subexam of the SBTPE was found to be CNGPA, ENG, SS, and NSC.

The strongest combination of variables for predicting performance on the surgical nursing subexam of the SBTPE was found to be CNGPA, ENG, and NSC.

The strongest combination of variables for predicting performance on the obstetrical nursing subexam of the SBTPE was found to be CNGPA, SS, and NSC.

The strongest combination of variables for predicting performance on the nursing of children subexam of the SBTPE was found to be CNGAP, SS, and NSC.

The strongest combination of variables for predicting performance on the psychiatric nursing subexam of the SBTPE was found to be CNGPA, ENG, SS, and NSC.

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CHAPTER I

STATEMENT OF THE PROBLEM

I. INTRODUCTION

Although the American College Test Assessment (ACT) has become widely adopted in recent years, few studies dealing with relationships between ACT and State Board Test Pool Examination (SBTPE) performance have been reported in the literature. Many institutions of higher learning require ACT test results be submitted as a part of the admissions procedure. Many nursing programs utilize ACT scores in screening applicants for admission. A study of relationships between ACT performance and SBTPE performance has merit for two reasons. The first is that the ACT test is a widely used test (Assessing Students on the Way to College, 1972). The information gathered from such a study will be useful to high school advisors who provide precollege guidance and counseling to students. Secondly, information derived from this study will serve the public interest, as it is related to cost of nursing education and state nursing regulations concerning SBTPE performance. Many states now have a regulation that specifies a pass percentage requirement that each program must achieve per year. For example, in Tennessee the current regulations specify a pass percentage requirement of 85 percent. For the baccalaureate nursing applicant, the ACT test scores can usually be available to the applicant at least four years prior to having to take the SBTPE.

Knowledge of relationship between ACT scores and SBTPE performance will be useful to guidance counselors, nursing applicants, nursing students, and nursing faculty in academic planning. In some situations the information from this study may be of assistance to nursing applicants, nursing students, nursing programs, and the public in avoiding unnecessary expenses. With the concern over financial stringency and budget curtailment, that many higher education institutions are currently facing, it is appropriate and timely to analyze the predictive relationship of ACT scores and grade point averages to SBTPE performance.

American College Test Assessment

The American College Test Assessment (ACT) is explained in a technical report published by The American College Testing Program. The report, Students on the Way to College (1972), states:

Each of the ACT tests is oriented toward one of the four primary subject-matter areas of college and high school instruction. Thus, the English test is designed to measure the student's understanding and the use of the basic elements in correct and effective writing; the mathematics test, the student's mathematical reasoning ability; the social studies test, evaluative reasoning and problem-solving skills required in the social studies; and the natural sciences test, the critical reasoning and problem-solving skills required in the natural sciences. The average of a student's scores on these four tests is his ACT Composite Score, which may be considered an estimate of his overall academic ability. ACT scores are reported on a standard score scale that ranges from 1 to 36. The standard error of measurement is about 1.0 for the ACT Composite and approximately 2.0 for each of the four ACT tests. . . . This means that a student's true score is generally within 1 score point either side of his reported score for the ACT Composite and within 2 score points either side of his reported score for each of the ACT tests (p. 3).

State Board Test Pool Examination

The State Board Test Pool Examination (SBTPE) is a combination of five separate content area tests, each of which the graduate nurse must pass in order to be licensed to practice as a registered nurse (R.N.). The five specialty content areas comprising the SBTPE are: medical nursing, surgical nursing, obstetrical nursing, nursing of children, and psychiatric nursing.

Each state has its own passing score requirement. The minimum score pass requirement in Tennessee is 350.

The University of Tennessee, Knoxville, College of Nursing

The University of Tennessee, Knoxville, College of Nursing graduated the first students from the baccalaureate program in 1974. A statement from a recent self study report (A Self Study and Evaluation of The Bachelor of Science in Nursing Program and the Master of Science in Nursing Program, September 2, 1980) reflects the high quality that has been achieved by this program from its beginning.

4. The BSN [Bachelor of Science in Nursing] program was fully accredited for the maximum eight year period in 1974. State Board performance by graduates is the best in Tennessee. . . . (p. 7).

II. THE PROBLEM

Statement of the Problem

What is the predictability of State Board Test Pool Examination performance as determined by discriminant and multiple regression analysis of seven selected variables: high school grade point average;

The University of Tennessee, Knoxville, College of Nursing grade point average; ACT standard English score; ACT standard mathematics score; ACT standard social studies score; ACT standard natural sciences score; and, ACT standard composite score?

Statement of the Purpose

The two-fold purpose of this study was: (1) to determine the predictive relationship between each of the selected variables and SBTPE performance, and (2) to determine the strongest combination of the selected variables predictive of SBTPE performance.

III. ASSUMPTIONS

The following assumptions were accepted for the study:

1. The sample would be representative of the total population.
2. The sample would be large enough to provide reliable predictability results.
3. The high school grade point averages were assumed to have a comparable value regardless of the high school from which the GPA (grade point average) was reported.
4. The dates the ACT and SBTPE were taken would not be a critical factor and test data from more than one date and year could be used.
5. The selected variables have a relationship to SBTPE performance, the predictive utility of which may be determined from a discriminant study of the relationship of the selected variables to one another and to SBTPE performance.

6. Grade point averages collectively represent a comparable variable to be studied, although instruction and faculty expertise may have varied considerably among the high schools from which GPA's were reported and among the courses within The University of Tennessee, Knoxville, College of Nursing over the years covered by this study.

IV. DEFINITION OF ABBREVIATIONS AND TERMS

1. ACT. The American College Test Assessment.
2. CNGPA. The University of Tennessee, Knoxville, College of Nursing cumulative grade point average at the end of the quarter prior to graduation from the baccalaureate nursing program.
3. FAIL. A score below 350 on any one of the five subexams of the SBTPE.
4. HSGPA. High school grade point average.
5. MED. The medical nursing subexam of the SBTPE.
6. NCH. The nursing of children subexam of the SBTPE.
7. OBS. The obstetrical nursing subexam of the SBTPE.
8. PASS. A score of 350 or above on any one of the five subexams of the SBTPE.
9. PSY. The psychiatric nursing subexam of the SBTPE.
10. SBTPE. State Board Test Pool Examination.
11. Subexam. Any one of the five content area tests of the SBTPE.
12. SURG. The surgical nursing subexam of the SBTPE.
13. UT, K CN. The University of Tennessee, Knoxville, College of Nursing.

V. DESIGN OF THE STUDY

The Population

The population studied was composed of 572 graduates of the UT, K CN. The population was confined to graduates from the years 1974 through 1979.

The Sample

The sample selected was composed of 322 graduates from whom the following variables could be identified: high school grade point average; UT, K CN grade point average; and ACT standard scores. The sample was selected from the graduate population from the years 1974 through 1979.

The Treatment

The study was designed to determine the predictive relationship of each of the selected variables to SBTPE performance (pass or fail) and to determine the strongest combination of the selected variables predictive of SBTPE performance. Data from each of the graduates' records that were identified as independent variables were: (1) high school GPA; (2) UT, K CN GPA; (3) ACT standard English score; (4) ACT standard mathematics score; (5) ACT standard social studies score; (6) ACT standard natural sciences score; (7) ACT standard composite score. Dependent variables for the study were SBTPE performance, identified as: (1) RESULT (pass or fail); (2) MED; (3) SURG; (4) OBS; (5) NCH; and (6) PSY. Computer facilities at The University of Tennessee, Knoxville, were utilized for the analyses.

Data were first analyzed to determine the relationship between each of the independent (selected) variables and the dependent variables. Next, stepwise discriminant analysis was computed to determine the strongest combination of independent variables predictive of SBTPE performance (pass or fail). Finally, stepwise multiple regression models were utilized to determine the strongest set of variables predictive of SBTPE performance.

VI. LIMITATIONS OR DELIMITATIONS

The population for this study was limited to the graduates of The University of Tennessee, Knoxville, College of Nursing baccalaureate program for the years 1974 through 1979. The sample drawn from this population was limited to graduates whose records on file in the UT, K CN contained the following data: high school grade point average; UT, K CN cumulative grade point average; SBTPE scores. No attempt was made to identify the period of time a graduate had spent in the program. No attempt was made to distinguish between the transfer and generic program history of the graduates; however, graduates who were transfer students were in large proportion excluded from the sample due to a lack of either the ACT standard scores or high school grade point average within their UT, K CN records.

The SBTPE results used for the sample were limited to first-time takers. The sample was not restricted to either in-state or out-of-state takers; therefore, the sample included in-state and out-of-state takers.

VII. ORGANIZATION OF THE STUDY

Chapter I contains the introduction; the statement of the problem, the assumptions, the definition of abbreviations and terms, the design of the study, the limitations or delimitations, and the organization of the study. Chapter II is a review of the related literature. Chapter III is a presentation of the methodology. Chapter IV is a presentation of the data and an analysis of the treatment of the data. Chapter V contains a summary, findings, discussion, conclusions, and recommendations.

CHAPTER II

REVIEW OF LITERATURE

I. INTRODUCTION

Much has been written about prediction of state board examination performance. Various factors have been studied and analyzed as predictors of state board examination performance. Factors most commonly appearing in predictive studies have included National League for Nursing Achievement Test performance, nursing theory grades, verbal and reading ability, and Scholastic Aptitude Test scores.

Relatively little appears in the literature reporting study of any relationship of American College Test Assessment (ACT) performance to State Board Test Pool Examination (SBTPE) performance. One may conjecture that the reason is due to the fact that the ACT is usually administered to an individual as a junior or senior in high school, and that the ACT is taken too early prior to the SBTPE to have any relevance for study. The view may have been held that there are other variables more closely tied to SBTPE performance, so why bother with ACT's.

ACT scores have become widely used as a part of the admission profile of applicants to nursing education programs, but only two studies examining the relationship of ACT performance and state board examination performance were found. The two studies, by Ledbetter and Perez, are discussed near the end of this chapter.

The majority of predictive studies reported in published literature have studied National League for Nursing (NLN) Achievement Tests or course grades or Grade Point Average (GPA) as predictors of state board examination performance, and the correlations to state board performance have for the most part been positive.

Studies concerned with ACT performance and with various aspects of education abound. The literature on these subjects is too voluminous to review completely. This review has intentionally been limited to published studies concerned with predicting nursing graduates' performance on state board examinations.

II. EARLIER STUDIES

NLN Studies

In 1957 the National League for Nursing published a report of analysis of state board scores. The study sample included 3,601 graduates of 1956 and 1957. The sample representation of types of nursing programs was mixed with 453 from basic baccalaureate degree programs. "The primary purpose of the study . . . was to provide information on candidate attainment by state, not by types of programs or accreditation status" (Analysis of State Board Test Scores 1957, May 1959). Graphs were used to depict attainment of exam takers in mean standard scores according to general type of basic program.

Reported findings of the 1957 study were that differences were evident between attainment of candidates from different types of

programs and programs of varying accreditation status. The report stated:

It is interesting that differences are evident between attainment of candidates from different types of programs, and programs of varying accreditation status, even though the examination used is not designed to ascertain such differences, but it is impossible to tell what the findings might have been if the instrument used had been one developed specifically to ascertain differences between types of programs (p. 301).

An article prepared by the staff of NLN Measurement and Evaluation Services was published in 1970 which provided a look at correlations between Pre-Nursing and Guidance Examination scores (PNG) and state board examination scores. Data from 8,242 students who graduated from schools of nursing were used; of that number, 7,126 passed the licensing examination and the remaining 1,116 either did not take the exam or failed the first take. Within the report the staff stated:

Considering the data by test, the highest correlations in each of the groups involved the Social Studies and the Composite scores, while the lowest were in Mathematics and Quantitative Aptitude. By type of program, the correlations were consistently higher in the baccalaureate degree programs than in the diploma and associate degree programs, and seven of the nine scores produced higher correlations in the associate degree programs than in the diploma programs. These observations may be explained largely in terms of the variability of the groups, since higher correlations are obtained typically in heterogeneous groups, and the students in the baccalaureate programs were the most heterogeneous, in terms of PNG scores, while those in diploma programs were most homogeneous (p. 62).

Despite the fact that all of these students had graduated from schools of nursing, striking and highly significant differences still existed between the mean PNG scores of those who had passed the licensing examination and those who, for one reason or another, had not yet passed it (p. 63).

Review

Taylor, et al (1966) reported that of 19 different tests used in 20 different studies for predicting SBE performance, the most frequently

used predictors were the "ACE," high school rank, and the "Co-op" (p. 34).

The authors stated:

In general the studies accomplished to date have been of little help in the problem of differential prediction within nursing. Suitable studies could yield a sound basis for predicting how well each applicant or beginning student nurse would do in each of the several areas of nursing specialization. Such a set of predictive scores for each student nurse could be most helpful in student counseling programs and in assisting students in their difficult career decision of choosing the program which will more likely enable them to eventually make their highest contribution in nursing (p. 62).

The authors proceed to point out that the state of knowledge about predicting school and job performance would be more advanced if research had been more diversified, and particularly, more replication has been accomplished in prediction of classroom grades than is really necessary (pp. 62-63).

Abdellah (1970) reported a review of nursing research during the years 1955-1968 and stated that problems of recruitment, selection, and retention of nursing students continue to be paramount (p. 239).

Abdellah wrote:

. . . Tests of academic aptitude have been found consistently to be related to criteria of success in nursing school, particularly when the criteria have been based on academic rather than on clinical performance. . . .

About one-half of nursing school dropouts are associated with academic failure. Much still needs to be done to salvage this waste of vital nurse manpower (p. 239).

Other Studies

Munday and Hoyt (1965) published results of a study which had reviewed available data on the use of ACT in nursing schools. The study

sample was taken from the 1964 ACT Research Service and totaled 1,510. The sample included seven schools from the South, Midwest, and Southwest. The stated purposes of this study were to review available data on the use of ACT in nursing schools, and to compare its validity with that of other measures, and to summarize the predictive efficiency of ACT data with respect to grades in courses typically included in nursing school curricula (p. 341). Within their summary and conclusions, the authors reported:

1. Nursing schools differ widely in terms of the academic potential of their students. Regardless of these differences, nursing students score lower in the mathematical area than in other areas of academic ability. . . .

3. Standard ACT data (four test scores, four high school grades) were excellent predictors of over-all grades in the first year of nursing. For five of the seven schools, the correlation of ACT data with over-all grades was .70 or higher. . . .

5. For the nursing schools in this sample, ACT data had substantial validity for predicting success in a variety of specific courses (English, social studies, nursing fundamentals several specific sciences).

6. A survey of Research Service results for all colleges suggested that ACT data have useful validity in predicting success in courses frequently included in nursing curricula. The predictive correlations ranged, on the average, from .52 in speech to .62 in biology and chemistry (p. 344).

A study by Brandt, Hastie, and Schumann published in 1966 found grades received in nursing theory courses and NLN Basic Medical-Surgical Achievement scores as useful in predicting performance on State Board Examinations.

The Brandt, Hastie, Schumann study was part of a curriculum research project at the University of Washington School of Nursing. The authors stated the purpose as being related to determining whether grades from within the curriculum successfully predict state board

performance and to determining whether NLN Achievement Test and Social Science Test performance were more accurate than grades in predicting state board performance.

The sample consisted of 156 students who completed their nursing curriculum requirements during 1962 and 1963. The study was designed to answer several specific questions which would require correlation determinations. The Pearson product moment technique was used to determine the needed correlations. All correlations were markedly low between grades received in nursing theory courses and those received in nursing practice courses. Theory course grades were related to scores on the achievement tests; nursing practice course grades showed little relationship to NLN test scores. The authors reported:

. . . Grades received in nursing theory courses, scores on the Natural Science and Social Science tests, and scores on the NLN Basic Medical-Surgical Achievement test may be useful in predicting performance on State Board Examinations (p. 69).

The second phase of the study at the University of Washington School of Nursing was reported by Brandt, Hastie, and Schumann in 1967. The authors identified the second phase of the study as concerned with on-the-job performance as related to objectives of the school of nursing and existing health needs of the community. In this study, items which described observable behaviors were developed according to criteria that were established, and then converted to a five point rating scale. A pilot study was made using graduates from other nursing schools and supervisors from hospitals in the greater Seattle area. Questionnaires were distributed to graduates and their immediate supervisors. Some

graduates were unable to complete the questionnaire, details of which were explained in the report. In their summary, the authors stated:

. . . Generally, the graduates who received the highest mean value on 51 behavioral statements also received high ratings on the single ability appraisal item. A similar pattern existed with the graduates who obtained the lowest mean scores.

. . . Although no definite conclusions can be drawn from these findings, a timely question remains. Considering the needs of students today and the opportunities which can be provided during their enrollment in the university, what goals can a school of nursing realistically set (p. 60)?

Brand (1967) published results of a study which compared graduates of a basic baccalaureate program and graduates of a baccalaureate program for registered nurses. The two programs used for the study were offered by the University of Virginia School of Nursing. The two study groups included 45 basic nursing students and 8 registered nurse students. All 53 students received the Bachelor of Science in Nursing degree in June 1965.

In the Brand comparison study, the Concept Mastery Test, NLN Achievement Tests, and the Allport-Vernon-Lindzey Scale of Values were used. Brand stated: "No significant differences were found except for the scores on the NLN Maternal-Child Health Nursing Test, in which case basic baccalaureate students' scores were significantly higher" (p. 351). In discussion of this finding, Brand explained:

The difference in performance on this test by the two groups may have been due to the time variable involved for the students enrolled in the baccalaureate program for registered nurses. One to 20 years had elapsed since these students had received instruction and clinical experience in Obstetrical and Pediatric Nursing. The basic baccalaureate program students had been administered the test on completion of their course in Maternal-Child Health Nursing which included theory and a clinical laboratory.

A second factor that may be considered as a possible explanation for the existing difference between the two groups in this area of nursing is the quality of instruction and clinical laboratory experiences the students enrolled in the baccalaureate program for registered nurses received in their respective diploma programs (p. 350).

A basic issue raised at the outset of this study was whether or not advanced standing credit should be awarded diploma program graduates to apply toward the baccalaureate degree in nursing. Although the samples of students used as subjects for this study were small, and the admission requirements and curriculum specific to the University of Virginia School of Nursing, it would appear from the analysis of data presented in this study, that the practice of awarding advanced credit to students enrolled in the Baccalaureate Program for Registered Nurses at the University of Virginia, 1964-65, was warranted (p. 350).

Ruiz, Thurston, and Poshek completed a study, the purpose of which was determining the extent certain characteristics pertained to success on the State Board Test Pool Examination. The study group included 410 candidates of the registered nurse licensure examination. The study group included 37 baccalaureate graduates and 373 diploma graduates. Intelligence, selected life history events, and personality structure were the personal characteristics selected for the study.

From their analyses, Ruiz, Thurston, and Poshek (1967) were able to conclude that intellectual potential was the most reliable predictor of success. Other factors tended to play more negligible roles. These researchers wrote:

. . . Graduates who passed the licensure examination were more intelligent on the average than graduates who failed; and among the sub-groups of graduates who failed various numbers of areas, there was a consistent decrease in mean I.Q. as the number of areas per group increased. An incidental finding concerning intelligence was that compared as groups, the baccalaureate group was slightly, but significantly, superior to the diploma group. The observation that failure on the licensure examination is independent of psychopathology should not be misinterpreted as implying that "normal" differences in personality (such as the

need to achieve, motivation for learning, and so on), are totally immaterial with regard to academic accomplishment and test performance. On the contrary, the general problem of differences in level of motivation seems to represent a potentially fruitful area for future research. An additional inference is possible on the basis of information obtained concerning the performance on multiple re-examinations on the licensure examination by members of the failure group; the more areas a graduate fails on an original examination, the smaller the probability that she will ever become a nurse (p. 78).

Baldwin, Mowbray, and Taylor, Jr. (1968) studied correlations between theory grades and state board scores, and correlations between NLN examination scores and state board scores. The school involved was the Bryn Mawr Hospital School of Nursing. A random sample of 74 students from 1960-1964 provided data for this study. Relationships between the predictors and state board scores were determined by the product moment coefficient of correlation. These researchers concluded:

1. NLN Achievement Examination scores provide a basis for predicting State Board scores, even though the bands of probable error are moderately broad.
2. The correlations between theory grades and State Board scores are too low to be useful in prediction (p. 172).

Miller, Feldhusen, and Asher (1968) reported a prediction study relevant to state board performance of associate degree nursing graduates. The study sample consisted of 116 graduates of the Associate Degree Nursing Program of Purdue University. Study data were from the years 1966 and 1967. Clinical predictor variables used included course grades (combined theory and performance for four nursing courses) and high school grades averaged (English, Mathematics, Science, over-all). Several "mechanical" predictor variables were used, including Scholastic Aptitude Test verbal and mathematics scores (p. 555).

The analysis by Miller, Feldhusen, and Asher included the inter-correlation of 22 clinical and mechanical predictors with five state board examination scores. Multiple correlations were run for each state board score using the 22 clinical and mechanical predictors. According to their findings, six variables were efficient predictors of state board examination scores. The researchers stated:

The 27 variables were intercorrelated, and multiple regression equations generated. Six variables were found to be most efficient in predicting SBE [State Board Examination] scores and the chance of failure on each of the SBE tests. They were the SAT [Scholastic Aptitude Test] verbal score; the father's education level; the student's age in months upon admission; high school graduation rank; the number of college credits before entering the nursing education program, and the over-all grade average at the end of the nursing program (p. 558).

The researchers also stated, however, that cross validation study or actual trials of prediction of SBE scores for a new sample of nursing graduates will be needed to test the accuracy of the prediction formulas.

In 1968, Brandt and Matheny reported the third phase of a study conducted by the University of Washington School of Nursing Evaluation Committee. The third phase study examined relationships between the graduates' performance on the job and in school or on state board examinations. Brandt and Matheny (1968) wrote:

The small correlation values obtained for most of the relationships studied tended to support others' findings in the literature of little relationship between measures of academic performance and assessment of on-the-job performance (p. 246).

Their findings demonstrated minimal relationship between theory course grades or state board scores and on-the-job performance, but clinical practice grades correlated significantly with the latter (p. 246).

Mueller and Lyman (1969) found personality factors were less effective predictors of state board examination performance than were aptitude and ability predictors. The study sample consisted of 65 graduates of 1967 of the Jewish Hospital of Cincinnati School of Nursing. Variables studied included several NLN Achievement Tests, Psychological Aptitude (Verbal Ability, Science, Reading Skill, General Information), Rank in High School Class, and Personality Traits. A total of 38 potential predictors were determined. Results of the study were that aptitude and ability predictors were generally highly positively correlated with tests on the state board examination. Personality factors were less effective predictors of state board performance. None of the family background factors were significantly correlated (p. 267).

Mueller and Lyman (1969) did a cross-validation study using data about 45 of the 1968 graduates. The cross-validation study showed 40 correct and 5 incorrect predictions (p. 267).

Burgess and Duffey (1969) formed two independent samples for their study. The study samples were made up of students of the collegiate program in the Department of Nursing Education at the University of Kansas Medical Center. One group of students was designated the experimental group; the other served as the cross-validation group. A total of 58 intellectual, interest, personality, and educational variables were examined as potential predictors of GPA on the two year study groups. Product moment and multiple regression analyses were

applied to the data. The researchers found the combined Freshman and Sophomore GPA to be the single most significant predictor of the collegiate nursing GPA. The results of the study demonstrated that it is possible to significantly predict collegiate nursing GPA using 20 or even 5 predictors (p. 72).

Muhlenkamp (1971) used a combination of predictors in a study at Marquette University College of Nursing, Milwaukee, Wisconsin. The combination of predictors included: College Board Scholastic Aptitude Test (SAT) and English test scores; grades in specific nursing courses and in a developmental psychology course; seventh semester grade point averages (GPA); and, for one part of the study, National League for Nursing Achievement test scores (p. 57).

Muhlenkamp's study was conducted in two parts. In the first part, multiple regression analysis applied to the data resulted in seventh semester grade point average emerging as the most effective or best predictor. Muhlenkamp wrote:

. . . It is not surprising, of course, to find the seventh semester GPA as the best predictor, since it is a composite of the grades earned up to that point. In addition, the GPA is likely to reflect a general ability factor, which test performance may also reflect (p. 57).

In the second part of the study, NLN achievement test scores were included in addition to the predictor variables used in the first part. Muhlenkamp stated:

. . . In these data, the NLN Natural Science test score was the best predictor for all criteria except Pediatric Nursing. The seventh semester GPA was again identified with three of the five tests-- Medical, Obstetric, and Pediatric Nursing . . . (p. 57).

Backman and Steindler (1971) reported a study at Rutgers which involved associate degree nursing graduates of 1959 through 1964. The Wechsler Adult Intelligence Scale (WAIS), the Verbal and Math tests of the Scholastic Aptitude Test (SAT), and high school rank were used for correlation computations with state board exam subtest performance and the school's Associate of Science GPA. Higher correlations were produced from SAT Verbal test data than from the other predictors studied. The researchers wrote:

In summary, the best predictors of achievement in the A.S. [Associate of Science] program, as well as of performance on state board examination, were tests of verbal ability and general information. It is interesting to note that the test with the highest predictive validity--the SAT Verbal--was specifically designed to predict success in college (p. 487).

The researchers also noted the homogeneity of the study sample and suggested the correlation coefficients produced by this study should be considered as conservative estimates of predictive validity (p. 487).

Burgess, Duffey, and Temple (1972) reported two studies that compared data from the first study reported by Burgess and Duffey in 1969. The researchers used 56 variables as potential GPA predictors on two independent student samples and 55 variables omitting the prenursing GPA in the second study. These researchers wrote:

In the studies discussed here, grade point average emerged as the single most significant predictor of nursing school success. In Study II, of the 56 variables examined 60 percent of the variance associated with predicting GPA could be accounted for with only five variables in each of the two Groups. Only five of the best 20 predictors of each Group were common to both Groups in the replication of Study I. Cross-validation of Studies I and II showed that the same seven variables that predicted success in Study I significantly predicted success in Study II. That a single

variable, freshman and sophomore GPA, accounted for most of the predictive variance indicates that future GPA could be predicted by utilizing former GPA. Moreover, in Study III, loss of prediction was noted when GPA was deleted from the predictive matrix (p. 366).

Dubs (1975) designed a study to investigate the relationship between academic achievement as determined by state board performance and competence of the graduate as determined by employer ratings. Dubs used a class of 30 from a diploma school of nursing as a source of data for the study. A questionnaire was sent to each graduate and a rating scale was sent to each graduate's employer. Grade point averages and state board examination scores were obtained from the school of nursing files. Multiple correlations among student grades, graduate ratings, and state board scores were calculated. The researcher interpreted her findings:

Data collected for the study were interpreted to mean that, in general, the subjects were adequately prepared for first-level positions in nursing. Subjects who had good grades in nursing practice tended to have good performance ratings as graduates. Subjects who had good grades in nursing theory tended to have good scores on state board examinations. . . .

Students' three-year cumulative grade point averages and the nursing theory grades were the best predictors of success on state board examinations (p. 62).

Bell and Martindill (1976) designed a three phase cross-validation study for prediction of scores on state board examinations. Data involving 101 nursing students who graduated from a baccalaureate program were used for the study sample. A second sample of 33 from the same school was used to cross-validate the prediction equations. The first phase involved computing a correlation matrix from raw scores of five SBE and five NLN variables. The second phase

used a stepwise multiple regression analysis to compute a prediction equation for each SBE. The final phase used the regression equations to predict SBE scores. Cross-validation correlations between the predicted and actual obtained scores of the second sample of 33 graduates ranged from .64 to .81. The researchers wrote:

. . . For each equation, the NLN test scores in Nursing of Children and Obstetric Nursing were consistently the best indicators of performance on the SBEs. Additionally, a factor analysis indicated that the SBEs do not measure independent entities, but that all five examinations have high loadings on the same factor. The results suggest that nursing programs should develop and validate prediction equations to assist nurses in preparing for SBEs (p. 54).

Deardorff, Denner, and Miller (1976) gathered data from graduates of a midwestern associate degree nursing program for the years 1969 through 1974 and then completed a study designed for predicting SBE scores based on performance on NLN achievement tests. Their study results suggested raw scores were generally better predictors than percentile scores. The researchers stated:

The NLN raw scores yielded higher multiple correlations with SBE scores than did the NLN percentile scores. However, the correlations of the predicted scores resulting from each of the two types of NLN score with the actual SBE scores were about the same. Furthermore, the predicted SBE scores from each scoring method were highly correlated. These findings suggest that raw scores and percentile scores may still be preferred since they represent equal interval data while percentile scores do not. When using percentile scores, errors in prediction are more likely to occur for the extreme scores (p. 38).

Shelley, Kennamer, and Raile (1976) studied data from graduates of 1968 through 1973 at a diploma school of nursing. Data used included selected course grades, final grade averages, 17 NLN achievement test scores, and SBTPE scores. The authors explained that correlation

coefficients were calculated for every possible pairing of data elements, but only correlations with SBTPE scores were of immediate interest. The highest course correlation coefficients occurred between final grade averages and SBTPE scores. The authors reported a higher degree of correlation between the NLN achievement test scores and the SBTPE scores. Of 85 pairings, only 1 failed to correlate at a level of $P=0.01$ or higher (p. 53). The authors wrote: "It was concluded from the study that the NLN achievement test scores continue to show significant correlation with SBTPE scores" (p. 55).

Wolfle and Bryant (1978) collected data from 121 graduates from the years 1970 to 1976 in a southwest Virginia associate degree nursing program. A causal study was designed with SBE performance assumed to be caused by the ability factor, general level of academic performance, and performance on the NLN tests. A separate model was evaluated for each of the five state board examinations. Path analysis theorem was applied to construct and complete the causal study. The authors explained:

NLN achievement tests help predict performance on SBEs. Previous authors focused on the relationship for its predictive capabilities. We preferred to analyze the social system of nursing education as an interlocking system of causal relationships. From such a framework, we analyzed for our data the association of NLN tests with SBE scores and concluded that approximately one-fifth of the relationship between the medical, surgical, and obstetric examinations spuriously resulted from prior ability and general performance. These same antecedent variables, however, had a much greater spurious effect on the NLN--SBE relationship for the two tests, high ability and a good overall academic record were as important predictors of SBE performance as was an ability to score well on the NLN (pp. 314-315).

In a 1978 study, ethnicity, admission GPA, and certain prerequisite courses were found to be significantly related to SBE performance. Clemence and Brink (1978) reported a study that was designed to explore relationships between selected variables and terminal criteria of program completion and passing state board examinations. Data from one generic bachelor's program in nursing from 1971 through 1975 were used for their study. The sample size was 247. Raw data were subjected to frequency tabulation, measures of central tendency, Pearson's Chi squares, and correlation analysis; the relationship between admission variables and terminal variables was accepted as significant if the probability level was better than 5 percent. The authors reported:

The findings suggest, not surprisingly, that admission G.P.A. continues to be the most significant factor in relation to success/nonsuccess in professional schools as well as in academic programs (p. 9).

Pardue studied the difference among the relationships of blocked-content and integrated-content in baccalaureate nursing programs to faculty satisfaction, senior students' critical thinking ability, and students' state board examination performance. Pardue (1979) reported that 204 schools responded to her initial contact concerning the study; of those, 10 were blocked-content and 74 were integrated-content programs. Only eight schools were randomly selected for the study, four blocked-content and four integrated-content. Data were collected from subjects selected which involved 104 senior nursing students relative to critical-thinking ability, 85 faculty members relative to faculty satisfaction, and 230 recently graduated students' SBE scores.

Pardue stated a hypothesis that students from blocked-content programs would score significantly higher on SBE performance. The hypothesis was affirmed. Pardue wrote:

Based on the data collected and analyzed in this study, three conclusions were warranted:

- . Baccalaureate nursing faculty members' satisfaction was not a function of the program content type.

- . Baccalaureate senior nursing students' critical-thinking ability was not a function of the program content type.

- . Baccalaureate nursing students' SBE performance was significantly higher in blocked-content programs than in integrated-content programs (p. 310).

Dickerson, McKnight, Murdock, and Thompson (1980) reported research assessing the ability of several constructs to predict SBTPE performance. Data used were from 97 senior nursing students from two baccalaureate programs, one private and one public. The constructs included psychosocial factors, reading skills, demographic factors, and educational preparation and performance. Stating their findings, the authors wrote:

The results of this research indicate that scores on the five subtests of the SBTPE can be successfully predicted based on a knowledge of high school curriculum content, stress scores, reading ability, and NLN Achievement Test scores. Those students with more than two years of high school algebra, one year of geometry, more than two years of biology and chemistry, and somewhat better than average scores on the NLN Achievement Tests, score above the median on the SBTPE subtests 75 percent of the time (pp. 49-50).

III. ACT RELATED STUDIES

Only two studies were found in the published literature that examined the relationship of ACT performance to SBE performance.

Ledbetter (1969) completed a dissertation that dealt with an analysis of performance of graduates in a selected baccalaureate program. The population for the study consisted of 61 generic students and 94 registered nurse students of the selected school. Correlations between ACT composite scores and final course grades ranged from .08 to .23 ($df=60$) (p. 102). However, Ledbetter did find all correlations between ACT composite scores and SBE subtest scores significant at the .01 level of confidence, with the correlation coefficients ranging from medical nursing .34 (lowest) to the highest two, pediatric nursing and psychiatric nursing, .46 each ($df=60$) (p. 104). Correlations between State Board Test Pool Examination scores and cumulative grade point averages were found to be significant at the .05 level of confidence for all five subtests, and all except psychiatric nursing were significant at the .01 level of confidence (p. 123).

Ledbetter's findings concerned with NLN Achievement Test scores were consistent with findings of earlier studies, which showed a positive correlation between NLN Achievement Test scores and state board examination performance.

A second study found in the literature which investigated the relationship of ACT performance to state board examination performance was reported by Perez (1977). The study involved graduates of a baccalaureate nursing program. The sample size was narrowed from a graduate group of 230 to 123 study subjects with no missing scores. A stepwise regression analysis technique was utilized to analyze the data.

Perez found that 3 of the 12 predictor variables used in the equations appeared to be most sensitive and useful predictors of state board examination scores. The three were: "ACT Social Science Reading Score" (Variable 3); "GPA On Completion of Freshman Year (minimum--30 hours)" (Variable 7); and "GPA In Prerequisite Social Sciences and English Taken As A Group" (Variable 11). Perz wrote:

While most all predictor variables appeared in all equations, 3,7, 11 appear to be most sensitive and useful predictors of Board scores . . . (p. 21).

. . . The ACT Social Science Reading Score, Variable 3, was as previously mentioned, selected early in all equations and had slightly better simple correlations than ACT Natural Science. As before, this may be due to the social science content of the Board Exams, but a second and more interesting speculation is that reading ability is the common denominator. This portion of the ACT is a reading test in the area of social sciences and is generally accepted as a better indicator of reading ability than of social science knowledge. While several studies reported correlations of SAT scores with SBE scores, none were located using the ACT, therefore, supporting evidence could not be found in previous literature . . . (p. 22).

. . . It also identifies the need for additional studies of the relationship between reading ability and success on SBE and between ACT and SBE scores (p. 23).

One final study warrants reporting here due to the fact the ACT data were a component of the study reported and due to the fact that data from that study and the present study were from the same higher education institution. Stoner (1979) completed a dissertation which was an analysis of factors affecting the retention of in-state freshmen admitted to The University of Tennessee, Knoxville. Information was collected on over 17,000 in-state freshmen. The study covered the five-year period of 1968-1973. Among the findings, Stoner reported:

. . . The research determined that composite ACT score and high school grade point average were both positively and significantly related to graduation . . . (p. 109).

IV. SUMMARY

The literature has yielded a host of studies involving the prediction of state board examination performance. Several studies have found NLN achievement tests, course grades, GPA's, and SAT verbal scores to be the most significant indicators of performance on the state board examinations.

Only two studies were found which investigated the relationship of ACT scores to state board examination performance. Although each found ACT scores to be significant predictors of SBE performance, the fact that only two such studies were found, and several years apart, adds significance to the present study.

CHAPTER III

METHODOLOGY

I. INTRODUCTION

The study was designed to examine the predictive relationship of seven selected variables to performance on the state board test pool examination.

This chapter will define the population, describe the determination of the sample, and describe the way the data were prepared for computer analysis. Statistics used in the analyses are identified.

The chapter is concluded with a listing of the research questions which form the framework of the study.

II. THE POPULATION

The population was composed of 572 graduates of the baccalaureate program of The University of Tennessee, Knoxville, College of Nursing. The population was confined to graduates from the years 1974 through 1979.

III. DATA COLLECTION

After obtaining permission to implement the study from the Dean of the College of Nursing and other appropriate individuals, baccalaureate graduates' folders within the College of Nursing were examined for availability of data to be studied. As anticipated, the folders varied as to grade averages and scores available due to

transfers into the College of Nursing and other reasons. It was decided that the study sample would be composed of those graduates for whom state board scores were available and the selected seven variables could be identified, those being HSGPA, CNGPA, and ACT standard scores (ENG, MA, SS, NSC, COMP). It must be noted that race, sex, age of the graduates, length of time in the baccalaureate nursing program, and re-entry were not considerations.

Data for each graduate for whom SBTPE scores and the variables information were available were recorded on a master list. The required data were available for 322 graduates for the years 1974 through 1979. A decision was then made that this sample size was sufficient to be representative of the population to which the study results would be generalized.

A computer card was prepared recording data for each graduate, for a total data set of 322 cards. The cards were checked against the master list to check for key punch errors. The cards were run through the computer for a computer print of the sample data. The sample data were again checked against the master list to check for errors. The cards were then ready for the treatment of the data.

IV. DESIGN OF THE STUDY

The study was designed so that the effect of the experimental variables, the independent variables, could be evaluated in terms of specific criteria, which in this study were the SBTPE performance. The independent variables identified for the study were: high school

grade point average (HSGPA); college of nursing grade point average (CNGPA); American College Test Assessment (ACT) standard scores (ENG, MA, SS, NSC, COMP). The dependent variables were State Board Test Pool Examination (SBTPE) performance. These were identified to the computer as RESULT used for pass or fail, with pass assigned a numerical value of 1 and fail assigned a numerical value of 0. Subexam scores were entered into the regression models when dependent variables other than RESULT were appropriate. SBTPE subexam scores were identified to the computer as MED (medical nursing), SURG (surgical nursing), OB (obstetrical nursing), NCH (nursing of children), and PSY (psychiatric nursing). All the variables studied were assigned a numerical value, which were thus suitable to statistical analyses.

V. TREATMENT OF THE DATA

The Statistical Analysis System (SAS) was chosen for analysis of the data. The SAS was selected for its linear and multiple regression computational and plotting capabilities. The data were run under release 79.4B of SAS at The University of Tennessee, Knoxville (657).

The SAS program was designed to accomplish analysis of the predictive relationship of each of the seven selected variables to SBTPE performance. The SAS program was then designed to provide a stepwise discriminant analysis for determining the predictive relationship between the overall SBTPE performance (result of pass or fail) and the strongest predictive combination of the independent variables. Further, the SAS

program was designed to provide a multiple regression analysis of the strongest predictive combination of the independent variables for performance on each of the SBTPE subexams.

VI. STATISTICS

The statistical procedures used included: basic regression, multiple regression, t statistic, F value, R^2 , and r. Simple regression was calculated by the computer for each of the independent variables in predicting SBTPE performance. Multiple regression models were determined using backward elimination (eliminating one independent variable at a time) with attention to the t-directed search, deleting an independent variable from the model with the highest value above .10. The regression was continued until models contained no variables with t-directed search showing value of .10 or higher. The change in r was noted as the model was changed.

VII. RESEARCH QUESTIONS

1. What is the predictive relationship of high school grade point average to SBTPE performance (result of pass or fail)?
2. What is the predictive relationship of The University of Tennessee, Knoxville College, of Nursing grade point average to SBTPE performance (result of pass or fail)?
3. What is the predictive relationship of the ACT standard English score to SBTPE performance (result of pass or fail)?

4. What is the predictive relationship of the ACT standard mathematics score to SBTPE performance (result of pass or fail)?
5. What is the predictive relationship of the ACT standard social studies score to SBTPE performance (result of pass or fail)?
6. What is the predictive relationship of the ACT standard natural sciences score to SBTPE performance (result of pass or fail)?
7. What is the predictive relationship fo the ACT standard composite score to SBTPE performance (result of pass or fail)?
8. What interaction relationship of the selected variables is predictive of SBTPE performance (result of pass or fail)?
9. What interaction relationship of the selected variables is predictive of performance on the medical nursing subexam of the SBTPE?
10. What interaction relationship of the selected variables is predictive of performance on the surgical nursing subexam of the SBTPE?
11. What interaction relationship of the selected variables is predictive of performance on the obstetrical nursing subexam of the SBTPE?
12. What interaction relationship of the selected variables is predictive of performance on the nursing of children subexam of the SBTPE?
13. What interaction relationship of the selected variables is predictive of performance on the psychiatric nursing subexam of the SBTPE?

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

I. INTRODUCTION

This chapter includes an analysis of the data from the sample of 322 graduates of the baccalaureate program of The University of Tennessee, Knoxville, College of Nursing. The high school grade point average (HSGPA), The University of Tennessee, Knoxville, College of Nursing, grade point average (CNGPA), American College Test standard scores (ACT: ENG, MA, SS, NSC), and State Board Test Pool Examination (SBTPE) scores were studied.

The data collected from the selected college of nursing's files were analyzed, and the findings were reported in this chapter according to the research questions presented in Chapter III. The discussion presented is intended to explain the context of the tables and any significance of the findings. Statistical significance judgments were made using the F probability numbers determined by the computer computations.

Table I provides the study's findings of the predictive relationship of each of the seven independent variables to SBTPE performance (result of pass or fail). Table II provides findings of a stepwise discriminant analysis for determining the predictive relationship between the overall SBTPE performance (result of pass or fail) and the strongest predictive combination of the independent variables. Tables III through VII provide results of the multiple

TABLE I

DISCRIMINANT ANALYSIS FOR SUCCESS ON STATE BOARD TEST POOL EXAMINATION
 RELATED TO: HIGH SCHOOL GRADE POINT AVERAGE, THE UNIVERSITY OF
 TENNESSEE, KNOXVILLE, COLLEGE OF NURSING GRADE POINT AVERAGE,
 AMERICAN COLLEGE TEST STANDARD SCORES (ENGLISH,
 MATHEMATICS, SOCIAL STUDIES, NATURAL
 SCIENCES, COMPOSITE), 1974-1979

INDEPENDENT VARIABLES	(N=322)	F VALUE
HSGPA		11.77 *
CNGPA		21.68 *
ENG		23.15 *
MA		37.51 *
SS		28.12 *
NSC		43.31 *
COMP		56.40 *

*Significant at .001.

TABLE II

STEPWISE DISCRIMINANT ANALYSIS FOR SUCCESS ON STATE BOARD TEST POOL
 EXAMINATION RELATED TO: HIGH SCHOOL GRADE POINT AVERAGE, THE
 UNIVERSITY OF TENNESSEE, KNOXVILLE, COLLEGE OF NURSING GRADE
 POINT AVERAGE, AMERICAN COLLEGE TEST STANDARD SCORES
 (ENGLISH, MATHEMATICS, SOCIAL STUDIES,
 NATURAL SCIENCES), 1974-1979

INDEPENDENT VARIABLES	(N=322)	F VALUE
HSGPA, CNGPA, ENG, MA, SS, NSC		10.43 *
CNGPA, ENG, MA, SS, NSC		12.54 *
CNGPA, MA SS, NSC		15.57 *
CNGPA, MA NSC		20.10 *

*Significant at .001.

TABLE III
STEPWISE MULTIPLE REGRESSION ANALYSIS FOR SUCCESS ON STATE
BOARD TEST POOL EXAMINATION DEPENDENT VARIABLE:
MEDICAL NURSING, 1974-1979

INDEPENDENT VARIABLES**	(N=322)	F VALUE
HSGPA, CNGPA, ENG, MA, SS, NSC		32.14 *
HSGPA, CNGPA, ENG, SS, NSC		38.56 *
CNGPA, ENG, SS, NSC		47.87 *

*Significant at .001.

**The independent variables are: HSGPA (high school grade point average), CNGPA (The University of Tennessee, Knoxville, College of Nursing grade point average), ENG (American College Test Assessment standard English score), MA (American College Test Assessment standard mathematics score), SS (American College Test Assessment standard social studies score), and NSC (American College Test Assessment standard natural sciences score).

TABLE IV
STEPWISE MULTIPLE REGRESSION ANALYSIS FOR SUCCESS ON STATE
BOARD TEST POOL EXAMINATION DEPENDENT VARIABLE:
SURGICAL NURSING, 1974-1979

INDEPENDENT VARIABLES**	(N=322)	F VALUE
HSGPA, CNGPA, ENG, MA, SS, NSC		19.46 *
HSGPA, CNGPA, ENG, SS, NSC		23.42 *
CNGPA, ENG, SS, NSC		27.88 *
CNGPA, ENG, NSC		35.34 *

*Significant at .001.

**The independent variables are: HSGPA (high school grade point average), CNGPA (The University of Tennessee, Knoxville, College of Nursing grade point average), ENG (American College Test Assessment standard English score), MA (American College Test Assessment standard mathematics score), SS (American College Test Assessment standard social studies score), and NSC (American College Test Assessment standard natural sciences score).

TABLE V
STEPWISE MULTIPLE REGRESSION ANALYSIS FOR SUCCESS ON STATE
TEST POOL EXAMINATION DEPENDENT VARIABLE:
OBSTETRICAL NURSING, 1974-1979

INDEPENDENT VARIABLES**	(N=322)	F VALUE
HSGPA, CNGPA, ENG, MA, SS, NSC		23.31 *
HSGPA, CNGPA, ENG, SS, NSC		28.05 *
HSGPA, CNGPA, SS, NSC		35.12 *
CNGPA, SS, NSC		46.39 *

*Significant at .001.

**The independent variables are: HSGPA (high school grade point average), CNGPA (The University of Tennessee, Knoxville, College of Nursing grade point average), ENG (American College Test Assessment standard English score), MA (American College Test Assessment standard mathematics score), SS (American College Test Assessment standard social studies score), and NSC (American College Test Assessment standard natural sciences score).

TABLE VI
STEPWISE MULTIPLE REGRESSION ANALYSIS FOR SUCCESS ON STATE BOARD
TEST POOL EXAMINATION DEPENDENT VARIABLE:
NURSING OF CHILDREN, 1974-1979

INDEPENDENT VARIABLES**	(N=322)	F VALUE
HSGPA, CNGPA, ENG, MA, SS, NSC		21.04 *
CNGPA, ENG, MA, SS, NSC		25.20 *
CNGPA, ENG, SS, NSC		31.42 *
CNGPA, SS, NSC		40.84 *

*Significant at .001.

**The independent variables are: HSGPA (high school grade point average), CNGPA (The University of Tennessee, Knoxville, College of Nursing grade point average), ENG (American College Test Assessment standard English score), MA (American College Test Assessment standard mathematics score), SS (American College Test Assessment standard social studies score), and NSC (American College Test Assessment standard natural sciences score).

TABLE VII

STEPWISE MULTIPLE REGRESSION ANALYSIS FOR SUCCESS ON STATE BOARD
TEST POOL EXAMINATION DEPENDENT VARIABLE:
PSYCHIATRIC NURSING, 1974-1979

INDEPENDENT VARIABLES**	(N=322)	F VALUE
HSGPA, CNGPA, ENG, MA, SS, NSC		31.32 *
CNGPA, ENG, MA, SS, NSC		37.12 *
CNGPA, ENG, SS, NSC		45.94 *

*Significant at .001.

**The independent variables are: HSGPA (high school grade point average), CNGPA (The University of Tennessee, Knoxville, College of Nursing grade point average), ENG (American College Test Assessment standard English score), MA (American College Test Assessment standard mathematics score), SS (American College Test Assessment standard social studies score), and NSC (American College Test Assessment standard natural sciences score).

regression analysis of the predictive relationship of the selected independent variables to performance on each of the SBTPE subexams.

II. SAMPLE PROFILE

The sample data of the 322 subjects were drawn from a population total of 572 for the years 1974 through 1979. Of the 322 sample subjects, 301 had a result of pass on the SBTPE on first take and 21 had a result of fail on the first take. The pass result for the sample was 93.4 percent. The data from the sample of 322 were utilized for each analysis.

III. RESEARCH QUESTIONS: FINDINGS AND INTERPRETATIONS

The first seven research questions were concerned with the predictive relationship of each of the selected variables to SBTPE performance (result of pass or fail). The general linear models procedure of the Statistical Analysis System (SAS) was utilized to analyze the data for each of the seven questions.

The first research question concerned the predictive relationship of HSGPA to SBTPE performance (result of pass or fail). The results of the analysis were presented in Table 1, page 36. The F value of 11.77 was significant at the 0.0007 level of significance. The t-directed test provided a probability greater than t of 0.0007. The Pearson product moment correlation coefficient (r) was above 0.1. It was decided that further study of the HSGPA variable was desirable.

The second research question concerned the predictive relationship of The University of Tennessee, Knoxville, College of Nursing grade point average (CNGPA) to SBTPE performance (result of pass or fail). The result of the analysis is provided in Table I, page 36. The F value was 21.68 which was significant at the 0.0001. The greater than t probability was computed to be 0.0001. The r was 0.2. Based on these findings, it was decided the CNGPA variable warranted further study.

The third research question concerned the predictive relationship of ENG to SBTPE performance (result of pass or fail). (Refer to Table I, page 36.) The F value obtained was 23.15 with a significance of 0.0001. The r was less than 0.3. The t significance computed was 0.0001. These findings indicated the ENG variable should be studied further.

The fourth research question concerned the predictive relationship of MA to SBTPE performance (result of pass or fail). (See Table I, page 36.) The F value obtained was 37.51. The r was slightly above 0.3. The F significance and the t significance were each computed to be 0.0001. The decision was made that these findings warranted further study of the MA variable.

The fifth research question concerned the predictive relationship of SS to SBTPE performance (result of pass or fail). (Consult Table I, page 36.) The F value derived was 28.12 with a significance of 0.0001. The t significance also computed to be 0.0001. The r was

slightly less than 0.3. These determinations suggested further study of the SS variable was justified.

The sixth research question concerned the predictive relationship of NSC to SBTPE performance (result of pass or fail). (See Table I, page 36.) The F value was computed to be 43.31. The r was above 0.3. The F significance and the t significance were each computed to be 0.0001. The findings warranted further study of the NSC variable.

The seventh research question concerned the predictive relationship of the ACT standard composite score to SBTPE performance (result of pass or fail). The analysis finding was presented in Table I, page 36. The F value of 56.40 was significant at the 0.0001 according to the computer calculations. The computation for probability greater than t was 0.0001. The r was 0.3. These findings were judged to warrant further study of the COMP variable.

The researcher noted that the findings for each of the first seven research questions provided r values which were less than 0.5. Also, the model frequently predicted that graduates who actually failed would have passed. These observations pointed to a need to study further the relationships of the variables. The decision to study the variables further was also supported by findings from a one-way analysis of variance computation utilizing the four ACT standard scores (ENG, MA, SS, NSC) to predict SBTPE performance (result of pass or fail).

Stepwise Discriminant Analysis of Variable Combinations

The eighth research question concerned the strongest combination from the independent variables that would be predictive of SBTPE performance (result of pass or fail). A stepwise discriminant analysis was utilized to provide the computations required by this question. For the models used for each computer run for the analysis, the COMP was not included because it is a composite of four scores (ENG, MA, SS, NSC) which were among the independent variables selected for the study.

For the stepwise discriminant analysis, the model included result (pass or fail) as the dependent variable. The six independent variables included were: HSGPA, CNGPA, ENG, MA, SS, and NSC. The findings are provided in Table II, page 37.

The first step of the discriminant analysis, using six independent variables, provided a significant F value of 10.43. The r was 0.4. Four variables (HSGPA, CNGPA, ENG, SS) were identified with a probability greater than t above 0.10. The variable with the highest probability greater than t was HSGPA (PR > t: 0.8267); this finding excluded this variable from the next step.

The second step (see Table II, page 37) provided an increase in the F value to 12.54. The r remained 0.4. Five independent variables were included in this step: CNGPA, ENG, MA, SS, and NSC. Three in the set were not indicated to be good predictors; the three had significance values above 0.10. The highest of

these was ENG ($PR > t: 0.4683$) and was thus identified to be excluded from the next step.

The third step included four independent variables (CNGPA, MA, SS, NSC). This step's finding is contained in Table II, page 37. The F value was further increased over that in the second step. The r remained 0.4. Only one variable was indicated not to be a good predictor. The SS variable demonstrated a significant value for t above 0.10 ($PR > t: 0.1808$) and was excluded from the next step.

Three independent variables remained in the final step as each met the probability greater than t criteria of the researcher with a value of less than 0.10 (CNGPA: 0.0638, MA: 0.0071, NSC: 0.0002). The F value increased to 20.10. (See Table II, page 37.) The r remained at 0.4.

The findings of the stepwise discriminant analysis demonstrate a positive relationship between the variables studied and SBTPE performance (result of pass or fail). Further, the procedure determined the best possible combination of predictors from among those studied to be: CNGPA, MA, and NSC.

Stepwise Multiple Regression Findings

The last five research questions were concerned with identifying the interaction relationship of the selected variables that was predictive of performance on each of the SBTPE subexams (MED, SURG, OBS, NCH, PSY). Multiple regression analysis was chosen to identify the predictive combinations. This procedure

enabled the researcher to use the actual SBTPE subexam scores in each model. Raw data analyzed in the regression models are provided in the Appendix. Throughout the multiple regression computer runs, the F test, r, and t probability were studied to identify the variable that was to be deleted from each next step.

The ninth question concerned the interaction relationship of the selected variables that was predictive of performance on the SBTPE medical nursing subexam. (See Table III, page 38.) The first step of the regression model included six independent variables: HSGPA, CNGPA, ENG, MA, SS, and NSC. The criterion variable was MED. As shown in Table III, page 38, an F value of 32.14 was computed. The F significance was 0.0001. The r was 0.6. Two independent variables (HSGPA, MA) had a probability for t above 0.10. The higher, MA (PR > t: 0.5184) was identified for exclusion from the next step.

The second step included five independent variables: HSGPA, CNGPA, ENG, SS, and NSC. The F value was 38.56 with a significance of 0.0001. The r was 0.6. One variable, HSGPA, had a t probability above 0.10 which justified its exclusion from the next step.

The final step contained four independent variables: CNGPA, ENG, SS, and NSC. The F value was 47.87 and was significant at 0.0001. The probability greater than t was considerably less than 0.10 for each of the four variables. The r was 0.6. These findings identify CNGPA, ENG, SS, and NSC as being

the interaction combination predictive of performance on the SBTPE medical nursing subexam.

The tenth research question concerned the interaction relationship of the selected variables that was predictive of performance on the SBTPE surgical nursing subexam. The regression model's first step included six independent variables: HSGPA, CNGPA, ENG, MA, SS, and NSC; SURG was the criterion variable (Refer to Table IV, page 39.) The F value obtained was 19.46. The r was 0.5. The level of significance for F was 0.0001. The MA variable ($PR > t$: 0.8774) was chosen to be excluded from the next step.

The second step had five independent variables: HSGPA, CNGPA, ENG, SS, and NSC. The F value obtained was 23.42, significant at 0.0001. The r was 0.5. HSGPA ($PR > t$: 0.0367) was chosen for exclusion from the next step.

The third step included four independent variables: CNGPA, ENG, SS, and NSC. The F value was computed as 27.88, significant at 0.0001. The r was 0.5. All t probabilities were 0.0391 and less; SS was chosen for exclusion from the next step.

The final step included three independent variables: CNGPA, ENG, and NSC. The F value was 35.34. The r was 0.5. Values of t probabilities were: CNGPA, 0.0198; ENG, 0.0006; NSC, 0.0001. Based on the data studied and these findings, these three variables appear to be the best predictors for surgical nursing SBTPE subexam performance.

The eleventh question concerned the interaction relationship of the independent variables that was predictive of performance on the obstetrical nursing SBTPE subexam. (See Table V, page 40.) The model was begun with six variables: HSGPA, CNGPA, ENG, MA, SS, and NSC. The criterion variable was OBS. An F value of 23.31 was obtained. The r was above 0.5. The F significance level was 0.0001.

The MA variable ($PR > t: 0.9045$) was excluded from the second step. The variables left were: HSGPA, CNGPA, ENG, SS, and NSC. The F value obtained was 28.05, significant at 0.0001. The r was above 0.5.

The third step, with ENG excluded ($PR > t: 0.6880$), contained four variables: HSGPA, CNGPA, SS and NSC. The F value computed was 35.12. F was significant at 0.0001. The r was above 0.5. HSGPA, with a value for t probability of 0.2737 was selected to be withheld from the next step.

The final step ended with three variables: CNGPA, SS and NSC. The t probabilities were 0.0029 and less. The F value computed was 46.39 and its significance level was 0.0001. The r was less than 0.6. The best predictor for the obstetrical nursing SBTPE subexam performance, based on these findings, appears to be the combination of the three variables: CNGPA, SS, and NSC.

The twelfth question concerned the interaction relationship of independent variables to performance on the nursing of children SBTPE subexam. (Refer to Table VI, page 41.) The first step of the model for this question contained six variables: HSGPA, CNGPA,

ENG, MA, SS, and NSC. The t probability was above 0.10 for three variables, the highest being HSGPA (0.4955). The F value was 21.04 with an F probability of 0.0001. The r was above 0.5.

The second step was run with HSGPA excluded from the model. Left in the model were: CNGPA, ENG, MA, SS, and NSC. The F value was 25.20 with a computed significance of 0.0001. The r was above 0.5. ENG and MA had large t probabilities, MA having the larger (0.4814).

The MA was deleted for the third step. Variables in this step were: CNGPA, ENG, SS, and NSC. The r was above 0.5. The F value was 31.42 with a significance of 0.0001. ENG had a t probability of 0.1102; other variables were 0.0029 and less.

The final step contained three variables which combination produced an F value of 40.84, significant at 0.0001. The r was above 0.5. The t probabilities were 0.0006 or less. This final step identified the best combination of predictor variables studied to be: CNGPA, SS, and NSC.

The final research question concerned the interaction relationship of independent variables to performance on the SBTPE psychiatric nursing subexam. (See Table VII, page 42.)

With PSY as the criterion variable, six independent variables were entered into the model: HSGPA, CNGPA, ENG, MA, SS, and NSC. The F value obtained was 31.32. The F probability was 0.0001. The r was slightly above 0.6. The highest t probability calculated was 0.1802 (HSGPA).

The second step, HSGPA excluded, contained five variables: CNPA, ENG, MA, SS, and NSC. The F value was 37.12, which was computed to have a significance of 0.0001. The r remained slightly above 0.6. The highest greater than t probability computed was 0.2166 (MA).

The final step contained four variables: CNGPA, ENG, SS, and NSC. The F value was 45.94, significant at 0.0001. The r was 0.6. The t probabilities were 0.0042 and less. Based on these computations from analysis of the data studied, the final selection of best combination of variables for prediction of performance on the SBTPE psychiatric nursing subexam was: CNGPA, ENG, SS, and NSC.

CHAPTER V

SUMMARY, FINDINGS, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

I. INTRODUCTION

This chapter is organized into six sections. The introduction serves as section one. The study is summarized in the second section. The findings from the analyses for the research questions are presented in the third section. A discussion related to the findings is the fourth section. The conclusions drawn from these findings are found in section five. The recommendations for future research in response to the findings are found in the final section.

II. SUMMARY

The purpose of this study was two-fold: (1) to examine the relationship between each of the seven selected variables and State Board Test Pool Examination (SBTPE) performance and (2) to determine from the selected variables the strongest combination predictive of State Board Test Pool Examination performance. The seven selected variables were: high school grade point average (HSGPA); The University of Tennessee, Knoxville, College of Nursing grade point average (CNGPA); and, American College Test Assessment (ACT) standard scores

(English, ENG; mathematics, MA; social studies, SS; natural sciences, NSC; and, composite, COMP).

The study was designed to determine whether any one of the selected variables or a combination of the variables was predictive of performance on the SBTPE. To give direction to the study, thirteen research questions were stated.

1. What is the predictive relationship of high school grade point average to SBTPE performance (result of pass or fail)?

2. What is the predictive relationship of The University of Tennessee, Knoxville, College of Nursing grade point average to SBTPE performance (result of pass or fail)?

3. What is the predictive relationship of the ACT standard English score to SBTPE performance (result of pass or fail)?

4. What is the predictive relationship of the ACT standard mathematics score to SBTPE performance (result of pass or fail)?

5. What is the predictive relationship of the ACT standard social studies score to SBTPE performance (result of pass or fail)?

6. What is the predictive relationship of the ACT standard natural sciences score to SBTPE performance (result of pass or fail)?

7. What is the predictive relationship of the ACT standard composite score to SBTPE performance (result of pass or fail)?

8. What interaction relationship of the selected variables is predictive of SBTPE performance (result of pass or fail)?

9. What interaction relationship of the selected variables is predictive of performance on the medical nursing subexam (MED) of the SBTPE?

10. What interaction relationship of the selected variables is predictive of performance on the surgical nursing subexam (SURG) of the SBTPE?

11. What interaction relationship of the selected variables is predictive of performance on the obstetrical nursing subexam (OBS) of the SBTPE?

12. What interaction relationship of the selected variables is predictive of performance on the nursing of children subexam (NCH) of the SBTPE?

13. What interaction relationship of the selected variables is predictive of performance on the psychiatric nursing subexam (PSY) of the SBTPE?

Population and Sample

The population total was 572; the data were obtained from records of graduates of the baccalaureate nursing program of The University of Tennessee, Knoxville, College of Nursing from the years 1974 through 1979. The sample of 322 was drawn from those graduates' records for whom all the variables for this study were identifiable from records information on file in the College of Nursing. The data utilized for the study are presented in the Appendix.

Methodology

The Statistical Analysis System (SAS) was utilized for the computations that were required. The three statistical methodologies applied for the analyses of the data were: (1) simple

regression; (2) stepwise discriminant analysis; and (3) stepwise multiple regression analysis. Statistical findings utilized to make judgments about the models that were in use for each method were F value and significance, t probability, and Pearson product moment correlation coefficient (r).

III. FINDINGS

The findings were related to each of the thirteen research questions.

1. The study found a predictive relationship between HSGPA and SBTPE performance (result of pass or fail).

2. The study found a predictive relationship between CNGPA and SBTPE performance (result of pass or fail).

3. The study found a predictive relationship between ACT English standard score and SBTPE performance (result of pass or fail).

4. The study found a predictive relationship between ACT mathematics standard score and SBTPE performance (result of pass or fail).

5. The study found a predictive relationship between ACT social studies standard score and SBTPE performance (result of pass or fail).

6. The study found a predictive relationship between ACT natural sciences standard score and SBTPE performance (result of pass or fail).

7. The study found a predictive relationship between ACT standard composite score and SBTPE performance (result of pass or fail).

8. A stepwise discriminant analysis, in four steps, demonstrated a sufficiently large F statistic which, when considered with r and t findings, was judged to indicate that CNGPA, MA, and NSC is the strongest set of the variables studied in predicting SBTPE performance (result of pass or fail). The decision was made that further study of the selected variables was warranted.

9. The findings determined CNGPA, ENG, SS, and NSC were the strongest set of the selected variables studied in predicting performance on the MED subexam of the SBTPE.

10. The findings determined CNGPA, ENG, and NSC were the strongest set of the selected variables studied in predicting performance on the SURG subexam of the SBTPE.

11. The findings determined CNGPA, SS, and NSC were the strongest set of the selected variables studied in predicting performance on the OBS subexam of the SBTPE.

12. The findings determined CNGPA, SS, and NSC were the strongest set of the selected variables studied in predicting performance on the NCH subexam of the SBTPE.

13. The findings determined CNGPA, ENG, SS, and NSC were the strongest set of the selected variables studied in predicting performance on the PSY subexam of the SBTPE.

IV. DISCUSSION

The researcher recognized that there may be other variables that were not included in this study which, if included, might have caused a somewhat different set of findings.

A noteworthy limitation of this study was the high performance quality of The University of Tennessee, Knoxville, College of Nursing baccalaureate program featuring a low overall fail percentage on the SBTPE. Since the population studied had a characteristic of homogeneity in that the overall fail percentage for SBTPE performance was low, it is suggested the study should be replicated with other populations with lower pass percentages and a larger number of fails within the sample.

Findings of this study are expected to be of some value to the administration and nursing faculty of The University of Tennessee, Knoxville, College of Nursing and other interested persons for evaluation and counseling usage. The ACT standard composite score was determined predictive, with a positive correlation, of performance on the SBTPE. Also, NSC and MA were found to be predictors, with positive correlations, of SBTPE performance, both for overall SBTPE performance (result of pass or fail) and for performance on each of the SBTPE subexams. The CNGPA was significant in every step run and was thus judged a significant and reliable predictor of SBTPE performance. NSC was the other independent variable that screened through each step of the analyses as a significant predictor. While the CNGPA finding may be most useful to the nursing faculty, the NSC finding is expected to be of assistance to nursing faculty and others who are in a situation to counsel prenursing students.

The researcher found it interesting to note that ENG was included in the final MED and SURG subexam multiple regression models,

and SS was included in all the final steps except for the SURG subexams. The judgment of the researcher is that further study of these interaction relationships is warranted, especially for those nursing programs that may be experiencing a problem with admissions screening or SBTPE performance.

A future study designed for earlier predictability of SBTPE performance before the final quarter GPA might be of value to nursing faculty of some programs for assistance in identifying potential SBTPE fail candidates early in their nursing course work.

The study's finding that the selected variables demonstrate a significant predictive relationship to SBTPE performance affirms what some nursing educators may have previously decided intuitively. This study, in the judgment of the researcher, has demonstrated that the ACT scores, as widely used as they have become in nursing admission processes, have not been studied enough to date.

Finally, the superior SBTPE pass percentage achievement of graduates of the baccalaureate program of The University of Tennessee, Knoxville, College of Nursing may have mandated poor predictive capability. Recognizing this, caution should be used in acting on the results of the study. Another researcher has stated (Stoner, 1979): "As numbers of nontraditional students increase, distinct prediction equations will become more functional."

V. CONCLUSIONS

Based on the analyses applied to the data studied, it was concluded that the selected variables were statistically related to SBTPE performance, but the positive correlation coefficients were not quite as high as would be desirable for good predictive confidence. The researcher would have preferred all correlation coefficients be above 0.5. Also, it was concluded that the higher an individual's set of CNGPA, NSC, and MA achievement, the higher that individual's scores are likely to be on the SBTPE.

Pardue (1979) addressed the importance of investigating the effectiveness of baccalaureate nursing curricula in producing graduates who pass the board (SBTPE) examination. Based upon the findings of this study, the researcher concluded that the selection for and education of students within the curriculum of The University of Tennessee, Knoxville, College of Nursing baccalaureate program are working with excellent results.

VI. RECOMMENDATIONS

Another study of the seven selected variables using a sample with a larger proportion of fail result on the SBTPE is recommended for comparison to these findings.

In this study the MA faired well as a lone predictor with a large F value that was significant, however, the MA variable was excluded from the final multiple regression step identifying the

strongest predictive combination of variables for each of the SBTPE subexams. A follow-up study utilizing the MA variable is recommended for those nursing education programs that have a special interest in this variable.

A study is recommended which would be designed to examine the relationship of the ACT scores to nursing course final grades. Since findings of this study indicate a predictive relationship between ACT scores and SBTPE performance, a predictive finding for relationship of ACT scores to specific nursing course grades would provide useful information to students and faculty at an earlier point within the nursing program which might facilitate selection of effective tutoring or remedial work for students who might benefit from such help.

The author recommends a study designed as an extension of this study. The recommended study would include additional variables. With inclusion of other variables such as motivational and personal traits, other significant variable combinations as predictors of SBTPE performance might be identified.

The structure of this study focused on the students who graduated from the baccalaureate nursing program. It is recommended that a study extending the sample to a broader base population would allow an added focus on students who did not complete the program. Although SBTPE results would not be available for students who did not complete the program, comparisons of high school grade point averages, ACT scores, and final grades from required general education and

nursing courses could be studied for any findings of significance. An underlying argument for such a study would be that it is important to know what is happening with those students who do not complete the nursing program and thus do not make it to the SBTPE. Another argument for such a study might be that if the ACT scores are predictive of success with the CNGPA and SBTPE, as demonstrated in this study, then students who dropped out of the nursing program due to academic difficulty should have different ACT score results than those who graduated.

Related to the present study, the researcher recommends that selection committees at other institutions with nursing programs be cognizant of these results as they apply to The University of Tennessee, Knoxville, College of Nursing as they develop selection criteria. Caution needs to be exercised, however, in that the population from which these findings were determined was only The University of Tennessee, Knoxville, population and for that reason cannot be specifically applied to a student population at another institution.

The final recommendation is that the study be duplicated for The University of Tennessee, Knoxville, College of Nursing graduates' performance on the upcoming revision of the SBTPE when a sufficient sample size has been generated. Updated predictive information would, no doubt, be useful to those who serve as advisors to marginal nursing students and those who advise prenursing students for The University of Tennessee, Knoxville. It is expected that other institutions with nursing programs would find such a study interesting and useful.

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APPENDIX

RAW DATA

CBS	HSGPA	CNGPA	ENG	MA	SS	NSC	CCMP	MED	SURG	OPS	NCH	FSY
1	3.10	2.93	26	27	27	27	27	626	618	596	671	573
2	2.87	2.53	19	19	12	15	16	522	552	590	494	573
3	3.65	3.30	21	24	19	27	23	451	382	485	486	550
4	3.57	2.80	22	26	25	25	25	451	432	495	454	450
5	3.40	2.46	20	19	16	24	20	509	625	587	608	532
6	3.30	3.07	26	28	27	21	26	546	560	465	519	591
7	2.68	2.75	21	22	27	21	23	552	555	581	582	619
8	3.92	3.46	26	31	28	30	29	509	517	621	517	557
9	3.00	2.91	25	21	21	29	24	570	513	666	579	554
10	3.18	3.54	22	28	27	24	25	472	590	601	632	494
11	3.91	3.05	25	26	27	27	26	385	457	553	462	600
12	3.00	3.02	22	17	24	21	22	583	558	630	636	640
13	3.64	3.20	25	35	19	30	27	602	597	611	554	657
14	2.76	3.16	23	18	29	29	25	573	629	682	590	541
15	3.84	3.32	24	31	26	26	27	614	663	618	566	618
16	3.00	3.23	25	22	21	25	23	657	499	618	561	572
17	2.61	2.89	22	21	25	24	23	622	608	581	613	595
18	3.17	2.54	23	27	30	27	27	570	474	590	474	582
19	2.67	2.37	12	8	15	14	12	467	529	590	494	424
20	2.81	2.82	23	23	26	24	24	641	645	692	620	650
21	2.54	2.84	22	10	21	25	20	461	468	516	590	468
22	2.50	2.71	23	22	20	18	21	466	468	451	458	395
23	2.28	2.54	15	18	12	18	16	325	364	427	392	376
24	2.72	2.79	21	21	20	21	21	552	489	526	526	577
25	3.06	3.97	30	26	26	29	28	572	620	581	515	452
26	3.53	3.40	29	33	25	21	28	566	612	609	598	586
27	3.03	3.13	19	35	27	25	27	519	465	422	462	522
28	3.97	3.95	25	29	26	31	28	682	522	609	662	677
29	2.02	3.14	21	15	11	19	17	518	505	641	533	651
30	3.95	3.59	28	28	27	30	28	577	630	599	612	601
31	2.16	2.51	19	19	18	19	19	362	390	392	336	557
32	3.15	3.07	21	26	24	20	23	596	524	596	615	532
33	3.43	3.11	18	23	22	24	22	546	451	494	519	562
34	3.69	3.75	22	25	22	27	24	552	535	590	621	620
35	3.00	2.64	20	26	16	29	23	426	442	415	561	590
36	3.83	3.48	20	29	22	25	24	461	499	553	508	507
37	3.10	2.58	22	15	20	22	20	423	545	452	576	496
38	3.17	2.78	18	16	24	20	20	492	473	443	446	404
39	3.70	3.70	22	26	24	22	24	468	545	498	528	552
40	3.39	3.06	24	30	31	31	29	509	450	621	538	598
41	2.71	2.55	19	18	21	16	19	523	580	588	502	450
42	2.70	2.91	24	15	26	27	24	663	727	720	741	775
43	3.20	2.92	20	14	20	15	17	318	350	474	468	572
44	3.67	3.47	21	18	22	22	21	553	547	661	670	605
45	2.69	3.09	21	30	11	14	19	579	592	544	522	461
46	2.65	2.66	15	20	21	19	19	386	484	651	575	446
47	3.29	2.58	22	23	12	20	20	364	491	430	357	359
48	2.48	3.08	26	28	26	33	28	507	529	446	417	554
49	2.29	2.47	20	27	16	20	21	384	386	590	512	532
50	3.95	3.59	27	29	25	30	28	664	692	714	613	647
51	3.86	3.38	26	29	30	30	29	609	552	647	485	501
52	3.33	2.48	21	13	22	19	16	601	475	553	512	522
53	3.82	3.21	27	32	25	31	29	562	521	609	536	656
54	3.53	3.68	23	28	23	30	26	617	632	691	667	628
55	3.13	3.15	16	16	22	24	20	516	597	671	533	407
56	3.40	2.85	22	32	26	28	27	689	618	510	660	590

CBS	HSGPA	CNGPA	ENG	MA	SS	NSC	COMP	MED	SURG	OBS	ACH	FSY
57	3.82	3.65	33	33	27	30	31	601	546	673	644	668
58	2.70	2.21	24	24	26	30	26	610	597	563	667	607
59	3.07	2.61	20	28	22	27	24	519	502	476	525	564
60	3.44	2.91	17	23	21	18	20	363	473	368	441	305
61	3.18	2.84	22	18	20	18	20	250	274	453	486	550
62	3.39	2.58	25	24	28	28	26	659	517	592	617	598
63	3.78	3.26	20	16	12	22	18	350	381	455	434	601
64	3.41	3.59	22	26	24	22	24	602	531	545	475	532
65	3.21	3.04	16	24	24	25	22	505	465	412	566	486
66	3.89	3.73	30	33	26	29	30	586	649	627	628	682
67	2.74	2.58	20	18	17	17	18	411	495	449	378	501
68	3.37	2.99	22	24	24	22	23	538	468	590	613	532
69	3.89	3.45	25	21	26	27	25	503	549	600	463	544
70	2.76	2.91	19	22	12	23	19	483	396	503	424	536
71	3.10	3.00	25	23	21	11	20	522	464	468	461	408
72	2.94	2.91	19	25	14	23	20	523	571	547	454	532
73	3.44	3.03	21	20	18	23	21	573	497	562	520	459
74	3.77	2.63	12	10	15	17	15	406	320	388	462	358
75	3.20	2.70	17	18	25	21	20	516	591	715	468	615
76	3.67	3.21	17	29	27	30	26	641	456	537	534	550
77	3.22	2.87	19	23	16	8	17	363	341	557	470	523
78	3.27	3.61	21	20	31	23	24	522	455	551	405	526
79	2.38	2.69	18	14	8	20	15	419	528	378	288	322
80	3.19	2.68	23	14	15	23	20	327	485	499	510	485
81	2.50	2.57	21	15	20	16	18	377	342	340	241	413
82	2.36	2.62	21	18	17	28	21	559	456	450	540	503
83	2.79	2.87	21	24	15	22	21	464	463	540	582	494
84	3.50	3.34	21	29	19	26	24	566	592	627	681	526
85	2.53	2.64	24	22	18	21	21	487	533	430	554	494
86	3.80	3.46	24	30	25	25	26	444	525	570	451	629
87	1.97	2.63	21	17	15	16	18	352	435	415	463	535
88	3.32	2.46	22	18	20	20	20	533	588	526	534	459
89	3.41	3.36	25	25	22	32	26	566	565	611	589	552
90	2.93	2.86	27	17	15	25	22	622	604	621	594	615
91	3.64	3.50	23	26	28	22	25	622	598	638	566	540
92	2.51	2.23	26	21	24	23	24	526	532	519	489	526
93	3.09	2.64	23	30	26	32	28	573	588	485	550	513
94	2.74	2.76	22	24	22	26	24	546	470	604	615	490
95	3.87	3.19	22	27	25	21	24	565	585	526	598	637
96	3.06	3.11	19	20	13	14	17	503	592	581	546	489
97	3.29	3.17	30	27	30	30	29	594	541	599	412	704
98	3.66	3.02	25	26	14	18	21	425	350	490	420	465
99	3.19	3.21	24	30	25	20	25	559	533	581	603	503
100	3.39	2.72	23	26	22	31	26	631	519	510	491	523
101	3.28	2.64	22	14	27	23	22	491	552	561	468	432
102	3.09	2.93	20	17	16	16	17	442	343	417	482	350
103	2.88	2.26	18	25	14	23	20	526	555	412	494	468
104	3.57	3.14	23	21	24	19	22	605	540	470	554	580
105	3.55	3.37	21	27	24	26	25	578	597	591	575	600
106	3.60	3.48	14	16	23	18	18	528	484	553	587	441
107	3.06	2.55	21	23	24	30	25	510	578	507	520	572
108	3.35	3.54	33	27	27	28	29	704	670	646	658	674
109	2.49	2.63	22	21	23	18	21	492	514	568	542	512
110	1.64	2.63	20	18	21	20	20	497	459	505	602	500
111	3.43	3.06	25	31	24	31	28	614	530	588	574	523
112	2.84	3.39	25	19	31	31	27	631	689	530	624	600

CBS	HSGPA	CNGPA	ENG	MA	SS	NSC	CCPP	FED	SURG	OBS	NCF	PSY
112	3.72	3.56	24	28	18	29	25	465	470	460	547	475
114	2.85	3.10	16	15	9	22	16	364	514	405	305	433
115	3.89	2.88	29	30	27	29	25	656	638	580	552	694
116	3.18	3.32	24	20	25	22	24	621	522	588	606	595
117	3.26	3.24	26	27	21	27	25	533	580	443	630	568
118	3.28	3.14	23	19	25	22	22	479	456	470	505	542
119	3.00	3.12	23	28	20	25	24	534	558	536	468	507
120	3.51	3.41	29	23	28	30	28	657	677	692	656	701
121	2.79	3.30	23	14	15	21	19	628	535	655	606	600
122	2.72	2.65	22	26	22	18	22	526	597	485	476	439
123	2.66	2.94	21	23	24	19	22	452	547	526	502	532
124	3.44	3.02	22	21	12	18	18	505	481	453	494	555
125	3.48	2.94	22	22	22	19	22	524	490	617	512	532
126	3.31	3.48	23	21	25	28	24	626	524	562	615	648
127	3.94	3.12	27	28	26	32	28	585	560	561	556	582
128	3.34	3.37	21	26	22	27	24	531	478	590	440	618
129	2.22	2.80	21	26	11	21	20	444	497	443	494	468
130	3.18	2.97	24	25	26	22	24	580	586	537	502	605
131	2.82	2.82	19	16	22	22	20	460	525	522	613	526
132	2.38	3.17	24	21	25	22	23	516	484	570	545	590
133	3.21	3.51	25	18	25	29	24	642	656	655	636	646
134	3.42	3.28	24	28	11	28	23	546	555	485	542	431
135	2.83	2.96	19	18	21	20	20	478	555	485	534	532
136	3.39	3.14	21	18	12	25	19	475	471	442	432	442
137	1.88	2.65	23	22	20	24	22	519	563	495	438	532
138	3.20	2.96	26	24	31	31	28	600	547	620	606	605
139	4.00	3.07	28	25	24	23	25	485	490	485	510	495
140	3.15	3.02	15	22	20	22	20	562	568	522	562	545
141	3.41	3.10	21	25	13	20	20	475	365	513	468	536
142	3.50	2.72	21	25	22	28	24	554	522	526	478	512
143	3.29	2.58	24	31	25	31	28	516	571	596	517	540
144	2.89	2.54	16	22	15	24	20	448	480	447	427	456
145	2.66	3.05	21	16	24	23	21	510	563	605	598	581
146	3.84	2.88	22	17	11	24	19	404	456	381	430	404
147	2.94	3.04	22	21	24	22	22	588	675	651	646	552
148	2.73	2.45	17	23	25	27	23	545	485	643	562	542
149	2.97	3.25	23	26	27	26	26	517	556	572	552	516
150	3.54	3.84	19	22	18	22	20	585	506	494	562	591
151	3.52	3.41	19	25	25	29	25	592	615	666	604	562
152	3.60	3.35	21	25	22	26	24	459	547	557	534	541
153	2.69	3.19	25	21	12	24	21	574	575	583	568	491
154	3.67	2.81	17	17	14	16	16	411	480	512	462	448
155	2.13	2.50	23	20	11	14	17	555	537	515	517	515
156	2.74	2.95	21	12	15	22	18	413	592	489	485	516
157	3.97	3.18	24	23	22	25	24	538	513	455	511	562
158	2.72	2.85	20	17	25	26	22	545	475	595	528	568
159	3.26	2.32	21	16	22	20	20	429	498	490	392	484
160	3.71	2.76	19	17	22	14	18	385	371	437	406	500
161	2.44	2.58	17	14	17	19	17	524	514	535	478	461
162	3.50	3.56	20	25	25	32	27	583	598	604	642	622
163	3.36	2.92	22	20	26	28	24	600	634	605	500	590
164	2.61	2.81	19	23	18	24	21	555	578	647	538	490
165	2.78	2.55	20	24	15	21	21	508	470	540	547	542
166	3.43	2.82	27	21	31	30	27	747	661	671	730	605
167	2.76	2.35	17	20	16	19	18	461	375	405	404	450
168	3.29	3.34	23	23	25	26	25	560	547	557	486	641

CBS	HSGPA	CNGPA	ENG	MA	SS	NSC	CCMP	FED	SURG	ORS	NCF	FSY
169	3.63	3.40	21	28	16	23	22	586	563	526	583	442
170	2.83	2.54	19	23	21	21	21	538	459	484	519	629
171	3.91	3.22	22	27	29	26	26	587	588	682	670	632
172	2.39	2.76	20	16	21	25	21	512	555	495	558	523
173	2.97	2.59	16	12	19	20	17	490	517	495	399	483
174	3.07	2.88	20	28	22	21	23	621	589	666	511	528
175	3.20	3.50	23	19	15	24	20	632	638	638	545	507
176	3.51	3.03	23	26	27	26	26	577	521	686	553	526
177	3.97	3.42	21	23	17	25	22	501	505	540	512	542
178	3.03	3.79	24	25	20	24	23	594	596	651	686	668
179	3.18	2.55	21	15	24	25	21	511	495	495	547	394
180	2.21	2.66	23	16	18	19	19	595	597	510	639	542
181	2.36	2.88	22	19	25	25	23	614	627	618	628	637
182	3.06	3.01	18	27	12	23	20	537	562	561	505	619
183	2.97	3.14	21	18	24	16	20	482	613	572	455	618
184	2.50	3.26	22	28	21	21	23	417	440	453	366	550
185	4.00	3.32	19	15	26	20	20	515	455	638	570	592
186	3.41	2.34	23	18	27	27	24	614	613	563	546	507
187	2.78	2.36	19	17	19	19	19	436	467	398	333	424
188	3.74	2.92	21	26	7	19	18	511	597	612	681	554
189	3.57	3.22	16	25	17	21	20	656	734	646	681	544
190	2.58	2.86	14	19	14	18	16	370	481	526	406	550
191	3.63	3.01	23	26	23	28	25	454	450	468	426	557
192	2.16	2.28	17	13	12	21	16	415	322	504	386	350
193	3.12	2.89	25	24	26	32	27	539	571	537	574	622
194	2.67	2.44	20	21	6	21	18	385	428	405	403	287
195	3.54	2.65	22	17	19	21	20	478	621	578	502	550
196	3.06	3.06	20	23	22	26	23	621	589	531	483	385
197	2.75	2.94	11	28	15	19	18	544	625	651	603	628
198	3.67	3.47	21	10	17	23	18	512	604	485	526	450
199	3.79	3.23	27	28	25	22	26	614	563	701	628	674
200	3.54	3.17	19	22	26	31	25	554	482	599	536	601
201	3.27	2.59	21	15	17	20	19	475	474	465	596	563
202	3.49	3.25	24	12	21	19	19	577	513	417	400	517
203	3.53	3.00	25	26	24	20	24	523	491	380	519	571
204	3.34	3.31	25	29	18	21	23	452	621	568	502	277
205	2.88	3.52	29	28	25	27	27	573	456	620	606	568
206	3.36	3.35	22	16	23	24	21	627	613	547	542	568
207	3.26	2.60	22	32	26	22	26	511	429	437	575	456
208	3.37	2.85	22	21	21	24	22	522	470	502	489	449
209	3.65	3.53	20	27	29	24	25	559	547	470	519	552
210	3.49	3.04	21	16	24	20	20	510	521	590	502	545
211	3.52	2.73	22	18	21	27	22	483	459	495	540	412
212	4.00	3.66	27	31	27	30	29	628	613	664	696	609
213	3.15	2.42	22	22	25	20	22	573	519	581	605	641
214	2.66	2.18	24	18	28	24	24	645	645	658	685	548
215	3.89	3.25	23	23	21	16	21	572	478	655	628	600
216	2.57	2.93	19	26	24	25	24	552	563	581	568	479
217	3.21	2.80	26	18	30	31	26	664	638	638	511	545
218	3.57	3.74	25	28	31	29	28	632	607	628	545	638
219	2.31	2.93	22	26	20	22	23	472	547	630	462	459
220	3.47	3.02	24	29	26	32	28	566	618	631	624	523
221	2.44	3.17	24	26	22	24	24	516	564	579	517	615
222	3.27	3.04	24	20	18	23	21	512	580	505	614	450
223	3.18	3.04	19	24	22	17	21	472	407	443	478	404
224	3.00	3.28	22	24	14	21	20	554	489	557	550	586

CBS	HSGPA	CNGPA	ENG	MA	SS	NSC	COMP	FED	SURG	OBS	ACH	FSY
225	2.89	2.42	19	7	13	18	14	310	315	376	335	325
226	3.00	2.66	15	17	15	15	17	308	343	350	342	355
227	3.66	2.40	21	18	11	22	18	558	521	544	448	461
228	3.08	2.76	23	21	22	21	22	572	606	572	561	516
229	2.86	2.91	24	21	28	24	24	614	627	600	558	618
230	2.00	2.44	19	16	20	20	19	491	455	369	409	368
231	2.73	2.39	15	14	15	18	17	436	265	358	363	466
232	3.41	3.29	22	23	27	26	25	608	490	590	582	568
233	2.95	2.65	23	20	15	22	21	533	597	413	412	466
234	3.14	2.30	21	10	18	17	17	373	287	426	332	294
235	3.27	3.06	18	18	22	20	20	524	578	600	538	553
236	2.87	3.04	18	20	18	20	19	397	443	407	502	442
237	2.69	2.65	24	25	26	27	26	450	633	592	554	562
238	3.13	3.25	27	30	22	15	24	559	450	485	468	524
239	3.28	2.97	23	28	28	29	27	433	563	590	520	535
240	3.40	2.58	24	29	26	30	27	628	642	655	591	581
241	2.71	2.87	13	18	22	22	20	512	571	568	470	455
242	3.47	2.95	25	31	26	22	26	600	695	588	590	486
243	3.62	3.07	20	19	21	19	20	546	511	579	650	515
244	2.93	2.77	24	30	30	19	28	600	620	516	561	544
245	3.39	3.22	21	21	22	29	22	566	456	540	519	552
246	3.52	2.56	13	16	17	24	18	556	546	505	596	500
247	4.00	3.68	29	36	28	31	31	736	678	734	718	614
248	3.44	3.08	22	26	24	21	23	443	555	530	512	512
249	3.00	2.62	18	16	16	18	17	586	528	516	493	535
250	2.62	3.08	20	21	20	19	20	443	456	470	532	436
251	3.73	3.40	19	22	23	23	22	605	547	561	547	542
252	3.97	3.76	23	29	25	31	28	687	615	686	672	684
253	3.80	3.25	23	29	31	30	28	530	625	631	622	615
254	3.82	2.90	20	17	16	15	17	465	485	329	510	377
255	3.08	2.85	14	17	15	18	16	587	505	512	533	528
256	3.74	3.52	21	26	22	22	23	507	513	503	596	536
257	3.47	3.03	21	24	26	22	23	617	435	628	552	601
258	2.28	2.75	22	18	20	18	20	405	342	396	357	504
259	3.90	3.09	25	21	24	21	23	539	563	516	614	622
260	3.14	2.51	25	23	24	24	24	546	522	474	574	396
261	2.67	2.95	19	26	16	22	21	472	477	530	596	561
262	3.35	2.54	19	27	22	21	22	555	512	601	465	552
263	2.64	2.58	22	22	24	29	24	577	552	542	460	591
264	3.28	2.92	19	22	21	26	22	560	480	456	515	483
265	3.29	3.20	20	21	22	17	20	560	522	620	574	495
266	3.47	3.41	22	22	22	21	22	538	490	580	596	480
267	2.77	2.95	26	23	15	23	23	620	651	528	587	606
268	3.89	2.94	17	20	10	20	17	454	426	481	474	446
269	3.97	2.92	20	24	10	17	18	428	506	503	494	424
270	3.90	3.40	29	28	28	30	29	602	639	530	632	605
271	2.61	3.10	22	23	23	18	22	524	528	424	523	553
272	2.75	2.87	17	17	25	16	19	553	584	484	587	615
273	2.67	2.92	22	26	23	24	24	538	468	562	520	532
274	3.17	3.09	23	22	15	22	22	524	450	468	524	548
275	3.24	3.08	15	28	15	27	22	522	423	511	485	582
276	3.74	2.61	24	30	24	30	27	566	637	433	486	586
277	3.10	3.00	21	14	24	21	20	554	591	676	485	582
278	3.50	2.43	20	26	15	20	21	479	470	470	446	552
279	3.59	3.34	19	30	25	31	26	553	606	605	621	590
280	3.15	3.13	24	20	25	29	26	546	621	588	590	477

CBS	HSGPA	CNCFA	ENG	MA	SS	NSC	CCMP	MED	SURG	OBS	NCF	PSY
281	3.05	2.52	22	29	26	31	27	553	530	588	542	550
282	2.54	2.30	23	17	22	24	22	503	631	621	482	631
283	3.84	3.71	29	30	29	28	29	663	592	600	658	544
284	3.06	2.71	18	14	12	17	15	492	456	485	542	504
285	2.70	2.90	22	20	24	29	24	646	625	571	603	590
286	3.26	3.32	24	20	23	21	22	544	618	520	533	580
287	3.67	3.46	26	20	26	27	25	489	549	442	515	637
288	4.00	3.76	28	29	30	31	30	554	578	701	605	704
289	2.87	3.51	20	21	26	28	24	479	484	519	517	457
290	3.00	2.73	20	20	19	20	20	534	403	545	559	466
291	3.20	2.44	22	19	24	28	23	530	477	460	554	522
292	2.32	2.78	32	28	26	25	28	607	570	507	621	526
293	2.52	2.61	23	15	17	15	18	538	585	600	530	498
294	3.03	2.70	19	25	17	24	21	531	627	507	470	485
295	3.49	3.25	22	16	21	23	21	491	459	542	502	536
296	3.26	2.60	22	13	19	22	19	510	378	433	440	563
297	2.35	2.69	21	15	16	9	16	491	410	333	405	382
298	3.09	3.14	23	19	20	24	22	501	491	430	455	502
299	3.23	3.24	22	21	23	20	22	587	485	640	590	595
300	3.06	2.86	23	19	22	20	21	420	512	503	612	442
301	2.65	3.39	16	12	7	14	12	544	540	470	512	278
302	2.74	2.84	21	10	12	16	15	580	553	512	554	572
303	3.90	3.71	19	26	29	26	25	636	637	617	612	568
304	3.23	3.09	22	29	27	26	26	524	528	590	530	618
305	4.00	4.00	23	25	26	29	26	625	615	686	672	619
306	2.31	2.77	21	24	12	24	21	556	509	505	526	518
307	3.69	3.86	26	24	28	29	27	711	611	701	540	561
308	2.37	3.04	18	24	22	16	21	512	539	620	566	532
309	2.87	3.16	22	29	23	30	26	614	656	655	666	581
310	3.87	3.31	21	26	27	29	26	552	456	516	454	586
311	3.95	2.77	19	17	20	29	19	585	607	628	630	554
312	3.43	3.07	22	25	26	29	26	720	682	544	567	623
313	3.37	2.64	23	23	22	23	23	515	545	474	480	610
314	2.36	2.37	17	19	4	17	14	287	400	378	305	341
315	3.30	2.89	24	25	24	21	24	510	512	590	542	668
316	3.19	3.54	21	31	27	28	27	632	564	596	699	665
317	3.62	3.25	19	25	14	17	19	492	350	391	430	486
318	3.97	3.71	19	24	23	29	24	562	615	657	545	572
319	4.00	3.87	23	33	26	29	28	621	578	581	621	552
320	3.53	2.76	15	17	12	18	16	420	429	495	462	429
321	3.78	3.12	29	27	26	28	28	594	541	617	559	577
322	2.88	2.68	22	25	14	18	20	440	386	442	425	522

VITA

Theresa Griffith Sharp was born in the Citico Community of Monroe County, Tennessee. She attended elementary school in Madisonville, Tennessee. During her high school years, she took secondary level courses during two summers at Hiwassee College, near Madisonville, and graduated in a total of three years from Madisonville High School at age sixteen.

The junior year of undergraduate work was completed at Carson-Newman College in Jefferson City, Tennessee, before transferring to the John Hopkins Hospital School of Nursing at age eighteen. She received a Bachelor of Science degree with a major in Nursing from The John Hopkins University, Baltimore, Maryland, in 1958. Two graduate degrees were received from The University of Tennessee, Knoxville: the Master of Science with a major in Educational Administration and Supervision in August, 1965; and, the Doctor of Education with a major in Educational Administration and Supervision in June, 1981. The two collateral study areas chosen for the doctoral study were Nursing and Continuing and Higher Education.

She was selected for membership in Pi Lambda Theta and Sigma Theta Tau. The author's professional experiences have included: staff nurse, head nurse, supervisor, assistant director of nursing service, director of nursing service, inservice education, public education (five years teaching at the secondary level and one year in secondary level administration), nurse educator, nursing education consultant,

director of associate degree nursing program, and dean of nursing affairs. In addition, she has been active in several professional organizations and held offices at the local and state levels.

The author is married to William Joseph Sharp. They have one son, William Joseph Sharp, Jr.