The Relationship Between Teacher Candidates' Performance on Praxis I and Praxis II in New Jersey

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THE RELATIONSHIP BETWEEN TEACHER CANDIDATES’ PERFORMANCE ON
PRAXIS I AND PRAXIS II IN NEW JERSEY

BY

CATHY R. OWENS-OLIVER

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Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Education
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OFFICE OF GRADUATE STUDIES

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submit a copy with your final dissertation to be bound as page number two.
Abstract

The Relationship Between Teacher Candidates’ Performance on Praxis I and Praxis II in New Jersey

The purpose of this study is to examine the relationship between teacher candidate performance on the Praxis I: Pre-Professional Skills test and select Praxis II: Subject-Area Assessments. Praxis I is a set of three basic skills tests in reading, writing, and mathematics most often used as an admissions test for teacher education programs. Praxis II is a battery of tests used to assess adequate content knowledge for program exit and for obtaining a license for beginning practice. This research focuses on teacher supply and quality in New Jersey, as demonstrated by teacher candidate performance on Praxis I and Praxis II and explores two hypotheses—whether these tests are a useful screening tool for determining which students do not have the necessary basic skills for pursuing teacher education studies, or if they are a barrier against recruitment of potentially good teacher candidates, especially candidates of color.

Keywords: teacher preparation, admissions, highly qualified teacher, teacher licensure, teacher assessments, Praxis
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My husband, Sidney Oliver, for investing in my strong finish!

Last but not least, I certainly thank J.C. Mylas for being here, because had you not, I would not have been able to complete this assignment.
Dedication

To my biological father, John M. Owens, my spiritual father Dr. Otis Lockett, Sr.,

and Our Father, the true and living God. Now I have three fathers in heaven.
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Chapter I
INTRODUCTION

The need for more improved schools seems to be a universal issue on which most people agree. The best approach for how to improve schools, however, is the center of an ongoing national debate. Some scholars and policymakers think better principals will yield better schools. In partnership with the Center for the Study of Teaching and Policy at the University of Washington, the Wallace Foundation commissioned a study in 2010 which found that an effective school leader’s responsibility is to guide staff toward improved teaching and learning for all students and that this reconfiguration of school leadership precipitates increased student achievement (Wallace Foundation, 2013).

Another school of thought is that better working conditions for teachers is the turnkey for school improvement. In June 2012, The Education Trust released a report entitled, Building and Sustaining Talent: Creating Conditions in High-Poverty Schools That Support Effective Teaching and Learning (Almy & Toomey, 2012). The finding in the report identified the conditions necessary for teaching and learning to take place, and it provided examples of how the right conditions helped to attract and retain effective teachers.

But in this current age of accountability, most agree that America needs to recruit or even create a higher quality of teacher in order to get higher quality learning experiences and achievement outcomes for students. In a recent review of teacher preparation programs across the United States, the National Council on Teacher Quality (NCTQ) stirred the education field with this report:
Once the world leader in educational attainment, the United States has slipped well into the middle of the pack. Countries that were considered little more than educational backwaters just a few years ago have leapt to the forefront of student achievement. There’s no shortage of factors for America’s educational decline: budget cutbacks, entrenched poverty, crowded classrooms, shorter school years, greater diversity of students than in other countries. The list seems endless.

NCTQ’s *Teacher Prep Review* has uncovered another cause, one that few would suspect: the colleges and universities producing America’s traditionally prepared teachers….have become an industry of mediocrity, churning out first-year teachers with classroom management skills and content knowledge inadequate to thrive in classrooms with ever-increasing ethnic and socioeconomic student diversity….Altogether, the *Review* provides data on the 1,130 institutions that prepare 99% of the nation’s traditionally trained new teachers….For now, the evaluations provide clear and convincing evidence, based on a four-star rating system, that a vast majority of teacher preparation programs do not give aspiring teachers adequate return on their investment of time and tuition dollars.

(Greenberg, McKee, & Walsh, 2013. p. 1)

This negative spotlight caps off a decade of increasing demands upon conventional and non-traditional teacher preparation programs. Graham and Garton reported in 2003 that increased federal and state requirements for teacher licensure led to more selectivity among teacher preparation programs and a greater burden on their faculty to produce better and brighter candidates for the teaching profession (United States Department of Education (USDE) as cited in Graham & Garton, 2003).
While there has been an increase in non-traditional teacher preparation programs and alternative pathways to teaching, the greatest supply of teacher candidates is produced primarily by traditional schools of education and teachers’ colleges (USDE, 2013). The NCTQ also reported that,

more than 200,000 candidates graduate each year from teacher preparation programs…to qualify for a teaching credential. Did their preparation make them more effective teachers than they would have been without the experience?...Purported differences found in research from the last 50 years regarding the effectiveness, on average, of teachers who had traditional preparation and those who had little preparation are questionable. More recent research, however, suggests that graduates of some programs are overall more effective than graduates of other programs, suggesting that preparation can make a difference. (Greenberg et al., 2013, p. 5)

Teacher preparation programs offered at most institutions of higher education must meet various regulations imposed by state education agencies, accreditation organizations, and the leaders on individual campuses. Most of them seek national approval from the Council for Accreditation of Educator Preparation (CAEP) which is a merge of the National Council for Accreditation of Teacher Education (NCATE) and the Teacher Education Accreditation Council (TEAC). This combined agency holds programs accountable by requiring them to submit evidence of having met standards of quality and/or inquiry briefings about their mission and goals. State agencies determine if teacher education programs are approved to confer degrees upon teacher candidates
(Boyd, Goldhaber, Lankford, & Wycoff, 2007). Through the Higher Education Act (HEA) the United States Department of Education (USED) requires Title II reporting through which they evaluate both traditional and alternate route teacher preparation programs.

Federal legislation outlined in the *Highly Qualified Teacher* (HQT) provisions of the *Elementary and Secondary Education Act* (ESEA) and other policies at the state and local levels were established to increase the content knowledge of teachers by mandating that all teachers achieve *highly qualified* status. In order to be deemed HQTs, beginning teachers must show evidence of content knowledge by passing content-area exams and/or majoring in those areas as undergraduates, as well as obtaining state licensure (Boyd et al., 2007; Gitomer & Qi, 2010).

In every state, teacher candidates are required to successfully complete a teacher education program approved by the state Departments of Education and/or pass any required teacher certification exams. Once teacher candidates have met these requirements, they must submit transcripts and other documentation along with an application for a teaching license. States have various reciprocity and portability requirements such that a teacher who moves across state lines and is licensed in a previous state of residence may have to meet additional requirements, including test score requirements, in order to obtain a license in the new state of residence.

Since the 1980s, policymakers have increasingly depended on teacher testing as a means of ensuring classroom readiness and teacher quality. In 1983, the National Commission on Excellence in Education released the report *A Nation at Risk: The Imperative for Educational Reform* in which the failing status of schools in the United
States was discussed. The report addressed the lack of competitiveness with other countries, the need for higher standards for teacher education program entry, and standardized testing to measure teaching and learning. But of all the requirements for entry to the profession, testing of teachers continues to be highly controversial (Gitomer, Latham, & Ziomek, 1999; National Association of State Boards of Education, 1998). Some of the issues fueling the controversy include the lack of a streamlined curriculum across teacher education programs, variance in expectations for what teachers should know and be able to do, and the potential adverse impact on diversity. Albeit controversial, teacher testing is certainly not a new phenomenon. Testing of teacher candidates’ basic skills has been required since the 19th century, but was administered at the local district level. In the 20th century, this testing became a licensure requirement at the state level (Angrist & Guryan, 2007).

The political push for teacher testing is largely influenced by policymakers’ intention to provide a screening process which will identify those who are most qualified to be in classrooms. But there continues to be uncertainty about the impact of this testing on the potential candidate pool for beginning teachers. There is some concern that while teacher testing may help to set the standard for entry level practice, it may also deter students from applying to teach and/or create barriers that keep would-be good teachers from entering the profession (Angrist & Guryan, 2007). Once these would-be teachers complete their teacher education coursework and student teaching programs, they also must pass the state-required test(s) in order to get a teaching license. State Departments of Education can then assert that, having completed state requirements, teacher candidates have met the criteria necessary for beginning practice (Boyd et al., 2007).
The most widely used teacher licensing assessment is the *Praxis Series™*, a revised version of what was formerly the National Teachers Examination (NTE), and it is administered by Educational Testing Service, Inc. (ETS), located in Princeton, New Jersey. The series includes *Praxis I: Pre-Professional Skills*, which is an assessment of basic skills in reading, writing, and mathematics, as well as *Praxis II: Subject–Area Assessments*, a group of various content knowledge tests. *Praxis I* is primarily used as an entry requirement for teacher preparation programs and taken early in the undergraduate experience. *Praxis II* is primarily used as an exit requirement and is usually taken at the end of the undergraduate experience, just before or after student teaching. Most states require applicants for teacher certification to pass both *Praxis I* and *Praxis II* and each state sets their own passing score. Currently 30 states and territories require *Praxis I* for entry into teaching, and approximately 40 states and territories require *Praxis II* (Educational Testing Service, 2012).

Each state’s Department of Education and its state Board of Education individually determines what its passing score will be for each *Praxis* exam. This results in widespread differences not only in scores across the United States but in the rate at which teacher candidates qualify for a teaching license. Sometimes a candidate submits scores to more than one state, depending on where s/he is interested in teaching. In some cases, that candidate meets the passing score in one state but not in the other. This presents a challenge for schools of education across colleges and universities because students in the same teacher preparation program may be required to meet different passing scores depending on whether they intend to teach inside or outside the state where they were prepared.
Praxis I test scores are reported on a score scale of 150 to 190, and Praxis II scores are reported on a score scale of 100 to 200 (with the exception of a few tests that have not yet been converted from the former scale for the National Teachers Exam (NTE). Praxis I is comprised of three separate tests, but there are more than 100 Praxis II tests based on 70 different content areas. In more than 30 states and territories, students are required to pass each of the Praxis I exams and the designated Praxis II exam in order to fulfill state licensure requirements. Some states, such as New Jersey, require Praxis II for licensure while the schools of education require Praxis I for program entry (Educational Testing Service, 2012; Nettles, Scatton, Steinberg, & Tyler, 2011). Also, some teacher education programs require passing Praxis II as a requirement for graduation, not only licensure.

In the last decade, the use of standardized tests to assess teacher candidates’ career readiness has steadily increased. Supporters of testing anticipate that these measures will greatly enhance the quality of teachers entering the field; but there are many skeptics who are concerned that standardized testing is a barrier that may limit the supply of good applicants, thus discouraging those who actually may be qualified from considering a teaching career (Angrist & Guryan, 2007). Beyond this, there is even greater concern that teacher testing restricts the supply and racial/ethnic diversity of the teacher candidate pool. The effects of teacher testing continue to be an ongoing debate, with widespread discussion and very little consensus (Darling-Hammond, 1998; Darling-Hammond & Cobb, 1996; Gitomer, Latham, & Ziomek, 1999).
Statement of the Problem

The standards and accountability movement has raised expectations for better teaching and better learning. Education stakeholders contend that if students are going to learn better, then teachers will have to teach better, and this requires increased skills. The call for higher achievement for all students demands that all teachers, especially new teachers, demonstrate a higher skill level than they have in the past. In an effort to raise standards, most states have raised certification requirements and this has led to an increase in teacher testing. But many contend that the move to increase standards seems to be in conflict with the move to increase diversity and cultural competence in the teacher candidate pool (Gitomer et al., 1999).

Opponents of teacher testing worry that the move to raise standards will result [and in some states already has resulted] in raising the acceptable passing scores, which may limit the volume of ethnic minority teacher candidates in the potential teaching pool (Casey & Childs, 2007; Nettles et al., 2011; Villegas & Irvine, 2010). In their research report Recruitmen, Retention, and the Minority Teacher Shortage, Ingersoll and May (2011) asserted that,

The assumption has been that an inadequate initial supply, coupled with barriers to entry, are the main reasons that insufficient numbers of minority teachers are employed. Thus attention has tended to focus on identifying obstacles to recruiting minority candidates into teaching and, in turn, developing strategies to overcome these obstacles….As career and employment options available to minorities have broadened. A shrinking share of this shrinking number of minority college graduates have entered teaching….When minority candidates do seek to enter
teaching, the growth of occupational entry tests, coupled with lower pass rates on these tests by minority teaching candidates, has meant that fewer minority candidates are successful. (p.3)

Since each state chooses which teacher licensure exams it will adopt and what its passing scores will be, each state must also determine if the priority is to raise standards or to increase diversity (see Appendix D). It is difficult to do both and, quite often, favoring one comes at the expense of the other (Gitomer et al., 1999; Smith, 1987).

According to the 2012 U.S. Census, the African-American population has grown by 14% since 2002, and the non-White Hispanic population has grown by 43%. In New Jersey, the African-American population is almost 14%, and the Hispanic population is almost 18% (U.S. Census, 2012). In 2013, USDOE (as cited in French, 2013) reported that less than 15% of the national teaching force was African-American and Hispanic, which is less than half of the 35% African-American and Hispanic K-12 student population. In a state-by-state review of minority teachers, Boser (2011) reported that the teaching workforce did not look like the students they teach. Boser asserted that the limited number of minority teachers is perpetuated by academic limitations of minority students—especially high school dropout rates—which prevents them from pursuing teaching careers. In order to recruit and retain African-American and Hispanic teachers, the academic achievement among these students during their K-12 experience must be increased (Boser, 2011).

In their report, The Academic Quality of Prospective Teachers: The Impact of Admission and Licensure Testing, researchers Gitomer, Latham, and Ziomek (1999) referenced several other reports (e.g. Goertz & Pitcher, 1985; Graham, 1987; and Smith,
Miller, & Joy, 1988), that indicated that teacher testing has an adverse impact on minorities (as cited in Youngs, Odden, & Porter, 2003). Researchers have found that minority candidates do not perform as well on standardized tests as do their counterparts (Darling-Hammond, Dilworth & Bullmaster, 1996; Murnane, Singer, Willett, Kemple, & Olsen, 1991) National reports released during the 1980s (i.e. A Nation at Risk, 1983; A Nation Prepared, 1987) prompted radical change in education reform which included greater accountability for educators underpinned by teacher testing. During that time, in response to the new national education agenda, more than 40 states added standardized assessments of content knowledge to their teacher certification requirements (Villegas, 1997). These requirements raised angst among educators who were concerned not only that the assessments could be biased against minorities, but that tests may not predict teacher effectiveness in the classroom. Many contend that low performance among minorities in undergraduate programs is largely due to poor education and achievement that began in elementary school and was perpetuated throughout high school (Villegas & Lucas, 2004).

As emphasis on the use of teacher testing increases, researchers continue to explore the extent to which these tests, alongside other academic measures, predict which teacher candidates will be successful in the classroom. As reported by Graham and Garton (2003), tests are a good predictor of future test-taker performance on standardized tests (e.g. Villeme, Hall, & Phillippy, 1982; Wakeford, 1988; Williams & Wakeford, 1990), but they have not found enough evidence to support a strong relationship between test-taker performance and teacher performance in the classroom. More recent research has examined whether standardized tests required for program admission predicted a high
quality student teaching performance for teacher candidates, and it has found little
evidence of predictive validity (Dybdahl, Shaw & Edwards, 1997; Lawrence & Crehan,
2001). In their careful study of criteria for teacher education admissions and what
beginning teachers need to know, Casey and Childs (2007) wrote that “the use of these
tests as admission criteria means that potential applicants who failed the tests are not
granted admission, so no data are available on how well they would have performed in
the program” (p. 10). Another teacher quality research team wrote,

The problem in assessing whether requiring certification deters potentially
effective teachers from entering the profession is observing what social scientists
call the counterfactual— in this case, how the size and composition of the pool of
teacher candidates would have differed without certification. (Boyd, Goldhaber,
Lankford, & Wyckoff, 2007, p. 60)

However, an assessment of basic skills may serve as a filter for teacher education
programs seeking to screen out students who are better prepared to meet the demand of a
challenging teaching career from those who simply have an interest (Gitomer, Brown,
Bonett, 2011). Still, others contend that an assessment of basic skills used for entry to
teacher preparation, not the teaching profession, seriously hinders efforts to increase
diversity in the education field. Bennett, McWhorter, and Kuykendall strongly argued
that if basic skills testing requirements were not a barrier, then potential Latino and
African-American teacher candidates would do well in teacher preparation programs and
on the job once they move into the profession (2006).
This study examined the performance of teacher candidates in New Jersey who took the required teacher assessments for entry to teacher education programs, as well as those required for successful program exit and state certification. We look specifically at the demographic backgrounds of these candidates over a five year period to assess trends in performance of African-American and Hispanic test-takers as related to their White counterparts. Recently, the NCTQ Review provided an update of the process of selective admissions across teacher education programs nationwide and reported that less than 20% of the programs in New Jersey restrict admission into teacher education to the top half of undergraduate students. This raises the question of whether the higher bar for entry, based on program entry test results, increases the quality of the teacher candidate pool, decreases minority representation in the pool, or both. NCTQ contended that “increasing the rigor and therefore the prestige of teacher preparation, the profession will attract more talent, including talented minorities” (Greenberg et al., 2013, p.6).

In 2011, the Educational Testing Service (ETS) released a report, *Useful Signal or Unnecessary Obstacle? The Role of Basic Skills Tests in Teacher Preparation* (Gitomer et al., 2011), which explored the probability of advancing to teaching based on Praxis scores (taken from 1999-2005). Of the 33,000 test taken during that time period, less than 700 were taken by Hispanic persons, so this subgroup was not included in the sample. But the pass rate of African-Americans interested in becoming teachers was 35% less than that of their non-Hispanic, White peers. Further exploration is necessary to determine if performance on the basic skills tests reduces the number of ethnic minority candidates pursuing teaching.
In 2012, ETS published another report, the *Performance and Passing Rate Differences of African-American and White Prospective Teachers on Praxis Examinations* (Nettles et al., 2011). This research included almost 75,000 test-takers for *Praxis I* between November 2005 and November 2009. Only 11% of the *Praxis* test-takers were African-American and only 2% were Hispanic, while approximately 80% were White. Hispanics were not included in the analysis because they comprised less than 5% of the test-taker pool. Table 1 shows the reported disparities in performances between the subgroups.

Table 1

*Differences in Pass Rates on Praxis I Tests by Race/Ethnicity Group*

<table>
<thead>
<tr>
<th></th>
<th><em>Praxis I Reading</em></th>
<th><em>Praxis I Writing</em></th>
<th><em>Praxis I Math</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of first-time African American test-takers who passed</td>
<td>40.7</td>
<td>44.2</td>
<td>36.8</td>
</tr>
<tr>
<td>Percentage of first-time White test-takers who passed</td>
<td>81.5</td>
<td>79.5</td>
<td>78.2</td>
</tr>
</tbody>
</table>

*Source: Nettles et al., 2011, p. 9*

The study confirmed that there is a huge disparity between the first attempt pass rates of Whites and that of African-Americans on all three *Praxis I* exams. ETS researchers concluded that “given the currently limited supply of African-American teachers, any leak in the pipeline is problematic” (Nettles et al., 2011, p. 7). It may be that teacher testing, as an admission and licensure criteria “takes a predominantly White population of potential teachers and creates an even more homogeneous group” (Gitomer et al., 1999, p. 38).
Purpose of the Study

The purpose of this study is to examine the relationship between teacher-candidate performance on *Praxis I: Pre-Professional Skills*, a basic skills test, and select *Praxis II: Subject-Area Assessments*, tests of teacher content knowledge. The study focuses on teacher supply and quality in New Jersey, as demonstrated by teacher candidate performance on *Praxis I*, among other variables, and the potential underrepresentation of ethnic minorities in New Jersey’s teacher candidate pool. The study explores whether entrance exams for admission to teacher education programs are an obstacle preventing potentially successful teacher candidates from entering the traditional schools of education or a useful screening tool for denying program entry, and perhaps a career in teaching, to students who do not have the necessary basic skills.

Despite the path teacher candidates take as they aspire to become teachers, whether traditional or non-traditional, they must pass state-mandated licensure exams (i.e. *Praxis*). The extent to which minority teacher candidates have difficulty passing may indeed lead to underrepresentation of African-American and Hispanic teachers. The Gitomer, Brown, and Bonett (2011) study broadly examined test-takers across all *Praxis*-user states who took *Praxis I* and *Praxis II* tests between 1999 and 2005. Since then, there has been increased national emphasis on the growing Hispanic population, closing the achievement gap, changing trends in teacher education program accreditation, and a common curriculum. This study explores whether we are beginning to see improved performance on teacher assessments, particularly in New Jersey—a state that fits the aforementioned trends.
In New Jersey, 60% of the teacher candidates complete traditional teacher education programs while about 40% complete alternative programs (New Jersey State Department of Education, 2013). The Praxis I basic skills test is a program requirement not a state requirement, so most teacher education programs require students to pass Praxis I for entry. Alternative certification programs do not require passing Praxis I since most of these candidates already have a bachelor’s degree. But in order to become certified to teach in New Jersey, all teacher candidates are required to pass Praxis II content knowledge exams, regardless of whether they complete education studies at a traditional or alternative teacher preparation program (Educational Testing Service, 2012; http://www.state.nj.us/education/educators/license/praxis/).

While basic skills are taught at the high school level and necessary for entry to teacher education, content knowledge is taught as coursework within teacher education programs, and acquisition of it is necessary for program completion. Praxis II measures teacher candidates’ success in acquiring the necessary content for beginning teaching. Questions about the value and implications of Praxis I test performance, particularly for minority teachers in New Jersey, generate two hypotheses. Hypothesis 1: Tests of teacher candidates’ basic skills are not a necessary screening for teacher education program entry and prevent would-be good teachers, especially ethnic minorities, from meeting teacher certification requirements. Hypothesis 2: Tests of teacher candidates’ basic skills is an effective means of determining if potential teacher candidates possess the readiness skills necessary for entering a teacher education program and later pursuing teacher licensure. While teacher candidates must fulfill varied requirements across states and education programs, one common requirement is passing tests of their knowledge and skills. The
validity of these tests, such as Praxis, in terms of predicting teacher performance in student teaching as well as on the job continues to be a national debate.

If basic skills tests are valid measures of fundamental precursors needed for teacher preparation coursework study, then there ought to be an association between success on Praxis I and outcomes on Praxis II. However, if basic skills tests are not a predictor of other academic outcomes, Praxis II outcomes ought to be independent of Praxis I performance. (Gitomer et al., 2011, p. 433)

This study investigates that relationship. But this is not a study investigating whether the passing scores set forth by the New Jersey State Board of Education are fair or appropriate. Instead, this study attempts to establish the relationship between teacher tests used for admission into New Jersey teacher education programs and those used to obtain a license to teach in New Jersey. This study examines performance of New Jersey teacher candidates who took the following tests between July 2006 and July 2012:

- Praxis I: Pre-Professional Skills Test: Reading (5710)
- Praxis I: Pre-Professional Skills Test: Writing (5720)
- Praxis I: Pre-Professional Skills Test: Mathematics (5730)
- Praxis II: Elementary Education: Content Knowledge (5014)
- Praxis II: English Language, Literature, and Composition (5041)
- Praxis II: Mathematics: Content Knowledge (5061)
- Praxis II: Social Studies: Content Knowledge (5081)

Again, the three Praxis I tests assess basic skills for program entry. The four Praxis II exams are for program exit and career entry. The Elementary Education test is used for a license to teach language arts, social studies, science, and mathematics in grades K-6 classrooms. The subject-area assessments are used for secondary level teaching licenses primarily for grades 7-12 in each respective area.
Research Questions

1. What are the academic and demographic characteristics of teacher candidates in New Jersey who pass Praxis I: Pre-Professional Skills?

2. What is the relationship between success on the Praxis I: Pre-Professional Skills assessment and success on the Praxis II: Content Knowledge assessment for teacher candidates in New Jersey? Subsidiary questions related to research question 2 are: (a) What is the relationship between success on Praxis I and success on Praxis II for teacher candidates in New Jersey with different ethnic backgrounds? (b) What is the relationship between success on Praxis I and success on Praxis II for teacher candidates in New Jersey with different academic histories as measured by academic major? And (c) What is the relationship between success on Praxis I and Praxis II for ethnicity subgroups in New Jersey with different academic histories as measured by undergraduate grade point average?

3. How does testing of teacher candidates as an admissions requirement influence the pool of minority teacher candidates prepared through traditional teacher preparation programs in New Jersey?

Significance of the Study

This study partially replicates a previous study by researchers Drew Gitomer, Terran Brown, and John Bonett (2011), *Useful Signal or Unnecessary Obstacle? The Role of Basic Skills Tests in Teacher Preparation*. Their study included the same seven Praxis tests and research questions, however it did not include any emphasis on gender.
However, their sample included all test-takers who took the Praxis I between 1999 and 2005 and took the selected Praxis II tests between 2002 and 2005. Their sampling included almost 27,000 White and African-American teacher candidates from across all states in which these tests are used, including but not limited to New Jersey. They could not include Hispanics because there was not a sufficient number of Hispanic candidates (Gitomer et al., 2011).

Diversification of the teaching profession has moved to the top of the national agenda now that the United States Department of Education (USDE) has created the website teach.gov as a tool for recruiting more teachers of color. United States Secretary of Education Arne Duncan (as cited in Bireda & Chait, 2011) expressed these concerns:

I’m very concerned that increasingly, our teachers don’t reflect the great diversity of our nation’s young people, and so making sure we have more teachers of color and particularly more men, more black and Latino men, coming into education is going to be a significant part of this Teach Campaign. (p. 1)

More than a third of the United States student population is comprised of ethnic minorities, while African-American and Hispanic teachers comprise less than 20% of the public school teaching pool (Bireda & Chait, 2011). All undergraduates interested in a teaching career must pass state-mandated licensure exams (i.e. Praxis). If African-American and Hispanic teacher candidates do not pass the required tests, the gap between the volume of minority students and minority teachers will widen. In their comprehensive study of the differences in Praxis performance by race, Nettles et al. (2011) analyzed data for test-takers who tested between 2005 and 2009. They reviewed 16 high volume Praxis tests, including all three Praxis I tests and 13 Praxis II tests, and
they found that only 11% of the test-takers were African-American and only 13% of them met the minimum score required for teacher licensure. Again, they did not include Hispanics because the sample was too small (Nettles et al., 2011).

This data calls attention to the disparate impact teacher testing has on the teaching pool and the widening gap between minority teacher and student populations. While the minority teaching population shows minimal growth, the minority student population is steadily increasing. According to the 2012 U.S. Census, the African-American population—now more than three million—has grown by 14% since 2002. But, the Hispanic population, having grown by 43%, now represents 16% of the total United States population, which exceeds 50 million people. The U.S. Census (2012) reported that one in every six Americans is of Hispanic descent and that the Hispanic population has grown in every single state.

In New Jersey, the African-American population is 13.7% which is up almost 6% from 2000. But the Hispanic population is 17.7%, which is up 39% (U.S. Census Bureau, 2012). There are more than 300,000 Hispanic students in New Jersey, which is 21% of the K-12 student population (Pew Hispanic Center, 2011). “The burgeoning Hispanic population creates both challenges and opportunities for the future….The country must find a way to educate an increasingly diverse and underprivileged generation of children or risk losing its competitive edge” (“America’s growing,” 2011, p. 1).

Most United States Hispanics reside in nine states—Arizona, California, Colorado, Florida, Illinois, New Mexico, New Jersey, New York, and Texas (U.S. Census Bureau, 2012). As is the case with most students of color, Hispanic students live in low socio-economic communities, attend schools that often lack the necessary resources for
21st century instruction and are less likely to have experienced an effective teacher (Boyd et al., 2007). Although 75% of Hispanic children are born in the United States, their primary language is not English, and not many teachers are adequately trained to address the needs of students with limited English proficiency. In 2012, after a study conducted in partnership with researcher Andrew Rotherham, the USDOE released a report stating that one out of three teachers did not have the adequate skills and knowledge necessary for teaching children with limited English proficiency (Rotherham, 2011).

**Theoretical Framework**

While the United States teaching pool, in large part, remains governed by the licensure and certification system, there is limited research on the impact of licensure credentialing on student learning. Efforts to show links between the two have been very weak. There is a continued debate about who gets a license, how a license is obtained, and whether or not more focus should be on where one obtains licensure versus if s/he has it. Dr. Dan Goldhaber, Director of the Center for Education Data & Research (CEDR) at the University of Washington, Bothell leads various research efforts to examine teacher quality through the lens of teacher preparation. CEDRs research provides insight into much of what is known about the link between teacher licensure and student achievement (www.cedr.us/researcher).

Goldhaber has conducted extensive research addressing human resources policies and practices influencing teacher quality and the placement of teachers. He has suggested (2005) that teacher licensure requirements do positively influence student achievement if they help states separate those teacher candidates who are qualified from those who are not, so that school districts are then able to hire better teachers. However,
if districts can hire at least minimally qualified teachers in the absence of the licensure requirements, then one cannot make the claim that the requirements, in and of themselves, delineate the best teachers and, thus, help improve student achievement (Goldhaber, 2005).

Ongoing research examining the relationship between teacher performance on licensure tests and student achievement gains has explored whether performance on teacher licensure exams is a good predictor of their effectiveness in the classroom. While effect sizes vary, researcher Daniel Goldhaber found positive links between the two (2007). Yet, Clotfelter, Ladd, Vigdor, & Wheeler (2005) found that the distribution of teachers with varied credentials really does make a difference in student learning. When more needy students are placed with teachers who lack proper qualification, the achievement gap gets wider. Placing weaker teachers with students who live in high poverty communities exacerbates the learning gaps caused by their socioeconomic conditions. Researchers Clodfelter et al. also found that the effects for mathematics performance are significantly large, especially for minority students with low socioeconomic status. They further concluded that experience and licensure test scores are the two certification requirements that best link with student achievement, especially in the early years of a teacher’s career (2006).

Based on the huge disparity between teacher certification across schools and the documented differences in what teachers know and are able to do in an effort to increase student learning, “poor, minority, and low-performing students are much more likely to have teachers who are inexperienced, uncertified, and less academically able than their higher-performing peers” (Boyd et al., 2007, p. 46). Goldhaber and Brewer (2000) found
that licensed teachers showed higher gains in students’ mathematics achievement than those who were not licensed. They found similar, though not as striking, results in science (Youngs, Odden, & Porter, 2003).

In their 2011 study entitled, *Useful Signal or Unnecessary Obstacle? The Role of Basic Skills Tests in Teacher Preparation*, Gitomer et al. (2011) explored whether Praxis tests are

…an unnecessary hurdle, preventing potentially good teacher candidates from entering the profession, or an indicator of career readiness to guide teacher candidates’ course of study....If basic skills tests are not predictive of future success, then the role of preparation is to ensure that a student can achieve a passing score and then move on to study within a teacher education program. Alternatively, if the tests are measuring important constructs relevant to successful teacher education outcomes, then simply achieving a particular score may not be sufficient. The individual may answer enough items correctly to pass a state’s designated threshold but continue to struggle with respect to the set of skills measured. Under this interpretation, additional attention to the skills measured by the tests may still be necessary to ensure successful completion of teacher education requirements. (p. 433)

It is important for education officials to be able to measure the differences in skills of candidates who are interested in becoming teachers and those who demonstrate evidence of the skills and knowledge necessary to [obtain a license to] teach. This means that part of the role of a teacher education program is not just to prepare candidates to meet the demands required of teachers, but to screen out those who are not able to do so. This
means that, inevitably, teacher education admissions requirements will prevent interested candidates from obtaining teacher licensure (Gitomer et al., 1999).

Goldhaber (2004) explained that teacher testing creates a baseline for the minimal knowledge teacher candidates must have for beginning practice. He asserted that if test performance truly indicates who the “career-ready” candidates are in a better way than do school districts, which do not require a test, then perhaps teacher testing does increase student learning. Goldhaber’s work provides evidence that there is some research connecting a teacher’s performance on tests to student achievement, but further study is needed in order to determine if the teacher exams are separating would-be good teachers from those who lack the necessary skills. Over-reliance on teacher test scores could result in falsely labeling good teachers as bad, inadvertently removing would-be good teachers from the candidate pool and, thus, decreasing student achievement (2007).

**Limitations**

In an effort to examine the relationship between teacher licensure tests and teacher candidate supply, performance, and diversity, it is necessary to study the tests being used. More robust national data is readily available for the *Praxis Series* of tests created by ETS because they are used in more than 40 states and territories. Included in the list of states that do not use *Praxis* are California, Florida, Michigan, New York, and Texas—states which have higher volumes of teachers, especially minority teachers. New Jersey was chosen for purposes of this study because of its high volume of Hispanic teacher candidates. In the Gitomer et al. study (2011), Hispanics were not included because the sample size was too small in comparison to national volume. Limiting the study to teacher volume in New Jersey provides a close examination of Hispanic performance,
given that the Hispanic population is almost 20% of its population (U.S. Census Bureau, 2012).

When they register to take Praxis, teacher candidates self-report certain background information including race/ethnicity, undergraduate grade point average (UGPA), major, gender, institution or agency where they received teacher preparation, and if they intend to teach in the state where they will be tested. Because this is self-reported data, the information may not be completely accurate. Also, test-takers are not required to report background information. It is virtually impossible to determine if inaccurate info is reported, so no adjustments to the questionnaire results can be made. Some test-takers do not report UGPA, but those who do must choose a range provided by ETS (i.e. 2.50 – 2.99) during registration. The ETS ranges for UGPA do not directly correspond to the ranges for which New Jersey allows flexibility (i.e. 2.50 – 2.75). For race/ethnicity, test-takers are given 12 choices (See Appendix B). Perhaps teacher candidates in a given ethnic group may be less inclined to accurately complete the race/ethnicity section of the registration questionnaire than that of another group. This may cause some inconsistency in the self-reported data. For purposes of this study, the categories of Mexican, Mexican American, Chicano, Puerto Rican, Other Hispanic, and Latino were combined to represent New Jersey’s Hispanic population. Test-takers who did not clearly indicate their race/ethnicity were not included.

Test registrants must indicate a designated institution to which they want their scores reported and an attending institution, which is where they are enrolled at the time they test. Because New Jersey is classified by ETS as an automatic reporting state, any
person who takes a *Praxis* exam in New Jersey is included in the state testing database. This study includes only those who indicated they attended a New Jersey institution.

It cannot be determined if a test-taker actually plans to seek licensure based on testing data. *Praxis* tests are required in 40 states so test-taker results may meet passing licensure requirements in many states, including but not limited to New Jersey. It is very difficult to determine where an individual will seek licensure based on their testing data. Since cutoff scores for *Praxis* tests are determined by each state, passing scores in one state may equal or exceed passing scores in another. Any given teacher candidate’s scores may meet or exceed requirements in more than one state, and this affords that candidate the opportunity to seek licensure in more than one state (Gitomer et al., 2011). And still, there are those who, unsure if a teaching career is for them, take the *Praxis* exam just to have the option to teach later in life. This study examines teacher candidates based on their meeting passing scores necessary for licensure. It is uncertain if all *Praxis* test-takers in this study actually intend to teach in New Jersey or at all, but if they indicated they wanted their scores reported to a New Jersey institution, they are highly likely to seek New Jersey state licensure.

**Delimitations**

This study attempts to replicate parts of the Gitomer et al study (2011) that examined whether the *Praxis I: Pre-Professional Skills* test was an unnecessary obstacle or whether it provided useful and early information about how teacher candidates were likely to perform on *Praxis II: Subject-Area* tests. Their research was conducted with a sample of 23,000 total teacher candidates who tested between the 1999 and 2005, but it included less than 2,000 African Americans and no non-White Hispanics. The current
study began with approximately 46,000 persons who took the tests between the years 2006 and 2012.

The basic premise for this research is not new, but the availability of specific data on teacher candidates in New Jersey in recent years offers new information for a more acute analysis and allows an examination of trends in minority performance more closely than what has been done in previous research. Other studies, such as *Performance and Passing Rate Differences of African-American and White Prospective Teachers on Praxis Examinations* by Nettles et al. (2011), addressed national trends in Praxis test-taker performance, under-representation of ethnic minorities in the teaching pool, and test preparation for African-American candidates. But most of these studies did not provide state-specific information that would inform program direction for Hispanic-serving institutions.

**Definitions of Terms**

*Average performance range.* The range of scores earned by the middle 50% of the examinees taking the test. It provides an indication of the difficulty of the test.

*Candidate.* College student or test-taker seeking a teaching credential

*Decision reliability.* The tendency of pass/fail decisions made on the basis of examinee test scores to be consistent from one edition of the test to another.

*Elementary and Secondary Education Act (ESEA.)* Legislation passed in 1965 to emphasize equal access to education and establish high standards and accountability. In 2002, Congress amended ESEA and reauthorized it as the *No Child Left Behind Act* (NCLB), which included Title I for disadvantaged students.
ETS. The Educational Testing Service, founded in 1947, is the world's largest private nonprofit educational testing and assessment organization.

Median. The score that separates the lower half of the scores from the upper half.

Passing score (cut score). A qualifying score for a single test that is set by the state or licensing agency.

Praxis. The Praxis Series™ tests are taken by individuals entering the teaching profession as part of the certification process required by many states and professional licensing organizations.

Reliability. The tendency of individual scores to be consistent from one edition of the test to another.

Standard setting. A study to produce a recommended minimum cut score for a licensure test. These studies are designed to identify the level of knowledge necessary for a teacher candidate to be considered for beginning practice and to reconfirm the relevance (validity) of the test content for teachers in the adopting state.

Teacher education program. Educator preparation program or school of education.

Validity. The extent to which test scores actually reflect what they are intended to measure. (Praxis tests are intended to measure the knowledge, skills, or abilities that groups of experts determine to be important for a beginning teacher.)
Chapter II

REVIEW OF RELATED LITERATURE

Historical Background

The need for highly qualified public school teachers has been part of an ongoing discussion since the mid-1700s. In 1750, Benjamin Franklin shared an emphatic teacher recruitment message, noting that colonies desperately needed “good schoolmasters” (Franklin, 1750). States first began including teacher testing as a licensure requirement in the 1960s. This practice has continued over the years as accountability measures have consistently become the determining factor for teacher and student proficiency. The primary purpose for teacher licensure assessments is to determine if teacher candidates have the basic skills necessary for entering the teaching profession (Goldhaber, 2007; Graham & Garton, 2003; Lucas, 1997). It is clear that no teacher could possibly know all the content and pedagogy necessary for high quality teaching on the first day of the job. Therefore, ongoing, job-embedded, professional development is necessary to ensure their continued learning. Graham and Garton (2003) reported that it is important to establish some entry level performance standards to determine if candidates for the teaching profession have the basic and essential skills and knowledge necessary for a beginning practitioner. It was later in the 1970s and 1980s that additional research was released proving not only that basic skills are necessary for teachers, but that teacher candidates lacked these skills, and that colleges and universities responsible for preparing them to teach were not doing a good job (Lucas, 1997). This insight led to a nationwide overhaul of teacher preparation programs that resulted in more stringent requirements for admission and for program completion. By the late 1980s the admissions criteria of
teacher preparation programs were found to be as stringent as admissions into engineering, pharmacy, business administration, and other professional degree areas (Lucas, 1997). Yet, it was during this same time that the Carnegie Corporation (1996) demanded more diversity in the teaching population. “We cannot tolerate a future in which both [non-Hispanic] white and minority children are confronted with almost exclusively [non-Hispanic] white authority figures in the school” they said (p. 32). This outcry brought national attention to the need for teacher preparation programs to recruit ethnic minority teacher candidates so that diversity in the teacher candidate pool more adequately reflects the teaching profession and the growing diversity in the student population (Carnegie Forum on the Education Economy, 1986; Macias, 1999).

In 1996, the Carnegie Task Force on Education released a subsequent report elevating attention to the need for more centralized licensure and certification systems for teachers. Naturally this effort was supported by various education reform groups, especially the National Education Association (NEA), which is the largest teacher union in the country (Ballou & Podgursky, 2000a, Carnegie Corporation, 1996). These proposed systems for teacher credentialing involved program accreditation and approval measures for teacher education programs, student teaching and other forms of clinical practice, and teacher testing. The latter component of the system stipulated that teacher candidates must pass a licensure test as do doctors and lawyers who must pass medical boards and bar exams (Carnegie Corporation, 1996).

The 1998 reauthorization of the Higher Education Act included a requirement that teacher education institutions report the licensure exam results of all those who were teacher education program completers. This amendment was largely due to the need for
assurance that teachers demonstrated the competencies necessary to be deemed highly qualified. As the Higher Education Act was reauthorized, stipulating that teacher education institutions report their teacher candidates’ pass rates on licensure exams, the National Council for the Accreditation of Teacher Education (NCATE) was also undergoing major changes, including the development of new standards for accreditation to raise the emphasis on teacher candidate performance in teacher education programs. Other state and institutional efforts also were being put in place at this time (Gitomer & Qi, 2010).

The No Child Left Behind provisions of ESEA (2002) mandated that teachers not only be licensed, but that they demonstrate competence in the particular content areas in which they teach. As a result of these changes, state departments of education and teacher education institutions required candidates to pass multiple tests. Given that only those who passed their specified subject matter tests were eligible to teach in public schools, it was evident that essentially all licensed teachers successfully passed subject matter exams. By the end of the 1990s, all states had teacher candidate licensure testing requirements in place for entry to teacher education programs, earning initial licensure, or both (ESEA, 2002; Gitomer 1999; Gitomer & Qi, 2010; Luster 2010; National Association of State Directors of Teacher Education and Certification, 1998).

As the 1990s came to a close, concerns regarding teacher diversity became a greater focus. More research and scholarly literature was released on this topic, questioning the potential for an adverse impact of teacher licensure testing (Futrell, 1999; Riley, 1998; Stephens, 1999; Vail, 1998). Further reports were released in the early years of the 21st century which examined potential adverse impacts of teacher licensure...
assessments on the demographic and academic characteristics of teacher candidates. Researchers argued that in an effort to create uniformity and high standards for entry to the teaching profession, state education agencies were actually limiting the pool of diverse candidates interested in teaching (Gitomer et al., 1999).

The literature in this review was selected based on its relevance to increased testing of teacher candidates and decreased teacher candidacy among ethnic minorities. The volume of research explored herein provides insight regarding how state and national efforts to raise standards for a more qualified teaching force have resulted in more testing requirements for potential teachers, higher cut scores for potential teachers to reach, and potential decrease of diversity and cultural competence in the teacher candidate pool. As greater emphasis is being placed on testing for teacher candidates, emerging research explores whether performance on these tests as well as other academic characteristics provides and predictive value related to teacher readiness and effectiveness. This body of research informs our study and provides an opportunity to further the debate on the use of teacher candidate testing as measure of candidate quality.

**Admission to Traditional Teacher Education Programs**

The 21st century ushered in greater demand for new teachers as well as a national debate over the best way to prepare them. Some demanded more ease of entry into the teaching profession (Finn & Madigan, 2001), while others argued that if students are going to learn more, their teachers have to know more—meaning, both teachers and students need a higher quality education (National Commission on Teaching and America’s Future, 1996). Yet, research on teacher preparation continued to be spotty and some reported that there remained limited understanding of how to best design teacher
education programs and licensure structures (Boyd, Grossman, Lankford, Loeb, & Wycff, 2005; Wilson, Floden, Ferrini-Mundy, 2002).

As concern began to spread regarding the lack of rigorous requirements for admission to teacher education programs, concern also spread regarding the potential negative impact of higher standards. But education policymakers pushed for more testing as a means to determining if teacher candidates possessed the knowledge and skills necessary for successful classroom practice. Because links between what teachers should know and be able to do and how they are prepared by various teacher education programs across the United States have not been clear, a wide and varied range of admission requirements have been put in place. No single best way to attract and prepare the best and brightest teacher candidates has been determined (Casey & Childs, 2007; Gitomer, Latham, & Ziomek 1999; Youngs et al., 2003).

In order to determine the relationship between teacher education admission requirements and candidate performance after admission, teacher education programs would have to accept all candidates regardless of their academic profiles. Even though these programs seek better recruitment and admissions processes, their criteria for teacher candidate selection is largely driven by the efforts of policymakers and other public officials to hold them accountable (Graham & Garton, 2003). Prior to the 21st century, teacher education programs used various means of formative assessments of teacher candidates’ proficiencies, but the high-stakes-high-standards movement demanded more selective, more stringent, more test-based admission requirements (Auguste, Kihn, & Miller, 2010; Wilson & Robinson, 2012).
Accountability measures often do not take into consideration the varying backgrounds, schooling levels, and learning experiences or limitations teacher candidates bring to the admissions process. Teaching faculty across schools of education must work to accommodate a wide variety of learning needs in an effort to prepare candidates for a teaching career. A toolkit of several different teaching strategies and curricular resources is necessary in order to adequately prepare candidates—from any given academic background—to pass teacher licensure exams.

Researchers at the Educational Testing Service (ETS) conducted interviews with teacher education faculty across the United States to explore their efforts to meet the many varied needs of students who come to them from diverse backgrounds. The interviews provided detailed information regarding how and what students were being taught in preparation for Praxis exams and helped determine success strategies and recommendations for all colleges of education seeking to prepare candidates to teach. Many of the interviewees focused primarily on ways to align instruction with what students are expected to know for Praxis exams (Nettles et al., 2011; Nettles, Millett, & Oh, 2009).

Some research suggests that the tests are repetitive and they do not accurately predict how teachers will perform in the classroom (i.e. Daniel, 1993; Dybdahl, Shaw & Edwards, 1997; McCutcheon, Schmidt, & Bolden, 1991; Olstad, Beal, & Marrett, 1987; Salzman, 1989, 1991; Williams & Wakeford, 1990). Hanushek and Pace (1995) found that teacher candidates’ coursework and testing requirements significantly lower the probability of potential teachers completing teacher education training. This suggests that entry level tests such as Praxis I may be an unnecessary obstacle preventing students who
have an interest in teaching from pursuing teacher education studies (as cited in Angrist & Guryan, 2010).

But the intended outcome of admission policies and programs that prepare teachers is to yield applicants who will perform well in both the programs where they are trained and the schools where they will teach (Casey & Childs, 2007, Darling-Hammond, 1998; Darling-Hammond, Berry, & Thoreson, 2001). Stakeholders, including, but not limited to, teacher education programs, want to ensure that new teachers possess the necessary skills and knowledge to meet the learning needs of students. Entrance exams are widely used in an effort to determine career readiness for teacher education as well as the teaching profession.

**Grade Point Average**

Teacher education programs have consistently used undergraduate grade point average (UGPA) as the leading criteria for program admission (Lawrence & Crehan, 2001; Mikitovics & Crehan, 2002; Riggs, Riggs & Sandlin, 1992). Many believe it to be a good indicator of academic aptitude and a predictor of college readiness and success with college-level instruction. But Casey and Childs (2007) asserted that while it remains the leading criterion for program admission, researchers have found weak relationships between UGPA and performance in those programs.

Grading practices tend to vary across institutions of higher education but there is some research showing a strong relationship between the UGPAs of undergraduates and their performance on teacher licensure exams (Gitomer, 2007; Gitomer et al., 1999). One of the challenges in being able to produce more robust research regarding UGPA as an admission criteria is that the range of UGPAs among teacher candidates is limited. In an
effort to enforce high standards for entry, teacher education programs tend to restrict UGPA to a certain range. So it is difficult to determine the relationship between UGPA and other variables, such as student teaching and content area. It is virtually impossible to detect whether candidates who are denied admission on the basis of their UGPA would have been successful as student teachers or beginning teachers had they been allowed to pursue teacher education studies (Casey & Childs, 2007).

Researcher Drew Gitomer (2011) suggested that “If the *Praxis I* assessment of basic skills is a reliable measure of the knowledge and skills necessary for beginning teacher practice and central to teacher education curricula, then we should expect there to be a relationship between UGPA and teacher licensure exam scores” (Gitomer et al., 2011, p. 433). But research remains inconsistent as it relates to UGPA. In the early 1990s some researchers found that it did not predict teaching performance. McCutcheon, Schmidt, and Bolden (1991) examined the relationship between UGPA, *Praxis I* scores, and other variables. In a sample size less than 100, they found that UGPA did not predict student teaching performance. However, other researchers (e.g. Daniel, 1993; Riggs & Riggs, 1992) found UGPA to be a good predictor of both student teaching outcomes and teacher performance in the classroom. With a sample of 500 teacher candidates, Daniel (1993) found UGPA to be a stronger predictor of student teaching and first-year teaching performance than the NTE. He also noted that general knowledge and communication skills tests (similar to that of *Praxis I*) were not as strong predictor variables as were professional knowledge exams (similar to *Praxis II*) and UGPA. Heller and Clay (1993) not only found no relationship between UGPA and teaching, but they found that *Praxis* scores (then the NTE) were too limited to predict practice.
In a study of teacher quality indicators, Zumwalt and Craig (2005) explored the relationship between UGPA, academic major, teacher preparation programs, and SAT and ACT scores. They found an increase in teacher quality, based on Praxis test scores, as measured by academic background variables—GPA, SAT, and ACT. In a study of teacher effectiveness based on student testing outcomes, Kane, Rockoff, and Staiger (2006), who examined selectivity of institutions of higher education as well as UGPA, cautioned state agencies against hiring teacher candidates based on their academic background because they found that while these factors influenced admission to teacher education, they did not yield increased teacher quality in the classroom (Kane et al., 2006). Bacon and Bean (2006) examined the reliability of UGPA and differences between overall UGPA and UGPA within a limited timeframe, such as most recent UGPA or UGPA based on coursework within academic major. They found overall UGPA to be the most reliable in terms of various education program and policy decisions (Bacon & Bean, 2006).

In 2007, in their own review of literature addressing UGPA, staff at the New Jersey Department of Education wrote:

The important point is that none of the studies on GPA appear to address correlation based on particular levels or intervals of GPA. It could be, for example, that the studies all looked at teachers in the 2.65-4.0 range and found that some of those teachers were good and some were not. However, if the studies were to compare the effectiveness of a group of teachers with GPAs in the 2.65-4.0 range and a group with GPAs in the 1.5-2.0 range, for example, then we might begin to see some significant differences. The question is: In the absence of such
research, do we want to risk eliminating the GPA requirement only to find later that GPA does at least partially determine a teacher’s effectiveness in the classroom?....A number of other studies show that a teacher’s academic knowledge (not necessarily measured by GPA) is a good predictor of student achievement in the classroom. Therefore, if GPA has strong validity in terms of predicting general academic achievement, and if a teacher’s academic knowledge is a good predictor of student achievement in the classroom, then an indirect link might exist between undergraduate GPA and teacher effectiveness in the classroom. (Davy, Doolan, & Higgins, 2007, pp. 5-6)

Of course, UGPA is inconsistent across and within states due to the possibility of grade inflation, especially in cases where UGPA is self-reported among more selective and competitive institutions. Using a population of two million and data from more than 160 colleges and universities, Rojstaczer (2009, 2010) conducted a study of grades across institutions of higher education and found a 0.10 relationship between a 100 point increase in SAT and GPA and reported that “what is true about less selective colleges and universities is that while their grade inflation is not suppressed, their starting GPAs at the initiation of grade inflation were relatively low….Inflation rates appear to be independent of institution selectivity” (http://www.gradeinflation.com, para. 11).

Also, Hall and West (2011) explored connections between SAT, ACT, and Praxis test outcomes with UGPA. Even though their sample size was less than 100, they found that 16% of the variance in student teaching performance is attributable to UGPA and Praxis scores. And, more recently, researchers Patterson and Mattern (2013) of The College Board, found a negative relationship between program admissions rates and
mean SAT, high school GPA, and UGPA in the first year of college, but a positive relationship between the latter variables and selectivity. They asserted that more selective institutions have lower admissions rates (Patterson & Mattern, 2013).

The lack of consistent findings with regard to student GPA leaves questions as to its use as a selection criterion in teacher preparation. While Zumwalt and Craig (2005) found that Praxis test scores resulted in increased teacher quality as measured by GPA, SAT, and ACT, they contended that this increase compromised the diversity of the teaching pool and may have had an adverse impact on would-be good teachers (Zumwalt & Craig, 2005). Despite what we know from the research that is available, teacher preparation programs continue to use both measures as gatekeepers (Graham & Garton, 2003). This review of literature related to UGPA is very important to the present study given that it is deemed a critical factor variable.

In a recent study, Nettles et al. (2011) found that low UGPAs among African-American undergraduates were consistent with their low scores on Praxis I exams. This may mean that the perceived low volume of African-American teacher candidates who actually gain licensure would be the same regardless of whether states used UGPA or Praxis test scores as the candidate selection criteria. In their 2011 report, Performance and Passing Rate Differences of African-American and White Prospective Teachers on Praxis Examinations, Nettles et al. discussed the strong relationship between Praxis I scores and UGPA that they found.

…the key to increasing the supply of African-American teachers among those who are interested in pursuing a license by taking the tests is to focus upon strengthening their academic preparation for and achievement in college.
Improving grades and school performance are important, yet these are not the most important factors. In fact, the finding in this study, is that as African-American and White test-takers’ grades increase so too did the gaps on Praxis I, suggested that other factors are at work as well. (Nettles et al., 2011, p. 47)

There has been extensive research on what is often referred to as the Black-White achievement gap at all levels, kindergarten through college. But there is limited research on the Hispanic-White achievement gap. The growing population of Hispanic K-12 students, more than 23% nationally and 21% in New Jersey—the focus of this study—calls attention to the need for more research on trends in teacher education and performance for Hispanic undergraduates (U.S. Census Bureau, 2010; Pew Hispanic Center, 2012). Research on the achievement gap among various subgroups is key to the context of this study, given that our examination of Praxis I performance in relationship to Praxis II performance is likely to yield evidence of similar gaps both among test-takers who pass designated exams and those who may not.

The Praxis Series

The Praxis Series, developed in 1993, includes a battery of various teacher assessments that measure general and specialized content based on national standards and current research on teaching and learning. The Praxis I assesses basic skills in reading, writing, and mathematics. These three assessments are designed to be taken in the early college years and are most often used to evaluate if a student interested in teaching first has the pre-professional academic skills necessary to pursue studies in teaching. The Praxis II is comprised of more than 100 subject-matter assessments which evaluate whether a teacher candidate has the minimal content knowledge and skills necessary to
begin teaching. “Students who take *Praxis* and other licensing tests represent the only known supply pool that is truly interested in becoming teachers. Even baccalaureate degree recipients in…education cannot be considered…committed to becoming teachers until they…take required licensing tests.” (Nettles et al., 2011, p. 47)

Each state using *Praxis* exams selects which ones they require for each licensure area and then sets what they deem to be an appropriate passing score. ETS facilitates the standard-setting meetings during which classroom teachers and higher education faculty review test specifications, determine the knowledge needed for beginning teachers, make judgments about the level of difficulty of test items, and then recommend a passing score (see Appendix D). But there is no right or wrong score. States take several issues into consideration—such as shortage areas, political implications, demographics, and retention deficits—when setting scores. Both within and across states, passing scores tend to change. A student who passes a test in one state may very well have failed it in another. If a state periodically raises or lowers the passing score, a student who passes in one timeframe may not have passed in another. This variation in what constitutes a pass or fail fuels the research debate over whether *Praxis* tests scores can be used to determine a teacher candidate’s classroom performance (Nettles et al., 2011). Yet cut scores set by states do have a direct impact on the pool of teacher candidates.

*Praxis* pass rates range between 70 and 90%, which is relatively high in comparison to exam performance in law, medicine, and accounting fields. In 2012, *Education Week* reported that, in several states, the actual scores on teacher licensure exams are significantly higher than the passing scores set by state education agencies. Their findings were consistent across states, content areas and grade levels, as well as
different testing companies. The report raised questions about the rigor of teacher exams and whether they were best used as a minimum screen or if passing scores, overall, were just set too low (in comparison to other professions). But setting high passing scores has been a trend for some time. In 2009, the United States Department of Education reported that pass rates for teacher candidates was 96%. *Education Week* journalist Stephen Sawchuk, argued that “…states have set the passing bar significantly below the mean in many cases—even for those teaching at the high school level, where teachers on average have stronger academic qualifications than their colleagues in the lower grades” (Sawchuk, 2012, para. 21). Nonetheless, education policymakers contend that standardized tests do assist in screening out less qualified teachers. Because test-takers are allowed to take the test as many times as they choose, it is difficult to determine how the state-mandated passing scores affect scaled scores, and how many applicants teacher licensure exams ultimately screen out (Goldhaber, 2007). For purposes of this study, all data is based on first-time scores.

Using tests to evaluate teacher candidates’ basic skills, content knowledge, and pedagogical knowledge continues to be a controversial issue among education policymakers, researchers, and higher education faculty. *Praxis* exams, widely used by state agencies, remain at the center of decisions regarding licensure for beginning teachers. Youngs et al. (2003) reported that during the 1990s, several researchers found a strong correlation between how well prospective teachers performed on licensure tests and how well their students performed on achievement tests (e.g., Ehrenberg & Brewer, 1995; Ferguson, 1991; Hanushek, 1992). Then later, ETS researchers Gitomer, Brown, and Bonett (2011) found that passing the *Praxis I* basic skills test had a positive
relationship with passing *Praxis II* content tests and was, therefore, a useful admission requirement which gave students insight into whether they should pursue a teaching career. But while it may be true that there is a strong relationship between these tests, recent researchers argue that these teacher licensure exams do not show strong links to success in teaching.

But *Praxis* tests were not designed to predict how well teacher candidates will perform in the classroom. Gitomer and Latham (1999) reported that as an admission requirement, *Praxis* exams assess the extent to which teacher candidates possess basic skills and knowledge, in both content and pedagogy, to begin teaching, and that they do not measure the full array of skills necessary for mastery in teaching. Passing *Praxis*, at any score level, does not ensure that teacher candidates will be successful in the classroom (Gitomer et al., 1999). However, other researchers contend that if *Praxis* exams do not accurately screen for good, would-be candidates, then they inadvertently deter students from not only completing teacher preparation but considering the teaching profession as a potential career.

Researchers have questioned whether the *Praxis I* is an effective tool for distinguishing between teacher candidates who are adequate and those who are inadequate (Boyd et al., 2007). But Gitomer (year??) also found that those who score high on *Praxis* exams, also had high grades and SAT scores. He suggested that those who do not have high scores on *Praxis* are not equipped for teaching careers (assuming GPA and SAT scores depict career readiness). He reported a wide gap between those who pass and those who do not, which suggests that few test-takers have borderline performance: just
above or below the cut scores. So the Praxis does, indeed, filter out those who may not be qualified candidates for teaching (Gitomer & Qi, 2010).

In her paper *Selecting the Qualified: Predictors of Student Teacher Performance*, S. A. Salzman reported that both the basic skills and content area teacher assessments were weak predictors of a teacher candidate’s student teaching. She found that the “Praxis I: Pre-professional Skills Reading score was significantly correlated with ratings of classroom procedures (r = .29) in student teaching and with interpersonal skills (r = .23), but not with teaching plans (r = .19) (Salzman, 1991). That same year, researchers Riggs and Riggs (1991, as cited by Casey & Childs, 2007) found that teacher candidate scores on the Praxis II (or NTE) content area exams correlated only r = .02 with student teaching. Because those who do not meet the passing scores do not get admitted into teacher preparation programs, it is unknown whether or not they would have been effective teachers (p. 12). Daniel (1993) published research findings which also suggested the NTE exam was a strong predictor of student teacher performance or teaching behaviors. In 1997, in the research publication entitled, “Teacher testing: Reason or rhetoric,” Dybdahl, Shaw, and Edwards discussed that they found Praxis I scores to have no relationship to measures of teacher preparation program success. In 2002, after sampling over 1,000 student teachers, researchers Mikitovics and Crehan reported that “Praxis I Reading, Writing and Mathematics scores were not significantly correlated with student teaching performance, but were correlated .27, .28, and .19, respectively, with UGPA. UGPA, however, was correlated .10 with student teaching performance.”

When ETS analysts Gitomer, Brown, and Bonett (2011) examined the question of whether the Praxis I basic skills assessment actually measures the knowledge and skills
necessary for beginning teacher practice or poses an unnecessary obstacle for students who want to teach, they examined teacher candidates’ ability to pass *Praxis II* tests of Elementary Education, English, Mathematics, and Social Studies, after taking *Praxis I*. They used data from the years 1999-2005. Their sample was divided into three groups: first-time passing test-takers, test-takers who pass after more than two attempts, and those who never pass. They found that those who pass the *Praxis I* successfully on the first attempt had a higher probability of passing the *Praxis II* than those who struggled to pass the *Praxis I* (Gitomer et al., 2011).

Gitomer’s research (with various teams of other ETS researchers) spanned the 1990s to the mid 2000s. While his most recent report was published in 2011, it was based on data collected prior to 2006. While there are few gaps in research related to *Praxis*, both by ETS researchers as well as others across the country, there are many inconsistencies. Research from the last decade shows that teacher licensure test requirements do not yield higher quality candidates for teaching, but rather, they reduce the overall volume of students who pursue teaching careers (Angrist & Guryan 2007). It is debatable whether the effects are significant. There is also research which examines the relationship between tests used for program admission and teacher effectiveness during student teaching internships. Most of it suggests either a weak relationship or no relationship, insinuating that teacher assessments are not strong predictors of teacher quality (Jacob & Lefgren, 2004; Goldhaber, 2007). So much of the work by Gitomer was reviewed because of his access, as a leading research scientist at ETS, to the preponderance of data included in his studies from the years of test-taker performance ETS captures and stores (www.ets.org/research). While other researchers may not have
had as robust data sets, they did have reasonable sample sizes to conduct meaningful studies. It was thought to be important in this review of literature to balance the research studies of ETS, the company that makes the tests, with the studies and findings of those who implement the tests in their states and teacher preparation programs, as well as those who analyze test-taker performance statistics and trends in an effort to inform education policy decision makers.

So, the ongoing debate remains. Are teacher licensure assessments such as Praxis the best determinant for ensuring high quality teacher candidates? Do these assessments create an adverse impact in that they yield a homogenous population of candidates who do well on standardized tests but perhaps not so well in the classroom? Do teacher education programs which use these assessments as a gateway to the teaching profession also create an adverse impact related to lessening the teaching career interest of students who could become qualified teachers someday?

**Minority Teacher Candidate Pool**

Bennett, McWhorter, and Kuykendall (2006) explained that as teacher licensure requirements began to increase, research reports showed that enrollment of ethnic minority students in teacher education programs was decreasing. So an additional debate emerged as to whether the testing requirements specifically or intentionally deterred minority students from pursuing a teaching license. Also, Memory et al. (2003) reported that many felt the decline in enrollment and the need for concerted minority recruitment efforts were largely due to new requirements for entry into teacher education programs and for licensure license.
Bennett, McWhorter, and Kuykendall (2006), strong voices in research efforts addressing disparity among minority educators, listed several others (e.g., Garcia, 1986; Gillis, 1990-1991; Smith et al., 1988) who expressed concern with the negative impact of teacher licensure testing requirements on African-Americans. While these researchers support the efforts of state agencies and admissions programs to accept students who demonstrate the necessary basic skills, they expressed concerned that pressure to raise cut scores in an effort to create a more qualified teaching pool did not anticipate various unintended consequences, resulting in more disadvantages for students rather than benefits.

Bennett et al. (2006) explored research which revealed a disproportionately high number of African-Americans and Hispanics who did not pass. Given that there are no national passing scores (because states set their own cut scores), pass rates must be reviewed on a state-by-state basis (see Appendix D). Smith (1987) found that from 1984 to 1987 almost a third of all test takers and more than half of the minority candidates who sought admission to various teacher education programs in Texas did not pass one or more of the three basic skills tests. Similar findings were reported by the by Snow (1995).

National constituencies such as the American Association of Colleges of Teacher Education (Dilworth, 1990) and the North Central Regional Educational Laboratory (Dorman, 1990) had previously released reports of research with findings similar to Bennett et al. and others regarding the negative impact of teacher testing on minority students. This led to an article published in the Review of Educational Research (King, 1993a) summarizing the supporting evidence of the increasing need for more teachers of color and suggesting teacher testing as an obstacle for minority students interested in
teaching (Memory et al., 2003). A study conducted by the National Research Council in 2001 entitled, *Testing Teacher Candidates: The Role of Licensure Tests in Improving Teacher Quality* (Bennett et al., 2006), concluded that:

…lower passing rates for minority teacher candidates on current licensure tests pose problems for schools and districts in seeking a qualified and diverse teaching force. ...Higher passing scores on licensure tests is likely to reduce the diversity of the teacher applicant pool, further adding to the difficulty of obtaining a diverse school faculty. (p. 179)

Bennett et al. contended that the Praxis I is unfair and biased against minority students who would be good teachers someday. They further argued that teacher education program admissions and state agencies should eradicate the testing requirements (Bennett et al., 2006).

In consideration of the perception that teacher licensure tests are more of a barrier than a diagnostic evaluation, particularly for minorities, Angrist and Guryan (2007) conducted research that found no apparent link between teacher candidate testing requirements and the volume of African-American students in the teaching pool. But they did find some data that showed a negative correlation between basic skills testing requirements and the volume of new Hispanic teachers in the pool. They found a 2% reduction in the number of Hispanic teacher candidates, which is considerable given that the volume of new Hispanic teachers in the 1999-2000 school year was only 5% overall (Angrist & Guryan, 2007).

Critical attention must be given to the issue of race/ethnicity due to the ongoing efforts to narrow the achievement gap between White students and students of color,
especially African-Americans and Hispanics. National efforts are in place to address these learning gaps at both the K-12 and college levels. ETS researchers wrote,

To the extent that group differences in licensure test performance can be explained by the quality of academic preparation, solutions to the achievement gap become potentially more tractable. Race…is not an explanation, in and of itself, for differences in educational achievement….By looking at other factors, such as academic history, we may be able to better make sense of what is referred to as the achievement gap. (Gitomer et al., 2011, p. 434)

Based on the volume of Praxis test-takers in 2007, the teacher candidate pool was 88% non-Hispanic White (Gitomer, 2007; Planty, Hussar, Snyder, & Provasnik, 2008). While the demographics of the teaching profession have remained relatively the same over time—primarily a non-Hispanic White female workforce—the student population has become increasingly more diverse (Gitomer et al., 2011). By the 2009-10 school year, public school enrollment had grown to a population of almost 40% Hispanic, 40% African-American, and 20% American Indian students in high poverty schools, while the enrollment of non-Hispanic Whites hovered at 6% (Planty et al., 2012).

The disparity between the population of Hispanic teachers and that of Hispanic students is an ongoing problem. Currently less than 15% of the teaching profession is comprised of Hispanic teachers. One explanation for the lack of minority representation among prospective teachers is the low volume of students of color graduating from college with interest in teaching and their low pass rates on teacher licensure exams (Nettles et al., 2011). Further perpetuating the diversity gap is the fact that Hispanic students either not seeking to enter the teaching profession or not able to
successfully meet program requirements. While there have been various initiatives in place to recruit and retain more ethnic minority teachers, teacher preparation programs are still under-producing them.

In his preface to a paper presented by Luis A. Ubinas, President of the Ford Foundation, Kurt Landgraf, President and CEO of Educational Testing Service, referred to the lack of Hispanic teachers as “a national calamity: how our nation is failing our Latino youngsters, failing to propel them into higher education, including education administration, and into successful, productive careers” (Landgraf, 2012. p. 3). Hispanic students are much more likely to attend low-performing schools with limited educational resources and to be taught by novice and/or weak teachers (Padron, Waxman, & Rivera, 2002; Landgraf, 2012).

Low performing schools often lack the additional resources and support staff necessary to be competitive in the job market for teachers. Various research studies have suggested that teaching quality in these schools is less than that of schools in more affluent communities. Schools with better working conditions attract better teachers, who are reluctant to teach in high poverty neighborhoods (e.g., Boyd et al., 2005a; Lankford, Loeb, & Wyckoff, 2002). Goldhaber’s research (2007) indicates that hard-to-staff schools have the least qualified teachers because teachers are placed and displaced in accordance with certification requirements. He found that high-performing, perhaps easy-to-staff, suburban, schools usually showed no evidence of being impacted by teachers’ educational preparation and exam scores (Goldhaber, 2007).

Licensed teachers who score well on standardized tests and are assumedly more qualified, seek to teach in and are sought after by districts that offer higher pay, more
incentives, state-of-the-art classrooms and equipment, and other attractions that are often scarce in low-performing urban and rural schools. In response to this teacher shortage, districts facing the ills of low socioeconomic conditions are often forced to accept teachers who may not be fully credentialed and have had difficulty getting jobs in more affluent, resource-rich districts. This cycle perpetuates the equity gap which sustains poverty in poor communities, the diversity gap in the teaching force, and the gap in student achievement (Darling-Hammond, 1998; Hirsch, Koppich, & Knapp, 1998).

Low performing schools are more deeply affected by any adverse impact that teacher admission and licensing testing may have on the Hispanic teacher candidate pool. But researchers assert that the diversity gap in teaching cannot be solely attributed to teacher testing. Gitomer, Latham, and Ziomek (1999) wrote, “The proportion of minority individuals being attracted to teacher education is far smaller than the proportion of minority students in U.S. classrooms….Without radical changes in the recruitment and adequate training of talented minorities, this trend will not change any time soon” (p. 38)

A decade later, Bireda and Chait (2011) propelled this same message again.

The lack of diversity in the teaching force is troubling for several reasons. Fewer minority teachers may indicate that few minorities are interested in pursuing a career in teaching. The low number of minority teachers also may indicate that there are fewer minority candidates with the skills and qualifications to enter the field. The inability to retain highly effective minority teachers, like all teachers, is also a challenge for many…. (p. 1)
The ability to attract highly qualified minority teachers in these districts is not only essential for stabilizing the teaching force, but is key to increasing student achievement (Bireda & Chait, 2011).

Concerted efforts to recruit minority teachers may be a critical link in closing the achievement gap for schools in high minority, high-poverty communities. Some research suggests that ethnic minority teacher candidates are more likely to seek teaching positions at schools serving high populations of ethnic minority students. Specialized knowledge and skills related to cultural competency are important for teacher candidates who become employed in high minority schools. The need for ethnic minority teachers, especially Hispanics, is great in these schools because their personal connection to the cultural and economic backgrounds of students adds value to student learning and expands textbook-teaching practices. They not only serve as role models for minority students but provide learning exposure for non-minority students who have limited interaction with persons of a different race (Macias, 1999).

Also, Bireda and Chait (2011) asserted that, “the scarcity of minority teachers is not limited to any one type of school, in over 40% of public schools there is not a single teacher of color. And in urban and high-poverty schools where minority teachers are disproportionately employed, teaching staffs are still predominately composed of white teachers” (p. 1). Last year, the Center for American Progress (as cited in Boser, 2011) reported that “students of color do better on a variety of academic outcomes if they’re taught by teachers of color” (p. 1) and that the great disparity between the volume of minority students and that of minority teachers is a common issue across the nation. The Center reported that “more than 20 states have differences of 25 percentage points or
more between the diversity of their teacher and student populations” (p. 2). This is particularly relevant to this study since New Jersey is included in these 20 states.

It seems, then, that the research related to the Praxis I is both positive and negative. One school of thought supports claims that Praxis exams are a good screening instrument for prospective teachers, while the other supports arguments opposing their use altogether. It is certainly apparent to both sides that these exams restrict the supply of ethnic minorities into the pool of prospective teacher candidates (Gitomer & Latham, 1999). This review of literature underpins the intentions of this study to identify whether performance on the Praxis I for program relates to Praxis II performance for program exit, and if students who do not do well on the Praxis I might still pass their respective Praxis II content area exams if given the opportunity to pursue teacher education. Relevant to this study is the ongoing research discussion regarding the extent to which using Praxis exams for screening helps counsel out of the program students who are not ready to pursue a teaching career and if those who are counseled out of the program fall within any particular subgroup.

In 2011, when ETS examined the performance gaps between African-American candidates and their White counterparts, only 11% of all test-takers were African-American, and the volume of non-White Hispanics was far less than that. This report, Performance and Passing Rate Differences of African American and White prospective Teachers on Praxis Examinations, suggested that Praxis performance may be the cause of a “leak in the pipeline” (Nettles et al., 2011, p. 47). The report also stated that during visits to minority-serving higher education institutions, ETS researchers learned that changes in state certification regulations (such as raising passing scores and/or mandating
use of the assessment as a program entry requirement) demanded that teacher education faculty increase emphasis on Praxis preparation. Faculty members shared concerns that curriculum was becoming more Praxis-centered than teacher-centered. Not only did the faculty members complain about the lack of opportunity for input on these policies, but they also expressed concern that the new requirements would further lessen the low volume of minority students interested in teaching, as well as push them toward alternative paths to certification for which the Praxis I is usually not required (Nettles et al., 2011).

Several states have introduced alternative paths to teacher certification as a means of attracting more ethnic minority teacher candidates and loosening the strict requirements. There is not much research on whether this strengthens or weakens the quality of the teacher candidate pool. But alternative routes are increasingly becoming a supply chain for state and local education agencies, especially in New Jersey, Texas, and California—states where there are more diverse populations and almost 30% of the teaching pool comes through alternate paths (Feistritzer, 2011). While program requirements for those certified through the alternate path differ from state to state and even across programs within states, the alternative circumvents having to give emergency licenses to uncertified teachers as a means to fill shortage areas (Goldhaber, 2007). Because shortage areas are more widespread in high poverty school communities, this is where alternate path teachers are more concentrated. Some alternate route programs such as Teach for America were created specifically to respond to the critical shortage in high-poverty, hard-to-staff schools (Boyd et al., 2005).
The National Center for Education Information (NCEI) reported that most of the 40,000 candidates who took advantage of alternative routes to teaching were ethnic minorities (NCEI, 2008). In her report on the profile of American teachers, C. Emily Feistritzer (2011) explained that a third of those pursuing alternate pathways to teaching were non-White. She reported that Hispanics accounted for 15%, African-Americans for 11%, and another 4% as other ethnicities. In New Jersey, where alternate route programs abound, 40% of the new hires across the state enter teaching through an alternate preparation program (Feistritzer, 2011). So the high volume of alternate entry teachers, particularly minorities, suggests that alternative paths may be the key to increasing the minority teacher candidate pool (Nettles et al., 2011).

While alternative pathways to teacher licensure are steadily growing, the primary source of new teachers continues to be traditional 4 to 5 year teacher education programs. So, despite the means by which a new candidate pursues teacher certification, teaching assessments such as the Praxis continue to be the gatekeeper; screening out those deemed unprepared for a teaching career (Nettles et al., 2011). This mix of literature was chosen and included in this review to acknowledge both sides of the issue (pros and cons of Praxis tests) as a foundation for further study and to establish a context for how this study might explore whether Praxis tests fulfill the purpose they were created to serve. Careful attention was given to the extent to which that purpose inadvertently excludes certain subgroups from the pool of prospective teacher candidates. Surely the growing diversity of students in New Jersey demands a more diverse teaching force.
Teacher Licensure and Certification in New Jersey

In New Jersey, all teacher candidates are required to pass Praxis II exams, regardless of whether they completed traditional or alternative preparation programs. Because the Praxis I is required by most teacher preparation programs and not a state-regulated requirement for licensure, alternative certification programs often do not require it. At schools where Praxis is required (see Appendix A), undergraduate students must pass it in order to gain entry into a teacher education program. However, as indicated on the New Jersey Department of Education’s website (http://www.state.nj.us/education/educators/license), most candidates for alternative certification already have a baccalaureate degree from having completed their undergraduate studies in a more specific content area.

While approximately 40% of the teacher candidates in New Jersey enter the profession through alternative pathways, 60% complete traditional teacher education programs. Six percent of the programs that offer an alternate path are non-IHE based, the rest co-exist with traditional programs. Since the 1980s, the alternative path to teaching has served to increase teacher quality by pulling upon liberal arts majors. In 1978, the New Jersey legislature commissioned a group to examine all teacher preparation programs across the state. The group found that many undergraduates pursuing teaching careers were graduating without having demonstrated the necessary basic skills. So in 1985, New Jersey launched new requirements to increase both the quantity and quality of teachers. In addition to having an education major, teacher candidates had to determine a major in liberal arts and pass the specified Praxis exam (Klagholz, 2000).
Today, all teacher certification candidates in New Jersey, regardless of their route to entry, must earn a baccalaureate or advanced degree from an accredited college or university, successfully complete an approved teacher preparation program for licensure, meet cumulative but flexible UGPA requirements (see Table 3), pass the appropriate *Praxis* exam(s) for their individual certification area, and pass an examination of health and personal hygiene administered at local school district offices. This is indicated on the New Jersey State Department of Education’s website (http://www.state.nj.us/education/educators/license/overview/).

Currently New Jersey has adopted the new *Praxis Core Academic Skills for Educators* tests: Reading 5712, Writing 5722, and Math 5732. These three tests, aligned with Common Core State Standards (CCSS), have replaced the three former *Praxis I: Pre-Professional Skills* tests, which were not aligned with these new national standards (http://www.ets.org/praxis/nj). New Jersey has also adopted several new *Praxis II* content knowledge tests, including Elementary Education: Multiple Subjects 5031, English Language, Literature, and Composition 5041; and Mathematics: Content Knowledge 5061—also aligned with CCSS (http://www.ets.org/praxis/nj/requirements).

Because CCSS currently apply to areas of literacy and mathematics, the *Praxis II* test for social studies in New Jersey was not changed. When new tests are created and adopted, New Jersey’s State Board of Education also sets new passing scores (see Appendix D). For the purposes of this research study, all data is based on the former *Praxis I* and *Praxis II* tests required through July 2012. The New Jersey State Board of Education did not make any changes to these tests or the passing scores between July 2006 and July 2012, the time period covered in this study. Again, this study examines
performance of New Jersey teacher candidates who took the required tests and were required to meet the indicated passing scores as determined by the New Jersey State Department of Education (see Table 2).

Table 2

*Passing Scores for Praxis Tests in New Jersey*

<table>
<thead>
<tr>
<th>Required Test</th>
<th>Passing Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Praxis I</em> Pre-Professional Skills Test: Reading (5710)</td>
<td>175</td>
</tr>
<tr>
<td><em>Praxis I</em> Pre-Professional Skills Test: Writing (5720)</td>
<td>173</td>
</tr>
<tr>
<td><em>Praxis I</em> Pre-Professional Skills Test: Mathematics (5730)</td>
<td>174</td>
</tr>
<tr>
<td><em>Praxis II</em> Elementary Education: Content Knowledge (5014)</td>
<td>141</td>
</tr>
<tr>
<td><em>Praxis II</em> English Language, Literature, and Composition (5041)</td>
<td>162</td>
</tr>
<tr>
<td><em>Praxis II</em> Mathematics: Content Knowledge (5061)</td>
<td>137</td>
</tr>
<tr>
<td><em>Praxis II</em> Social Studies: Content Knowledge (5081)</td>
<td>157</td>
</tr>
</tbody>
</table>

New Jersey does allow flexibility with UGPA requirements. Students who have a high UGPA are allowed to earn a slightly lower passing score on the *Praxis II* and those with lower UGPAs must earn higher passing scores (see Table 3).

Table 3

*Flexibility for UGPA Requirements in New Jersey*

<table>
<thead>
<tr>
<th>Test</th>
<th>Passing Score</th>
<th>Passing Score + 10%</th>
<th>Passing Score – 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEM</td>
<td>141</td>
<td>155</td>
<td>134</td>
</tr>
<tr>
<td>ENG</td>
<td>162</td>
<td>178</td>
<td>154</td>
</tr>
<tr>
<td>MATH</td>
<td>137</td>
<td>151</td>
<td>130</td>
</tr>
<tr>
<td>SS</td>
<td>157</td>
<td>173</td>
<td>149</td>
</tr>
</tbody>
</table>

*Note.* *ELEM =* Elementary Education, *ENG =* English Language, Literature, and Composition, *MATH =* Mathematics, and *SS =* Social Studies.
There are 33 teacher education programs in New Jersey listed as score recipients of *Praxis* test-taker performances (see Appendix A). Even though the New Jersey State Department of Education does not require passing *Praxis I* for teacher licensure and certification, they do set the passing score for those programs that use *Praxis I* as an admission requirement. Almost all of the 33 teacher education programs use *Praxis I* to screen for teacher education readiness.

During the July 21, 2012 State Board of Education meeting in Trenton, New Jersey, board members participated in a review of *Praxis* research and performance data. It was reported (by Dr. Robert Higgins, Director of the Office of Certification and Induction and Secretary of the State Board of Examiners) that New Jersey candidates had a 90% passing rate on the *Praxis II: Elementary Education 0014* test, and the passing rate was 95% for White test-takers, 75% for non-White Hispanics, and 61% for African-Americans. The results also showed the state to have below 70% performance rates over the last 5 years in *Praxis II: Mathematics*, and this seemed to raise deep concern. While these pass rates are particularly high for White teacher candidates, there remains a great disparity between them and their African-American and Hispanic peers. Given what was known about the *Praxis I* prerequisite, it was assumed that all teacher candidates in this data set had successfully passed *Praxis I*. But the low pass rates of these newly licensed ethnic minority teachers raised concern. At the time of this study, the number of minority candidates in this pipeline as well as the path by which they were prepared remained unknown. This information was included in this literature review as evidence of the fact that even after candidates in New Jersey pass the *Praxis I* and successfully complete
teacher education studies, there remained a gap in performance between White teachers and their counterparts.

The approximate 1.6 million non-White Hispanics in New Jersey comprise almost 20% of its total population, ranking the state as 7th in the nation for the number of Hispanic residents. The Pew Hispanic Center (2012) has reported that 21% of the school-age students in New Jersey are non-White Hispanic. New Jersey is among 25 states in which the Hispanic population is the largest group of ethnic minorities. U.S. Census data from 2010 reveals that more than 6% of the full-time college students were Hispanic and more than 23% of K-12 students were Hispanic. When subtracting the percentage of minority students from that of minority teachers, the Center for American Progress (as cited in Boser, 2011) found a 31% difference for New Jersey. Their report on teacher diversity also reveals that New Jersey is among more than 20 states with diversity gaps with percentage points of 25 or higher. It also revealed that more than 25% of both African-American and Hispanic teachers entered the profession through an alternate path to certification.

In summary, there is a great deal of research addressing teacher preparation and testing. National emphasis on increasing student achievement drives efforts to raise the bar on what new teachers should know and be able to do. The research included in this review is mostly empirical but some is theoretical. It sheds light on the extent to which teacher testing appropriately measures college and career readiness and whether performance outcomes provide a clear indication of the knowledge, skills, and abilities that may be lacking among those who did not perform well.
A plethora of research was chosen that specifically addressed the variables examined in this study in an effort to create a context for program admission requirements and to further examine whether more recent test-taker data yields the same results as similar studies upon which these requirements were based. Given the recent changes in student and teacher standards, which result in changes to Praxis exams and teacher education curriculum, this study could yield similar findings as previous bodies of work or introduce new options for the field.

While some of the literature does include studies which suggest that Praxis tests inform teacher effectiveness, what is more important for this study are the pieces exploring whether scores on Praxis I that are used for teacher education entry correlate with scores on Praxis II that are used for entry to the profession, and whether that relationship changes, given certain test-taker characteristics. The intention for this study was to discover the probability of potential teacher candidates’ passing the Praxis I exam (on the first attempt) and moving on to pursue studies in teacher preparation. The performance of ethnic minority candidates, especially given the growing population of Hispanics, is particularly important considering the large volume of minority students in New Jersey’s K-12 classrooms. The next section includes the methods and design of study as well as the processes for data collection that led us to the pool of New Jersey test-takers examined here.
Chapter III

RESEARCH METHODOLOGY

Research Design

The purpose of the study is to examine the relationship between teacher-candidate performance on *Praxis I: Pre-Professional Skills*, a basic skills test, and select *Praxis II: Subject-Area Assessments*, which are tests of teacher content knowledge. The study focuses on teacher candidate supply and quality in New Jersey, as demonstrated by teacher candidate performance on *Praxis I*, and it explores whether entrance exams for admission to teacher education programs may be an obstacle preventing otherwise successful teacher candidates from entering the traditional teacher education or a useful screening tool for denying program entry, and perhaps a career in teaching, to students who do not have the necessary basic skills. This is not a study investigating whether the passing scores set forth by the State Department of Education in New Jersey are fair or appropriate. Instead, it attempts to establish the relationship between teacher tests used for admission into New Jersey teacher education programs and those used to obtain a license to teach in New Jersey.

The research design for this study is a quantitative analysis using logistic regression to understand the relationship of *Praxis I* and *Praxis II* performance as estimated by three variables: race, academic major (or course of study), and undergraduate grade point average (UGPA). The study also measures the relationship between passing the *Praxis II* and the number of test-taking attempts. A modeling approach was used to analyze how these variables relate to the likelihood of candidates who pass *Praxis I* also passing *Praxis II*. The data includes the performance of New
Jersey teacher candidates between July 2006 and July 2012 who passed the required
Praxis I and Praxis II tests across four content areas: Elementary Education and
secondary English, Social Studies, and Mathematics. The Praxis tests in this study are all
scored on a 100 to 200 scale. The required passing scores for New Jersey are listed in
Table 2.

Methods

In this analysis, logistic regressions were used to examine the relationship
between model variables with certain test-taker characteristics and whether or not they
passed Praxis I and Praxis II. Racial differences in Praxis performance as related to
academic major and UGPA were examined. In order to understand the relationship, New
Jersey test-taker outcomes on Praxis I were compared with their Praxis II outcomes. The
dependent variable is Praxis II status, meaning passing or not passing Praxis II. The
three predictor variables were race, academic major, and UGPA. Using logistic regression
analysis assisted with the determination of the likelihood that test-takers who pass all
three subtests of Praxis I will pass the selected Praxis II exam based on the
aforementioned independent variables. If test-takers do not pass Praxis I and, therefore,
are not accepted into a teacher education program, is it likely that they would not have
passed the Praxis II exam to exit the program and apply for teacher licensure? Effect size
was measured as described by Kraemer and Thiemann (1987) (see Appendix F). Those
less than .2 were relatively negligible. Those between .2 and .5 were determined to be
small. Those between .5 and .8 were determined to be medium effect sizes and measures
above .8 were large. Both statistical significance and effect size were considered in this
analysis to determine the strength and meaningfulness of any correlated variables (see Table 15).

**Research Population and Sampling**

The population for the time period of this study included 45,552 New Jersey test-takers which was pared down to those who took all three *Praxis I* tests as well as at least one *Praxis II* test. Data then had to be disaggregated to those whose fourth test was an assessment of Elementary Education, English, Social Studies, or Mathematics. There were 45,552 test-takers for these tests during the period of this study. Almost 21,000, which equals 63% of the pool, took only one test. Of the 8,981 who took three tests, 8,268 only took the three subtests of *Praxis I* (see Table 4). Assuming most candidates take *Praxis* exams in pursuit of a teaching career, this data suggest that almost 9,000 New Jersey test-takers began the journey to become a teacher and, for whatever reason, did not complete that journey. This sample size includes test-takers who took all three *Praxis I* exams and at least one *Praxis II* subject-area exam. All three *Praxis I* exams and the *Praxis II*: Elementary Education exam were taken by a total of 2,999 individuals. A total of 559 individuals took the English exam, 384 took the Mathematics exam, and 649 took the Social Studies exam (see Table 4).
Upon registration, test-takers complete a Background Information Questionnaire (BIQ) that asks that they indicate their ethnic background, gender, academic major, UGPA, teacher preparation institution, and other variables (see Appendix B). Because this is voluntarily self-reported information, test-takers may choose not to disclose this personal information, which results in missing data needed for research. Occasionally a test-taker will report different background information across registrations. In this study, test-takers’ background information was taken from the most recent registration. Test-takers who did not include all demographical details necessary for this study were removed from the data set. The original sample included those 4,591 test-takers who attempted all three components of Praxis I and one of four Praxis II tests of content knowledge (Elementary Education, English, Mathematics, and Social Studies) between 2006 and 2012. Of the 4,591 originally included in the sample, 1,085 did not provide full demographical information. This reduced the sample size to 3,506 test-takers (see Table 5).
Table 5

*Population and Sample Size*

<table>
<thead>
<tr>
<th>Test-taker Trends</th>
<th>Total Test-takers</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 + P2 ELEM</td>
<td>2999</td>
</tr>
<tr>
<td>P1 + P2 ENG</td>
<td>559</td>
</tr>
<tr>
<td>P1 + P2 MATH</td>
<td>384</td>
</tr>
<tr>
<td>P1 + P2 SS</td>
<td>649</td>
</tr>
<tr>
<td>Original Sample</td>
<td>4591</td>
</tr>
<tr>
<td>Missing Info</td>
<td>1085</td>
</tr>
<tr>
<td>Complete Info</td>
<td>3506</td>
</tr>
</tbody>
</table>

*Note.* P2 = *Praxis II* tests including: ELEM = Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.

There was an investigation of performance statistics and other characteristics of test-takers who were removed from the data set. Of those excluded, 57% passed all three *Praxis I* exams. There were 88% who passed the *Praxis II* Elementary Education exam; more than 70% who passed the *Praxis II* English and Mathematics, and 60% who passed the *Praxis II* Social Studies exam (see Appendix E for more details).

In an effort to define test-takers’ passing status, the data were pulled based on their first attempt at both the *Praxis I* and the *Praxis II* exams. A test-taker may make several attempts to reach New Jersey’s passing score, so if s/he took the *Praxis* more than once, the passing status in this study is based on the first attempt. The average number of test-taker attempts for those included in this study is 1.01 which means those who attempt to pass a *Praxis* exam usually do so in the first attempt. That said, number of attempts was removed from the list of critical variables.
Table 6

Population and Sample Size of Test-takers Distributed by Praxis II Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>ELEM</th>
<th>ENG</th>
<th>MATH</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>2999</td>
<td>559</td>
<td>384</td>
<td>649</td>
</tr>
<tr>
<td>Missing Info</td>
<td>684</td>
<td>128</td>
<td>112</td>
<td>161</td>
</tr>
<tr>
<td>Sample Size</td>
<td>2315</td>
<td>431</td>
<td>272</td>
<td>488</td>
</tr>
</tbody>
</table>

Note. ELEM=Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies. The sample size reflects the volume of test-takers who provided full demographic information and passed all three Praxis I tests (reading, writing, and mathematics).
Validity and Reliability of the Instrument

ETS ensures that the test developers for Praxis adhere to strict protocols regarding fairness. They conduct systematic bias reviews of test items, and they include ethnic and geographical representation to ensure diversity on national advisory committees and panels. They also follow certain processes for standard setting studies and conduct differential item analysis (Educational Testing Service, 2010).

With a few exceptions, the Praxis I and Praxis II tests reviewed meet the criteria for technical quality articulated in the committee’s framework. This is particularly true regarding score reliability, sensitivity reviews, standard setting, validation research (although only content-related evidence of validity was provided), costs and feasibility, and test documentation. (Mitchell, Robinson, Plake, & Knowles, 2001, p. 87)

The validity of Praxis tests in terms of predicting teacher performance in student teaching as well as on the job continues to be a national debate. Nonetheless, researchers support the content validity and reliability of Praxis tests, while at the same time they encourage more research on this issue. “The extent to which teacher licensure tests identify candidates with the knowledge and skills minimally needed for competent practice is a key concern” (Mitchell et al., 2001, p. 121).

If basic skills tests are valid measures of fundamental precursors needed for teacher preparation coursework study, then there ought to be an association between success on Praxis I and outcomes on Praxis II. However, if basic skills tests are not a predictor of other academic outcomes, Praxis II outcomes ought to be independent of Praxis I performance. (Gitomer et al., 2011, p. 433)
Data Collection

The data for this study were provided by the Center for Statistical Analysis at Educational Testing Service (ETS) in Princeton, New Jersey. ETS is the organization that develops and administers Praxis assessments. ETS maintains test-taker data, including number of attempts, passing scores and pass rates, and overall and categorical performances within a particular test for a period of 10 years. Along with performance results, ETS also collects test-takers’ personal profile data based on voluntary information provided in the BIQ (see Appendix B).

The critical factor variables are Praxis I scores, UGPA, race, and academic major. Passing scores for New Jersey test-takers are provided in Table 2, and revised scores based on flexible UGPA requirements are provided in Table 3. The Praxis I data set includes test-taker scores for students who met the cut scores for admission to a teacher education program in the state of New Jersey. Scores for Praxis tests are provided directly to the higher education institute a candidate attends and/or designates as a score recipient as well as to the New Jersey State Department of Education by ETS and not by an individual test-taker. Test scores along with the number of retake attempts are determined and reported by ETS but race, UGPA, and academic major are self-reported data.

There is some misalignment between New Jersey’s flexible UGPA requirements and the UGPA categories self-reported when test-takers register for a Praxis test. There are six categories from which candidates may select and report their UGPA: 4.00 – 3.50, 3.49 – 3.00, 2.99 – 2.50, 2.49 – 2.00, 1.99 – 1.50, and Below 1.50. But New Jersey’s State Board of Education flexibility ranges for UGPA are 2.50 – 2.75 and 3.50 or higher. The Board will accept teacher candidates whose UGPA is between 2.50 and 2.75, if they
achieve a score that is 10% higher than the indicated cut score. The Board will accept teacher candidates’ whose score is within 5% less than the cut score if their UGPA is a 3.50 or higher (http://www.state.nj.us/education/educators/license/overview/). The Board allows students with a higher UGPA to achieve a slightly lower score on Praxis exams than the set passing score. But students who have a lower UGPA than what The Board has set as the standard are required to score higher than the set passing scores (see Table 3). There was an investigation of the sliding scale for UGPA to determine passing status based on the Passing Score +10% and Passing Score – 5% flexibility options.

Based on the data that ETS provided, some assumptions were made to account for minor discrepancies in the data set. In cases where a test-taker profile had an inconsistency (such as reporting a different race than what was indicated on a previous test registration form), the most recent selections as self-reported through the registration system were used. Because there are 12 different selections to choose from regarding race/ethnicity, mostly among those of Spanish descent, the data fields were combined to ensure a sufficient sample. The Hispanic sample included all test-takers who indicated: Puerto Rican, Mexican, Mexican-American, Chicano, Latino, Latin American, and Other Hispanic. However, the remaining options were African-American, Asian-American, Native American, and White. There were some candidates who labeled race as “Other.” The focus of this study is the performance of African-American, White, and Hispanic test-takers. It was not possible to conduct an analysis on other ethnic subgroups due to the extremely low volume of candidates and an even smaller pool of those with complete profiles.
This study replicated portions of a larger study, *Useful Signal or Unnecessary Obstacle? The Role of Basic Skills Tests in Teacher Preparation*, published by ETS researchers Drew Gitomer, Terran Brown, and John Bonett in 2011. Their study sample included all test-takers who took the *Praxis I* between 1999 and 2005 and took the selected *Praxis II* tests between 2002 and 2005. Their sampling included almost 27,000 White and African-American teacher candidates from across all states in which these tests are used, including but not limited to New Jersey. They determined passing status based on the national median passing standards of all states and territories that require *Praxis* exams, since different states set different passing scores. They could not include Hispanics in their study because there was not a sufficient sample size at the time and even for African-Americans, the national sample sizes were limited (Gitomer et al., 2011). In addition to race/ethnicity, the sample for the present study included test-takers who provided UGPA and academic major in their profiles (see Appendix C). Both these variables are self-reported during test-taker registration.

There is some misalignment between the categories listed during *Praxis* test registration and the UGPA categories collected by New Jersey for program entry flexibility. There are six categories from which candidates may select and report their UGPA to ETS: 4.00 – 3.50, 3.49 – 3.00, 2.99 – 2.50, 2.49 – 2.00, 1.99 – 1.50, and Below 1.50. New Jersey’s flexible UGPA requirement ranges are 2.50 – 2.75 and 3.50 or higher because the State allows test-takers with a higher UGPA to achieve a slightly lower score on *Praxis* and test-takers who have a lower UGPA must score higher than the passing score (see Table 3). Again, there was an examination of the sliding scale for UGPA to
determine passing status based on the “Passing Score +10%” and “Passing Score − 5%” flexibility options.

To determine academic major, some decisions were made regarding all the various subject areas that could fall within a particular major. In accordance with the study conducted by Gitomer, Brown, and Bonett (2011), the various fields for academic major and certification were categorized into the four main content areas depicted by the chosen Praxis II exams: Elementary Education, English, Mathematics, and Social Studies. Most fields were consistent with these titles except for Social Studies, an area which includes several subfields (i.e. geography, history, political science, etc.; see Appendix C.)

This study examined the varying backgrounds, learning experiences, and limitations teacher candidates brought to the admissions process, as defined by UGPA and academic major. If a candidate’s course of study and coursework outcomes significantly lowers his or her probability of passing the Praxis exam, this may suggest that the Praxis I may be an obstacle preventing students from pursuing teacher education studies in New Jersey. Because teacher education programs in New Jersey also consider UGPA for program admission, test-takers’ UGPA data were used, along with academic major, to explore the relationship between these factors and outcomes on Praxis exams. The data may assist in determining whether using UGPA and Praxis I outcomes for program admission may have an adverse impact on would-be good teachers.

**Data Analysis**

The purpose of the study is to examine the relationship between passing status for select Praxis II: Subject-Area Assessments of teacher content knowledge and Praxis I:
Pre=Professional Skills tests. The data were compiled and analyzed using SPSS. Test-taker outcomes were included for all those who attempted a Praxis I or Praxis II exam during the timeframe indicated for this study, and who provided the necessary demographic information. Praxis II scores, along with four predictor variables—Praxis I status, UGPA, race, and academic major—were entered into SPSS without any personal information of individual test-takers; so their identity remained confidential. The data sets provided by ETS are the same as those provided annually to institutes of higher education as well as state departments of public instruction so that they may conduct their own similar or different analyses.

SPSS was used to calculate the descriptive statistics of various test-taker characteristics, to identify pertinent frequency distributions, and to analyze other data associated with variables in this study, including but not limited to Praxis I scores, UGPA, passing scores, race/ethnicity, and academic major. Praxis I and Praxis II are abbreviated in tables as P1 and P2 respectively. The four individual Praxis II tests included in this study are abbreviated as ELEM for Elementary Education, ENG for English, SS for Social Studies, and MATH for Mathematics.

Regression analyses were run for each Praxis II test introducing each of the four predictor variables separately first, and then altogether. Consistent with the Gitomer et al. study, effect size was measured as described by Kraemer and Thiemann (1987). Effect sizes less than .2 were relatively negligible. Measures between .2 and .5 were considered small. Effect sizes between .5 and .8 were considered medium and effect sizes above .8 were large.
Test-taker data were disaggregated by Praxis I status, race/ethnicity, UGPA, and academic major in order to determine the relationship between these variables and the probability of passing the Praxis II. Table 7 displays the five models that were estimated. Model 1 explores passing status on the three Praxis I exams in relationship to the corresponding Praxis II exam. The a priori assumption is that Praxis I assesses the basic knowledge and skills necessary for college readiness and entry to teacher education studies. The relationship between performance on Praxis I and then Praxis II were examined to determine the extent to which using Praxis I as an admission requirement screens out those who are not ready for [and perhaps not likely to succeed at] Praxis II. Models 2 through 4 examine the relationship of various demographic and academic factors with the outcome of passing Praxis II. An investigation was conducted to determine whether race/ethnicity, academic major, and UGPA account for variation in test-taker performance. By examining these critical factors, it may help the field better understand the achievement gap and how to narrow it, the academic factors related to successful outcomes on teacher licensure exams, and how changes in the teacher candidate pool may be affected. Model 5 considers all four predictors together. For each Praxis II exam (Elementary Education, English, Mathematics, and Social Studies), the relationship of passing all three Praxis I exams (reading, writing, and mathematics) race, academic major, and UGPA was estimated with regard to passing status on respective Praxis II exams. Logistical regressions were run for Elementary Education, English, and Social Studies. But there were some convergence issues for the Mathematics exam due to the low number of people not passing Praxis I Mathematics, so the final model solution was not interpretable in SPSS.
Table 7

Models Estimated in Analysis with Outcome of Likelihood of Passing Praxis II

<table>
<thead>
<tr>
<th>Regression Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1: Passed P1 on first attempt</td>
</tr>
<tr>
<td>Model 2: Race</td>
</tr>
<tr>
<td>Model 3: Academic Major</td>
</tr>
<tr>
<td>Model 4: UGPA</td>
</tr>
<tr>
<td>Model 5: Praxis I, Race, Academic major, UGPA</td>
</tr>
</tbody>
</table>
Chapter IV

RESEARCH FINDINGS AND ANALYSIS

The data analysis is based on logistic regression used to understand the relationship between Praxis I and Praxis II test-taker outcomes. There was an attempt to determine why some teacher candidates are able to pass Praxis tests more than others by exploring certain test-taker characteristics. The relationship of variables in the model was examined, including demographic characteristics of the test-takers as well as passing status on Praxis exams. There was particular interest in connections between race/ethnicity and performance outcomes for Praxis, along with academic major, and UGPA.

The first research question explored the academic and demographic characteristics of teacher candidates in New Jersey who pass the Praxis I: Pre-Professional Skills (see Table 8). Before the sample size was narrowed to include only those test-takers who provided complete demographic profiles, the initial data pool was much larger—almost 46,000 test-takers in New Jersey between years 2006 and 2012—who took all three subtests of Praxis I and then took a Praxis II content area exam (see Tables 4 and 8). Of those who passed the Praxis I, more than 22,000 pursued studies in elementary education, 4,500 in English, 3,000 in mathematics, and approximately 4,500 in social studies (see Table 8).

Initially the models were run using the sample population of those with Praxis II passing status without accounting for New Jersey’s sliding scale for UGPA flexibility. However, an investigation of the sliding scale was conducted to determine passing status
and 12.1% of the population of test-takers across designated Praxis II content areas were affected by the flexible UGPA options.

Table 8

Population and Praxis II Pass Rates by Race

<table>
<thead>
<tr>
<th>Test</th>
<th>ELEM</th>
<th>ENG</th>
<th>MATH</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>1923</td>
<td>406</td>
<td>270</td>
<td>332</td>
</tr>
<tr>
<td>WHITE</td>
<td>17980</td>
<td>3808</td>
<td>2390</td>
<td>3797</td>
</tr>
<tr>
<td>HISP</td>
<td>2284</td>
<td>305</td>
<td>267</td>
<td>354</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>22187</td>
<td>4519</td>
<td>2927</td>
<td>4483</td>
</tr>
<tr>
<td><strong>Pass</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>1014</td>
<td>153</td>
<td>51</td>
<td>101</td>
</tr>
<tr>
<td>WHITE</td>
<td>15954</td>
<td>2756</td>
<td>1410</td>
<td>2287</td>
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<tr>
<td>HISP</td>
<td>1464</td>
<td>166</td>
<td>75</td>
<td>174</td>
</tr>
<tr>
<td><strong>Not Pass</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>909</td>
<td>271</td>
<td>219</td>
<td>231</td>
</tr>
<tr>
<td>WHITE</td>
<td>2026</td>
<td>1052</td>
<td>980</td>
<td>1510</td>
</tr>
<tr>
<td>HISP</td>
<td>290</td>
<td>138</td>
<td>187</td>
<td>183</td>
</tr>
<tr>
<td><strong>Pass Rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>52.7</td>
<td>33.2</td>
<td>18.8</td>
<td>30.4</td>
</tr>
<tr>
<td>WHITE</td>
<td>88.7</td>
<td>72.3</td>
<td>58.9</td>
<td>60.2</td>
</tr>
<tr>
<td>HISP</td>
<td>83.4</td>
<td>54.6</td>
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<tr>
<td><strong>Sample Size</strong></td>
<td>2315</td>
<td>431</td>
<td>272</td>
<td>488</td>
</tr>
</tbody>
</table>


The study began with a sample of 3,506 test-takers who each took four the Praxis exams required for teacher licensure in New Jersey and provided all necessary demographic information put forth in the research questions. A majority of New Jersey test-takers (approximately 22,500) who passed the Praxis I and entered teacher education programs to pursue studies in our high-volume content areas—Elementary Education, English, Mathematics, and Social Studies—were White, while less than 3,300 were African-American and Hispanic (see Table 8). White teacher candidates consistently
outperform their African-American and Hispanic peers. African-American candidates underperform in all content areas. Their 53% pass rate in Elementary Education is more than 30% lower than that of Whites and Hispanics. In English and Social Studies, their pass rate is approximately 30%, which is 30% lower than Whites and 20% lower than Hispanics. Their scores are particularly low in Mathematics, in which their 18% pass rate is 40% lower than Whites and 10% lower than Hispanics. While Hispanics outperform their African-American counterparts, they still underperform in comparison to their White peers. Most of those who pass the Praxis I regardless of their race/ethnicity, pursue careers in Elementary Education. There were more academic majors and higher pass rates in Elementary Education than any other content area. There were fewer test-takers for Mathematics than other content areas, and pass rates were lower as well. Consistent with the growth of New Jersey’s Hispanic population, there were over 3,000 non-White Hispanic test-takers, 800 of whom did not pass their respective content knowledge exams, even after having passed Praxis I.

Given the disparity in pass rates by race for Praxis II, the means and standard deviations between Praxis I scores were also examined in an effort to determine whether performance gaps were consistent. This analysis was used investigate baseline equivalency between White and African-American test scores, as well as White and Hispanic test scores of those who took all three Praxis I exams. The mean scores for White candidates were 178 for reading, 176 for writing, and 178 for mathematics, with standard deviations of 5.63, 4.22, and 6.67 respectively. For African-Americans, the mean scores were 174 for reading, 173 for writing, and 173 for mathematics, with standard deviations of 7.22, 4.54, and 7.68 respectively. The mean scores for Hispanics were 174
for reading, and 173 for both writing and mathematics, with standard deviations of 6.95, 4.60, and 7.32 respectively. The performance gaps between White candidates and both African-Americans and Hispanics were similar for reading, but the gaps for African-American scores in writing and mathematics were slightly wider.

The second research question referred to the relationship between success on Praxis I and success on Praxis II for teacher candidates in New Jersey given various characteristics such as race/ethnicity, academic major, and UGPA. The correlation between test-taker performance on Praxis I exams used for teacher education program entry in New Jersey and Praxis II exams used for program exit was examined. Five different models, to determine the likelihood of passing Praxis II, were explored (see Table 7). After applying each model to the data, the squared multiple correlations for the logistic regressions were determined. An analysis for each variable follows.

Model 1 examined the relationship of Praxis I performance to that of Praxis II. Models 2 through 4 examined this relationship introducing each predictor variable (i.e. race/ethnicity, academic major, and UGPA respectively). Model 5 is a complex model which examined all three critical factor variables together. In addition to an examination of the predictive value of each variable, an analysis was conducted for each Praxis II test. A close review of sample size and an analysis of variance for each model was conducted.

Model 1: Praxis I Passing Status

For Model 1, as presented in Table 9, a Wald chi-square test was conducted to examine the probability of test-taker outcomes on Praxis I and on all four Praxis II exams. The first analysis was run for Praxis I as a predictor for Praxis II: Elementary Education. The Chi-square value for Praxis I Reading was 100.33 (df = 1, p = 000). The
Chi-square value for Praxis I Writing was 9.37 ($df = 1, p = .002$). The Chi-square value for Praxis I Mathematics was 98.91 ($df = 1, p = .000$). There was a significant relationship between passing the three Praxis I exams used for program entry and passing the Praxis II Elementary Education exit exam. The $p$ values for all three Praxis I tests were less than .05, and each standard regression coefficient was positive. The beta for the reading test ($\beta = 1.830$) was greater than that of mathematics ($\beta = 1.776$); the betas for both reading and mathematics were greater than that of writing $\beta = .0539$. The effect sizes for Praxis I Reading and Praxis I Writing as a predictor for Elementary Education were .446 and .423 respectively. For math, it was .117 which was relatively negligible, but the effect sizes for reading and writing were close to medium (see Appendix F). Passing Praxis I is clearly a predictor, suggesting test-takers who do well on Praxis I are likely to do well on Praxis II Elementary Education (see Table 9).

A Wald chi-square test was conducted to the probably of the test-taker outcomes on Praxis I and the Praxis II: English exam. The Chi-square value for Praxis I Reading = 45.77 ($df = 1, p = 000$). The Chi-square value for Praxis I Writing = 11.69 ($df = 1, p = .001$). The Chi-square value for Praxis I Mathematics is 8.43 ($df = 1, p = .004$). There was a probability that passing the three Praxis I exams used for program entry would lead to passing the Praxis II English exit exam. The standard regression coefficient for the reading test ($\beta = 3.082$) was greater than that of the writing test ($\beta = 1.868$) and the mathematics test ($\beta = .0879$). The betas for both the reading and writing tests were greater than that of the mathematics test. These standard regression coefficients for all three entry exams were positive. However, the effect sizes for Praxis I Reading, Writing, and Math as a predictor for English were .576, .270, and .212 respectively, which measures medium
to small (see Appendix F). Passing the *Praxis I* is a predictor of test-takers also passing *Praxis II*: English. Students who pass the Reading, in particular, along with the Writing and Math components of *Praxis I* are likely to pass the English exam (see Table 9).

In examining the relationship between the test-taker outcomes on the *Praxis I* and on the *Praxis II* Social Studies exam, it was determined that the Chi-square value for *Praxis I*: Reading to be 17.32 (*df* = 1, and *p* = 000); the Chi-square value for *Praxis I* Writing to be 14.44 (*df* = 1, *p* = .000); and the Chi-square value for *Praxis I* Mathematics was 13.37 (*df* = 1, *p* = .015). There was a significant probability that passing the three *Praxis I* exams used for program entry would lead to passing the *Praxis II* Social Studies exit exam. The standard regression coefficients for all three *Praxis I* exams were positive, suggesting that test-takers who passed *Praxis I* exams were likely to pass *Praxis II* exams. The beta for reading (β = 1.561) and the beta for writing (β = 1.209) were both greater than the beta for mathematics (β = 0.673). But the effect size for mathematics was much smaller than that of reading and writing. The effect sizes for *Praxis I* Reading, Writing, and Math as a predictor for Social Studies performance were .275, .228, and .144 respectively (see Table 9 and Appendix F). Yet, passing all three *Praxis I* exams does provide some predictive value for passing the *Praxis II* Social Studies exam.

A Wald Chi-square test was conducted to examine the probability of the test-taker outcomes on *Praxis I* and *Praxis II* Mathematics exams, but there were some convergence issues. If the standard regression coefficients were used to estimate the relationship, where β = .789 for reading, β = 1.083 for writing, β = 30.474 for mathematics, and *p* = 1.000, there would be a significant relationship between passing *Praxis I* exams used for program entry and passing the *Praxis II* Mathematics exam. But
the overall high pass rate on the *Praxis I* entry exam made it difficult to use passing
*Praxis I* as a reliable predictor for Mathematics. There were 384 people in the data set
who took *Praxis I* and *Praxis II* Mathematics. Of these, only 19 did not pass *Praxis I* and
one of these passed *Praxis II* Mathematics.

Table 9

*Parameter Estimates and Effect Sizes for Praxis I*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>Chi-Square</th>
<th>p value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELEM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 Reading</td>
<td>1.830</td>
<td>0.183</td>
<td>100.326</td>
<td>0.000</td>
<td>0.446</td>
</tr>
<tr>
<td>P1 Writing</td>
<td>0.539</td>
<td>0.176</td>
<td>9.366</td>
<td>0.002</td>
<td>0.117</td>
</tr>
<tr>
<td>P1 Math</td>
<td>1.776</td>
<td>0.179</td>
<td>98.911</td>
<td>0.000</td>
<td>0.423</td>
</tr>
<tr>
<td><strong>ENG</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 Reading</td>
<td>3.082</td>
<td>0.456</td>
<td>45.765</td>
<td>0.000</td>
<td>0.576</td>
</tr>
<tr>
<td>P1 Writing</td>
<td>1.868</td>
<td>0.546</td>
<td>11.686</td>
<td>0.001</td>
<td>0.270</td>
</tr>
<tr>
<td>P1 Math</td>
<td>0.879</td>
<td>0.303</td>
<td>8.428</td>
<td>0.004</td>
<td>0.212</td>
</tr>
<tr>
<td><strong>SS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 Reading</td>
<td>1.561</td>
<td>0.375</td>
<td>17.315</td>
<td>0.000</td>
<td>0.275</td>
</tr>
<tr>
<td>P1 Writing</td>
<td>1.209</td>
<td>0.318</td>
<td>14.435</td>
<td>0.000</td>
<td>0.228</td>
</tr>
<tr>
<td>P1 Math</td>
<td>0.673</td>
<td>0.276</td>
<td>5.959</td>
<td>0.015</td>
<td>0.144</td>
</tr>
</tbody>
</table>

*Note.* P1 = *Praxis I*. ELEM = Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.

As previously explained, *Praxis II* Mathematics was excluded from Table 9 based
on the issues with data convergence. This was largely due to the limited number of test-
takers failing *Praxis I* Mathematics. The final model solution was not interpretable in
SPSS. After the data were pared down to the final sample size of test-takers who provided
a complete, demographic profile necessary for this study, there remained 272
Mathematics test-takers in the sample size, only 14 of them failed to pass *Praxis I* on the
first attempt.
The data set in Table 10, also provided by ETS, includes all test-takers across the country and overseas who took the *Praxis I* Mathematics exam during the 2006-2012 period. These data provide a comparison of New Jersey test-taker performance with that of those who did not attend a higher education institution in New Jersey. Table 10 shows that test-takers of Mathematics in New Jersey had higher pass rates on average than the national pass rate. But the New Jersey passing score of 174 is less than the national median of 178. Nonetheless, it was not possible to complete a logistic regression analysis examining the relationship of *Praxis I* and *Praxis II* in Mathematics due to the high success rate of test takers in New Jersey who attempt and pass the *Praxis I* Mathematics test (see Tables 9 and 10).

### Table 10

**Pass Rates Summary for Praxis I: Mathematics in 2006-2012**

<table>
<thead>
<tr>
<th>Praxis Test</th>
<th>Agency</th>
<th>N</th>
<th>% Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Praxis I: Mathematics</td>
<td>All Test Takers</td>
<td>582060</td>
<td>77.19</td>
</tr>
<tr>
<td></td>
<td>NJ</td>
<td>11967</td>
<td>82.71</td>
</tr>
</tbody>
</table>

*Note.* This data includes only test-takers who are attending institutions in NJ.

The pass rate of New Jersey test-takers is several points higher than the national pass rate. But national pass rates are based on the national median score, since each state sets its own passing score. The national median for *Praxis I*: Mathematics is 178, while the passing standard for New Jersey is 174. Despite academic major, UGPA, and demographical profiles, test-takers in New Jersey demonstrate competency in Mathematics. *Praxis I*: Mathematics is a high-school level assessment of basic skills while *Praxis II* Mathematics is a much more in-depth exam that assesses whether a test-
taker has the adequate knowledge and skills for beginning practice as a Mathematics teacher (Educational Testing Service, 2012).

**Model 2: Race/Ethnicity**

In Model 2, a regression analysis was conducted to determine the effect of test-takers’ race/ethnicity on *Praxis II* outcomes. Because race is introduced as one variable, dummy codes were used for the three primary ethnic groups included in the study—White, African-American, and Hispanic. Where Hispanic is the reference group, the contrasts are White versus Hispanic, and African-American versus Hispanic. The *p* values for all ethnic groups included in the study are greater than .05. There were very small effect sizes for race/ethnicity across all four content areas. This finding suggested that despite ethnic backgrounds, those candidates who pass *Praxis I* are likely to pass *Praxis II* and candidates who do not pass *Praxis I* are not likely to pass *Praxis II*. Ethnic identity is not a significant predictor of passing status on the *Praxis II* for New Jersey test-takers seeking a license to teach Elementary Education, English, or Social Studies, and effect sizes were extremely small (see Table 11).
Table 11

Parameter Estimates and Effect Sizes Based on Race

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>Chi-Square</th>
<th>p value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race White</td>
<td>0.315</td>
<td>0.275</td>
<td>1.306</td>
<td>0.253</td>
<td>0.054</td>
</tr>
<tr>
<td>Race AA</td>
<td>-0.296</td>
<td>0.370</td>
<td>0.640</td>
<td>0.424</td>
<td>-0.035</td>
</tr>
<tr>
<td>ENG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race White</td>
<td>-0.421</td>
<td>0.696</td>
<td>0.367</td>
<td>0.545</td>
<td>-0.074</td>
</tr>
<tr>
<td>Race AA</td>
<td>-0.933</td>
<td>0.860</td>
<td>1.176</td>
<td>0.278</td>
<td>-0.131</td>
</tr>
<tr>
<td>SS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race White</td>
<td>-0.029</td>
<td>0.435</td>
<td>0.005</td>
<td>0.946</td>
<td>-0.005</td>
</tr>
<tr>
<td>Race AA</td>
<td>0.115</td>
<td>0.706</td>
<td>0.026</td>
<td>0.871</td>
<td>0.011</td>
</tr>
</tbody>
</table>

Note. Subheadings refer to Praxis II tests: ELEM=Elementary Education, ENG = English Language, Literature, and Composition, and SS = Social Studies. AA = African-American.

Models 3 and 4: Academic Major and UGPA

In Models 3 and 4, academic major and UGPA respectively were examined (see Table 12). In Model 3, academic major was found to be a statistically significant predictor of outcomes on Praxis II in areas of Elementary Education (Chi-square value = 5.16, df = 1, and \( p = .023 \)) and Social Studies (Chi-square value = 7.47, df = 1, and \( p = .006 \)), but not in English (Chi-square value = 2.02, df = 1, and \( p = .155 \)). The standard regression coefficient was greater in Social Studies (\( \beta = 0.559 \)) than in other content areas. Teacher candidates who passed Praxis I exams, and whose academic course of study was Elementary Education or Social Studies, were found to be more likely to pass their respective Praxis II exams. However, the effect sizes for academic major were very small (< .2) across all content areas (see Table 12.) Overall, the effect sizes of these two variables do not compare to that of passing status for Praxis I.
Table 12

Parameter Estimates and Effect Sizes for Academic Major and UGPA

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>Chi-Square</th>
<th>p value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELEM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acad Major</td>
<td>0.395</td>
<td>0.174</td>
<td>5.156</td>
<td>0.023</td>
<td>0.107</td>
</tr>
<tr>
<td>UGPA</td>
<td>0.203</td>
<td>0.116</td>
<td>3.048</td>
<td>0.081</td>
<td>0.078</td>
</tr>
<tr>
<td><strong>ENG</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acad Major</td>
<td>-0.436</td>
<td>0.307</td>
<td>2.023</td>
<td>0.155</td>
<td>-0.113</td>
</tr>
<tr>
<td>UGPA</td>
<td>0.870</td>
<td>0.212</td>
<td>16.833</td>
<td>.000</td>
<td>0.304</td>
</tr>
<tr>
<td><strong>SS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acad Major</td>
<td>0.559</td>
<td>0.204</td>
<td>7.466</td>
<td>0.006</td>
<td>0.153</td>
</tr>
<tr>
<td>UGPA</td>
<td>0.228</td>
<td>0.151</td>
<td>2.278</td>
<td>0.131</td>
<td>0.085</td>
</tr>
</tbody>
</table>

*Note.* Subheadings refer to *Praxis II* tests: ELEM = Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.

Model 4 also addressed UGPA (see Table 12 for parameter estimates and effect sizes). For Elementary Education (*p* = .081) and Social Studies (*p* = 0.131), UGPA was not a significant predictor. But for English, UGPA was statistically significant (Chi-square value = 16.8, df = 1, and *p* = 000). However, the effect size for UGPA (.304) was found to be quite small (see Appendix F). Findings concluded that along with those who pass *Praxis I* exams, teacher candidates who do well on their coursework and achieve higher grades, may be more likely to pass their respective *Praxis II*: English exams.

There is some misalignment between New Jersey’s flexible UGPA requirements and the UGPA categories self-reported when test-takers register with ETS for the *Praxis* test. There are six categories from which candidates may select and report their UGPA to ETS: 4.00 – 3.50, 3.49 – 3.00, 2.99 – 2.50, 2.49 – 2.00, 1.99 – 1.50, and below 1.50. But New Jersey’s flexible UGPA requirements range is 2.50 – 2.75 and 3.50 or higher. The State Department of Education accepts test-takers whose UGPA is between 2.50 and
2.75, if they achieve a score of 10% higher than the indicated passing score for Praxis II. The Department also accepts those whose score is within 5% less if their UGPA is a 3.50 or higher. Candidates with a higher UGPA may achieve a lower score on their respective Praxis II exams than the state-determined cut score and those who have a lower UGPA must achieve a higher score than the State’s cut score. Model 4 was run using the sample size of those with Praxis II passing status without accounting for the sliding scales for UGPA flexibility. But an investigation of the sliding scale was conducted to determine passing status based on the “Passing Score +10%” and “Passing Score – 5%” flexibility options (See Table 13 and Appendix E). Only 12.1% of the test-takers were affected by the flexible UGPA options.

Table 13

Analysis of the Sliding Scale for Flexible UGPA Requirements

<table>
<thead>
<tr>
<th>Test</th>
<th>Sample Size</th>
<th>Passing Score</th>
<th>Pass to Not Pass</th>
<th>Not Pass to Pass</th>
<th>Total Affected</th>
<th>Percentage Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEM</td>
<td>2315</td>
<td>2088</td>
<td>78</td>
<td>52</td>
<td>130</td>
<td>5.6</td>
</tr>
<tr>
<td>ENG</td>
<td>431</td>
<td>313</td>
<td>12</td>
<td>16</td>
<td>28</td>
<td>6.6</td>
</tr>
<tr>
<td>SS</td>
<td>488</td>
<td>291</td>
<td>22</td>
<td>37</td>
<td>37</td>
<td>12.1</td>
</tr>
<tr>
<td>MATH</td>
<td>272</td>
<td>143</td>
<td>5</td>
<td>19</td>
<td>24</td>
<td>8.8</td>
</tr>
</tbody>
</table>

*Note. ELEM=Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.*

Since UGPA was self-reported, there was some likelihood that test-takers inflated or fabricated this information. Also, prior research about using UGPA for teacher education program admission must be taken into consideration. While programs tend to use it, some researchers have concluded it is not a good predictor of college readiness (Lawrence
& Crehan, 2001; Mikitovics & Crehan, 2002; Riggs, Riggs & Sandlin, 1992); it does not predict performance in teacher education courses (Casey & Childs, 2007; Kane, Rockoff, & Staiger, 2006); and that grading practices vary across programs (Gitomer, 2007; Gitomer et al., 1999).

Others concluded that it is a good predictor. Zumwalt and Craig (2005) found that an increase in teacher quality, based on Praxis test scores, as measured by UGPA. Bacon and Bean (2006) found overall UGPA to be the most reliable indicator in terms of various education program and policy decisions. Hall and West (2011) reported a 16% variance in student teaching performance attributable to UGPA and Praxis scores. ETS researchers (Nettles et al., 2011) found that low UGPAs among African-American undergraduates are consistent with their low scores on Praxis I exams. Yet, it remains virtually impossible to detect whether candidates who are denied admission on the basis of their UGPA would have been successful as beginning teachers had they been allowed to pursue teacher education studies (Casey & Childs, 2007).

**Model 5: Praxis I, Race, Academic Major and GPA**

In Model 5, all four predictor variables were combined. When the Nagelkerke R-square value for Praxis I (0.368) was compared with that of academic major (0.377), there was an improvement of +0.009. An investigation of R-square change was conducted to determine observable differences in predictive value. When variables were observed simultaneously, academic major and race/ethnicity added more predictive value. Table 14 shows that in addition to Praxis I status, academic characteristics (such as major and UGPA combined) add to the R-square values. Race/ethnicity added slightly more. But
consistent with all previous findings, overall, it was passing status for Praxis I that carried the most predictive value and higher probability for passing Praxis II.

Table 14

Changes in R- square Values

<table>
<thead>
<tr>
<th>Test</th>
<th>P1 Status</th>
<th>P1 + Acad Major/UGPA</th>
<th>P1 + Acad Major/UGPA + Race</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEM</td>
<td>0.368</td>
<td>0.377 (+0.009)</td>
<td>0.381 (+0.004)</td>
</tr>
<tr>
<td>ENG</td>
<td>0.403</td>
<td>0.449 (+0.046)</td>
<td>0.452 (+0.003)</td>
</tr>
<tr>
<td>SS</td>
<td>0.184</td>
<td>0.205 (+0.021)</td>
<td>0.206 (+0.001)</td>
</tr>
<tr>
<td>MATH*</td>
<td>0.188</td>
<td>0.259 (+0.071)</td>
<td>0.273 (+0.014)</td>
</tr>
</tbody>
</table>

Note. Praxis II tests: ELEM=Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies. Asterisk indicates the instability of the regression models related to mathematics.

Also observed, was the 37% variance in the model as related to Elementary Education ($R^2 = .368$). The $R^2$ value was .403 in English, accounting for 40% model variance. For Social Studies ($R^2 = 188$) and for Mathematics ($R^2 = .184$), there was an approximate 18% measure of variance in the models. The coefficients of determination indicate how close the data are to the fitted regression line. 37-40% indicates that the model explains more than a third but less than half of the variability in the data. The 18% value is much lower, indicating less fit in the model.

To be consistent with the Gitomer, Brown, Bonett study: Useful Signal or Unnecessary Obstacle? The Role of Basic Skills Tests in Teacher Preparation, effect size was measured as described by Kraemer and Thiemann (1987) (see Table 15 for effect sizes by test title). While passing status on all three Praxis I exams was found to be statistically significant across all four Praxis II content areas, the effect sizes were somewhat small, ranging between .1 and .4. But, they were larger for the Praxis I than the effect sizes of any other predictor variables. Clearly the common theme throughout
this analysis was the effect of passing status on Praxis I on the likelihood of passing Praxis II. While robust claims cannot be made about academic major and UGPA, evidence clearly supports the need for close examination of the impact of Praxis I performance.

Table 15

Parameter Estimates and Effect Sizes by Test Title

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>Chi-Square</th>
<th>p value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEM</td>
<td>P1 Reading</td>
<td>1.830</td>
<td>0.183</td>
<td>100.326</td>
<td>0.000</td>
<td>0.446</td>
</tr>
<tr>
<td></td>
<td>P1 Writing</td>
<td>0.539</td>
<td>0.176</td>
<td>9.366</td>
<td>0.002</td>
<td>0.117</td>
</tr>
<tr>
<td></td>
<td>P1 Math</td>
<td>1.776</td>
<td>0.179</td>
<td>98.911</td>
<td>0.000</td>
<td>0.423</td>
</tr>
<tr>
<td></td>
<td>Race White</td>
<td>0.315</td>
<td>0.275</td>
<td>1.306</td>
<td>0.253</td>
<td>0.054</td>
</tr>
<tr>
<td></td>
<td>Race AA</td>
<td>-0.296</td>
<td>0.370</td>
<td>0.640</td>
<td>0.424</td>
<td>-0.035</td>
</tr>
<tr>
<td></td>
<td>Acad Major</td>
<td>0.395</td>
<td>0.174</td>
<td>5.156</td>
<td>0.023</td>
<td>0.107</td>
</tr>
<tr>
<td></td>
<td>UGPA</td>
<td>0.203</td>
<td>0.116</td>
<td>3.048</td>
<td>0.081</td>
<td>0.078</td>
</tr>
<tr>
<td>ENG</td>
<td>P1 Reading</td>
<td>3.082</td>
<td>0.456</td>
<td>45.765</td>
<td>0.000</td>
<td>0.576</td>
</tr>
<tr>
<td></td>
<td>P1 Writing</td>
<td>1.868</td>
<td>0.546</td>
<td>11.686</td>
<td>0.001</td>
<td>0.270</td>
</tr>
<tr>
<td></td>
<td>P1 Math</td>
<td>0.879</td>
<td>0.303</td>
<td>8.428</td>
<td>0.004</td>
<td>0.212</td>
</tr>
<tr>
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The third research question asked whether testing of teacher candidates as an admissions requirement had the unintended consequence of limiting the pool of minority teacher candidates prepared through traditional teacher preparation programs in New York.
Jersey. This study denied the presupposition that *Praxis I* entry exams hindered ethnic minority students from entering the teaching profession since race/ethnicity was not deemed a significant variable. There were 5,141 African-American and Hispanic test-takers in the original data set, and 1,428 of them did not pass their *Praxis II* exams on the first attempt, which means that approximately 30% of them had to retake the exams until they were successful or chose not to retest (see Table 8). The pass rates for ethnic minority performance on *Praxis II* exams were an indication of how the achievement gap has continued to widen beyond high school and teacher education program entry.

For the state of New Jersey, the findings of this study are consistent with the findings reported by Gitomer et al., (2011). This means that for this study with this sample of test-takers in New Jersey, *Praxis I* was a useful signal of readiness for teacher education studies and not an unnecessary obstacle. This supports the use of basic skills testing as an admissions screen for teacher education programs.
Chapter V

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

As this study began, questions about the value and implications of Praxis I test performance, particularly for African-American and Hispanic teachers in New Jersey, generated two hypotheses. The first was that tests of teacher candidates’ basic skills are not necessary for the screening for teacher education program entry and may prevent would-be good teachers, especially ethnic minorities, from obtaining teacher licensure. The second hypothesis was that tests of teacher candidates’ basic skills are an effective means of determining if candidates interested in teaching possess the readiness skills necessary to enter a teacher education program and move on to become licensed. While teacher candidates must fulfill varied requirements across states and education programs, one common requirement is passing tests of their knowledge and skills. The validity of these tests, such as Praxis I, in terms of predicting teacher performance in student teaching continues to be a national debate.

This research explored three critical questions. First, what are the academic and demographic characteristics of teacher candidates in New Jersey who pass Praxis I: Pre-Professional Skills? Second, what is the relationship between success on the Praxis I: Pre-Professional Skills assessment and success on the Praxis II: Content Knowledge assessment for teacher candidates in New Jersey with different ethnic backgrounds and different academic histories as measured by academic major and undergraduate grade point average? Third, how does testing of teacher candidates as an admissions
requirement influence the pool of minority teacher candidates prepared through traditional teacher preparation programs in New Jersey?

**Conclusions**

The national argument supporting the use of *Praxis* exams for program entry is a logical one: Students who have not mastered basic skills in reading, writing, and mathematics are unlikely to master the competencies necessary for entry into teacher education studies. But the opposing argument is also a logical one: If the tests are biased against ethnic minorities and, therefore, reduce diversity in the teaching pool (Bennett et al, 2006) and/or if the tests do not predict teacher performance (Lawrence & Crehan, 2001), then they could be a barrier preventing would-be good and otherwise successful teachers from teaching. Also critical to both arguments is the fact that we do not know how the candidate pool would differ if licensure tests were not required (Boyd et al, 2007; Casey & Childs, 2007).

In response to the first research question regarding the relationship between success on the *Praxis I* test of basic skills and success on the *Praxis II* tests of content knowledge, the findings in this study support the research that suggests that performance on *Praxis I* program entry exams are strong predictors of performance on *Praxis II* exams for program exit. This means it is highly likely that test-takers in New Jersey who do not do well on *Praxis I* would not do well on *Praxis II*. It is clear that for the sample of New Jersey test-takers in this study, *Praxis I* was a useful signal of readiness for teacher education studies and not an unnecessary obstacle. These findings support the use of basic skills testing as a screen for teacher preparation admissions and deny the
presupposition that *Praxis I* entry exams hinder ethnic minority students in New Jersey from entering the teaching profession.

To answer the second research question regarding the relationship between success on the *Praxis I* and success on the *Praxis II* for test-takers with different ethnic backgrounds, race/ethnicity was not found to be a significant predictor. Test-takers who passed the basic skills tests were likely to pass the subject-area assessments, despite race/ethnicity. In a sample size of approximately 3,500, test-taker trends were examined for White, African-American, and non-White Hispanic candidates. There were no outcomes that point to the relevance of ethnicity in the probability of passing the *Praxis II*. However, pass rates for ethnic minority candidates who did pass their respective *Praxis II* exams were well below that of their peers. This is an indication of how the achievement gap persists beyond high school and throughout college. This also suggests that while these tests may not predict teaching effectiveness, they do indicate potential weaknesses.

When examining the relationship between success on the *Praxis I* and success on the *Praxis II* for test-takers with different academic histories, academic major (albeit small in effect size) was found to be a predictor for passing the Elementary Education and Social Studies assessment. This may be related to the State Department of Education’s requirement that college students in these areas must declare a major and focus their studies on a content-specific discipline and not just in general education. But given the small effect sizes, this is an informed assumption.

With regard to the relationship between success on the *Praxis I* and the *Praxis II* as measured by UGPA, the only analysis that showed UGPA to be significant, albeit
slightly, was English. It is important to note that New Jersey allows flexibility with UGPA requirements so students who have a high UGPA, are allowed to earn a slightly lower passing score on *Praxis II* and those who have lower UGPAs must earn higher passing scores (see Table 3). While the passing score for the *Praxis II: English* exam is 162, students whose UGPA is between 2.50 and 2.75 may still pass with a 178. On the other hand, if the UGPA is a 3.50 or higher, that student needs only a 154 to obtain passing status. While this approach may positively influence the candidate pool in New Jersey, UGPA is self-reported and there is mixed research about its validity.

As for the third research question of how using the *Praxis I* as an admission requirement might influence the pool of ethnic minority teacher candidates, again the results suggest that race/ethnicity is not a significant variable. Based on the findings, the *Praxis I* is not an unfair hurdle preventing any particular ethnic group from admission to traditional teacher education programs in New Jersey. This results of this study do not concur with the argument from Bennett et al. in which they concluded that if the basic skills testing requirements were not a barrier, then potential Latino and African-American teachers candidates would do well in teacher preparation programs and in the teaching profession once they move on to the classroom (Bennett et al., 2006). Due to the disparity found between *Praxis* scores of White students and African-American and Hispanic students, it is true that “any leak in the pipeline is problematic” (Nettles et al., 2011, p. 7) and that *Praxis* testing “takes a predominantly White population of potential teachers and creates an even more homogeneous group” (Gitomer et al., 1999, p. 38). So the lack of diversity perpetuated by the limited number of ethnic minority students pursuing teacher education and passing licensure exams is disturbing.
Given the wealth of research on the achievement gap between racial groups and the difficulty standardized testing poses for students of color, it was expected that race/ethnicity would be a significant factor in this study. It was expected that given the increasing population of Hispanics in New Jersey, the sample size would be robust enough to yield more compelling data about ethnic minority performance on Praxis exams. But results suggested race/ethnicity has no relationship to Praxis II test-taker outcomes in New Jersey for the time period of this study.

There are several alternate route programs in New Jersey, a state where 40% of the new hires enter teaching through a non-traditional teacher education program and almost 30% of the teaching pool comes through alternate paths (Feistritzer, 2005, 2011). Most of these programs do not require passing Praxis I for admission. There is little or no research on whether this strengthens or weakens the quality of the teacher candidate pool. But alternate paths to teaching may be the key to increasing the minority candidate pool since almost 30% of those pursuing licensure alternatively are ethnic minorities. (Feistritzer, 2011).

Again, it makes sense that if test-takers do not know basic skills in reading, writing, and mathematics, they will face challenges in their efforts to attain the higher-level content knowledge, skills, and abilities necessary for beginning teacher practice. Whether or not they will be able to develop basic skills during the course of teacher preparation if they are granted admission and provided with remediation despite low performance on Praxis I remains a question. While it may be that the Praxis I is perceived and utilized as a means of eliminating undergraduate students from the pool of teacher candidates because it is assumed they will not be effective teachers, this study
does not provide evidence of such because the data set includes those who pass the *Praxis I* on their first attempt, likely without struggle. Unlike New Jersey, several states waive the *Praxis I* admission requirement for students who have certain scores on other standardized tests, such as the Scholastic Aptitude Test (SAT), the American College Test (ACT), and the Graduate Record Exam (GRE). But this research concludes that the *Praxis I* is an appropriate admission tool for teacher education programs in New Jersey as it is such a strong predictor of outcomes on subject-area exams.

Some research has suggested that low performance among minorities in undergraduate programs is largely due to poor education and achievement that began in elementary school and was perpetuated throughout high school (Villegas & Lucas, 2004). While it may be that some students arrive at college having not received a strong learning experience in the fundamentals, the *Praxis I* is not the only standard teacher candidates must meet. Even though in this study the *Praxis I* was determined to be the most significant predictor of passing the *Praxis II*, it is important to know that the New Jersey State Department of Education does require teacher candidates to meet additional criteria.

**Study Limitations**

Because so many New Jersey test-takers did not provide demographical data, it was unknown how many of those not included in the sample are African-American or Hispanic, as well as how many of them were included in the group of those who took the three *Praxis* exams and then no more. Another unknown was how many test-takers bypassed the *Praxis I* requirement by pursuing and completing studies in arts and sciences and then getting the education credential through an alternate route as opposed to entering a traditional program. Given that this study focused on passing scores based on first
attempt, it may be that some candidates, including but not limited to ethnic minorities, do eventually pass if they choose to retake the exam(s). However, “for many of those who do not pass, their scores are at least a standard deviation below the median passing scores and would be unlikely to pass, even after taking the test multiple times” (Gitomer et al., 2011, p. 442).

In order to fully examine the influence of the Praxis I requirement on the pool of minority teacher candidates prepared in New Jersey, critical information is needed regarding those who did not gain admittance to teacher education programs, not just those who did. As explained by Casey and Childs (2007), “the use of these tests as admission criteria means that potential applicants who failed the tests are not granted admission, so no data are available on how well they would have performed in the program” (p. 10). Boyd et al. (2007) described the test-taking dilemma as something “social scientists call the counterfactual—in this case, how the size and composition of the pool of teacher candidates would have differed without certification” (p. 60). Still, a sample of more than 3,500 New Jersey test-takers in this study yields some insight into how certain variables, especially the Praxis I, influence the outcome of passing the Praxis II.

**Recommendations for Policy and Practice**

According to the recent publication by the US Department of Education, *Preparing and Credentialing the Nation’s Teachers* (USDE, 2013) New Jersey ranks 10th in the nation for its number of undergraduate students enrolled in teacher preparation programs. For the 2009-10 school year, the State Department of Education reported more than 24,000 candidates enrolled in teacher education. As the national emphasis on teacher effectiveness continues to grow, New Jersey should continue with policies and practices
that yield a population of beginning teachers who are readily equipped with the
knowledge and skills the contemporary classroom demands.

If teacher education programs in New Jersey continue to require passing the
Praxis I exam for entry, this will draw those who are likely to pass their Praxis II exams
for exit. But the State Department should reconsider the extent to which the UGPA
flexibility option generates career ready teacher candidates. Given the findings regarding
UGPA, it is good that New Jersey used multiple requirements for program entry. While
UGPA is a factor to be considered, Praxis I performance is a strong predictor. State
policy requiring those who want to teach Elementary Education to major in a content-area
as opposed to Elementary Education in general—as a stand-alone, may continue to yield
K-6 teachers who are strong in English Language Arts, Mathematics, and Social Studies.
(This study did not include Science.)

Even though race/ethnicity was not found to be a strong predictor in this study, it
was evident that the achievement gap persists. Research by ETS has suggested that
students who take the Praxis I early in their college career tend to score higher on average
than those who wait until the end of the teacher education experience (Nettles et al,
2011). The New Jersey State Department of Education’s policy requiring students to pass
the Praxis I for program entry assures that they will have to take it earlier in their college
careers. ETS also suggested that teacher education programs in New Jersey work closely
with school districts to recruit more teacher candidates of color (Nettles et al., 2011). As
the population of students of color in New Jersey, particularly Hispanic students,
continues to grow, there will be increased demand for teachers of color. Perhaps the
Department will work with teacher education programs to ensure that candidates get the
necessary materials and information needed in order to adequately prepare for Praxis exams and improve the pass rates of subgroups.

The Department could consider creating a triangulated partnership between school districts and schools of education for earlier introduction to teaching through which Praxis I test preparation courses would be offered in high schools. Students who are interested in teaching as well as those who have other college pursuits can only benefit from curriculum that promotes basic skills necessary for college readiness. As a diagnostic tool, this assessment may help narrow the achievement gap.

**Recommendations for Future Research**

During the time period covered in this study, New Jersey required the 2-hour Praxis II: Elementary Education: Content Knowledge (5014) exam. This test was a holistic assessment of four content areas for elementary education: reading, science, mathematics, and social studies. The test was scored on a compensatory model such that test-takers were able to compensate for weakness in one area with strengths in another. In July 2013, the Department adopted a new Praxis II exam, Elementary Education: Multiple Subjects (5031) which includes four separate subtests (one for each area—reading, mathematics, science, and social studies) and it require passing scores for each (http://www.ets.org/praxis; http://www.state.nj.us/education/educators/license).

Further study will determine if Praxis I and academic major remain strong predictors, and if content-area coursework still yields high performance on Praxis II. Further study may also explore if the disparity in Praxis performance by race increases or decreases. In addition to a new Praxis test for elementary education, there is a new entry exam: Praxis I: Core Academic Subjects for Educators (Educational Testing Service,
2012) Perhaps a replication of this study would further examine the predicted outcomes on select *Praxis II* exams based on the new *Praxis I* exam for program entry. While the new test also has three components—reading, writing, and math—it is also aligned with Common Core State Standards, which means that it may yield performance data in light of new national standards. Further study on the relationship of academic major not only to passing *Praxis II* but in-service skills deemed critical in the early years of teaching practice may draw attention from other states seeking to strengthen teaching and learning in elementary schools.

To clearly understand if the *Praxis I* program entry requirement has an adverse impact on any subgroup, research would need to include information on those who do not gain admission and a close analysis of their performance. Further exploration using national data is necessary to determine if performance on the basic skills tests reduces the number of ethnic minority candidates pursuing teaching and if the teacher exams are separating would-be good teachers from those who lack the necessary skills. Gitomer et al. (2011) concluded that

…if the tests are measuring important constructs relevant to successful teacher education outcomes, then simply achieving a particular score may not be sufficient. The individual may answer enough items correctly to pass a state’s designated threshold but continue to struggle with respect to the set of skills measured. Under this interpretation, additional attention to the skills measured by the tests may still be necessary to ensure successful completion of teacher education requirements (p. 433).
The lack of more available demographic data was a limitation for this study, but state Departments of Education and Institutes of Higher Education already collect this information through application processes. To further the research, state agencies could explore a more comprehensive study of the impact of various teacher education admission requirements on the potential educator pool as well as the relationship between variables and performance outcomes on Praxis. Potential findings might provide guidance to programs about ways not only to modify curriculum to address areas of weakness across multiple subgroups but also to recruit more candidates for teacher education.

This study did not include any emphasis on gender. It may be worthwhile to explore whether gender is a significant variable for passing or not passing the Praxis I. Given that the teacher workforce is largely comprised of females, it would be interesting to know the trends in test-taker performance, and if there are differences in female and male teacher candidate outcomes. Additional research might explore the differences in female and male test-taker performance given various academic characteristics, including scores on the Scholastic Aptitude Test (SAT) as well as Praxis exams.

It is still not known if candidates who do not pass Praxis exams would be otherwise effective. It is not known if and to what extent those who do pass are effective in the classroom. This continues to be an area where further research is needed. While a single score on a Praxis exam is not the only indicator of teaching readiness, many state officials rely on test scores and test performance outcomes to inform teacher licensure decisions. Given the ongoing national emphasis on increasing teacher quality, careful attention must be given to what these tests are [or are not] assessing and what can be
done, in addition to testing, to expand teachers’ knowledge, skills, and abilities so that they, in turn, can increase student achievement.
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APPENDICES
### Appendix A

**Teacher Education Programs in New Jersey**

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Appendix B

Praxis Registration Form Background Information Questionnaire Page 1

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| Address               |                |
|                       |                |

| City                  |                |
|                       |                |

State or Province:  
ZIP or Postal Code:  
Country Code:  

Daytime Phone/Area Code:  
U.S. Social Security #:  

Gender:  
Male Female  
Date of Birth:  
MM DD YY  

E-Mail Address:  

You MUST provide a valid e-mail address in order to access your test scores. PAPER SCORE REPORTS WILL NO LONGER BE MAILED TO YOU.

Candidate ID Number:  

TEST DATE – Select only one test date. A separate registration form is required for each date.

- [ ] September 22, 2012  
- [ ] January 26, 2013  
- [ ] June 6, 2013  
- [ ] November 3, 2012  
- [ ] April 13, 2013  
- [ ] July 21, 2013

TEST CENTER – Select your first- and second-choice test centers. Enter the test center’s five-digit code and print the name and location of each center in the appropriate spaces. Test center codes are available on the Praxis website at www.ets.org/praxis.

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Appendix B

Praxis Registration Form Background Information Questionnaire Page 2

Name: ____________________________ 2012–13 Praxis Registration Form (continued)

TEST SESSION/TEST SELECTIONS

Both Session 1 and Session 2 are two hours long. For each session, you may select a 2-hour test or one or two 1-hour tests. Tests that are longer than 2 hours must be scheduled in Session 1, and will run into Session 2 time. You may find the length of the test you are taking as well as the test codes on the Praxis website at www.ets.org/praxis/register/codes. For each test, enter the last three digits of the test code in the boxes below. Write the name of each test you are selecting in the space provided. (Abbreviate if necessary.) Note: This form cannot be used for computer-delivered tests.

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</tbody>
</table>

SCORE RECIPIENTS – Attending Institution and Recipient codes are available on the Praxis website at www.ets.org/praxis/register/codes. Enter the last four digits of the code in the boxes below. If you do not have a code number for one or more of these items, leave the item(s) blank. Scores will be sent only to agencies that are authorized score recipients. (Note: If you would like your attending institution to receive an official score report, you must also list them as a designated score recipient.) Note to Audiology and Speech Language Pathology test takers: Use the Audiology/Speech Language Pathology Attending Institution/Recipient codes list to complete this section.

Attending Institution:

Important: Please enter the code for the college or university where you took the classes that most closely relate to the test(s) you are taking. This is for data analysis purposes only. Your individual score report will NOT be sent to your attending institution unless you also list them as a Designated Score Recipient.

<table>
<thead>
<tr>
<th>Number 1</th>
<th>Number 2</th>
<th>Number 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

Other Passing Score Information:

To view passing score information for other states or agencies, please visit www.ets.org/praxis/states.

MAJOR AND CERTIFICATION FIELD

What is (are) your undergraduate/graduate major field(s)? Major and Certification Field codes are available on the Praxis website at www.ets.org/praxis/register/codes. Enter the code(s) in the boxes below.

Undergraduate | Graduate
---|---

Indicate the field(s) in which you are seeking certification. Major and Certification Field codes are available on the Praxis website at www.ets.org/praxis/register/codes. Enter the code(s) in the boxes below.

Certification Field: Field 1 Field 2

Page 2 of 4
Appendix B

Praxis Registration Form Background Information Questionnaire Page 3

Name: ___________________________  2012–13 Praxis Registration Form (continued)

BACKGROUND INFORMATION – Select one answer for each question below.

*a.* How do you describe yourself?
   1. ☐ African American or Black
   2. ☐ Asian American/Asian (Ex.: Japanese, Chinese, Korean)
   3. ☐ Southeast Asian American/Southeast Asian
      (Ex.: Cambodian, Hmong, Khmer, Laotian, Vietnamese)
   4. ☐ Pacific Islander
   5. ☐ Mexican, Mexican American, or Chicano
   6. ☐ Puerto Rican
   7. ☐ Other Hispanic, Latino, or Latin American
   8. ☐ Native American, American Indian, or Alaskan Native
   9. ☐ White
   10. ☐ Other
   11. ☐ Two or more races

*b.* What is your best language of communication?
   1. ☐ English
   2. ☐ Spanish
   3. ☐ Chinese
   4. ☐ Vietnamese
   5. ☐ Another language

*c.* What language(s) did you first learn as a child?
   1. ☐ English only
   2. ☐ English and another language
   3. ☐ Another language only

*d.* For which language other than English do you consider yourself proficient? (select all that apply)
   1. ☐ English only
   2. ☐ Spanish
   3. ☐ Chinese
   4. ☐ Other

*e.* What is the highest education level you have attained?
   1. ☐ Freshman (first year)
   2. ☐ Sophomore (second year)
   3. ☐ Junior (third year)
   4. ☐ Senior fourth or final year
   5. ☐ Earned bachelor's degree
   6. ☐ Earned master's degree plus additional credits
   7. ☐ Earned master's degree
   8. ☐ Earned master's degree plus additional credits
   9. ☐ Earned doctoral degree

*f.* Which of the following best describes your teacher preparation program?
   1. ☐ Undergraduate teacher education program (B.A. or B.S.)
   2. ☐ Post-baccalaureate program (not leading to a
certification or master's degree)
   3. ☐ Master's degree education program (M.A., M.S., M.Ed., M.A.T)
   4. ☐ Alternate route program designed to expedite the transition
to teaching career/masters degree
   5. ☐ Other

*g.* How many years has it been since you attended college or graduate school?
   1. ☐ Currently attending college or graduate school
   2. ☐ Less than 1 year
   3. ☐ 1–3 years
   4. ☐ 4–6 years
   5. ☐ 7–10 years
   6. ☐ More than 10 years

*h.* What is your cumulative undergraduate grade point average to date (based on a system where 4.0 = A)?
   1. ☐ 3.5–4.0
   2. ☐ 3.0–3.49
   3. ☐ 2.5–2.99
   4. ☐ 2.0–2.49
   5. ☐ 1.5–1.99
   6. ☐ Below 1.5

*i.* Are you or have you ever been enrolled in a teacher education program?
   1. ☐ Currently
   2. ☐ Formerly
   3. ☐ Never

*j.* Your teaching status is:
   1. ☐ Planning to enroll or currently enrolled in a
teacher education program
   2. ☐ Recently graduated and expect to begin
teaching in the near future
   3. ☐ 1 to 3 years teaching experience
   4. ☐ More than 3 years teaching experience
   5. ☐ Not planning to teach at this time

*k.* Do you intend to teach in the same state as the one in which you are currently taking the Praxis assessment?
   1. ☐ Yes
   2. ☐ No

*l.* In which kind of geographic area do you think you are most likely to teach next year?
   1. ☐ Urban
   2. ☐ Rural
   3. ☐ Suburban
   4. ☐ Do not plan on teaching next year

* Questions 1-11 will be reported to states or institutions that receive scores; reporting, other questions and/or sections with asterisks will be reported on an intent basis and recipient score reports. All other background questions are for research purposes only, and respondents will remain anonymous.
### MAJOR AND CERTIFICATION FIELD CODES — LIST E

#### EDUCATION SUBJECT AREAS
- 101 Agricultural Education
- 102 Art Education
- 103 Bilingual and Bicultural Education
- 104 Business Education
- 105 Cooperative Education
- 106 English Education
- 107 Environmental Education
- 108 Health Education
- 109 Family and Consumer Sciences
- 110 Technology Education
- 111 Life Science Education
- 112 Marketing and Distributive Education
- 113 Mathematics Education
- 114 Music Education
- 115 Office Technology Education
- 116 Physical Education
- 117 Physical Science Education
- 118 Reading Education
- 119 Reading Specialist
- 120 Secretarial Education
- 121 Social Studies Education
- 122 Teaching English as a Foreign Language
- 123 Health and Physical Education
- 199 Other

#### ELEMENTARY AND PRE-ELEMENTARY EDUCATION
- 201 Early Childhood Education
- 202 Elementary Education
- 203 Pre-Elementary Education
- 299 Other

#### HUMANITIES
- 301 Art
- 302 Drama
- 303 English
- 304 Fine Arts
- 305 French
- 306 German
- 307 Italian
- 308 Japanese
- 309 Latin
- 310 Literature
- 311 Music

#### SOCIAL SCIENCES
- 601 Anthropology
- 602 Business
- 603 Communication
- 604 Economics
- 605 Geography
- 606 Government
- 607 History
- 608 Political Science
- 609 Psychology

#### MATHEMATICS AND NATURAL SCIENCES
- 401 Biology
- 402 Botany
- 403 Chemistry
- 404 Computer and Information Sciences
- 405 Earth/Space Science
- 406 Engineering
- 407 Engineering Technologies
- 408 General Science
- 409 Geology
- 410 Mathematics
- 411 Physics
- 499 Other

#### MIDDLE SCHOOL EDUCATION
- 001 Middle School

#### NON-TEACHING EDUCATION
- 501 Educational Administration
- 502 Educational Psychology
- 503 Library and Archival Sciences
- 504 School Guidance/Counseling
- 505 School Psychology
- 506 School Social Work
- 507 Supervision
- 508 Media Specialist
- 599 Other

#### VOCATIONAL/TECHNICAL MAJORS
- 801 Accounting
- 802 Agriculture
- 803 Architecture and Environmental Design
- 804 Family and Consumer Sciences
- 805 Military Sciences
- 806 Office Technology
- 899 Other

#### SPECIAL EDUCATION
- 701 Audiology
- 702 Education of Students with Mental Retardation
- 703 Hearing Education
- 704 Special Education
- 705 Speech Language Pathology
- 706 Teaching Speech to Students with Language Disabilities
- 707 Teaching Students with Emotional Disabilities
- 708 Teaching Students with Hearing Disabilities
- 709 Teaching Students with Learning Disabilities
- 710 Teaching Students with Minimal Mental Disabilities
- 711 Teaching Students with Orthopedic Disabilities
- 712 Teaching Students with Physical and Mental Disabilities
- 713 Teaching Students with Visual Disabilities
- 799 Other

#### UNDECIDED
- 999 Undecided
Appendix D

Primer on Standard Setting (*Taken from Nettles et al., 2011*)

A standard-setting study produces a passing score recommendation. A passing score is the minimum test score that a test-taker needs to achieve to pass the particular licensure test and be awarded a license to teach. Each state sets its own passing score. ETS does not set passing scores; that is, the responsibility of each state’s licensing agency. Standard-setting studies serve two purposes. First, they are designed to identify the level of knowledge for a teacher candidate to be considered minimally qualified for independent, beginning practice. The level of knowledge is represented by a minimum test score candidates need to achieve. Second, the studies are designed to reconfirm the relevance (validity) of the test content for teachers in the adopting state. Different standard-setting approaches are used for different test structures. That is, there is a preferred standard-setting method for multiple choice (MC) test items and another for constructed response (CR) test items. ETS recommends and implements a modified Angoff method for MC items and a Benchmark method for CR items, both of which are defined later in this appendix. One or more ETS standard-setting specialists conduct and facilitate each standard setting study. For each study, a technical report is produced that describes the selection and representativeness (i.e., balance of backgrounds by gender, race/ethnicity, and other characteristics) of the participants involved and summarizes the standard-setting methods and results.

Panel Formation

For each method, the state (licensing agency) selects a panel of teachers and teacher educators to serve on the standard-setting panel. ETS works closely with the licensing agency to identify the appropriate types and numbers of educators from the state. ETS supplies the licensing agency with written descriptions of recommended qualifications and demographic characteristics of educators. Panels typically consist of 10 to 15 people, the majority of whom are practicing, licensed teachers in the content area covered by the test; teacher educators, who prepare teacher candidates, often are also represented. States are encouraged to select a panel of educators that reflect the diversity in the state (e.g., racial/ethnic, gender, geographic, and setting). ETS reviews the nominations and identifies those panelists who meet the criteria. The state licensing agency is then asked to confirm and approve the panel composition. ETS convenes the panel and conducts the study using the method suitable for the type of test being reviewed by the panel.

Standard-Setting Reports

Approximately 6 weeks after the standard-setting study is completed, the state receives a report of the study documenting who participated, the procedures and methods, and the results. The report also includes information about the standard error of the test and passing score recommendations within one and two standard errors of the panel’s recommendation. States may use this information and other state-specific information to decide on the operational passing score.
Appendix E
Investigation of Characteristics of Test-Takers Excluded from the Data Set Due to Missing Demographical Information

Elementary Education
- No substantive difference based on Praxis I passing status (57.3% excluded vs. 56.5% included)
- No substantive difference based on Praxis II ELEM passing status (88.2% excluded vs. 90.2% included)
- Smaller proportions of White and African American candidates were not selected, Hispanic was the same, as those not of these groups were excluded obviously. Smaller percentages of GPAs between 2.5 and 4.0 were not selected and more people not of relevant majors were not selected.

English
- Higher proportion passing Praxis I not included (78.1% excluded vs. 67.3% included)
- No substantive difference based on ENG passing status (72.7% excluded vs. 72.6% included)
- Smaller proportions by primary ethnicities (W, AA, H) were excluded as more were not of those categories. By GPA, exclusions were fairly uniform to those who were included. More people not of relevant majors were not selected.

Mathematics
- No substantive difference (75.0% excluded vs. 72.1% included)
- Higher proportion passing MATH not included (70.5% excluded vs. 52.6% included)
- Smaller proportions by primary ethnicities (W, AA, H) were excluded as more were not of those categories. More people 3.5-4.0 GPA were not selected than selected, but less so between 2.5 and 3.49. More people not of relevant majors were not selected.

Social Studies
- Higher proportion passing Praxis I not included (77.0% excluded vs. 70.1% included)
  No substantive difference based on SS passing status (60.2% excluded vs. 59.6% included)
- Smaller proportions by primary ethnicities (W, AA, H) were excluded as more were not of those categories. By GPA, exclusions were fairly uniform to those who were included. More people not of relevant majors were not selected.
Appendix F

Measuring Effect Size

1. The effect size measure $\delta$ for comparing two proportions described by Kraemer and Thiemann (1987) is given by

$$
\delta = 2(p_1(1 - p_1))^2(\arcsin \pi_1^{1/2} - \arcsin \pi_2^{1/2}),
$$

where $p_1$ is the proportion of the sample from Group 1 and $(1 - p_1)$ is the proportion of the sample from Group 2, and $\pi_1$ and $\pi_2$ are the proportions corresponding to an outcome of interest (e.g., passing Praxis II, passing Praxis I writing on the first attempt, etc.). According to Cohen (1988), an effect size can be categorized as small if $0.2 < \delta \leq 0.5$, medium if $0.5 < \delta \leq 0.8$, and large if $\delta > 0.8$. 

### Table 1. Differences in Pass Rates on Praxis I Tests by Race/Ethnicity Group

<table>
<thead>
<tr>
<th></th>
<th>Praxis I Reading</th>
<th>Praxis I Writing</th>
<th>Praxis I Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of first-time African American test-takers who passed</td>
<td>40.7</td>
<td>44.2</td>
<td>36.8</td>
</tr>
<tr>
<td>Percentage of first-time White test-takers who passed</td>
<td>81.5</td>
<td>79.5</td>
<td>78.2</td>
</tr>
</tbody>
</table>

*Source: Nettles et al, 2011, p. 9*

### Table 2. Passing Scores for Praxis Tests in New Jersey

<table>
<thead>
<tr>
<th>Required Test</th>
<th>Passing Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Praxis I Pre-Professional Skills Test: Reading (5710)</td>
<td>175</td>
</tr>
<tr>
<td>Praxis I Pre-Professional Skills Test: Writing (5720)</td>
<td>173</td>
</tr>
<tr>
<td>Praxis I Pre-Professional Skills Test: Mathematics (5730)</td>
<td>174</td>
</tr>
<tr>
<td>Praxis II Elementary Education: Content Knowledge (5014)</td>
<td>141</td>
</tr>
<tr>
<td>Praxis II English Language, Literature, and Composition (5041)</td>
<td>162</td>
</tr>
<tr>
<td>Praxis II Mathematics: Content Knowledge (5061)</td>
<td>137</td>
</tr>
<tr>
<td>Praxis II Social Studies: Content Knowledge (5081)</td>
<td>157</td>
</tr>
</tbody>
</table>

### Table 3. Flexibility for UGPA Requirements in New Jersey

<table>
<thead>
<tr>
<th>Test</th>
<th>Passing Score</th>
<th>Passing Score + 10%</th>
<th>Passing Score – 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEM</td>
<td>141</td>
<td>155</td>
<td>134</td>
</tr>
<tr>
<td>ENG</td>
<td>162</td>
<td>178</td>
<td>154</td>
</tr>
<tr>
<td>MATH</td>
<td>137</td>
<td>151</td>
<td>130</td>
</tr>
<tr>
<td>SS</td>
<td>157</td>
<td>173</td>
<td>149</td>
</tr>
</tbody>
</table>

*Note. ELEM = Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.*
Table 4. Volume of 2006-12 New Jersey Test-Takers by Test

<table>
<thead>
<tr>
<th>Test Totals</th>
<th>45552</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Test</td>
<td>29026</td>
<td>63.72</td>
</tr>
<tr>
<td>2 Tests</td>
<td>3230</td>
<td>7.09</td>
</tr>
<tr>
<td>3 Tests</td>
<td>8981</td>
<td>19.72</td>
</tr>
<tr>
<td>4 Tests</td>
<td>4023</td>
<td>8.83</td>
</tr>
<tr>
<td>5 Tests</td>
<td>288</td>
<td>0.63</td>
</tr>
<tr>
<td>6 Tests</td>
<td>4</td>
<td>0.01</td>
</tr>
<tr>
<td>P1 + P2 ELEM</td>
<td>2999</td>
<td>6.58</td>
</tr>
<tr>
<td>P1 + P2 ENG</td>
<td>559</td>
<td>1.23</td>
</tr>
<tr>
<td>P1 + P2 MATH</td>
<td>384</td>
<td>0.84</td>
</tr>
<tr>
<td>P1 + P2 SS</td>
<td>649</td>
<td>1.42</td>
</tr>
</tbody>
</table>

Note. P1 = All 3 Praxis I tests: Reading, Writing, and Mathematics. P2 = Praxis II tests including: ELEM=Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.

Table 5. Population and Sample Size

<table>
<thead>
<tr>
<th>Test-taker Trends</th>
<th>Total Test-takers</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 + P2 ELEM</td>
<td>2999</td>
</tr>
<tr>
<td>P1 + P2 ENG</td>
<td>559</td>
</tr>
<tr>
<td>P1 + P2 MATH</td>
<td>384</td>
</tr>
<tr>
<td>P1 + P2 SS</td>
<td>649</td>
</tr>
<tr>
<td>Original Sample</td>
<td>4591</td>
</tr>
<tr>
<td>Missing Info</td>
<td>1085</td>
</tr>
<tr>
<td>Complete Info</td>
<td>3506</td>
</tr>
</tbody>
</table>

Note. P2 = Praxis II tests including: ELEM=Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.

Table 6. Population and Sample Size of Test-takers Distributed by Praxis II Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>ELEM</th>
<th>ENG</th>
<th>MATH</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>2999</td>
<td>559</td>
<td>384</td>
<td>649</td>
</tr>
<tr>
<td>Missing Info</td>
<td>684</td>
<td>128</td>
<td>112</td>
<td>161</td>
</tr>
<tr>
<td>Sample Size</td>
<td>2315</td>
<td>431</td>
<td>272</td>
<td>488</td>
</tr>
</tbody>
</table>

Note. ELEM=Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies. The sample size reflects the volume of test-takers who provided full demographic information and passed all three Praxis I tests (reading, writing, and mathematics).
Table 7. Models Estimated in Analysis with Outcome of Likelihood of Passing Praxis II

Regression Models
Model 1: Passed Praxis I on first attempt
Model 2: Race/Ethnicity
Model 3: Academic Major
Model 4: UGPA
Model 5: Praxis I, Race, Academic major, UGPA

Table 8. Population and Praxis II Pass Rates by Race

<table>
<thead>
<tr>
<th>Test</th>
<th>ELEM</th>
<th>ENG</th>
<th>MATH</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>1923</td>
<td>406</td>
<td>270</td>
<td>332</td>
</tr>
<tr>
<td>WHITE</td>
<td>17980</td>
<td>3808</td>
<td>2390</td>
<td>3797</td>
</tr>
<tr>
<td>HISP</td>
<td>2284</td>
<td>305</td>
<td>267</td>
<td>354</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>22187</td>
<td>4519</td>
<td>2927</td>
<td>4483</td>
</tr>
<tr>
<td><strong>Pass</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>1014</td>
<td>153</td>
<td>51</td>
<td>101</td>
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<tr>
<td>WHITE</td>
<td>15954</td>
<td>2756</td>
<td>1410</td>
<td>2287</td>
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<tr>
<td>HISP</td>
<td>1464</td>
<td>166</td>
<td>75</td>
<td>174</td>
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<tr>
<td><strong>Not Pass</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>AA</td>
<td>909</td>
<td>271</td>
<td>219</td>
<td>231</td>
</tr>
<tr>
<td>WHITE</td>
<td>2026</td>
<td>1052</td>
<td>980</td>
<td>1510</td>
</tr>
<tr>
<td>HISP</td>
<td>290</td>
<td>138</td>
<td>187</td>
<td>183</td>
</tr>
<tr>
<td><strong>Pass Rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>52.7</td>
<td>33.2</td>
<td>18.8</td>
<td>30.4</td>
</tr>
<tr>
<td>WHITE</td>
<td>88.7</td>
<td>72.3</td>
<td>58.9</td>
<td>60.2</td>
</tr>
<tr>
<td>HISP</td>
<td>83.4</td>
<td>54.6</td>
<td>28.6</td>
<td>48.3</td>
</tr>
<tr>
<td><strong>Sample Size</strong></td>
<td>2315</td>
<td>431</td>
<td>272</td>
<td>488</td>
</tr>
</tbody>
</table>

Note. AA = African-American, White: White/Caucasian, HISP = Non-White Hispanic. ELEM = Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies. The sample size reflects the volume of test-takers who provided full demographic information.
Table 9. Parameter Estimates and Effect Sizes for Praxis I

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>Chi-Square</th>
<th>p value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 Reading</td>
<td>1.830</td>
<td>0.183</td>
<td>100.326</td>
<td>0.000</td>
<td>0.446</td>
</tr>
<tr>
<td>P1 Writing</td>
<td>0.539</td>
<td>0.176</td>
<td>9.366</td>
<td>0.002</td>
<td>0.117</td>
</tr>
<tr>
<td>P1 Math</td>
<td>1.776</td>
<td>0.179</td>
<td>98.911</td>
<td>0.000</td>
<td>0.423</td>
</tr>
<tr>
<td>ENG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 Reading</td>
<td>3.082</td>
<td>0.456</td>
<td>45.765</td>
<td>0.000</td>
<td>0.576</td>
</tr>
<tr>
<td>P1 Writing</td>
<td>1.868</td>
<td>0.546</td>
<td>11.686</td>
<td>0.001</td>
<td>0.270</td>
</tr>
<tr>
<td>P1 Math</td>
<td>0.879</td>
<td>0.303</td>
<td>8.428</td>
<td>0.004</td>
<td>0.212</td>
</tr>
<tr>
<td>SS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 Reading</td>
<td>1.561</td>
<td>0.375</td>
<td>17.315</td>
<td>0.000</td>
<td>0.275</td>
</tr>
<tr>
<td>P1 Writing</td>
<td>1.209</td>
<td>0.318</td>
<td>14.435</td>
<td>0.000</td>
<td>0.228</td>
</tr>
<tr>
<td>P1 Math</td>
<td>0.673</td>
<td>0.276</td>
<td>5.959</td>
<td>0.015</td>
<td>0.144</td>
</tr>
<tr>
<td>MATH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 Reading</td>
<td>0.789</td>
<td>0.376</td>
<td>4.394</td>
<td>0.036</td>
<td>0.180</td>
</tr>
<tr>
<td>P1 Writing</td>
<td>1.083</td>
<td>0.479</td>
<td>5.107</td>
<td>0.024</td>
<td>0.212</td>
</tr>
<tr>
<td>P1 Math</td>
<td>30.474</td>
<td>1434989.78</td>
<td>0.000</td>
<td>1.000</td>
<td>3.719</td>
</tr>
</tbody>
</table>

Note. P1 = Praxis I. ELEM = Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.


<table>
<thead>
<tr>
<th>Praxis Test</th>
<th>Agency</th>
<th>N</th>
<th>% Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Praxis I: Mathematics</td>
<td>All Test Takers</td>
<td>582060</td>
<td>77.19</td>
</tr>
<tr>
<td></td>
<td>NJ</td>
<td>11967</td>
<td>82.71</td>
</tr>
</tbody>
</table>

Note. This data includes only test-takers who are attending institutions in NJ.
Table 11. Parameter Estimates and Effect Sizes Based on Race

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>Chi-Square</th>
<th>p value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELEM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race White</td>
<td>0.315</td>
<td>0.275</td>
<td>1.306</td>
<td>0.253</td>
<td>0.054</td>
</tr>
<tr>
<td>Race AA</td>
<td>-0.296</td>
<td>0.370</td>
<td>0.640</td>
<td>0.424</td>
<td>-0.035</td>
</tr>
<tr>
<td><strong>ENG</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race White</td>
<td>-0.421</td>
<td>0.696</td>
<td>0.367</td>
<td>0.545</td>
<td>-0.074</td>
</tr>
<tr>
<td>Race AA</td>
<td>-0.933</td>
<td>0.860</td>
<td>1.176</td>
<td>0.278</td>
<td>-0.131</td>
</tr>
<tr>
<td><strong>SS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race White</td>
<td>-0.029</td>
<td>0.435</td>
<td>0.005</td>
<td>0.946</td>
<td>-0.005</td>
</tr>
<tr>
<td>Race AA</td>
<td>0.115</td>
<td>0.706</td>
<td>0.026</td>
<td>0.871</td>
<td>0.011</td>
</tr>
</tbody>
</table>

*Note.* Subheadings refer to *Praxis II* tests: ELEM = Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.

Table 12. Parameter Estimates and Effect Sizes for Academic Major and UGPA

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>Chi-Square</th>
<th>p value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELEM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acad Major</td>
<td>0.395</td>
<td>0.174</td>
<td>5.156</td>
<td>0.023</td>
<td>0.107</td>
</tr>
<tr>
<td>UGPA</td>
<td>-0.203</td>
<td>0.116</td>
<td>3.048</td>
<td>0.081</td>
<td>0.078</td>
</tr>
<tr>
<td><strong>ENG</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acad Major</td>
<td>-0.436</td>
<td>0.307</td>
<td>2.023</td>
<td>0.155</td>
<td>-0.113</td>
</tr>
<tr>
<td>UGPA</td>
<td>-0.870</td>
<td>0.212</td>
<td>16.833</td>
<td>.000</td>
<td>0.304</td>
</tr>
<tr>
<td><strong>SS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acad Major</td>
<td>0.559</td>
<td>0.204</td>
<td>7.466</td>
<td>0.006</td>
<td>0.153</td>
</tr>
<tr>
<td>UGPA</td>
<td>-0.228</td>
<td>0.151</td>
<td>2.278</td>
<td>0.131</td>
<td>0.085</td>
</tr>
</tbody>
</table>

*Note.* Subheadings refer to *Praxis II* tests: ELEM = Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.

Table 13. Analysis of the Sliding Scale for Flexible UGPA Requirements

<table>
<thead>
<tr>
<th>Test</th>
<th>Sample Size</th>
<th>Passing Score</th>
<th>2.75 – 2.50 and Passing Score +10%</th>
<th>3.50 or higher and Passing Score – 5%</th>
<th>Total Affected</th>
<th>Percentage Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEM</td>
<td>2315</td>
<td>2088</td>
<td>78</td>
<td>22</td>
<td>130</td>
<td>5.6</td>
</tr>
<tr>
<td>ENG</td>
<td>431</td>
<td>313</td>
<td>12</td>
<td>19</td>
<td>28</td>
<td>6.6</td>
</tr>
<tr>
<td>MATH</td>
<td>272</td>
<td>143</td>
<td>5</td>
<td>22</td>
<td>24</td>
<td>8.8</td>
</tr>
<tr>
<td>SS</td>
<td>488</td>
<td>291</td>
<td>22</td>
<td>37</td>
<td>37</td>
<td>12.1</td>
</tr>
</tbody>
</table>

*Note.* ELEM = Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies.
Table 14. Changes in \( R^2 \) square Values

<table>
<thead>
<tr>
<th>Test</th>
<th>P1 Status</th>
<th>P1 + Acad Major/UGPA</th>
<th>P1 + Acad Major/UGPA + Race</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEM</td>
<td>0.368</td>
<td>0.377 (+0.009)</td>
<td>0.381 (+0.004)</td>
</tr>
<tr>
<td>ENG</td>
<td>0.403</td>
<td>0.449 (+0.046)</td>
<td>0.452 (+0.003)</td>
</tr>
<tr>
<td>MATH*</td>
<td>0.188</td>
<td>0.259 (+0.071)</td>
<td>0.273 (+0.014)</td>
</tr>
<tr>
<td>SS</td>
<td>0.184</td>
<td>0.205 (+0.021)</td>
<td>0.206 (+0.001)</td>
</tr>
</tbody>
</table>

Note. Praxis II tests: ELEM=Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies. Asterisk indicates the instability of the regression models related to mathematics.

Table 15. Parameter Estimates and Effect Sizes by Test Title

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>Chi-Square</th>
<th>( p ) value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEM</td>
<td>P1 Reading</td>
<td>1.830</td>
<td>0.183</td>
<td>100.326</td>
<td>0.000</td>
<td>0.446</td>
</tr>
<tr>
<td></td>
<td>P1 Writing</td>
<td>0.539</td>
<td>0.176</td>
<td>9.366</td>
<td>0.002</td>
<td>0.117</td>
</tr>
<tr>
<td></td>
<td>P1 Math</td>
<td>1.776</td>
<td>0.179</td>
<td>98.911</td>
<td>0.000</td>
<td>0.423</td>
</tr>
<tr>
<td></td>
<td>Race White</td>
<td>0.315</td>
<td>0.275</td>
<td>1.306</td>
<td>0.253</td>
<td>0.054</td>
</tr>
<tr>
<td></td>
<td>Race AA</td>
<td>-0.296</td>
<td>0.370</td>
<td>0.640</td>
<td>0.424</td>
<td>-0.035</td>
</tr>
<tr>
<td></td>
<td>Acad Major</td>
<td>0.395</td>
<td>0.174</td>
<td>5.156</td>
<td>0.023</td>
<td>0.107</td>
</tr>
<tr>
<td></td>
<td>UGPA</td>
<td>-0.203</td>
<td>0.116</td>
<td>3.048</td>
<td>0.081</td>
<td>0.078</td>
</tr>
<tr>
<td>ENG</td>
<td>P1 Reading</td>
<td>3.082</td>
<td>0.456</td>
<td>45.765</td>
<td>0.000</td>
<td>0.576</td>
</tr>
<tr>
<td></td>
<td>P1 Writing</td>
<td>1.868</td>
<td>0.546</td>
<td>11.686</td>
<td>0.001</td>
<td>0.270</td>
</tr>
<tr>
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<td>0.879</td>
<td>0.303</td>
<td>8.428</td>
<td>0.004</td>
<td>0.212</td>
</tr>
<tr>
<td></td>
<td>Race White</td>
<td>-0.421</td>
<td>0.696</td>
<td>0.367</td>
<td>0.545</td>
<td>-0.074</td>
</tr>
<tr>
<td></td>
<td>Race AA</td>
<td>-0.933</td>
<td>0.860</td>
<td>1.176</td>
<td>0.278</td>
<td>-0.131</td>
</tr>
<tr>
<td></td>
<td>Acad Major</td>
<td>-0.436</td>
<td>0.307</td>
<td>2.023</td>
<td>0.155</td>
<td>-0.113</td>
</tr>
<tr>
<td></td>
<td>UGPA</td>
<td>-0.870</td>
<td>0.212</td>
<td>16.833</td>
<td>.000</td>
<td>0.304</td>
</tr>
<tr>
<td>SS</td>
<td>P1 Reading</td>
<td>1.561</td>
<td>0.375</td>
<td>17.315</td>
<td>0.000</td>
<td>0.275</td>
</tr>
<tr>
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<td>P1 Writing</td>
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<td>0.318</td>
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<td>0.000</td>
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<td>5.959</td>
<td>0.015</td>
<td>0.144</td>
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<tr>
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<td>0.946</td>
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</tr>
<tr>
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<td>0.026</td>
<td>0.871</td>
<td>0.011</td>
</tr>
<tr>
<td></td>
<td>Acad Major</td>
<td>0.559</td>
<td>0.204</td>
<td>7.466</td>
<td>0.006</td>
<td>0.153</td>
</tr>
<tr>
<td></td>
<td>UGPA</td>
<td>-0.228</td>
<td>0.151</td>
<td>2.278</td>
<td>0.131</td>
<td>0.085</td>
</tr>
</tbody>
</table>

Note. Praxis II tests: ELEM=Elementary Education, ENG = English Language, Literature, and Composition, MATH = Mathematics, and SS = Social Studies. Asterisk indicates the instability of the regression models related to mathematics. The effect sizes correspond to the block of variables: P1 = Praxis I Reading, Writing and Math, Race/Ethnicity, and Academic Major combined with UGPA.