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A STUDY OF THE RELATIONSHIPS OF ETHNICITY, SEX, AND SCHOOL
TO COMPETENCY LEVEL ACHIEVED BY HIGH SCHOOL JUNIORS ON
THE NORTH CAROLINA MINIMUM COMPETENCY TEST FOR THE
ROBESON COUNTY SCHOOL SYSTEM BETWEEN 1978-1983

A Thesis

by

ROGER DALE HERRING

Submitted to the Graduate School
Appalachian State University
in partial fulfillment of the requirements for the degree of
EDUCATIONAL SPECIALIST

May 1984

Major Department: Counselor Education and Research

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ABSTRACT

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(May 1984)

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This study sought to explore relationships of the variables of ethnicity, sex, and school to the variables of math and reading scores on the North Carolina Minimum Competency Test. The subjects were 2681 juniors from the Robeson County School System who took the North Carolina Minimum Competency Test at their first opportunity on the fall testing dates. The years covered by the present study are 1978-1983. Raw scores on the reading and math subtests were grouped according to the variables of ethnicity, sex, and school. F tests, chi square tests, and Scheffe Multiple Range Tests of Significance were used to establish the existence of significant differences pertaining to the three variables. A chi square analysis was also performed to determine the presence of relationships between the sex and the ethnicity of subjects and their pass/fail rates on the North Carolina Minimum Competency Test.

The results of this study demonstrated that several significant differences do exist between the variables of ethnicity, sex, and school and the variables of North Carolina Minimum Competency Test scores. Significant differences do exist between both math/reading scores and ethnicity. A significant difference does exist between the variable of sex and the reading scores of the North Carolina Minimum Competency Test at the .001 level of significance. As well, significant differences do exist between pass/fail rates on the reading/math subtest scores and both variables of ethnicity and sex at the .001 level of significance. More research was advised in the area of minimum competency. As well, additional research on the North Carolina Minimum Competency Test was advised especially in the areas of validity and reliability.

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Chapter 1

INTRODUCTION

In June 1977, the North Carolina General Assembly passed House Bill 204, "The High School Graduation and Competency Program." The bill stipulated that a high school minimum competency program must be passed if a student is to receive a high school diploma. The bill also established a Competency Test Commission to recommend the appropriate tests and procedures to the North Carolina State Board of Education. The test was to be administered each November to all eleventh grade students, and the test could be readministered repeatedly at designated intervals to students who failed to pass.

The North Carolina General Assembly's action reflected the minimum competency movement that began to sweep the nation in 1975. Over 33 states have mandated specific standards for the advancement in, or graduation from, their public schools (Pipho, 1979). Each requires the passing of some type of proficiency or competency test.

Jaeger (1980) quotes Bruce K. Eckland as theorizing that the public's expectations of education are largely pragmatic. Parents' desire for schools is to prepare their children to become responsible and productive adults, a role which is still largely defined in the terms of work and not necessarily good citizenship, not promoting personal development, and certainly not athletics. The entire Competency Based Education (CBE) movement is partly the response of a public who

believe that their children are being short-changed in such traditional subjects as reading, writing, and math, and that these skills are strongly related to success in the world of work.

Jaeger (1980) provides evidence of additional influences on the CBE movement. Factors such as declining SAT scores and lack of adequately prepared graduates for available jobs can be traced to be causes for more concern about competencies. The CBE movement also represents an endorsement of explicit expectations and improved accountability rather than the traditional placing of trust in the educators to produce results. As well, the movement illustrates the conviction that schools lack an adequate base for program design and operation that insures the outcomes or goals to be reached (i.e. competencies).

A. Craig Phillips, North Carolinas State Superintendent of Public Instruction, mandates the following mission of the public school systems (Instructional Services, 1979):

1. that schools should help students, as individuals, to become competent in the basic skills, to become resourceful and responsible for their own decisions and to become self-respecting contributing members of a democratic society;
2. that teachers should have high academic competencies, an enthusiasm for learning and teaching, and a sincere respect for the worth and dignity of each person;
3. that an environment should be available to each school-age child in which adequate resources are provided and used to optimal advantage, in which there is a belief that all students can and should learn to the degree they are able, and in which each student will experience success which will spur him or her on to greater achievement; and ,

4. that the people have a right to the privilege of an education and that it is the duty of the state to guard and maintain that right.

The present study attempts either to validate or challenge the educational reality of the Superintendent's mission as reflected in competency test results.

Statement of the Problem

The goal of this study is to ascertain whether a significant difference exists between the variables of ethnicity, sex, and school attended on a student's North Carolina Minimum Competency Test (NCMCT) scores. Today's educational process mandates the involvement of students through achievement, intellectual competency, a sense of self-identity and the ability to be self-determining. Secondary schools must offer this kind of education. Competency-based curricula stressing logical thinking and effective use of language can prove to be a valid and germane foundation for the educational experience (Burns, 1973). The question remains as to whether the NCMCT is an effective assessment tool.

Significance of the Problem

The determination of a significant difference in NCMCT scores due to the factors of ethnicity, sex, or school attended, would have important ramifications in three main areas: (a) legality, (b) bias, and (c) instructional accountability. The NCMCT has been challenged in the courts (Green v. Hunt, 1980) on the basis of lack of due process and racial discrimination. The lack of due process challenge focused on the

phase-in period for the initial administration of the NCMCT and on the test/instruction match (Riegle & Lovell, 1980). Lack of adequate time for students to prepare for competency testing presented a major legal issue. Guaranteeing that the NCMCT would measure what was being taught offers a challenge to state level administrators.

Bias pertains to ethnic, cultural, and/or educational discrimination within the test content. Much evidence exists of the disproportionate percentage of minorities who are academically deficient, which would result in a disproportionate percentage of minorities failing the NCMCT. Cultural bias generally reflects both ethnicity and socio-economic background variables. Title VI of the Civil Rights Act of 1964 prohibits "practices that have the effect of discriminating against individuals on the grounds of race, color, or national origin." Similarly, if segregation or "tracking" occurs as a result of remediation programs, a violation exists. The National Association for the Advancement of Colored People also has challenged several MCT programs recently, and HEW's Office for Civil Rights has published a position paper on potential discrimination effects of minimum competency programs (Riegle & Lovell, 1980).

Handicapped and other exceptional children are protected by the Fourteenth amendment which mandates that all students have the right to an education under the equal protection clause. As well, the Education for All Handicapped Children Act (P.L. 94-142) requires schools to provide equal protection by means of an Individual Educational Plan (IEP). If goals established by an IEP are different from that of a MCT program and passing a test is a prerequisite for a high school diploma,

the individual school has a legal problem. Section 504 of the Rehabilitation Act of 1973 provides that students may not be excluded from educational programs because of a handicap. The handicapped must be accommodated and, if necessary, on an individual basis. To do otherwise results in the legal situation of discrimination against the exceptional children within the schools.

Instructional accountability implies that the schools have incorporated within their curricula the competency objectives which the competency tests purport to measure. One of the major goals of MCT is the enhancement of students' academic school achievements (Serow, 1980). In order to ascertain the levels of achievements of the students' academic enhancement, the students have to have been more than exposed to the objectives required. Students must have been taught the basic objectives through the use of performance indicators.

To determine the significance of the variables of ethnicity, sex, and school attended, this study will utilize several analytical approaches to the data. The analyses will concentrate on the influences of ethnicity, sex, and school attended relative to scores on the NCMCT's math and reading subtest scores. The scores to be examined represent the eleven minimum math competencies and the ten minimum reading competencies as mandated by the North Carolina minimum competency objectives (see Appendix A).

Hypotheses

Presented below are the overall research and null hypotheses for the present study.

Research Hypotheses

1. A significant difference between ethnic groups exists on NCMCT math and reading scores.

2. A significant difference between males and females exists on NCMCT math and reading scores.

3. A significant difference between school attended exists on NCMCT math and reading scores.

Null Hypotheses

1. No significant difference between ethnic groups exists on NCMCT math and reading scores.

2. No significant difference between males and females exists on NCMCT math and reading scores.

3. No significant difference between school attended exists on NCMCT math and reading scores.

Definitions

Accountability. the process in which an individual, group, or institution is held responsible for pupil achievement, usually measured by means of a test, in this study specifically the NCMCT (Neill, 1978).

Basic Skills. traditional school-taught skills in the areas of reading, writing, and mathematics (Neill, 1978).

Bias. social, cultural, sexual, or ethnical discrimination (Riegle and Lovell, 1980).

Competency. the ends toward which a student's learning is directed; broad statements of general direction or purpose; what to learn and to be able to do (Burns & Klingstedt, 1973).

Competency-Based-Graduation. a program in which the award of a high school diploma is made contingent upon successful accomplishment of specific, pre-specified behaviors, assessed by the NCMCT's cut-off scores (Neill, 1978).

Competency Remediation. students who fail to attain the required minimum standard for graduation in the eleventh grade shall be given remedial instruction and additional opportunities to take the test up to and including the last month of the twelfth grade (Serow, 1980).

Criterion-Referenced Test. a test on which an individual pupil's performance is interpreted in terms of his/her performance on a set of prespecified objectives or competencies (Neill, 1978).

Cut-off Scores. that score which serves to differentiate students who "pass" and "fail"; i.e., math and reading sub-test scores of the NCMCT (Serow, 1980).

First-time Juniors. high school juniors taking the NCMCT at the first opportunity in November of the year 1978-1983 (Serow, 1980).

Life Skills. pupil performances which involve the application of school-learned basic skills to real-life (Neill, 1978).

Minimum Competency Testing. a program in which students are tested to determine their mastery of certain skills defined as essential aspects of school learning or essential aspects for performing tasks routinely confronted in adult life (Neill, 1978).

Performance Indicators. reasonable measures of progress toward the stated goals presented in quantitative measures of achievement (Instructional Services, 1979).

Phase-in Period. the length of time it requires to prepare and to install a new program or policy (Neill, 1978).

Test. a sample of behavior used to make inferences about a pupil's performance on a larger domain of similar behavior (Neill, 1978).

Assumptions and Limitations

Several assumptions for the present study are mentioned below. In addition, several major limitations are noted.

Assumptions

The assumptions made for this study are:

1. The math and reading scores reported represented honest and sincere effort on the part of the individual students to achieve at the highest level possible.
2. The reported scores represented correct student ethnic categorization on the test reporting form.
3. The reported scores represented valid student male/female classifications on the test reporting form.
4. The reported scores represented correct school assignments of students on the test reporting form.
5. The reported scores represented the inclusion of all tested students regardless of their academic placement (e.g. handicapped, exceptional, regular).

Limitations

The following limitations were recognized:

1. The present study represents only juniors from the Robeson County School System.
2. The present study represents only juniors who took the NCMCT at their first opportunity in November of the years covered, 1978-1983.
3. The present study represents only the subtest scores of math and reading of the NCMCT as administered during the years of the present study.

Chapter 2

REVIEW OF RELATED LITERATURE

Research in the area of minimum competency testing is concentrated in six key areas: (a) competency definitions, (b) the measurement of competencies, (c) minimum competencies for students or schools, (d) the legalities in question, (e) bias or discrimination, and (f) the incompetent (Brickell, 1978).

Competency Definitions

MCT is based on the specifications, or definition, of what constitutes competency in a given field. The use of specific behavior objectives for criterion levels of performance which have been established in a hierarchy leading from the simple to the complex fulfills most definitive issues (Burns & Klingstedt, 1973). Chall (1979) agrees that great variation in defining competency exists, and very little agreement on measures of competency exists, and very little agreement on measures of competency to be used exists as well. Bracey (1983) believes that instructional designers and test constructors should review the findings flowing from developmental psychology and cognitive science in order to arrive at more meaningful decisions regarding which skills are truly basic.

Much debate centers around differentiating between basic skills and life skills. The question whether life skills can be measured and whether they can be generally taught prompts Madaus and Airasian (1977)

to react negatively to MCT. To award a diploma for passing a test that measures only a portion of the broad range of materials that should constitute a sound curriculum over twelve years of schooling is unsound. (Pullin, 1981). Spady (1977) likewise challenges the evaluation of students exclusively by such narrow measures.

Measurement of Competencies

A quantity of literature exists in the area of how to measure competencies. A preponderance of the research presents negative views on MCT. Glass (1978) claims that the MCT includes indefensible technology. Items have never been validated as measures of "survival skills" and the pass/fail standards were set mindlessly and capriciously. Resnick and Resnick (1983) state that available evidence suggests that MCT tends to restrict the range of what is taught and thus to lower the standards of education for all but the weakest students.

The purpose of education is to train students to be self-motivated learners. This can not be fully realized as long as the instructional goals are teacher goals. CBE can reduce, or produce, negative psychological effects such as motivation, interests, frustrations, anxiety, and self-concept (Burns & Klingstedt, 1973).

Pipho (1979) reports that no research evidence is available to show that mandated student competency testing programs are working. Frahm and Covington (1979), in their three-month Ford Foundation study, report that after looking at MCT programs in many schools and states, they could see no evidence on the effectiveness of these programs.

Madaus (1981) also presents negative views on MCT. His research emphasizes that basic skills are improving and have been improving even

before the introduction of MCT. He further claims that the MCT is a political, not an educational, response to the misperception that basic skills are declining. In addition, Madaus states that MCT at best gives redundant information about a pupil's ability and that more viable alternatives exist.

On the positive side, Turlington (1979) reports dramatic increases in performance, a growing interest in school, and a positive contribution to the education of minority children as direct results of the performance standards and student tests in Florida.

Findley (1978) believes MCT provides valuable help to those students lacking certain basic skills. These students are identified early and are channeled to special teachers for the school remediation program.

Two views as to what kinds of tests to utilize in MCT are popular. James H. Popham and Ross Taylor support the use of criterion-referenced tests involving test items keyed to locally selected objectives (Neill, 1978). Also, these authors recommend the use of techniques such as observation, questionnaires, or the performance of certain tasks for skills/attitudes which are not adequately measured by competency tests. Donald Ross Green defends the use of norm referenced tests on academic skills but not on survival skills (Neill, 1978).

Minimums for Schools or Students

A competency test that measures adult life-role skills that were never taught in the school (and then is used as a basis for denying a diploma) is arguably as arbitrary as to violate due process of law (McClung, 1978). Piphon (1979) has reported that there does exist a

logical connection between student competency testing and teacher competency testing.

Senator Gary Hart (1978) demands that any legislation that requires proficiency testing, particularly if it includes sanctions against those who fail, should build in protection so that the students alone do not bear the burden of skills mastery. Congruence between the students and the schools is the key term in the study of Popham and Lindheim (1981). This point was elucidated legally by the Florida courts (*Debra P. v. Turlington*, May, 1981).

Flygare (1981) refers to *Anderson v. Banks*, U.S. District Court for the southern district of Georgia, June 17, 1981. Georgia state educators were unable to establish a direct match between the curriculum taught in the schools and the items tested. Consequently, the diploma sanction of passing a MCT was ruled unconstitutional.

Legalities in Question

Legal issues of minimum competency testing derive from federal and state constitutional, statutory, regulatory provisions, and from common law. Federal issues involve equal protection, due process, freedom of belief, and privacy. State concerns revolve around education provisions (Tractenberg, 1979). To date, at least four court cases have surfaced regarding minimum competency testing: *Wells v. Banks* (Georgia), *Hernandez v. Board of Education* (California), *Green v. Hunt* (North Carolina), and *Debra P. v. Turlington* (Florida).

Wise (1978) argues that two major problems are incorporated in MCT: inequality in education which is a political issue, and low academic achievement which falls under a technical issue. He recommends

that the higher levels of government be concerned with the promoting of equality of educational opportunity. The establishment of standards and the operation of schools should be the responsibility of the local boards of education and their professional staffs.

The adequacy of the phase-in periods, the match between the tests and the instruction, past and subsequent discrimination, and the rationale for setting standards have also surfaced as legal challenges to MCT (Down, 1979). Neill (1978) also argues that MCT should be required in the ninth grade. This earlier date allows time to provide serious remediation and additional opportunities.

Bias or Discrimination

Black, Puerto Rican, Chicano, Native American, and low income white children represent the vast educational underclass who are most likely to be affected by test misuse or abuse (Green, 1975). Bias can be attributed to content factors, norming procedures, or testing situations. Frary (1980) also concludes that MCT bias can derive from specific test items, differences in test score distributions across racial or ethnic groups, and the behavior of the individual examinee in choosing among the responses to each item. Haney & Kinyanjui (1979) reinforces the fact that the growing population of MCT may hinder rather than help minority students' opportunity for equal education. Black students still fall far behind their white classmates in terms of test results.

Minority youths do not achieve well in schools because the school culture is alien to them and often in conflict with their home culture (Banks, 1981). Smith (1978) and Serow (1980) are consistent with others

who emphasize that the most studied group of people in our 200 years of freedom from England, the non-white, are still educationally deprived when academic achievement is assessed by traditional techniques. Desegregation has not enhanced positive self-concepts nor has it facilitated marketability in our competitive world of work. The non-white and poor white still find themselves in a middle class, Anglo-Saxon oriented educational system.

Margaret M. Williams (1972) claims that the poverty variable represents four to six times more predictive validity than the race variable. She states that the association between economic level and achievement sharply suggests financial educational aid be expanded to include the economic importance of the families and neighborhoods in which underachieving children live.

Another perspective is presented by Mayeske (1971) in his 1965 study of six racial-ethnic groups (American Native, Mexican, Negro, Puerto Rican, Oriental, White). His results yielded that 24% of the total differences among all students in their academic achievement is the maximum national value that can be associated with their membership in one of the ethnic groups. After a variety of social condition variables, such as the social and economic well-being of the family, the presence or absence of key family members, the student's and parents' aspirations for schooling and future, the percentage decreased to only 1.2%.

Mushkin (1973) sees the answer in an achievement score adjustment. This alternative would serve as complementary to the regular standardized data. An example of this combination is the SIR (sex,

income, race) Index which uses those three categories as control variables.

The United States Supreme Court has ruled that the disproportionate racial impact of a test was not sufficient to establish an unconstitutional racial classification without proof that it reflected a racially discriminatory purpose (Washington v. Davis, 96 S.Ct. 2040 (1976)). The same court did rule that a test can be evidence of discriminatory purpose however.

In addition, the American Psychological Association and the National Education Association have both adopted resolutions that call for the suspension of MCT until the tests can be purged of sociocultural bias (Riegel & Lovell, 1980). Their professional reputations should serve as caution signs to those who overzealously demand MCT.

Originally, MCT did not consider the handicapped student as special. It was expected that all exceptional students would take the tests excluding the most severely retarded. Test modifications would be developed later and/or parents might apply to exempt their handicapped child (McKinney, 1970).

The Incompetent

Whether competency tests are unfair or biased depends on what happens to students who pass or fail the tests. The tests are positive if the incompetent (i.e., those who failed) receive effective instruction to help them master basic skills or competencies (Haney & Kinyanjui, 1979). Competency tests are harmful if incompetent students are allowed to fail without any remediation effort, or with weak remediation.

A period of two to three months should elapse between the end of a remedial or compensatory program and a second testing chance. Otherwise, the loss of achievement that students experience is not allowed to occur and students who do not truly possess the necessary skill levels may "pass" the competency test and be denied further remedial help (Neill, 1978). Serow (1980) amplifies this view by his belief that remediation should be intensive and individual if it is to be effective.

The North Carolina Minimum Competency Testing Program

Research specifically in the area of the North Carolina Minimum Competency Testing Program is very limited. The major studies are Gallagher & Ramsbotham (1978), Serow (1980), and Smith (1978). McKinney (1980) and Serow & Davies (1982) also have published relevant studies.

The NCMCT was developed to measure the two basic skills of reading and math. These skills were chosen because of their essential integration into the school curriculum and of their necessity for minimum functioning in society. As well, they represent two areas around which achievement tests have already been constructed.

The North Carolina Test Commission invited comments and suggestions on the content areas to be tested from a wide variety of people including experts from other communities and states that had already developed competency programs. The MCT's focus was on how basic math and reading skills are applied to practical situations.

Gallagher and Ramsbotham's (1978) study concentrated on the pilot study which yielded data that improved the eventual decisions to be made about the North Carolina Competency Test itself. The pilot study consisted of all eleventh graders in the state divided into three

groups: (1) a reading group (36,000) took three reading competency tests plus the ninth-grade achievement test for reading comprehension; (2) a math group (36,000) took three math competency tests along with the ninth-grade test for arithmetic computation; and, (3) a mixed group (6000) took one reading competency test (the Senior High Assessment of Reading Proficiency) and one math competency test (Test of Proficiency in Computation Skills). The study also included nonpublic schools that received either the math test or the reading test from the mixed package. Schools were assigned either or both of the tests in a randomly distributed format.

The results for the reading tests reflected trends found in earlier statewide assessment programs: females did better than males in reading; minority students scored significantly lower than whites; and students' performance increased dramatically as parental education and estimated family income increased. Performance was poorest in the eastern part of the state, gradually improved across the Piedmont, and was highest in the mountains.

The results for the mathematics tests showed patterns similar to those found in the reading results, but overall performance in math was substantially lower. Males and females had much closer math scores than reading scores. Minority students and low-income students whose parents had little education scored substantially lower than white students and higher income students.

The data analysis reviewed both the percentages of students who passed and the biserial "r" statistic, which allows an individual item to be compared with the total score to see whether it behaves as

expected. About 20% of the items were recommended for replacement or modification on the basis of these analyses.

The Commission also sought to insure that the tests to be recommended are as free of bias as possible. A Cultural Bias Committee reviewed all items on each test administered during the field trial, and those considered to be potentially biased were noted. In the statistical analysis, particular attention was paid to items considered as possibly biased.

Two statistical procedures were used to identify potentially biased items: large differences in an item's P-value (percentage of correct response) from overall test results, and point biserial correlations between an item and total scores for both minority students and for white students. Modification or substitution was suggested for items thus identified.

Smith (1978) examines each of the four arguments against the NCMCT: that the test will result in denial of equal protection of the law, in violation of Title VI of the 1964 Civil Rights Act, and in a denial of both procedural and substantive due process. His conclusions reflect the need for further court interpretation and implementation of the program on a continuous basis.

McKinney's (1980) study of the performance of exceptional students on the NCMCT concluded: (1) procedures used to classify students as handicapped by local schools were inadequate; (2) better guidelines for the use of test modifications were required; and (3) the student characteristics of ability, level, current level of performance in

reading and math, race, and parent education were related to successful performance on the test.

Serow (1980) reports on attempts to determine whether the remedial instruction provided to high school students who failed one or both sections of the NCMCT have resulted in improved performance on subsequent tests. The results indicate that remedial instruction can not be expected to produce broadly-based gains in students' Competency Test performances. Its effectiveness is likely to be influenced by some combination of factors which include subject area, instructional format, volume of remediation, pupil race and exceptionality, and the semester in which remediation is offered.

Serow points out that the NCMCT program incorporates provisions for the exclusion of the handicapped and/or exceptional children providing they meet the eligibility standards. North Carolina, as well, offers procedural modifications such as braille, large print, extended length of time, permission to work in test booklets rather than IBM answer sheets, sign language instruction, recording of answers by a proctor, and audio-cassette recordings of the instructions.

Serow and Davies (1982) examined equality of educational opportunity within MCT as analyzed in terms of the distribution of outcomes, availability of remediation, and effectiveness of remediation for Blacks and Whites. This study reviewed the data from the first three semesters of the NCMCT (fall 1978 to fall 1979) via a sample of 1731 subjects. On the basis of data from this sample, from the state-wide program in North Carolina, and from other states, the authors

conclude that it is obvious that the outcomes of competency testing are not equitably distributed by race.

Chapter 3

DESIGN OF THE STUDY

In this chapter, the research design is discussed and the subjects of the study are described. In addition, the instrument used for collecting data is examined and its reliability and validity are explored. The statistical procedures which were employed in the analysis of the data are also discussed.

Description of Research Design and Subjects

The purpose of this study involves three objectives: (1) to discover whether any significant differences exist in NCMCT scores due to ethnicity; (2) whether any significant differences in NCMCT scores exist due to sex; and, (3) whether any significant differences exist in NCMCT scores due to school attended. To determine school attended, ethnicity, sex, and to obtain test scores, a request was issued to all secondary school counselors in the Robeson County School System (see Appendix B). This request was reinforced by a direct letter to the counselors from Robeson County Superintendent Purnell Swett (Appendix C). Neither of these two communications yielded complete results. The total of 2681 subjects represents a sample reflecting 51.03% of the total population (see Appendix D).

Subjects for this investigation represented the six high schools of the Robeson County School System (see Table 1). It should be noted that two of the present high schools in this system are consolidations of five previously individual high schools. The sample population does represent these preconsolidated high schools in order to obtain a geographical and ethnic balance. These subjects were all juniors taking the NCMCT for the first time.

To determine whether a significant difference exists in NCMCT subtest scores on math and reading, relationships were explored for the following significances:

1. Ethnicity and NCMCT math scores
2. Ethnicity and NCMCT reading scores
3. Sex and NCMCT math scores
4. Sex and NCMCT reading scores
5. School attended and NCMCT math scores
6. School attended and NCMCT reading scores
7. Pass/fail rates on the NCMCT and ethnicity
8. Pass/fail rates on the NCMCT and sex
9. Pass/fail rates on the NCMCT and school attended

Data Gathering Instrument

The instrument used in this study to obtain scores was the North Carolina Minimum Competency Test. Presented below is as detailed an examination as could be ascertained for this instrument.

North Carolina Minimum Competency Test

The subjects' competency test scores were determined through the administration of the North Carolina Minimum Competency Test. The

Table 1

Subjects by School and Year

| SCHOOL | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | TOTAL | PERCENTAGE |
|--------------------|------|------|------|------|------|------|-------|------------|
| Littlefield | 20 | 75 | 113 | 104 | 89 | 93 | 494 | 18.4 |
| Magnolia | | 65 | 80 | 84 | 96 | 94 | 419 | 15.6 |
| Orrum | 95 | 87 | 104 | 82 | 80 | 80 | 528 | 19.7 |
| South Robeson | 170 | 92 | 85 | 121 | | 127 | 595 | 22.2 |
| West Robeson | | | | | | 406 | 406 | 15.2 |
| Parkton | | 49 | 56 | 47 | 50 | 37 | 239 | 8.9 |
| Totals | 285 | 368 | 438 | 438 | 315 | 837 | 2681 | 100.0 |
| Percentage by Year | 10.6 | 13.7 | 16.4 | 16.4 | 11.7 | 31.2 | 100.0 | |

NCMCT is a minimum competency test developed for use in North Carolina. Its major objective is to identify weak students and not to measure the complete spectrum of an individual's ability.

The NCMCT consists of the subtests of reading and mathematics. These two areas were selected because they represent both the total curriculum and minimal functioning in society. Appendix A lists the main objectives of the NCMCT's subtests.

The NCMCT's cut-off scores are 87 out of 120 (72%) for the reading subtest and 77 out of 120 (64%) for the math subtest. Cut-off scores were determined by the North Carolina Competency Test Commission following a series of studies prior to the first actual administration of the test in 1978. These studies included trial competency test results, input from teachers of exceptional pupils, specialists in reading and mathematics, and several statistical studies (Serow, 1980).

Reliability and Validity. Traditional test statistics for the NCMCT have not been published because of its stated purpose of identifying the performance of students who were at, or near, the cut-off scores.

William J. Brown (1983), Special Assistant for Testing of the North Carolina Department of Public Instruction, states, relative to the NCMCT: "In looking at a test of 120 items a KR-20 reliability coefficient would surely be in the mid-90's by virtue of the length of the test." Reliability refers to consistent results when repeated use with similar kinds of students are measured.

Brown also purports that the NCMCT's validity "would be determined by its value in screening out students who are deficient in basic

skills." Remediation teachers have attested to this measure of validity according to Brown (see Appendix E).

Validity refers to how well test items represent the performance domain that a test purports to measure. Brown's claim relative to the NCMCT's content validity is not substantiated by Serow's (1980) study of remediative results in North Carolina.

Serow attempted to determine whether the remedial instruction provided to high school students who failed one or both sections of the NCMCT have resulted in improved performance on subsequent tests. Separate data were gathered for three semesters: Fall (1978), Spring (1979), and Fall (1979). Information was provided on the average amount of weekly remediation offered to pupils, and the type of instructional format used (individual, large group, etc.). The background on students' race, sex, handicap, and parents' education was also provided.

Serow's results indicated that remedial instruction can not be expected to produce broad gains in students' competency test performances. Its effectiveness is likely to be influenced by some combination of factors which include subject area, instructional format, volume of remediation, pupil race and exceptionality, and the semester in which remediation is offered. If remediation in the later stages of the test program is to be effective, it should be intensive and offered individually or in very small groups. Even if these goals are accomplished, no guarantee of success exists.

Statistical Procedures

Data gathered from the administration of the NCMCT consisted of numerical scores for both the math and reading subtests. The initial

procedure was to group the scores for each subtest into categories of ethnic group, sex, and school attended. The procedure followed to accomplish this was by use of a frequency distribution count. The presence of errors was removed prior to the analysis of the data. Also the removal of confounding variables resulted in varying totals within the analyses. As well, different numbers of subjects took the subtests of the NCMCT.

To determine the presence of significant differences in NCMCT scores due to the variables of ethnicity, sex, and school attended, a series of F tests were employed. The F tests were administered separately to the math variable by ethnicity, sex, and school attended. In addition, F tests were administered separately to the reading variable by ethnicity, sex, and school attended.

To ascertain precisely the presence of significant difference determined by the series of F tests, the Scheffe Multiple Range Test for Groups was utilized on both math and reading score variables.

In addition, to determine the presence of significant differences within pass/fail rates on the NCMCT due to the factors of ethnicity, sex, and school attended, chi square tests of significance were computed for reading and math pass/fail rates controlling for the three variables. The computer program of data analysis for the present study required a .001 level of significance for the rejection of the null hypotheses. This level was set arbitrarily prior to the data analysis in order to ascertain the highest possible significance. The subsequent results reinforced the usage of this level of significance.

Summary

A total of 2681 high school juniors from the Robeson County School System were employed for this study to discover if any significant differences existed within NCMCT scores on reading and math due to the variables of ethnicity, sex, and school attended. Test scores were determined by the NCMCT for the years 1978-1983. In addition, only juniors who took the test for the first time during the fall administrations were included in this study.

The presence of significant differences between the test scores of math and reading and the stated variables was determined through the use of F tests, chi square tests of significance, and the Scheffe Multiple Range Test of Significance among Groups. The .001 level of significance was employed for the rejection of the null hypotheses in the F tests and the chi square tests of significance. The .05 level of significance was employed for the Scheffe Multiple Range Test of Significance among Groups in order to reject the null hypotheses.

Chapter 4

DATA ANALYSIS

The results of the F tests are presented for all NCMCT math and reading scores. The variables of ethnicity, sex, and school attended were shown to have a significant influence on the scores at the .001 level of significance.

Math Score Variable

Ethnicity

A significant difference was found to exist in math test scores when the ethnic variable was tested (see Table 2). The difference was shown to be significant at the .001 level of significance. For the difference between the NCMCT math scores and the ethnic variable, the null hypothesis was rejected.

In order to determine the precise location of significant difference, examination of the data by the Scheffe Multiple Range Test of Significance among Groups was employed. The Scheffe Test disclosed that a significant difference existed between the American Native group and the Caucasian group at the .05 level of significance. Also, a significant difference existed between the Afro-American group and the Caucasian group at the .05 level of significance. No significant difference existed between the American Native group and the Afro-American group at the .05 level of significance (see Table 3).

Table 2

F Ratio of Math Variable by Ethnic Group

| Source | Sum of Squares | df | Mean Squares | F | .001 |
|----------------|----------------|------|--------------|-------|-------|
| Between Groups | 40445.538 | 2 | 20222.769 | 49.87 | 0.001 |
| Within Groups | 1056798.130 | 2606 | 405.525 | | |

Table 3

Scheffe Multiple Range Test for Math Variable

Comparisons Among Groups

| Group | Number | Mean | Standard Deviation | Error |
|-----------------|--------|---------------|--------------------|-----------|
| Caucasian | 958 | 96.0939 | 19.0122 | 0.6143 |
| American Native | 1149 | 88.7467 | 20.4953 | 0.6046 |
| Afro-American | 502 | 86.5916 | 21.3600 | 0.9533 |
| Totals | 2609 | 91.0299 | 20.5108 | 0.4016 |
| | | Afro-American | American Native | Caucasian |

Afro-American

American Native

Caucasian

*

*

* Denotes pairs of groups significantly different at the 0.05 level

The present study reveals that the American Native and Afro-American have a decided disadvantage in taking the NCMCT math subtest.

Variable of Sex

No significant difference was found to exist between the variable of sex on NCMCT math scores. This lack of significant difference implies that both males and females have equal opportunities on the NCMCT's math subtest without discrimination of variable of sex (see Table 4).

Variable of School Attended

A significant difference was found to exist between school attended on the NCMCT's math subtest scores. The difference between school attended on math scores was shown to be significant at the .001 level of significance (see Table 5).

Reading Score Variable

Ethnicity

A significant difference was found to exist between ethnic groups on the NCMCT's reading scores. The difference between ethnic groups on reading scores was shown to be significant at the .001 level of significance. For the significant difference between ethnic groups on the NCMCT's reading scores, the null hypothesis was rejected at the .001 level of significance (see Table 6).

In order to ascertain the precise location of the significant difference, examination of the data by the Scheffe Multiple Range Test of Significance among Groups employed. This analysis disclosed that significant differences in NCMCT's reading scores existed between all three ethnic groups at the .05 level of significance (see Table 7).

Table 4

F Ratio of Math Variable by Sex

| Source | Sum of Squares | df | Mean Squares | F | Level of Significance |
|----------------|----------------|------|--------------|-------|-----------------------|
| Between Groups | 1.866 | 1 | 1.866 | 0.004 | 0.9469 |
| Within Groups | 1097494.100 | 2608 | 420.818 | | |

Table 5

F Ratio of Math Variable by School

| Source | Sum of Squares | df | Mean Squares | F | Level of Significance |
|----------------|----------------|------|--------------|--------|-----------------------|
| Between Groups | 27228.030 | 5 | 5445.606 | 13.225 | <0.001 |
| Within Groups | 1069395.088 | 2597 | 411.781 | | |

Table 6

F Ratio of Reading Variable by Ethnic Group

| Source | Sum of Squares | df | Mean Squares | F | Level of Significance |
|----------------|----------------|------|--------------|--------|-----------------------|
| Between Groups | 33652.965 | 2 | 16826.483 | 60.482 | <0.001 |
| Within Groups | 728062.155 | 2617 | 278.205 | | |

Variable of Sex

A significant difference was found to exist between males and females on the NCMCT's reading scores (see Table 8). The difference between male and female scores on reading was shown to be significant at the .001 level of significance. The null hypothesis was rejected at the .001 level of significance.

Variable of School Attended

A significant difference was found to exist between school attended on the NCMCT's reading scores. The difference between school attended on reading scores was shown to be significant at the .001 level of significance (see Table 9). The null hypothesis was rejected at the .001 level of significance.

Math Pass/Fail Ratios

The results of the chi square tests of significance are presented for all variables. Supplementary data relative to the chi square tests of significance may be found in Tables 14, 15, 16, and 17.

Variable of Ethnicity

The chi square ratio of ethnic groups and math pass/fail rates was shown to be significant between groups at the .001 level of significance (see Table 10). Further analysis of the data reveals that no significant relationship exists between males and females within any of the ethnic groups (see Table 15). Yet, Table 16 depicts that males did display significant relationships in pass/fail rates.

Table 7
Scheffe Multiple Range Test for Reading Score
Comparisons among Groups

| Group | Number | Mean | Standard Deviation | Error |
|-----------------|--------|--------|--------------------|--------|
| Caucasian | 958 | 103.81 | 14.7399 | 0.4762 |
| American Native | 1156 | 97.27 | 17.5086 | 0.5150 |
| Afro-American | 506 | 94.98 | 18.1309 | 0.8060 |
| Totals | 2620 | 99.22 | 17.0534 | 0.332 |

| | Afro-American | American Native | Caucasian |
|-----------------|---------------|-----------------|-----------|
| Afro-American | | | |
| American Native | * | | |
| Caucasian | * | * | |

* Denotes pairs of groups significantly different at the 0.05 level

Table 8

F Ratio of Reading Variable by Sex

| Source | Sum of Squares | df | Mean Squares | F | Level of Significance |
|----------------|----------------|------|--------------|--------|-----------------------|
| Between Groups | 3293.705 | 1 | 3293.705 | 11.392 | 0.001 |
| Within Groups | 756928.522 | 2618 | | | |

Table 9

F Ratio of Reading Variable by School

| Source | Sum of Squares | df | Mean Square | F | Level of Significance |
|----------------|----------------|------|-------------|--------|-----------------------|
| Between Groups | 23640.463 | 5 | 4728.093 | 16.724 | <0.001 |
| Within Groups | 736203.066 | 2604 | 282.720 | | |

Table 10

Chi Square Ratios of Math Pass/Fail Rates for Ethnicity

| Group Comparison | df | χ^2 | Level of Significance |
|------------------|----|----------|-----------------------|
| Total Groups | 2 | 73.97 | <.001 |

| Count Row Pct Col Pct Tot Pct | Caucasian | American Native | Afro- American | Row Total |
|--|-----------------------------|-----------------------------|-----------------------------|---------------|
| Fail | 256 26.4 26.7 9.8 | 481 49.6 41.9 18.4 | 233 24.0 46.4 8.9 | 970 37.2 |
| Pass | 702 42.8 73.3 26.9 | 668 40.8 58.1 25.6 | 269 16.4 53.6 10.3 | 1639 62.8 |
| Column Total | 958 36.7 | 1149 44.0 | 502 19.2 | 2609 100.0 |

Variable of Sex

The chi square ratio of males and females on math pass/fail rates was shown not to be significant at the .001 level of significance (see Table 11). This lack of significant relationship implies that being male or female should not have a significant relationship on whether individual NCMCT math scores will be passing or failing.

Reading Pass/Fail Ratios

Variable of Ethnicity

The chi square ratio of ethnic groups pass/fail rates was shown to be significant among total groups at the .001 level of significance (see Table 12). Also, the chi square ratio of reading pass/fail rates for ethnicity controlling for sex was shown to be significant among the American Native ethnic group at the .001 level of significance (see Table 16). The Caucasian and Afro-American ethnic groups' pass/fail rates were found not to be significant at the .001 level of significance (see Table 17). The data imply that being a Caucasian or Afro-American will not influence pass/fail chances on the reading subtest of the NCMCT.

Variable of Sex

The chi square ratio of the NCMCT's reading pass/fail rates for the males and females was shown to be significant among total males and females at the .001 level of significance (see Table 13 and 14). The chi square ratio of reading pass/fail rates was shown to be significant among female subjects at the .001 level of significance (see Table 16). The chi square ratio of reading pass/fail rates among males was shown, as well, to be significant at the .001 level of significance.

Table 11

Chi Square Ratios of Math Pass/Fail Rates for Sex

| Sex Comparisons | df | χ^2 | Level of Significance |
|-------------------------|----|----------|-----------------------|
| Total Male-Female Group | 1 | 0.095 | 0.7575 |

| | Count | | | |
|--------------|---------|--------|------|-----------|
| | Row Pct | Female | Male | Row Total |
| | Col Pct | | | |
| | Tot Pct | | | |
| Fail | | 496 | 474 | 970 |
| | | 51.1 | 48.9 | 37.2 |
| | | 37.5 | 36.8 | |
| | | 19.0 | 18.2 | |
| Pass | | 827 | 813 | 1640 |
| | | 50.4 | 49.6 | 62.8 |
| | | 62.5 | 63.2 | |
| | | 31.7 | 31.1 | |
| Column Total | | 1323 | 1287 | 2610 |
| | | 50.7 | 49.3 | 100.0 |

Table 12

Chi Square Ratios of Reading Pass/Fail Rates for Ethnicity

| Group Comparison | df | χ^2 | Level of Significance |
|------------------|----|----------|-----------------------|
| Total Groups | 2 | 28.07 | <.001 |

| Count | Caucasian | American Native | Afro-American | Row Total |
|--------------|-----------|-----------------|---------------|-----------|
| Fail | 55 | 137 | 64 | 256 |
| Row Pct | 21.5 | 53.5 | 25.0 | 9.8 |
| Col Pct | 5.7 | 11.9 | 12.6 | |
| Tot Pct | 2.1 | 5.2 | 2.4 | |
| Pass | 903 | 1019 | 442 | 2364 |
| Row Pct | 38.2 | 43.1 | 18.7 | 90.2 |
| Col Pct | 94.3 | 88.1 | 87.4 | |
| Tot Pct | 34.5 | 38.9 | 16.9 | |
| Column Total | 958 | 1156 | 506 | 2620 |
| Row Pct | 36.6 | 44.1 | 19.3 | 100.0 |

Table 13

Chi Square Ratios of Reading Pass/Fail Rates for Sex

| Sex Comparison | df | χ^2 | Level of Significance |
|-------------------------|----|----------|-----------------------|
| Total Male-Female Group | 1 | 26.76 | <.001 |

| | Count | Female | Male | Row Total |
|--------------|-------|--------|-------|-----------|
| Fail | 90 | 165 | 255 | |
| | 35.3 | 64.7 | 9.7 | |
| | 6.8 | 12.8 | | |
| | 3.4 | 6.3 | | |
| Pass | 1243 | 1122 | 2365 | |
| | 52.6 | 47.4 | 90.3 | |
| | 93.2 | 87.2 | | |
| | 47.4 | 42.8 | | |
| Column Total | 1333 | 1287 | 2620 | |
| | 50.9 | 49.1 | 100.0 | |

Table 14

Math Pass/Fail Rates by Ethnicity Controlling for Sex

| MATH | Pass | Fail | Total | Percentage | χ^2 | Level of Significance |
|---------------|------|------|-------|------------|----------|-----------------------|
| Female: | | | | | 28.16 | .001 |
| Caucasian | 344 | 139 | 483 | 36.5 | | |
| Am. Native | 363 | 249 | 612 | 46.3 | | |
| Afro-American | 119 | 108 | 227 | 17.2 | | |
| Male: | | | | | 48.75 | .001 |
| Caucasian | 358 | 117 | 475 | 36.9 | | |
| Am. Native | 304 | 232 | 536 | 41.7 | | |
| Afro-American | 150 | 125 | 275 | 21.4 | | |
| Totals | 1638 | 970 | 2608 | 100.0 | | |

Table 15

Math Pass/Fail Rates by Sex Controlling for Ethnicity

| MATH | | Female | Male | Total | Percentage | χ^2 | Level of Significance |
|-----------------|------|--------|------|-------|------------|----------|-----------------------|
| Caucasian | Pass | 344 | 358 | 702 | 73.3 | 1.897 | .1684 |
| | Fail | 139 | 117 | 256 | 26.7 | | |
| American Native | Pass | 363 | 304 | 667 | 58.1 | 0.689 | .4066 |
| | Fail | 249 | 232 | 481 | 41.9 | | |
| Afro-American | Pass | 119 | 150 | 269 | 53.6 | 0.148 | .7005 |
| | Fail | 108 | 125 | 233 | 46.4 | | |

Table 16

Reading Pass/Fail Rates by Ethnicity Controlling for Sex

| READING | Pass | Fail | Total | Percentage | X ² | Level of Significance |
|---------------|------|------|-------|------------|----------------|-----------------------|
| Female: | | | | | 10.69 | 0.0048 |
| Caucasian | 463 | 21 | 484 | 36.3 | | |
| Am. Native | 573 | 44 | 617 | 46.3 | | |
| Afro-American | 206 | 25 | 231 | 17.3 | | |
| Male: | | | | | 24.49 | .001 |
| Caucasian | 440 | 33 | 473 | 36.8 | | |
| Am. Native | 445 | 93 | 538 | 41.8 | | |
| Afro-American | 239 | 39 | 278 | 21.4 | | |
| Totals | 2366 | 255 | 2621 | 100.0 | | |

Table 17

Reading Pass/Fail Rates by Sex Controlling for Ethnicity

| READING | | Female | Male | Total | Percentage | X^2 | Level of Significance |
|-----------------|------|--------|------|-------|------------|-------|-----------------------|
| Caucasian | Pass | 463 | 440 | 903 | 94.4 | 2.650 | .1035 |
| | Fail | 21 | 33 | 54 | 5.6 | | |
| American Native | Pass | 573 | 445 | 1018 | 88.1 | 27.39 | .001 |
| | Fail | 44 | 93 | 137 | 11.9 | | |
| Afro-American | Pass | 206 | 236 | 442 | 87.4 | .9962 | .3182 |
| | Fail | 25 | 39 | 64 | 12.6 | | |

Summary of Analysis

The following is a summary of the significant differences which were identified by the use of the F test of significance, the Scheffe Multiple Range Test of Significance among Groups, and the chi square test of significance.

1. F Test of Significance (.001 level of significance)

(a) A significant difference was found between ethnic groups on the NCMCT's math scores.

(b) No significant difference was found between males and females on the NCMCT's math scores.

(c) A significant difference was found between school attended on the NCMCT's math scores.

(d) A significant difference was found between ethnic groups on the NCMCT's reading scores.

(e) A significant difference was found between school attended on the NCMCT's reading scores.

2. Scheffe Multiple Range Test of Significance among Groups

(.05 level of significance)

(a) A significant difference was revealed between the Caucasian and American Native ethnic grouped on the NCMCT's math scores with the Caucasian group mean being significantly higher.

(b) A significant difference was revealed between the Caucasian and Afro-American ethnic groups on the NCMCT's math scores with the Caucasian group mean being significantly higher.

(c) No significant difference was revealed between the American Native and Afro-American ethnic groups on the NCMCT's math scores.

(d) A significant difference was revealed between the Caucasian and American Native ethnic groups on the NCMCT's reading scores with the Caucasian group mean being significantly higher.

(e) A significant difference was revealed between Caucasian and Afro-American ethnic groups on the NCMCT's reading scores with the Caucasian group mean being significantly higher.

(f) A significant difference was revealed between the Afro-American and American Native ethnic groups on the NCMCT's reading scores with the American Native group mean being significantly higher.

3. Chi Square Test of Significance (.001 level of significance)

(a) A significant relationship was found between ethnic groups on the NCMCT's math scores in pass/fail rates.

(b) A significant relationship was found between males and females on the NCMCT's math scores in pass/fail rates.

(c) A significant relationship was found between ethnic groups on the NCMCT's reading scores in pass/fail rates.

(d) A significant relationship was found between males and females on the NCMCT's reading scores in pass/fail rates.

Chapter 5

SUMMARY AND CONCLUSIONS

In this chapter, the results of the study are summarized and conclusions are drawn. In addition, the problem addressed by the study is restated and the procedure is described. Finally, recommendations for further investigations are suggested.

Restatement of the Problem

The goals of this study were to answer the questions of whether or not any significant difference in the North Carolina Minimum Competency Test reading and math scores exists relative to the variables of ethnicity, sex, and school attended. The null hypotheses for all differences under investigation stated that no significant differences in the NCMCT reading and math scores exist relative to the variables of ethnicity, sex, and school attended. The significance level was set at the .001 level to reject the null hypotheses employing the F test and the chi square test of significance. The significance level was set at the .05 level to reject the null hypotheses using the Scheffe Multiple Range Test of Significance among Groups.

Description of Procedure

Subjects for this study were selected from the Robeson County School System. The resultant N was 2687. The subjects' ethnicity, sex, and school attended variables were determined by the information recorded at the time of their taking the NCMCT. The NCMCT was taken as a prerequisite for graduation with a diploma.

Scores on the NCMCT were divided into the two basic areas of reading and math. Scores on the math and reading subtests were grouped according to the variables of ethnicity, sex, and school attended. Irrelevant effects and errors were removed prior to the analysis of the data by F test, chi square tests, and the Scheffe test.

Major Findings

Presented below are the major findings for each of the variables of reading and math scores, and the effects of the variables of ethnicity, sex, and school attended. These findings are discussed in relationship to the purposes and objectives of the NCMCT and to the impact of these findings on students, teachers, and the North Carolina school system as a whole. Implications are also of importance to the minimum competency movement nationally.

Ethnicity Variable

The present study has shown that the American Native and the Afro-American ethnic groups' scores are significantly different on the math subtest. This study also has shown that a significant difference does exist between ethnicity and the reading subtest scores. Likewise, the pass/fail rates on the NCMCT are significantly different relative to ethnicity. The major inference exists that ethnic classification and scores on the NCMCT are related.

Sex Variable

No significant difference was found to exist in NCMCT math scores relative to the variable of sex. Yet, a significant difference was

found to exist between NCMCT reading scores and the variable of sex. Chi square tests of significance disclosed that sex also influences a student's passing or failing the North Carolina Minimum Competency Test with females' chances of failing being ten times greater than males.

School Attended

The high school attended by an individual student was shown to be significantly influential in his/her math and reading scores. The Robeson County School System's high schools are all tri-racial in student composition. However, each high school may be composed of different percentages of Caucasian, American Native, and Afro-American students.

Conclusions

The questions under investigation in this study seem to have been answered in the affirmative. Significant differences do exist between North Carolina Minimum Competency Test scores and the variables of ethnicity, sex, and school attended.

Tests of minimum competency do not cause failure nor increase its frequency; they only lead to the recognition of it (Ebel, 1978). The North Carolina Minimum Competency Test has done such in the Robeson County School System. The data presented in this study establish the fact that significant differences do exist between the scores that an individual student makes on the North Carolina Minimum Competency Test and the variables of ethnicity, sex, and school attended.

Recommendations for Further Investigation

Future researchers in the area of minimum competency generally, and the North Carolina Minimum Competency Test specifically, should consider the following points:

1. Information regarding the minimal competencies that are common to, and those that are unique to, affected curricula should be obtained so that appropriate lead time can be allowed for the various curricula to reflect the desired competencies, and the variations in defining "competencies."

2. Schools should encourage the development of new modes of assessment and the further refinement of methods already developed. Tests to be used in the program should be validated with regard to how well they differentiate groups known, independently of the test under consideration, to have attained the competencies from groups known not to have attained the competencies.

3. Schools should sponsor more precise comparative studies of the long-range effects of Competency-Based-Education programs as compared with more traditional forms of education, as well as subgroups of students.

4. Competency tests should be modified or discarded for some exceptional children, such as Trainable Mentally Retarded students, and careful consideration should be given as to how exceptional students' scores on the North Carolina Minimum Test are to be treated, and how exceptional children's diploma/certificate status is to be defined.

5. An earlier testing time (perhaps the ninth grade) would increase the amount of time that can be given to those students needing remediation.

6. Research is needed relative to the North Carolina Minimum Competency Test's validity and reliability.

7. As it is unethical to change the requirements for a diploma for those students who have difficulty passing the competency test, denial of diplomas should not be based solely on competency test results without evidence that the issues and problems have been addressed satisfactorily.

8. A more effective inservice program needs to be developed pertaining to the uses of the North Carolina Minimum Competency Test.

9. Studies are needed to provide evidence that the North Carolina Superintendent of Public Instruction's mission statement is really being accomplished.

REFERENCES

REFERENCES

- Airasian, Peter., Madaus, G.F., & Pedulla, J.J. Minimal competency testing. Englewood Cliffs, N.J.: Educational Technology Publishing, 1979.
- Anderson, Barry D. & Lesser, Philip. The costs of legislated minimum competency requirements. Phi Delta Kappan, 1978, 59, 606-608.
- Banks, James A. Multi-ethnic education: theory and practice. Boston: Allyn & Bacon, 1981.
- Beal, Barry B. Denver, Colorado: a 17-year-old minimum competency program. Phi Delta Kappan, 1978, 59, 610-611.
- Beckham, Joseph. Legal implications of minimum competency testing. Bloomington, Indiana: Phi Delta Kappa Educational Foundation, 1978.
- Bracey, Gerald W. On the compelling need to go beyond minimum competency. Phi Delta Kappan, 1983, 64, 717-721.
- Bracey, Gerald W. Some reservations about minimum competency testing. Phi Delta Kappan, 1978, 59, 549-553.
- Brand, Werner E. Competencies possessed by secondary school students and college studies in... (Doctoral dissertation, University of Michigan, 1952). Ann Arbor: University of Michigan Press, 1952.
- Brickell, Henry. Seven key notes on minimum competency testing. Phi Delta Kappan, 1978, 59, 589-591.
- Brodinsky, Ben. Back to the basics: the movement and its meaning. Phi Delta Kappan, 1977, 58, 522-527.
- Brolin, Donn E. (Ed.). Life centered career education: a competency based approach. Reston, Virginia: Council for Exceptional Children, 1978.
- Brown, William J. Personal communication, October 28, 1983.
- Burns, Richard & Klingstedt, Joe Lars. (Eds.). Competency-based education: an introduction. Englewood Cliffs, N.J.: Educational Technology Publishing, 1973.
- Candor-Chandler, Catherine. Charleston, West Virginia: competency requirements for special educational students. Phi Delta Kappan, 1978, 59, 611-612.

- Cawelti, Gordon. National competency testing: a bogus solution. Phi Delta Kappan, 1978, 59, 619-621.
- Cawelti, Gordon. Requiring competencies for graduation: some curricular issues. Educational Leadership, 1977, 35, 86-91.
- Chall, Jeanne S. Minimum competency in reading: an informal survey of the states. Phi Delta Kappan, 1979, 60, 351-352.
- Coffman, William E. An exploratory study of group differences in the performance of pupils in grades 6, 7, 8, & 9 on items in the Iowa Test of Basic Skills. Paper presented at the Annual Meeting of the National Council of Measurement in Education, Toronto, March, 1978.
- Cook, J. Marvin. The D.C. school's plan for systemwide achievement. Educational Leadership, 1977, 35, 114-117.
- Down, A. Graham. Implications of minimum-competency testing for minority students. Paper presented at the Annual Meeting of the National Council on Measurement in Education, San Francisco, April, 1979.
- Ebel, Robert L. The case for minimum competency testing. Phi Delta Kappan, 1978, 59, 546-549.
- Enochs, James C. Modesto, California: a return to the four r's. Phi Delta Kappan, 1978, 59, 609-610.
- Farr, Roger & Olshavsky, Jill E. Is minimum competency testing the appropriate solution to the SAT decline? Phi Delta Kappan, 1980, 61, 528-531.
- Findley, Jim. Westside's minimum competency graduation requirements: a program that works. Phi Delta Kappan, 1978, 59, 614-618.
- Fisher, Thomas H. Florida's approach to competency testing. Phi Delta Kappan, 1978, 59, 599-602.
- Flygare, Thomas J. Graduation competency testing fails in Georgia. Phi Delta Kappan, 1981, 63, 134-135.
- Frahm, Robert & Covington, Jimmie. What's happening in minimum competency testing? Phi Delta Kappan, 1979, 60, 123-125.
- Frary, Robert B. & Giles, Mary B. Multiple-choice test bias due to answering strategy variation. Paper presented at the Annual Meeting of the American Educational Research Association, Boston, April, 1980.
- Gallagher, James J. & Ramsbotham, Ann. Developing North Carolina's competency testing program. School Law Bulletin, 1978, 9, 1-9.

- Glass, Gene V. Matthew Arnold and minimum competency. Educational Forum, 1978, January, 139-144.
- Glass, Gene V. Minimum competence and incompetence in Florida. Phi Delta Kappan, 1978, 59, 602-605.
- Green, Robert L. Standardized achievement testing: some implications for the lives of children. Paper presented to the National Institute of Educational Test Bias Conference, Washington, D.C., December, 1975.
- Hall, Gene E. & Jones, Howard L. Competency-based education: a process for the improvement of education. Englewood Cliffs, N.J.: Prentice-Hall, 1976.
- Haney, Walt & Kinyanjui, Kabiru. Competency testing and equal educational opportunity. IRCD Bulletin, 1979, 14, No. 2.
- Hart, Gary K. The California pupil proficiency law as viewed by its author. Phi Delta Kappan, 1978, 59, 592-596.
- Henderson, Donald J. Gary, Indiana: high school diplomas with meaning. Phi Delta Kappan, 1978, 59, 613-614.
- Holthouse, Norman. Achievement, social class, and the summer vacation: the effect of the summer vacation on the reading, math and language arts achievement of students from various socio-economic backgrounds. National Institute of Education, 1976, January, 1-48.
- Hornbeck, David W. Maryland's "project basic." Educational Leadership, 1977, 35, 98-101.
- Horton, Lowell. Mastery learning. Bloomington, Indiana: Phi Delta Kappa Educational Foundation, 1981.
- Huff, Marilyn. A board member looks at required competencies for graduation. Educational Leadership, 1977, 35, 108-113.
- Instructional Services: North Carolina Department of Public Instruction. Competency goals and performance indicators K-12, 2nd Ed. Raleigh: Department of Public Instruction, 1979.
- Jaeger, Richard M. & Tille, Carol K. (Eds.). Minimum competency achievement testing: motives, models, measures, and consequences. Berkeley: McCutchan Publishing Corporation, 1980.
- Lerner, Barbara. The minimum competency movement: social, scientific, and legal implications. American Psychologist, 1981, 36, 1057-1065.
- Madaus, George F. NIE clarification hearing: the negative team's case. Phi Delta Kappan, 1981, 63, 92-94.

- Madaus, George F. & Airasian, Peter. Issues in evaluating student outcomes in competency-based graduation programs. Journal of Research and Development in Education, 1977, 79-91.
- Mager, Robert F. Preparing instructional objectives. Palo Alto: Fearon, 1962.
- Mayeske, George. On the explanation of racial-ethnic group differences in achievement test scores. Paper presented at the American Psychological Association Convention, Washington, D.C., September, 1971.
- McCandless, Boyd R. & Roberts, Albert. Teacher's marks, achievement test scores, and aptitude relative with respect to social class, race, and sex. Journal of Educational Psychology, 1972, 63, 153-159.
- McClung, Merle. Are competency testing programs fair? legal? Phi Delta Kappan, 1978, 59, 397-400.
- McClung, Merle. Competency testing: potential for discrimination. Clearinghouse Review, 1977, 439, 440-448.
- McKinney, James D. Performance of exceptional students on the North Carolina Minimum Competency Test, 1978-1979. Final Report. Chapel Hill: University of North Carolina Press, 1980.
- Mecklenburger, Jim. Minimum competency testing: the bad penny again. Phi Delta Kappan, 1978, 59, 697-699.
- Mushkin, Selma J. A proposal for a "SIR" adjusted index of educational competence. Washington: Georgetown University, Public Services Lab, 1973.
- NAACP may file suit charging Florida proficiency test discriminating. School Law News, 1978, 6, 2.
- Nance, W.R. How fares competency development in Oregon? Educational Leadership, 1977, 35, 102-107.
- Nathan, Joe & Jennings, Wayne. Educational bait-and-switch. Phi Delta Kappan, 1978, 59, 621-625.
- National Association of Secondary School Principals. Competency tests and graduation requirements. Reston, Virginia: National Association of Secondary School Principals, 1976.
- Neill, Shirley Boes. The competency movement: problems and solutions. Sacramento: Education News Service for the American Association of School Administrators, Arlington, Virginia, 1978.
- Parnell, Dale. The case for competency-based education. Bloomington, Indiana: Phi Delta Kappa Educational Foundation, 1978.

- Pipho, Chris. Minimum competency testing in 1978: a look at state standards. Phi Delta Kappan, 1978, 59 585-588.
- Pipho, Chris. The NAEP conference of minimum competency testing. Phi Delta Kappan, 1979, 61, 123-124.
- Pipho, Chris. Update III: minimum competency. Denver: Education Commission of the States, 1977.
- Popham, W. James & Lindheim, Elaine. Implications of a landmark ruling on Florida's minimum competency test. Phi Delta Kappan, 1981, 63, 18-20.
- Popham, W. James & Rankin, Stuart C. Minimum competency tests spur instructional improvement. Phi Delta Kappan, 1981, 62, 637-639.
- Popham, W. James. The case for minimum competency testing. Phi Delta Kappan, 1981, 63, 89-92.
- Pullin, Diana. Minimum competency test and the demand for accountability. Phi Delta Kappan, 1981, 63, 20-22.
- Resnick, Daniel & Resnick, Lauren. Improving educational standards in American schools. Phi Delta Kappan, 1983, 65, 178-180.
- Riegle, Rodney & Lovell, Ned. Minimum competency testing. Bloomington, Indiana: Phi Delta Kappa Educational Foundation, 1980.
- Roesch, Ronald & Golding, S.L. Competency to stand trial. Urbana, Illinois: University of Illinois, 1980.
- Sandberg, John H. Competency-based education comes to Pennsylvania. Phi Delta Kappan, 1979, 61, 119-121.
- Schmeiser, Cynthia & Ferguson, Richard. Performance of black and white students on test materials containing content based on black and white cultures. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, April, 1976.
- Schmieder, Allen A. Competency-based education: the state of the scene. Washington: American Association of Colleges for Teacher Education, 1973.
- Serow, Robert C. Competency testing in North Carolina: remediation and subsequent test performance. Raleigh, North Carolina: North Carolina State University, 1980. (ERIC Document Reproduction Service No. ED 194 458)

- Serow, Robert C. & Davies, James. J. Resources and outcomes of minimum testing as measures of equality of educational opportunity. American Education Research Journal. 1982, 19, 529-539.
- Smith, Annie D. & Johnson, Constance. The impact of desegregation on the achievement test scores of black and white students in rural and an urban county. Paper presented at the Annual Convention of the American Personnel and Guidance Association, Chicago, April, 1976.
- Smith, Michael R. Legal considerations of competency testing programs. School Law Bulletin, 1978, 9, 1-9.
- Spady, William. Competency-based education: a bandwagon in search of a definition. Educational Research, 1977, January, 9-13.
- Spady, William. Competency-based education: organizational issues and definitions. Educational Research, 1977, February, 9-15.
- Thomas, Gail E. Family status and standardized achievement tests as contingencies for black and white college entry. National Institute of Education, Washington, D.C.: Russell Sage Foundation, 1977.
- Thurston, Paul & House, Ernest R. The NIE adversary hearing on minimum competency testing. Phi Delta Kappan, 1981, 63, 87-89.
- Tractenberg, Paul & Kahn, Laura. State minimum competence testing programs: legal implications of minimum competency testing: Debra P. and beyond. Final Report. Denver: Education Commission of the States, Department of Research and Information Services, 1979.
- Turlington, Ralph D. Good news from Florida: our minimum competency program is working. Phi Delta Kappan, 1979, 60, 649-651.
- Williams, Margaret M. Race, poverty, and educational achievement in an urban environment. Paper presented at the American Psychological Annual Convention, Honolulu, 1972.
- Williams, Robert L. The BITCH-100: a culture-specific test. Paper presented at the American Psychological Annual Convention, Honolulu, 1972.
- Wise, Arthur E. Minimum competency testing: another case of hyperrationalization. Phi Delta Kappan, 1978, 59, 596-598.
- Zieky, Michael & Livingston, Samuel. Manual for setting standards on the basic skills assessment tests. Princeton: Education Testing Service, 1977.

APPENDIX A

North Carolina Minimum Competency Objectives

APPENDIX A

North Carolina Minimum Competency Objectives

| <u>Reading</u> | <u>Mathematics</u> |
|--|--|
| 1. To demonstrate word knowledge and to use contextual clues and abbreviations to determine word meaning | 1. To compute using whole numbers |
| 2. To follow written directions accurately | 2. To compute using fractions |
| 3. To select the main idea and related details from various passages | 3. To compute using decimals |
| 4. To classify information | 4. To compute using percentages |
| 5. To draw inferences from various materials | 5. To solve problems involving money matters |
| 6. To draw conclusions | 6. To solve problems involving measurement |
| 7. To compare and contrast various reading materials | 7. To use geometric ideas in solving everyday problems |
| 8. To organize information | 8. To interpret and use maps, graphs, charts, and tables |
| 9. To locate and apply information | 9. To apply knowledge of probability and statistics to everyday situations |
| 10. To interpret maps, charts, and pictures | 10. To estimate answers to problems |
| | 11. To solve problems involving addition, subtraction, multiplication, and division of whole numbers, fractions, decimals, and percentages |

APPENDIX B

Request for Data



Appalachian State University
Boone, North Carolina 28608

704/262-2055 & 2056

11-8-83

Dear

Being on "leave of Absence" from the Robeson County School System and a considerable distance from the county schools, I would like to ask a favor of you. I am in the process of writing an Ed. S. thesis focusing on the North Carolina Minimum Testing Program for Competencies. I need some information from each of the county high schools to effect this project.

I need a copy of your school's list of the 1st-time juniors who took the NCMCT in October during the years 1979-1982 (1983 also if the scores have returned). A copy of the summary page(s) would be ideal because it includes the statistical data required (e.g. sex, race, scores, years, and school attended). No student names will be involved so the confidentiality factor will not be violated.

I have the support of the North Carolina Department of Public Instruction and Superintendent Purnell Swett in this endeavor. I need this information prior to December 1, 1983.

Any monetary factors incurred will be compensated upon notice. Also, credit will be given to those who have aided in the finished work.

Thank you in advance for your assistance.

Roger D. Herring
ASU Box 12257
Boone, NC 28608

APPENDIX D

Sample Ratio of Total Population

APPENDIX D

Sample Ratio of Total Parent Population by
Ethnicity, Subtest, Sex and Year

| SEX | Population | | Sample | | Percentage | |
|--------------------|------------|------|---------|------|------------|------|
| | Reading | Math | Reading | Math | Reading | Math |
| Male | 1937 | 2486 | 1297 | 1287 | 66.4 | 51.8 |
| Female | 2620 | 2609 | 1333 | 1323 | 50.9 | 50.7 |
| ETHNICITY | | | | | | |
| Caucasian | 1051 | 1066 | 956 | 958 | 91.2 | 89.9 |
| American Native | 2819 | 2831 | 1156 | 1149 | 41.1 | 40.6 |
| Afro- American | 1200 | 1216 | 506 | 502 | 42.2 | 41.3 |
| YEAR | | | | | | |
| 1978 | 853 | | | 285 | | 33.4 |
| 1979 | 898 | | | 368 | | 41.0 |
| 1980 | 947 | | | 438 | | 46.3 |
| 1981 | 841 | | | 438 | | 52.1 |
| 1982 | 819 | | | 315 | | 38.5 |
| 1983 | 896 | | | 837 | | 93.4 |
| TOTALS | 5254 | | | 2681 | | 51.0 |

APPENDIX E

William J. Brown Communication

DEPARTMENT OF PUBLIC INSTRUCTION



STATE OF NORTH CAROLINA

RALEIGH

October 28, 1983

Roger Herring
Appalachian State University
Box 12257
Boone, North Carolina 28608

Dear Mr. Herring:

I received your note requesting information on The Competency Test. This test was developed under contract with national publishing firms for use in North Carolina. As such, we are primarily interested in the difficulty level of the items and the performance of students who were at or nearby the cut-off score. In addition, we are interested in special studies as to any possible cultural bias in the test. Since these areas have not been stated in some detailed traditional test statistics such as reliability and test/retest, correlations have not been of primary interest. In looking at a test of 120 items a KR-20 reliability coefficient would surely be in the mid .90's by virtue of the length of the test. Its validity would be determined by its value in screening out students who are deficient in basic skills. This function is atested to by remediation teachers who work with the students who do not pass The Competency Test. However, a small prediction study has not been conducted. As you may have gathered by now, we have not published traditional test statistics for The Competency Test partly because our major purpose has been to identify weak students rather than to prepare a test which measures across the whole range of ability. We are not able to send you a report which would look like those typically available from a norm referenced test.

Yours truly,

A handwritten signature in cursive script that reads "William J. Brown".

William J. Brown
Special Assistant for Research

WJB:kd

APPENDIX F

Subjects by Ethnicity and Sex

APPENDIX F
Subjects by Ethnicity and Sex

| ETHNIC GROUP | NUMBER OF SUBJECTS | | | | TOTAL | PERCENTAGE |
|-----------------|--------------------|--------|------|--------|-------|------------|
| | Reading | | Math | | | |
| | Male | Female | Male | Female | | |
| Caucasian | 473 | 484 | 475 | 483 | 959 | 36.6 |
| American Native | 538 | 617 | 536 | 612 | 1153 | 44.1 |
| Afro-American | 275 | 231 | 275 | 227 | 506 | 19.3 |
| Totals | 1286 | 1332 | 1286 | 1332 | 2618 | 100.0 |

APPENDIX G

Means, Standard Deviations, and Numbers of

Math and Reading Subjects by School

APPENDIX G

Means, Standard Deviations, and Numbers of Math and
Reading Subjects by School

| SCHOOL | NUMBER | | MEAN | | STANDARD DEVIATION | |
|---------------|--------|---------|------|---------|--------------------|---------|
| | Math | Reading | Math | Reading | Math | Reading |
| Littlefield | 496 | 490 | 95.5 | 103.7 | 19.0 | 13.9 |
| Magnolia | 406 | 407 | 90.3 | 98.3 | 19.7 | 16.7 |
| Orrum | 523 | 528 | 93.4 | 101.2 | 20.0 | 16.9 |
| South Robeson | 537 | 540 | 87.1 | 94.8 | 22.3 | 19.6 |
| West Robeson | 396 | 402 | 87.4 | 97.9 | 20.1 | 16.3 |
| Parkton | 245 | 243 | 92.6 | 99.5 | 19.8 | 15.9 |
| Totals | 2603 | 2610 | 91.0 | 99.2 | 20.5 | 17.1 |

APPENDIX H

Means, Standard Deviations, and Numbers of
Math and Reading Subjects by Ethnicity and Sex

APPENDIX H

Means, Standard Deviations, and Numbers of Math
and Reading Subjects by Ethnicity and Sex

| ETHNIC GROUP | NUMBER | | MEAN | | STANDARD DEVIATION | |
|-----------------|--------|--------|------|---------|--------------------|---------|
| | Male | Female | Math | Reading | Math | Reading |
| Caucasian | 473 | 484 | 96.1 | 103.8 | 19.0 | 14.7 |
| American Native | 538 | 617 | 88.7 | 97.3 | 20.5 | 17.5 |
| Afro-American | 275 | 231 | 86.6 | 94.9 | 21.4 | 18.1 |
| Totals | 1286 | 1332 | 91.0 | 99.2 | 20.5 | 17.1 |

SEX

| | Math | Reading | | | | |
|--------|------|---------|------|-------|------|------|
| Male | 1287 | 1287 | 91.0 | 98.1 | 21.6 | 18.7 |
| Female | 1323 | 1333 | 92.1 | 100.3 | 19.4 | 15.2 |
| Totals | 2610 | 2620 | 91.0 | 99.2 | 20.5 | 17.1 |

VITA

Roger Dale Herring was born in Laurinburg, North Carolina, on July 7, 1944. He graduated from Laurinburg High School in 1962. In 1965, he graduated from Pembroke State University with a B.A. Upon graduation, he accepted a teaching position with the Robeson County School System. He also entered Appalachian State University to work on a Master's degree in Junior College Education and History which was awarded in 1969.

He has held teaching, administrative, and counseling positions at various schools. During this time, he has conducted several faculty workshops in interpersonal relations, and has served as both chairman and consultant on several Southern Association Re-Accreditation studies. He has served on the Faculty Advisory committee to the Superintendent and on the Board of Directors of the Pembroke State University Alumni Association.

Mr. Herring is currently on leave of absence from the Robeson County School System while serving as a Graduate Research Assistant at Appalachian State University. He is completing requirements for both an Ed.S. degree in School Counseling and a Master's degree in General-Experimental Psychology.

The author is member of the North Carolina Personnel and Guidance Association, the North Carolina Peer Helpers Association, and Phi Delta Kappa.