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# Predictors for Passing the Psychology License Exam

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Walden University
2020

Abstract

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by

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MSW, New York University, 2003

BA, St. John's University, 2001


Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology



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Abstract

Psychology license exam takers who do not pass the exam cannot practice psychology independently, have difficulty securing employment, and may lose current jobs. Despite the increased number of psychologists entering the field and the increase in ethnic minority students in doctoral-level psychology programs, there is scarce recent research on predictors of license exam pass rates. The purpose of this quantitative nonexperimental study was to examine whether APA internship match rates, GRE scores, percentage of ethnic minority students, gender, program type, rate of admittance, and years to completion predict license exam pass rates. The triarchic theory of intelligence served as the framework. Archival data were collected from 176 doctoral psychology programs. The results of linear multiple regression analysis revealed that only rate of admission significantly predicted exam pass rates. Graduate program directors may apply the findings to support the success of doctoral students and increase licensure exam pass rates. Results may offer graduate program directors and policymakers a valuable perspective by suggesting a focus realignment in assisting students and embedding triarchic intelligence in training and examination.

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Dedication

First and foremost, I would like to dedicate this manuscript to my mother, Stella Chaparro. Mom, you are the reason I am humble, prudent, and kind. Your continuous words of encouragement motivated me to pursue this doctorate. You are my best friend, and I am forever grateful for your lifelong dedication towards me. There are simply not enough words to express my love and gratitude to you.

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Chapter 1: Introduction to the Study

The U.S. Bureau of Labor Statistics (as cited in Clay, 2017) stated that

employment in the field of psychology is projected to grow 22% by 2024, which is faster

than all other professions. The number of students entering graduate-level programs in

psychology is increasing (Clay, 2017). Between 2004 and 2013, the number of master's

degrees awarded increased by 54% and doctorates by 32% (Clay, 2017). Further, there

has been a steady increase of ethnic minority students in psychology doctoral programs

(American Psychological Association [APA], 2018). APA (2007) reported that 21% of

doctoral students enrolled in psychology programs were from minority groups. In 2015,

26% of doctoral students enrolled in psychology programs were from minority groups

(APA, 2015).

After students graduate from a doctorate-level psychology program, passing the

psychology license exam is essential for entry into the profession. The Examination for

Professional Practice in Psychology (EPPP) exam is a requirement for licensure in the

United States and nine provinces in Canada (Hunsley et al., 2016; Schaffer et al., 2013).

Exam takers who do not earn a passing score are unable to practice psychology

independently, have difficulty securing employment, and lose their current jobs

(Sharpless & Barber, 2013; Siegel & DeMers, 2016).

With the exception of Sharpless and Barber's (2013) study, there is scarce recent

data on predictors of EPPP license exam pass rates. Due to the importance of attaining

licensure and the increase of students entering doctoral psychology programs, exam

predictor variables should be scrutinized (Schaffer et al., 2013). The results of the current

study may contribute to social change by offering graduate program directors and policymakers a valuable perspective by suggesting a focus realignment in assisting students and embedding triarchic intelligence in training and examination. This quantitative, correlational, nonexperimental study addressed whether APA internship match rates, Graduate Record Examination (GRE) scores, percentage of ethnic minority students, gender, program type, rate of admittance, and years to completion predict EPPP license exam pass rates.

## Background

The Association of State and Provincial Psychology Boards (ASPPB) is responsible for the licensure of psychologists throughout the United States and Canada (Bohall & Bautista, 2017; DeMers, Webb, & Horn, 2014). The ASPPB was founded in 1961 to serve psychology boards and was developed by the APA Board of Professional Affairs Committee of State Licensure. The ASPPB identified the need to develop a standardized exam to provide licensure for psychologists (Bohall & Bautista, 2017). In response to this, the EPPP license exam was developed by the ASPPB to meet a minimum standard for independent psychology practice (DeMers et al., 2014; Siegel & DeMers, 2016).

The EPPP license exam was first administered in 1965, and by the mid1980s, it was widely accepted in most jurisdictions in the United States and Canada (DeMers et al., 2014; Siegel & DeMers, 2016). The EPPP license exam is a computerized exam consisting of 225 multiple-choice questions. Despite areas of specialty, examinees are expected to possess a broad and basic knowledge of psychology to pass the exam. The

EPPP license exam is scored on a scale from 200 to 800. The passing score proposed by the ASPPB is 500, which is a raw score of approximately 70%, and it represents the minimum standard for independent practice for a psychologist (DeMers et al., 2014).

This EPPP license exam is the method by which the state sets a criterion for determining competence and readiness for independent practice. The EPPP license exam is used to evaluate knowledge that is necessary for the competent practice of psychology. A general requirement for taking the EPPP license exam is a doctoral degree in psychology, either doctor of philosophy (PhD) or a doctor of psychology (PsyD). The exam is commonly taken upon graduation, though some jurisdictions allow the exam to be taken prior to the completion of the postdoctoral year. In addition to completing graduate school, an internship during graduate training and postdoctoral internship needs to be fulfilled to meet specific state licensing requirements (Norcross & Karpiak, 2015; Siegel & DeMers, 2016).

The ASPPB (2017) examined EPPP license exam pass rates by doctoral program between 2015 and 2017 and found that 7,354 exam candidates took the exam. The average pass rate for exam candidates taking the test for the first time exceeded 80% (ASPPB, 2017). Shaffer et al. (2013) noted that 7,402 doctoral-level candidates took the exam from April 2008 through July 2010, and the average pass rate for exam candidates taking the test for the first time was 82%. Sharpless and Barber (2013) researched program-level factors, including program prestige, admission rates, GRE scores, minority enrollment, and the relationship with the EPPP license exam. GRE scores significantly positively predicted EPPP exam scores, percentages of minorities in programs

significantly negatively predicted EPPP exam scores, and internship match rates significantly positively predicted EPPP exam scores (Sharpless & Barber, 2013). Sharpless and Barber noted the uncertainty in the EPPP license exam appropriateness for all groups and suggested exploration of variables such as demographic data of exam takers to reassure that the EPPP license exam is not excluding certain demographics.

In contrast, Bleske-Rechek and Browne (2014) examined data to identify how GRE scores changed regarding ethnicity and gender. Bleske-Rechek and Browne found that scores significantly varied by gender and ethnicity. Additionally, between 1986 and 2009, enrollment patterns were studied to identify whether GRE scores hindered efforts toward diversifying higher education (Bleske-Rechek & Browne, 2014). Bleske-Rechek and Browne found a minimal increase in male and female GRE scores since the 1980s. Moreover, results revealed a minor steady increase in GRE scores across all ethnic groups (Bleske-Rechek & Browne, 2014). Enrollment patterns from 1986 to 2009 indicated an increase in ethnic and gender populations, despite GRE score gaps (Bleske-Rechek & Browne, 2014). Therefore, GRE scores were not seen to obstruct efforts toward diversifying higher education (Bleske-Rechek & Browne, 2014).

Despite the increase in enrollment of ethnic minorities in doctoral psychology programs, the decrease in the GRE score gap, and the research completed thus far to identify predictors of passing the EPPP license exam, the lack of recent research on the relationship between predictors and passing the EPPP license exam suggested a need for further investigation regarding potential performance gaps (Bleske-Rechek & Browne, 2014; Sharpless & Barber, 2013). I used quantitative, correlational, nonexperiment design

to examine whether APA internship match rates, GRE scores, percentage of ethnic minority students, gender, program type, rate of admittance, and years to completion predict EPPP license exam pass rates.

## Problem Statement

The EPPP license exam is the basis for entry into the profession. Exam takers who do not pass cannot practice psychology independently, have difficulty securing employment, and may lose current jobs (Sharpless & Barber, 2013; Siegel & DeMers, 2016). There is scarce research on predictors of EPPP license exam pass rates. Although Sharpless and Barber (2013) identified key predictors of EPPP exam pass rates, the results are dated when considering the growth of the number of psychologists entering the field and the increase in ethnic minority students in doctoral-level psychology programs. The current study addressed the gap in the literature concerning recent data regarding APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion as predictors for the EPPP license exam pass rates.

## Purpose of the Study

The purpose of this study was to examine whether APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates. The results of the study may provide doctoral psychology programs with information regarding variables influencing license exam pass rates so that they can develop methods and strategies to improve license exam pass rates, thereby perhaps supporting the professional

success of doctoral students. With the exception of Sharpless and Barber's (2013) study, there was scarce recent literature on predictors of EPPP license exam pass rates. Due to the fast-growing field and the importance of attaining licensure, examining predictor variables was warranted (Schaffer et al., 2013).

## Research Question and Hypotheses

RQ: Do APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates?

$H_0$: APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion do not predict EPPP license exam pass rates.

$H_a$: APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates.

## Theoretical Framework

Sternberg's (1985, 1988, 1998) triarchic theory of intelligence served as the framework for this study. The triarchic theory of intelligence includes three types of cognitive abilities: analytical, creative, and practical (Ekinci, 2014). The triarchic theory of intelligence was appropriate for this study addressing predictors for the EPPP license exam.

Analytical ability comprises skills such as analyzing, evaluating, explaining, and comparing, while creative ability involves skills such as creativity, designing, imagining,

and supposing (Sternberg, 1985). Practical skills consist of adapting to contexts and using, applying, and implementing (Sternberg, 1985). In addition to these cognitive outcomes, attitudinal outcomes are also a focus of the theory for successful problem-solving (Howard, McGee, Shin, & Shia, 2001). There are associations between these three cognitive abilities.

The combination of the skills and attitudes are expected to produce the outcomes of analytical ability contributing to content understanding, creative ability contributing to problem-solving skills, and practical skills contributing to problem-solving (Sternberg, 1988). Success in applying intelligence comes with life values within a sociocultural context (Sternberg, 1985, 1988). In the current study, GRE scores of an individual capture indicate analytical ability, which contributes to the content understanding of clinical practice, while APA internship match rates reflect the practical and creative skills that contribute to problem-solving. Increased content understanding and problem-solving skills contribute to increased EPPP licensure exam pass rates. This theory has been extended to the triarchic theory of successful intelligence, incorporating values and context (Sternberg, 2003). A more thorough explanation of the theoretical framework is provided in Chapter 2.

## Nature of the Study

I used a quantitative nonexperimental design with archival data to assess relationship between the variables. This study focused on whether APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates. Data were

collected from publicly available reports from ASPPB (2017), the Insider's Guide to Graduate Programs in Clinical and Counseling Psychology (Sayette & Norcross, 2020), and the Association of Psychology Postdoctoral and Internship Centers'(APPIC) Match Rates by Doctoral Program (APPIC, 2017).

The data analysis included multiple regression analyses (see Gravetter &Wallnau, 2016). The criterion variable was EPPP license exam pass rates. The first predictor variable (PV1) was APA internship match rates, the second predictor variable (PV2) was GRE scores, the third predictor variable (PV3) was gender, the fourth predictor variable (PV4) was percentage of ethnic minority students, the fifth predictor variable (PV5) was program type, the sixth predictor variable (PV6) was rate of admittance, and the seventh predictor variable (PV7) was years to completion. A more detailed discussion of the data analysis is included in Chapter 3.

**Definitions**

*APA internship match rate*: Psychology doctoral students who pursue an APA-accredited internship complete an application and matching process provided by APPIC. Graduate psychology programs report the results of the doctoral students' APA internship match rates to APPIC. The APPIC match rates are provided at the doctoral program level (APPIC, 2017; Hatcher, 2015).

*EPPP license exam*: Passing the EPPP license exam is a requirement for licensure in the United States and nine provinces in Canada. The EPPP license exam is scored on a scale from 200 to 800. The ASPPB proposed a scaled score for passing the EPPP license exam as 500, which is a raw score of approximately 70%. This score represents the

minimum standard for independent practice for a psychologist (Hunsley et al., 2016; Schaffer et al., 2013).

*Gender:* For this study, gender was defined as female and male doctoral psychology students. Gender was calculated by using the percentage of female students enrolled in each psychology doctoral program (see Sayette & Norcross, 2020).

*GRE scores*: GRE scores assist in the selection of students for admission into graduate programs (Sternberg & Sternberg, 2017). For this study, information regarding GRE scores was obtained from doctoral programs.

*Percentage of ethnic minority students*: Percentage of ethnic minority students is defined as the percentage of ethnic minority students enrolled in each psychology doctoral program (Sayette & Norcross, 2020). APA (2007, 2015) defined ethnic minority doctoral students as African American, Hispanic, Asian, American Indian, and Native American.

*Program type*: Program type is defined as clinical PhD and PsyD programs (Sayette & Norcross, 2020).

*Rate of admittance*: The rate of admittance is defined as the rate at which applicants are accepted into the doctoral program. The rate of admittance is calculated by dividing the number of admitted students by the number of applied students (Sayette & Norcross, 2020).

*Years to completion*: Years to completion is defined as the average years taken to complete the doctoral psychology program, including internship (Sayette & Norcross, 2020).

## Assumptions

I assumed that the selected variables (APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion) were appropriate to examine as predictors of EPPP license exam pass rates. I also assumed that archival data were accurate and reliable (see Sayette & Norcross, 2020).

## Scope and Delimitations

The scope included recent data as reported by clinical doctoral psychology programs consisting of APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion. The delimitation of this study included quantitative analysis rather than interpretation used through a qualitative research design (see Sayette & Norcross, 2020).

## Limitations

The limitations of this study included the use of archival data; archival data limits findings to when the data was recorded. The use of program-level data restricted the ability to study individual-level data. Doctoral programs did not report data regarding doctoral students with learning disabilities or special exam accommodations; therefore, these data were not included in the study (see Sayette & Norcross, 2020).

## Significance

The results of the study may contribute to social change by providing doctoral psychology programs with information regarding variables influencing license exam pass rates to identify and apply methods and strategies to improve license exam pass rates,

thereby supporting the professional success of doctoral students. Universities may offer basic internship preparation programs targeting APA internship because it may be found to be significantly associated with the EPPP license exam performance. Also, secondary schools may offer GRE preparation programs that could increase the skills and knowledge required to score higher on the GRE and subsequently gain a higher score on the EPPP license exam, assuming this association was found to be significant. Furthermore, as a concern of the APA, the ASPPB, the APPIC, and other associations and their constituents, exam, and academic support programs informed by the results of the current study may be launched. For example, the APA may implement such programs in their annual, national, and regional conferences (see APA, 2017; Sharpless, 2019a).

**Summary**

The purpose of this study was to examine whether APA internship match rates, GRE scores, gender, percentage of minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates. The study was important due to the rapid employment growth in the field of psychology and the requirement of passing the EPPP license exam to secure employment (Sharpless & Barber, 2013; Siegel & DeMers, 2016).

The main purpose of the EPPP license exam is to provide psychologists with the ability to practice at an independent level (Norcross & Karpiak, 2015). With the exception of Sharpless and Barber's (2013) study, there was scarce recent data addressing predictors of EPPP license exam pass rates. The theory that served as a framework for

this study was the triarchic theory of intelligence (see Sternberg, 1985, 1988, 1998). A

review of the literature is included in Chapter 2.

Chapter 2: Literature Review

The EPPP license exam is a requirement for licensure in the United States and nine provinces in Canada (Hunsley et al., 2016; Schaffer et al., 2013). Due to the rapidly growing field and the importance of attaining licensure, examining the most recent exam predictor variables was warranted (Sharpless & Barber, 2013).The purpose of the current study was to examine whether APA internship match rates, GRE scores, gender, percentage of minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates.

Chapter 2 comprises a review of the literature. The chapter begins with a discussion of the search strategy used to complete a review of the relevant literature. The search strategy section is followed by a discussion of the theory used to frame the study. Chapter 2 then continues with an overview of the EPPP license exam and the GRE. An additional section is devoted to a historical overview and relevant information about APA internship match rates. The literature review related to the percentage of minority students is identified as minority student achievement and standardized exam scores. Lastly, the literature review for gender, program type, rate of admittance, and years to completion are included. A summary concludes the chapter.

**Literature Search Strategy**

The Walden University library was the main resource for the peer-reviewed articles needed for the literature review. Several general terms used in PsychInfo and Psych ARTICLE databases included *triarchic theory of intelligence*, *EPPP license exam*, *GRE*, *APA internship match rates*, *gender*, *program type*, *rate of admittance*, and *years to*

*completion*. The terms *minority students*, *minority students* and *standardized exams*, *minority psychology graduate students*, and *professional license exams* helped with identifying other peer-reviewed articles related to the study. The literature review included articles published within the last 5-15 years. The literature review included early research to provide a historical perspective of the variables addressed in the study.

This section presents a discussion of the search strategy used to complete a review of the relevant literature. The Literature Search Strategy section supports my efforts to provide an investigation into older and recent literature. The search strategy was used to identify the gap in the research concerning whether APA internship match rates, GRE scores, percentage of ethnic minority students, gender, program type, rate of admittance, and years to completion predict EPPP license exam pass rates.

### Theoretical Foundation

The triarchic theory of intelligence was used to frame this study. The triarchic theory of intelligence consists of abilities related to academic performance and real-life situations (Finn et al., 2014). The triarchic theory of intelligence is related to academic and cognitive abilities, which predict exam performance as well as academic achievement in nonspecific areas (Finn et al., 2014). Because the triarchic theory of intelligence focuses on exam performance and aptitude, the theory contributed to the examination of predictors of the EPPP license exam.

Each person has different abilities or strengths in learning that should be addressed by educators (Flores-Mendoza et al., 2018) using assessment tools. According to studies, there is a correlation between triarchic abilities and academic achievement

(Ekinci, 2014; Flores-Mendoza et al., 2018; Sternberg, Torff, & Grigorenko, 1998). The individual triarchic abilities contribute to making a practical profile of individual differences that could be correlated to the success of doctoral psychology students taking the EPPP license exam. Therefore, the theoretical framework was determined to be appropriate in providing a foundation for the research question guiding the current study.

Sternberg's (1985, 1988, 1998) triarchic theory of intelligence provides an approach with three types of cognitive abilities rather than a psychometric approach, which was well known for describing intelligence. Traditional intelligence testing focused on attention, memory, and problem-solving skills to establish the predictors of school success (Binet & Simon, 1916). Sternberg (1985, 1988, 1998) criticized traditional intelligence tests for narrowly measuring analytic skills and stated that traditional intelligence testing was not measuring knowledge and abilities accurately.

Sternberg (as cited in Grigorenko & Sternberg, 1997) researched intelligence among graduate students at Yale University. Sternberg (1997) observed student academic levels and concluded that although some students had perfect grades, others were average. Sternberg (1997) noted that several other students had the potential to succeed in graduate school but had low grades. Sternberg (as cited in Grigorenko & Sternberg, 1997) began to explore factors related to human intelligence because the common way, psychometrics to measure performance, did not prove to be consistently predictive. Sternberg's (1985, 1988, 1998) triarchic theory of intelligence, also known as the theory of successful intelligence, measures not only analytical abilities but also measures practical and creative abilities. Exam performance could improve by integrating different

abilities of learning, especially for students who learn differently from others (Sternberg, 1985, 1988, 1998). Sternberg (1985) stated that most theories related to intelligence are incomplete and that intelligence should be defined more broadly, encompassing not only analytical skills but also creative and practical skills. Sternberg (1985, 1988, 1998) developed a more comprehensive way of understanding intelligence and how students learn.

The analytical aspect of intelligence was the first and most systematically developed of the three aspects (Tigner & Tigner, 2000). The analytical aspect involves analyzing, critical thinking, comparing, and evaluating information. The analytical aspect is needed to solve problems and conduct decision-making correctly. The analytical aspect of intelligence includes meta-components, performance components, and knowledge acquisition (Tigner & Tigner, 2000). A student who excels in analytical intelligence performs well academically.

Furthermore, intelligence tests formerly designed to predict academic performance showed that analytical intelligence is most similar to the kind of intelligence that IQ tests attempt to measure (Tigner & Tigner, 2000). Sternberg (1988) noted that students with analytical intelligence not only do extremely well in academic areas they are also proficient at problem-solving and decision-making. Further, the analytical ability consists of determining ways to solve problems. The ability to analyze and comprehend a theory is an illustration of the analytical intelligence aspect of the triarchic theory (Sternberg, 1985).

Practical intelligence is the ability to apply, utilize, and implement information (Sternberg, 1988, 1998). The functions of practical intelligence are demonstrated by examining and adjusting to daily challenges. The ability to apply what is learned may help in identifying problems and solutions in real-life situations (Sternberg, 1998). Applying a theory learned in graduate school while working with a client is an example of practical intelligence (Sternberg, 1998). Practical intelligence functions as the ability to generalize knowledge gained in a particular situation to other situations that a person may experience (Sternberg, 1998). A person with practical knowledge is able to apply procedural information to everyday tasks. Sternberg and Grigorenko (1998) explained how teachers should assist students not only in acquiring information (a component of analytical intelligence) but also in applying that knowledge to the world in which they live (practical intelligence). Sternberg's (1988) practical intelligence is much more individualistic than analytical intelligence. Practical intelligence is difficult to assess using typical intelligence tests and may not be significantly correlated with academic performance (Tigner & Tigner, 2000).

The final aspect of Sternberg's (1985, 1988, 1998) triarchic theory is creative intelligence. The creative aspect of intelligence consists of the ability to discover, invent, and create (Sternberg, 1985). Creative intelligence provides a way to identify experiences and provide insight and resolutions. This form of intelligence is both creative and synthetic. Sternberg (1988) explained that synthetic thinkers are able to design, conceptualize, and presume. The ability to create a theory is an example of creative intelligence (Sternberg, 1998). Creative intelligence is important for new situations and

returning situations. New situations require skills that may have been acquired during past experiences; some people are more skilled than others in coping. Recurring situations rely on past experiences and knowledge (Sternberg, 1998). Therefore, creative intelligence is closely linked to the experience of the individual (Tigner & Tigner, 2000). People with creative intelligence can construct new ideas. Unlike analytical and practical intelligence, creative intelligence is best expressed in situations with minimal structure or constraint (Tigner & Tigner, 2000). Most academic settings impose a high degree of structure, which may suppress creativity. Educators may assist with creative intelligence by questioning principles, allowing mistakes, and encouraging risks (Tigner & Tigner, 2000).

The theory of triarchic intelligence, which focuses on three aspects of intelligence (theoretical, practical, and productive) and involves three dimensions (analytical, practical, and creative), has three kinds of capabilities: internal capacities, the capacity to adapt to environmental changes, and the ability to apply experiences to the present problem (Sternberg, 1985, 1988, 1998). These abilities will account for the measurements of the EPPP license exam in terms of the EPPP license exam takers' componential intelligence, contextual intelligence, and experiential intelligence. Given the triarchic intelligence theory as an information-processing perspective for abilities, abilities measured on the EPPP license exam are relevant to this study in terms of the EPPP license exam takers' componential intelligence, contextual intelligence, and experiential intelligence.

This section presented a discussion of the theory used to frame the study. The triarchic theory of intelligence was found to be of value to the study, as individual triarchic abilities contribute to making a practical profile of individual differences that could be correlated to the success of doctoral students taking the EPPP license exam. That is, measures by the EPPP license exam may be relevant to the intelligence of the EPPP exam takers' componential intelligence, contextual intelligence, and experiential intelligence. The next section provides a review of the literature on research supporting the triarchy theory of intelligence.

**Research Related to the Triarchic Intelligence Theory**

Sternberg et al. (1998) examined the efficacy of primary and secondary instruction by infusing the triarchic theory of intelligence into existing curricula. The three aspects of the triarchic theory were infused into instruction and assessment. One of the groups was provided instruction based on the triarchic theory, while the theory did not enhance the other group's instruction. Sternberg et al.(1998) divided students into three groups: (a) using standardized ability measures to analyze the comparability of the groups; (b) providing different instructional treatments, which were triarchic, critical thinking, and traditional; and (c) administering knowledge-based assessment measures. The procedure included two groups of students and teachers, one in a primary school setting and the other in a middle-school setting (Sternberg et al., 1998). The students in the group who received triarchic instruction, in general, learned more than students who received either traditional memory-based or analytically based instruction. Greater learning resulted by utilizing a variety of assessments, including both memory-based and

performance-based, that were designed for this project. The two experiments indicated that students benefit from triarchic instruction, not only when matched to the pattern of strengths but also when given equally to all students (Sternberg et al., 1998).

The triarchic theory of intelligence was also used as the basis of a study by Sternberg (2006), to determine whether analytical, practical, and creative skills increase Scholastic Aptitude Test (SAT) scores in predicting college performance and to identify ethnic group fairness (Sternberg, 2006). The study included 990 participants whose data were available for analyses. The participants included students in their first year of college or their final year of high school. Sternberg (2006) used the triarchic theory to suggest its potential use in college admissions as an enhancement to the SAT. The results indicated that applying the triarchic theory enhanced predictive validity for college grade point average (GPA) related to high school GPA and SAT and also reduced ethnic group differences. The results suggested that measures such as these could increase diversity and equity in the admissions process (Sternberg, 2006).

Current research has continued to support the triarchic intelligence theory. Sternberg et al. (2014) researched educational interventions with fourth-grade students based on the theory of successful intelligence (triarchic intelligence theory). The study included 7,702 fourth-grade students who received instruction based on analytical, creative, and practical aspects. Students were also educated based on memory or critical thinking. Within the comparison groups, the students who received successful intelligence instruction performed statistically better than students in other groups (Sternberg et al., 2014).

Ekinci (2014) investigated the relation between Sternberg's Triarchic Abilities Test (STAT), multiple intelligences, and the academic achievement of children in Turkey. The study included 172 children attending primary school between the ages of 11 and 12. STAT showed a significant and positive relation to linguistic, logical-mathematical, and intrapersonal test scores. The analytical ability was significantly related to logical-mathematical test scores. Practical ability scores were only related to intrapersonal test scores. Removing the effect of multiple intelligences, the partial correlations between mathematics, social science, and foreign language course grades and creative, practical, analytical, and total STAT scores were found to be significant for creative scores and total STAT scores but not significant for practical scores and analytical STAT scores (Enkinci, 2014).

Mandelman, Barbot, and Grigorenko (2016) examined how the Aurora battery, an assessment tool based on the triarchic theory, composed of analytical, practical, and creative cognitive abilities, predicted middle school grades and progress over a school year. The study consisted of a sample of 145 middle school students. The results demonstrated that the Aurora battery was able to predict a substantial amount of overall academic performance (GPA) one year following its administration.

Many levels of education use standardized assessments of ability and achievement. The level of abilities measured by the Aurora battery indicated a different contribution of each ability (analytical, practical, and creative) in the prediction of the GPA, and suggested that practical abilities, rather than analytical abilities, were the best predictors. This finding is of importance as it highlights that abilities that are not

traditionally thought of as being school-related, such as practical or creative abilities, were able to predict the GPA intercept and are worthy of attention (Mandelman et al., 2016).

Additionally, there exists an opportunity for these abilities to be developed within the classroom. The results questioned the dominance afforded to analytical abilities when it comes to school achievement (Mandelman et al., 2016). Standardized exams measure ability and achievement and are used at many levels of education. The widespread use of standardized exams such as the GRE supports educators' ability to predict academic performance and achievement. Part of the admission process at the graduate level includes the GRE (Mandelman et al., 2016). The previous section involved a discussion of the literature on research supporting the triarchic theory of intelligence. The next section provides an overview of the literature pertaining to the EPPP license exam.

## EPPP License Exam

In 1965, the EPPP license exam was first administered, and by the mid-1980s, it became widely accepted in most jurisdictions in the U.S. and Canada (ASPPB, 2016). The EPPP license exam consists of 225 multiple choice questions given in a computerized format. Despite areas of specialty, exam takers are expected to have a broad basic knowledge of psychology in order to be successful. The EPPP license exam is calculated within a range of 200 – 800 on a scaled score. The ASPPB proposed a scaled score for passing the EPPP license exam as 500 for independent practice, which is approximately a 70% raw score. This score represents the minimum standard for

independent practice for a psychologist. Each authority sets the standard for passing in its state and reports the score to the exam taker (ASPPB, 2016).

The main purpose of the EPPP license exam is to assess aspiring psychologists' abilities to practice at an independent level (Habben, 2013). The EPPP license exam evaluates knowledge that is vital for the competent practice of psychology. A general requirement for taking the EPPP license exam is a doctoral degree in psychology. Doctorate degrees in psychology include PhD or PsyD degree. Upon graduation, students sit for their exam, though some states allow students to complete the exam prior to finishing their post-doctoral year. In addition to completing graduate school, students must fulfill all internship and post-doctoral internship obligations to meet specific state licensing requirements (Habben, 2013).

From 1997-2005, Templer et al. (2008) compared EPPP license exam average scores from professional and clinical graduate psychology programs. The data included EPPP license exam mean scores from 59 professional and 148 traditional graduate psychology programs. The data for the study were obtained from the Educational Reporting Service, and the results indicated a decline in EPPP license exam scores from professional psychology programs. The decline of EPPP license exam scores was due to an increase of 31.1% of professional school programs and low academic standards. The study recommended that professional psychology programs accept fewer students with more strict admissions requirements (Templer et al., 2008).

From April 2008 through July 2010, Schaffer et al. (2013) provided a summary of EPPP license exam performance from 7,402 doctoral candidates. The summary of the

data included numerous factors in relation to EPPP license exam performance. The purpose of the study was to provide graduate programs, potential candidates, and the profession regarding a collective amount of data related to EPPP license exam performance (Shaffer et al., 2013). The data included questionnaires and scores from EPPP license exam candidates available by the ASPPB (Shaffer et al., 2013). The results demonstrated a high percentage of first-time exam takers, a weak relationship between study methods and pass rates and a stronger relationship with the amount of study time and pass rates.

Further, the study showed a statistically significant relationship relative to time after graduation and pass rates (Shaffer et al., 2013). Additionally, the data showed PhD candidates' EPPP license exam performance was superior to PsyD candidates' performance. However, there was a higher percentage of a first-time pass rate with PsyD candidates than PhD candidates. The study was unable to determine if low exam scores were related to the quality of graduate programs or internships. The information provided by the study will assist prospective students when choosing types of graduate programs. The researchers concluded that an evaluation of data regarding EPPP license exam performance provides guidance in education towards licensure for doctoral candidates (Shaffer et al., 2013).

Sharpless and Barber (2013) provided a summary of data to identify predictors of EPPP license exam pass rates, by examining the relationship between program prestige, program selectivity, student variables, and EPPP license exam performance. A significant correlation was found between all three factors. Program selectivity (lower admission

rates) and student variables (GRE scores) were the strongest predictors for EPPP license performance, with higher program selectivity associated with higher EPPP scores. Sharpless and Barber (2013) also identified a negative relation between EPPP license exam performance and the percentage of minority students. The data were retrieved from numerous resources that were publicly available. The data analysis consisted of multiple regressions, and the results included three consistent predictors. The three consistent predictors were GRE scores, the percentage of minorities in programs, and internship match rates, suggesting the higher number of enrolled ethnic minority students, the lower the EPPP license exam pass rates for ethnic minorities.

Sharpless and Barber (2013) suggested further investigation regarding predictors and the EPPP license exam to clarify the meaning of the data on ethnic minority students. It is unknown if minority students score lower on the EPPP license exam or if programs with higher percentages of ethnic minority students have applicants of all ethnicities who pass at lower rates. Because the psychology doctoral programs constantly work towards increasing the number of ethnic minority students, additional exploration should be made about EPPP license exam performance and its validity between groups (Sharpless & Barber, 2013).

Templer and Tangen (2013) examined pass/fail program rates, and the number of EPPP license exam taken and passed/failed in professional and traditional programs. The data obtained included the 2005-2009 ASPPB reports. The study included 154 traditional programs and 63 professional programs. Findings revealed that nine of 63 professional programs and 128 of 154 traditional programs had mean pass rates higher than the overall

pass rate of 87%. There was a 73% professional program pass rate and 93% traditional mean pass rate. The information provided covers the real differences since most professional programs have more students completing EPPP license exams, and the information includes those who have taken the exam more than once. Traditional clinical psychology graduates completed 3,447 EPPP license exams, and 3,185 passed. Professional clinical psychology graduates completed 7,202 EPPP license exams, and 4,946 passed (Templer & Tangen, 2013).

The greater quality of traditional programs influences the higher EPPP license exam pass rate. Further, the traditional program acceptance rate was 10%, whereas professional programs accept 44% of the applicants (Templer & Tangen, 2013). Templer and Tangen (2013) recommend additional exploration of the EPPP license exam and client-clinician relationship. Further, the authors recommend identifying whether there is a relationship between EPPP license exam performance and client outcome (Templer & Tangen, 2013). That is, the researchers identified a fundamental gap in knowledge about whether there is a relationship between EPPP license exam performance and client outcome, an issue requiring further investigation.

Shamp (2013) examined how psychology program characteristics predict APA internship placement site characteristics, which then predict EPPP license exam scores. The sample consisted of about 430 programs from February 2011 to June 2011 retrieved from the ASPPB EPPP license exam score report. Some of the program characteristics and internship placements predicted scores on the EPPP license exam. Students in clinical PhD programs were more likely to receive APA internship placement and

attained higher scores on the EPPP license exam compared to students in PsyD programs. Additionally, the findings revealed that school PhD programs were least likely to obtain APA internship placement and attained lower scores on the EPPP license exam. The researchers suggested further studies regarding the type of internship placements, internship characteristics, and doctoral program characteristics, noting the importance of addressing training and educational issues among programs and internships (Shamp, 2013). Learning and education experienced throughout internship training may strengthen students' knowledge of professionalism and EPPP license exam scores (Shamp, 2013). The previous section involved a review of the literature related to the EPPP license exam. The next section provides an overview discussion of APA internship match rates.

**APA Internship Match Rates**

The APA internship is a fundamental component for gaining supervised knowledge, clinical skills, and experience related to working with clients within a mental health setting (Stricker, 1995). According to Perfect, Thompson, and Mahoney (2015), an internship accredited by the APA, "…is considered to be the 'gold standard' for health service training" (p. 1008). In addition, successful completion of internship training is a requirement for taking the EPPP license exam (Shamp, 2013).

The need to train psychologists began during and after World War II, when the military workforce and veterans were in high need of mental health care (Stricker, 1995). Since the number of psychologists did not meet the elevated demand, the Veterans Association and government resources agreed to fund educational training to psychology programs in return for services (Stricker, 1995). The APA began to form committees to

identify the needed structure of internship training. In 1953, the APA committee on training in clinical psychology, and the Boulder conference developed the requirement for internship completion as part of a psychology graduate school program of study (Webb & Hill, 2016).

APA internship accreditation began in 1957, and various internship structures, regulations, and requirements evolved throughout the years (Perfect, Thompson, & Mahoney, 2015; Stricker, 1995). One considerable change occurred in 1968, with the development of the Association of Psychology Internship Center, whose purpose was to assist students secure internship placements (Perfect, Thompson, & Mahoney, 2015; Stricker, 1995). In 1992, the Association of Psychology Internship Center became known as the Association of Psychology Postdoctoral and Internship Center, where the internship matching process continue to develop (Webb & Hill, 2016).

In 1999, the APA internship matching process transitioned to what is now the current computerized method by which doctoral psychology students apply and matched to an internship site through APPIC (Webb & Hill, 2016). The matching process helps students and internship programs to secure positions without the issues of unreasonable pressure or unfairness (Webb & Hill, 2016). Doctoral psychology students complete a one or two-year supervised internship, which generally begins after completing coursework. Internships provide students with the necessary experience while working directly with clients and additional educational activities, with the final goal of gaining skills towards becoming a professional psychologist (Perfect, Thompson, & Mahoney, 2015; Stricker, 1995). Internship training is a combination of clinical, ethical, scientific,

and professional competence towards the development of professional identity (Meyer, Zapatka, & Brienza, 2015). The completion of supervised internship training is required for graduating from doctoral psychology programs (Perfect, Thompson, & Mahoney, 2015; Stricker, 1995).

Predoctoral internship placement is a requirement for completing psychology programs. The increasing concern of students who are not matched to an APA internship placement has increased a need for further investigation of the barriers to internship placement (Parent & Williamson, 2010). In 1999, Parent and Williamson (2010) noted 510 unmatched students, yet 218 positions remained unfilled while in 2009, 846 applicants were unmatched, and 299 positions remained unfilled. Failure to match has negative consequences for students, which may lead to a delay in completing degree requirements, hostility in the field, and having to search for an unaccredited placement site. Parent and Williamson (2010) examined the dilemma of unmatched students applying to pre-doctoral internship placements. Unequal contributors are programs that have both large numbers of applicants matched and low cumulative match rates. From 2000 through 2006, Parent and Williamson (2010) gathered and examined APPIC match rate reports. Of the 22,751 students who applied for an internship match, only 5,526 students were unmatched. However, 15 of the 391 programs evaluated contributed more than 30% of these unmatched applicants. The researchers conducted an exploratory analysis to determine common traits of these unequal program contributors so that the types of programs that may be responsible for unmatched internship applicants might be identified (Parent & Williamson, 2010). The researchers conducted exploratory analyses

to identify commonalities that may guide future research on the internship supply-demand imbalance. Of the 15 unequal contributors, 14 were PsyD programs, and one was a PhD program, and, as of 2009, all but one program was APA accredited.

More recent research related to APA internship match rates includes Callahan, Ruggero, and Parent (2013), who conducted a study of exceptional clinical psychology programs that included emerging professional benchmarks, given the program's predoctoral characteristics. The predoctoral characteristics included GRE scores and undergraduate GPA from 223 accredited clinical psychology programs. The emerging professional benchmarks were internship match rates and percentage of the program's passing rate for the EPPP license exam (Callahan et al., 2013). The researchers utilized a structural equation model to forecast the professional benchmarks and comparisons between programs predicting actual outcomes. Results revealed a significant positive relationship in programs admitting students with relatively better than expected predoctoral characteristics that also performed better than expected on emerging professional benchmarks (Callahan et al., 2013).

Hatcher (2015) conducted a longitudinal study and examined a 50% increase in APA internship applications between 2008 and 2013 for APPIC match rates. The study aimed to identify the recent fast increase in APPIC match applicants and to document the expected path for a match through 2020 for psychology students enrolled in accredited programs. Projections made after 2017, were based on recent enrollment and APA internship match data. Projections identified that the imbalance situation could become significantly resolved as early as 2017 to 2018 if internship placements outgrow the

number of applicants to decrease the imbalance of APA match rates (Hatcher, 2015).

Further, APA governance requires that all accredited psychology doctoral programs will

utilize only APA accredited internship placements by 2020. The results of the study

provide an understanding of the future of the APPIC internship match and the long-term

outcomes of the required accredited placements (Hatcher, 2015).

For over 23 years, Norcross, Sayette, and Pomerantz (2018) reviewed APA

accredited psychology clinical graduate training programs. The results of the study

presented an increase in growth in the percentages of female and ethnic minority students

in such programs over time. Female enrollment grew from 16% to 75%, and minority

enrollment grew from two percent to 25%. The theoretical approach applied by

professors has shifted from a psychodynamic to a cognitive-behavioral approach. Further,

APA internship match rates were high and steady in the early 2010s and recently

rebounded in the past three matching cycles (Norcross et al., 2018). Numerous studies

have focused on the growth and progress of graduate programs. Yet, the advancement

and evolution of psychology graduate training programs have not been researched

thoroughly (Norcross et al., 2018). The previous section involved a review of the early to

current research literature related to APA internship match rates. The next section

provides an overview discussion of the GRE.

**Graduate Record Examination**

Some researchers believe that investigation of the make-up of the GRE is

important because it is thought to determine strategies to improve academic performance

across all disciplines and demographic groups (Klieger, Cline, Holtzman, Minsky, &

Lorenz, 2014; Klieger, Bridgeman, Tannenbaum, Cline, & Olivera-Aguilar, 2018). In 1949, the Educational Testing Service first published the GRE, which was mostly used to compare applicants from diverse educational backgrounds for personnel selection (Kuncel, Hezlett, & Ones, 2001). Before 1985, the GRE primarily focused on quantitative and verbal reasoning. In 2011, test creators made several changes and modifications to the exam. Currently, the GRE consists of one analytical writing section, two verbal reasoning sections, and two quantitative reasoning sections. The verbal reasoning section focuses on the ability to analyze and synthesize information. The quantitative section focuses on mathematical skills, while the verbal reasoning and quantitative sections consist of only multiple-choice questions. The analytical writing section includes two separate writing assignments focusing on critical thinking and analytical skills (Kuncel et al., 2001). The GRE is a three-hour and 45-minute computerized exam. The latest version of the GRE was intended to align with skills considered necessary to be successful in graduate education and to facilitate the admissions process to differentiate levels of performance.

The GRE is a graduate-level admissions test taken by students or college-educated adults applying for graduate programs. The primary function of the GRE is to determine academic levels of performance to assist college admissions committees in choosing prospective candidates. Graduate-level programs focus on students' ability to apply reasoning skills, such as developing hypotheses and drawing conclusions from data. Due to the type of skills related to graduate-level programs and the GRE, these abilities are categorized as a measure of analytical intelligence (Kuncel et al., 2001).

Therefore, students who perform well on standardized exams would classify as analytical

thinkers, as they perform well on exams, mainly because they excel in analysis,

evaluation, and reasoning (Tigner & Tigner, 2000).

Sternberg and Williams (1997) examined the GRE as a predictor for psychology

student graduate performance by using the triarchic theory of intelligence as the basis of

the study. The study included first and second-year grades, dissertation ratings by

professors, and analytical, creative, practical, research, and teaching abilities rated by

professors. The results of the study found the GRE was a predictor for graduate grades

but not predictive for graduate performance (Sternberg & Williams, 1997). The authors

suggested further development in the superior use of tests to discover an additional talent

for aspiring psychologists (Sternberg & Williams, 1997).

Schmidt, Homeyer, and Walker (2009) researched the relationship between GRE-

Verbal (V), GRE-Quantitative (Q), undergraduate grade point average (UGPA), and

scores on the Counselor Preparation Comprehensive Examination (CPCE). The study

included 403 graduate students' CPCE scores. The multiple regression analysis

determined that the GRE-V, GRE-Q, and UGPA were all positive predictors of CPCE

scores. The researchers' advised further studies to include factors such as student, gender,

and ethnicity in relation to CPCE success (Schmidt et al., 2009).

Sections above discussed the literature regarding the theoretical framework, EPPP

license exam, APA internship match rates, and the GRE scores. The following sections

examine the remaining variables in the literature: gender, program type, rate of

admittance, years to completion, and percentage of minority students. Of necessity, this

inquiry includes students and colleges in a wide variety of disciplines, not confined to EPPP license exam candidates, and not restricted to the psychology field. The purpose of this portion of the review is to examine the recent literature regarding the effect of the abovementioned variables on graduate-level students' exam performance and how those variables affect their achievement in general.

## Gender

While any notions that males and females are significantly different in cognitive ability and academic performance have long since been discredited, some studies have shown that in certain professional disciplines, postgraduate test/qualification performance has varied by gender (Ruffing, Wach, Spinath, Brünken, & Karbach, 2015). Trinkle, Scheiner, Baldwin, and Krull (2016) found that several factors influenced the performance of (Certified Public Accountant) CPA candidates on the CPA qualification exam. They found that younger candidates and relevant to the present discussion, male candidates tended to perform better and had a higher pass rate than older and or female candidates. Trinkle et al. (2016) did not correlate such exam scores to graduate school academic performance, so it is not known if these results indicated poorer overall ability on the part of female students or simply poorer test performance (which are not the same). These findings are supported by the research of Myers, Franklin, Lepak, and Graham, (2018), who also found that female candidates had lower pass rates on the CPA exam than male candidates. They were unable to determine a reason for this phenomenon from the extant literature and called for more research.

Both Trinkle et al. (2016) and Myers et al. (2018) noted that since there was no logical reason to think that males are superior to females in academics or test-taking, there might be a reason inherent to the accounting profession. Until recently, accounting has been a male-dominated profession. Therefore, there might still be a gender bias in how instructors teach the subject, the attention given to male vs. female students, etc. that results in poorer female academic performance and test passing scores (Myers et al., 2018; Trinkle et al., 2018).

In the field of internal medicine, Sulistio et al. (2019) examined the effect of gender on resident evaluations and certifying exam pass rates. The researchers found females received higher evaluation scores for medical interviewing and interpersonal and communication skills. However, females and males scored equally on all other aspects of evaluations. There was no statistically significant difference between male and female exam pass rates or exam scores. Sulistio et al. (2019) suggested that the two differences they did find might be due to females being generally taught from an early age to be personable and develop their social skills to a greater extent than males, though they cautioned that this was only a hypothesis and was not proved by the data they gathered.

Woodfield, Earl-Novell, and Solomon (2005) challenged the idea, which they reported was extant in universities in England, that male university students were better at taking exams, while female students were better at completing coursework. They examined a population of students in Sussex and found no significant differences between males and females in terms of coursework completion, exam performance, or overall academic achievement. They did not separate their data by discipline. Woodfield

et al. (2005) observed that these findings were not surprising, but such confirmation (of a lack of gender difference) was needed in view of the persistence of bias in attitudes. They noted that such bias extended even to the students studied, noting that females and males both often believed that males were inherently superior test-takers (Woodfield et al., 2005). The previous section involved a review of research literature related to gender. The next section provides an overview discussion of the program type.

## Program Type

The type of program offered may have an influence on postgraduate professional qualification exam scores. A given program may produce higher or lower pass rates than another. Furthermore, a more intensive program in each field may produce different exam pass rates than less intensive programs.

One such study was performed by Bushardt, Booze, Hewett, Hildebrandt, and Thomas (2012), who sought to determine a correlation between program characteristics and certification exam pass rates for a program that prepared physician assistants. Of the four program characteristics examined, they found that if the program conferred a Master's degree, that program produced a higher rate of passing scores on the certification exam. Also, student-to-faculty ratios had a positive effect; lower ratios (meaning that there were fewer students for a given faculty member) produced higher passing rates. These findings suggested that program quality mattered in terms of ultimate outcomes, which, in this case, intended to be the production of certified physician assistants (Bushardt et al., 2010).

Turner (2005) examined program features for registered nurse training programs in terms of their effect on the National Council Licensure Examination (NCLEX-RN) exam. Significant relationships were found between mandatory classroom attendance policies, mandatory clinical attendance policies, the number of times that students were allowed to repeat nursing courses, the number of years of clinical nursing experience of faculty outside teaching, and the graduating classes' pass rates on the NCLEX-RN. No such relationships existed for prior comprehensive test performance, the size of the program, how the program graded its students, characteristics of the faculty such as years of experience, degrees, turnover, full-time vs. part-time, or board certification (Turner (2005). The previous section involved a review of the research literature on program type. The next section provides an overview discussion of rate of admittance.

### Rate of Admittance

One might expect that programs that are more exclusive and have lower rates of admittance produce higher-performing graduates. For this discussion, it is best to return to accounting programs, as the literature is largely silent on the effect of exclusivity on EPPP license exam pass rates. The concept briefly examined here is the motivation that professional degree programs must be exclusive in their admissions policies.

Lindsay, Tan, and Campbell (2009) observed that at the University of California, lowered admissions criteria for the School of Accounting had, over ten years prior to the study, resulted in lower CPA exam pass rates. They observed that this affected the prestige level of the program, which could have had the result of fewer qualified candidates—applying for the program, which would, in turn, further depress CPA pass

rates for successive graduate cohorts. Similarly, Barilla, Jackson, and Mooney (2008) found that CPA exam pass rates had a positive effect on the accreditation of university accounting programs.

These findings suggest that universities that offer programs intending to lead to professional licensure—in accounting or other fields have a keen interest in the ultimate licensure exam performance of their graduates. For the present study, the exclusivity of admission policies, measured by rate of admittance, are examined to determine if it impacts professional licensure exam pass rates.

## Years to Completion

Currently, significant research does not exist regarding whether intensive professional licensure programs (which generally take less time to complete) produce higher exam pass rates—in a variety of disciplines. One study that is useful in this regard is that of Richard-Eaglin (2017), who examined student success in nurse practitioner programs. Richard-Eaglin (2017) found a moderately significant correlation between the time that students spent in such programs and their ultimate pass rates on exams such as the NCLEX-RN. However, the measured variable was time spent in the program (years to completion). Thus, greater time to completion could be that the student, for a variety of reasons, required more time to do so, not that the program was less rigorous or intensive than another (Richard-Eaglin, 2017).

## Minority Student Achievement

There is a vast amount of research related to ethnic minority students and academic abilities, which is one of the most pressing concerns (Makarova & Birman,

2015). Further, the achievement gap between minority and non-minority students appears to be significant (Kermanshachi & Safapour, 2017). Minority students have historically underperformed academically, and their academic achievement continues to be a national concern. Fairlie, Hoffmann, and Oreopoulos (2014) noted that historically, minority students score lower on standardized exams than non-minority students. Before the civil rights movement, the majority of minority students were excluded from educational opportunities (National Academy of Sciences, 2011). At the beginning of the 1940s, the civil rights movement advocated for the increase of educational opportunities for minority students. Following several court cases in the 1960s and 1970s, minority students moved towards educational inclusion (National Academy of Sciences, 2011).

**Research on Minority Student Achievement and Standardized Exams**

Early research has focused on minority student achievement and standardized exams, including the GRE. Between 1975 and 1984, Dollinger (1989) studied 105 clinical students in the psychology graduate program at Southern Illinois University. Some minority students were admitted without consideration of GRE scores. Two variables were used, both reflecting students' performance while in graduate school and including (a) number of failed preliminary examinations and (b) a composite reflecting efficient and competent progress through the program (Dollinger, 1989). Both variables were significantly predicted from the GRE, particularly from the advanced psychology test.

The UGPA was unrelated to failed preliminary examinations and slightly correlated with the composite. The significant relations shrank when majority and

minority students were considered separately, although shrinkage was less for minority

students (Dollinger, 1989). Dollinger (1989) concluded that the failure of low scorers to

gain admission to graduate programs was not the defining factor. Instead, the GRE

predictive value was for both failing preliminaries and sustaining progress throughout the

program, with the relations decreasing slightly more for minority students.

Sampson and Boyer (2001) sought to determine if GRE scores from 1988 through

1997, combined with certain demographic variables, predicted first-year graduate work

among minority graduate students. This study differed from others since it primarily

focused on minority students who earned degrees. Minority students' access to graduate

education is an issue that has captured the concern of admissions officers, professors, and

administrators for decades (Sampson & Boyer, 2001). Central to the issue is which

prerequisites are meaningful or accurate in predicting whether an applicant can complete

the requirements for, and subsequently earn a graduate degree. The population of the

study consisted of 160 minority students who earned masters, doctorate, or specialist

degrees in social science, and who were recipients of a fellowship from graduate school

(Sampson & Boyer, 2001). The researchers gathered information available at the

graduate school from application dossiers and undergraduate and graduate school

transcripts. The researcher analyzed the data collected as descriptive statistics,

correlation, and multiple linear regression analysis.

The findings of the study indicated that the GRE-V score, age, major, and UGPA

are significantly associated with determining the first-year average of minority students

(Sampson & Boyer, 2001). The researchers' suggested the necessity of focusing on other

factors besides the usual criteria when admitting minority students to graduate programs. They further explained that other factors that may be considered for admissions should include potential graduate students' creative, practical skills and prior achievements, which are related to the aspects explained in Sternberg's (1985, 1988, 1998) triarchic theory of intelligence (Sampson & Boyer, 2001).

Current research has focused on minority student achievement and standardized exams, especially the GRE. Hartwig and Van Overschelde (2016) examined academic and demographic variables concerning CPCE scores. The demographic variables included sex, ethnicity, and age. The university institutional review board provided consent since completion of the study only required the use of archival data. Four hundred seventy-two master's level students were included in the study. Students' GRE-V scores, GRE-Q scores, UGPA, academic and demographic data from 10 years were examined in the study.CPCE total scores were obtained from the Center for Credentialing and Education (Hartwig & Van Overschelde, 2016). The results showed that the academic variables, GRE and UGPA, positively predicted CPCE scores, and the demographic variable of age had a negative association with CPCE scores (Hartwig & Van Overschelde, 2016). Moreover, sex and ethnicity did not predict CPCE scores. The results of the study provided information about factors that influence performance on the CPCE and how counseling educational programs may use resources for students who may need additional support (Hartwig &Van Overschelde, 2016).

Coleman-Salgado and Barakatt (2018) researched demographic and academic variables, along with standardized exam scores in relation to passing the National

Physical Therapy Examination (NPTE) for licensure. The study included 320 graduates

from the Master of Physical Therapy program. Preadmission data, including prerequisite

grade point average (pGPA), GRE-Analytic (A) score, GRE-V and GRE-Q scores, sex,

English as a second language (ESL), and NPTE exam results. A logistic regression

analysis was completed to identify which variables were predictive of NPTE success. The

strongest predictor included the GRE-Q scores concerning passing the NPTE for

licensure (Coleman-Salgado & Barakatt, 2018). GRE scores, pGPA, and ESL were

significantly associated with NPTE scores. The results were used for admission criteria

by applying a minimum threshold for GRE-Q scores. The study provided an example of

how the physical therapy educational program utilized its data for admission criteria to

maintain the mission of the program (Coleman-Salgado & Barakatt, 2018).

### Summary and Conclusions

The review of the literature provided an overview of the theoretical framework,

the EPPP license exam, GRE scores, APA internship match rates, gender, program type,

rate of admittance, years to completion, and studies related to minority students. The

literature related to the theoretical framework, triarchic theory of intelligence, provided

early to current research related to cognitive abilities and exam performance (Sternberg,

1998a, 2006, 2014). Literature review in relation to the EPPP license exam provided

knowledge that is vital for the competent practice of psychology and the importance of a

passing score (Schaffer, 2013; Sharpless & Barber, 2019a). The literature regarding the

seven variables for this study included information on students and colleges in a wide

variety of disciplines, not confined to EPPP license exam candidates, and not restricted to

the psychology field. The purpose of this portion of the review was to examine early to

recent literature regarding the effect of the abovementioned variables on graduate-level

students' exam performance and how those variables affect their achievement in general.

Chapter 3 discusses the research methodology, population and sampling, instrumentation,

data collection procedures, and data analysis method used in this study.

Chapter 3: Research Method

The purpose of this quantitative research study was to examine whether APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates. The following research question and its hypotheses were used to guide the study:

RQ: Do APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates?

$H_0$: APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion do not predict EPPP license exam pass rates.

$H_a$: APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates.

This chapter includes a discussion of the methodology used to answer the research question. The first section presents the chosen research methodology, sampling procedure, and the approach used for data collection. The third section provides information on the measurements used in the study and psychometric properties, and the final part includes the different types of statistical analyses that were employed.

**Research Design**

The objective of this study was to examine whether APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates. I used a quantitative, correlational, nonexperimental design with archival data to assess the relationship between the variables. Quantitative methodologies are utilized when the goal of the study is to investigate relationships between variables measured numerically (Babbie, 2012). Quantitative methodologies involve using numerical measurement and statistical analysis conducted on numerical data (Mustafa, 2011). The correlational design was appropriate because this study did not involve the manipulation of variables or the use of a controlled experimental research setting (see Sousa, Driessnack, & Mendes, 2007). A nonexperimental design was used because there were no interventions or treatment groups.

For this study, the PV1 was APA internship match rates, the PV2 was GRE scores, the PV3 was gender, the PV4 was percentage of ethnic minority students, the PV5 was program type, the PV6 was rate of admittance, and PV7 was years to completion. The criterion variable was the EPPP license exam pass rates. Numerical data were obtained using archival data. Multiple regression analyses were conducted to determine the relationship between the predictor variables and criterion variable. Regression analysis is used for prediction and yields a predicted value for the criterion variable resulting from a linear combination of predictors (Gravetter &Wallnau, 2016).

**Population and Sample**

The population of the study was doctoral psychology programs and included clinical PhD and PsyD programs (see Sayette& Norcross, 2020). The required sample size was determined through power analysis with G*Power software. The sample size computation was based on Cohen's effect size, level of significance, and statistical power or the probability of rejecting a false null hypothesis. An a priori power analysis was conducted with the following factors: (a) statistical test of multiple linear regression analysis with predictors (APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict); (b) statistical power of 0.80, which is normally used in quantitative studies (see Faul, Erdfelder, Lang, & Buchner, 2009); (c) medium effect size of 0.15 for regression analysis, and (d) level of significance of 0.05. The analysis yielded a minimum sample size of 55 doctoral psychology programs.

**Instrumentation**

I obtained data from publicly available archival data, including reports from ASPPB (2017), the Insider's Guide to Graduate Programs in Clinical and Counseling Psychology (Sayette & Norcross, 2020), and the APPIC Match Rates by Program Report (2019). Secondary data are existing data available in historical records, databases, and documents (Andrews, Higgins, Andrews, & Lalor, 2012). The unit of analysis was the program level. The use of program-level data restricted the ability to study individual-level data.

The Insider's Guide to Graduate Programs in Clinical and Counseling Psychology provided GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion, which were reported by each doctoral program (Sayette & Norcross, 2020). The APPIC (2019) Match Rates by Program Report was reported by the APPIC board of directors and included Phases I and II of the match. The report for APPIC match rates included APA-accredited internship programs and participation and placement for students who registered for the APPIC match. The National Matching Services INC. collects school and program information from each applicant during match registration, and the information is then reconfirmed by the applicant (APPIC, 2019).

The ASPPB provided EPPP license exam pass rates each year in the Psychology Licensing Exam Scores by Doctoral Program Report. The reported EPPP exam pass rates included APA-accredited and first-time exam takers (ASPPB, 2017). The EPPP license exam pass rates were reported as scaled scores from 200 to 800. The passing score is equal to a scaled score of 500. The information provided by the Psychology Licensing Exam Scores by Doctoral Program Report included school name, department name, program name, number of students who took the exam, percentage of pass rate, and percent correct by content area. Also, programs in which there were five or more graduates testing were included in the report. For programs that had four or fewer candidates testing, neither the number tested nor pass rates were shown in the report to protect the privacy of candidates from the low number of graduate programs (ASPPB, 2017).

**Operational Definitions of Variables**

**APA Internship Match Rate**

APA internship match rate was a continuous predictor variable measured using APA internship match rates reported by doctoral psychology programs. The APPIC Match Rates by Program Report was provided by the APPIC board of directors (APPIC, 2019; Hatcher, 2013, 2015).

**EPPP License Exam Pass Rates**

EPPP license exam pass rates were a continuous criterion variable measured using the overall EPPP license exam pass rates of each doctoral psychology program. The EPPP license exam pass rates included first-time exam takers (ASPPB, 2017).

**Gender**

Gender was a continuous predictor variable that was measured by using the percentage of females enrolled in doctoral psychology programs (Sayette & Norcross, 2020).

**GRE Score**

GRE score was a continuous predictor variable measured using average GRE scores reported by doctoral psychology programs. The GRE is an exam that evaluates cognitive abilities thought to predict student success in graduate performance (Sternberg & Sternberg, 2017).

**Percentage of Ethnic Minority Students**

Percentage of ethnic minority students was a continuous predictor variable measured using reports by each doctoral psychology program (Sayette & Norcross,

2020). This percentage varied within the sample and was considered an independent variable.

**Program Type**

Program type was a categorical predictor variable measured by clinical PhD and PsyD programs (Sayette & Norcross, 2020).

**Rate of Admittance**

Rate of admittance was a continuous predictor variable calculated by dividing the number of admitted students by the number of applied students (Sayette & Norcross, 2020).

**Years to Completion**

Years to completion was a continuous predictor variable defined as the average years taken to complete the doctoral psychology program, including internship (Sayette & Norcross, 2020).

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**Procedures for Recruitment, Participation, and Data Collection**

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Following Walden University's Institutional Review Board (IRB) approval, IRB approval number 02-20-20-0239195, data were retrieved from publicly available archival data including reports from ASPPB (2017), the Insider's Guide to Graduate Programs in Clinical and Counseling Psychology (Norcross & Sayette, 2015), and the APPIC Match Rates by Doctoral Program (2019). The data included APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, years to completion, and EPPP license exams pass rates of doctoral psychology

programs. The data were uploaded to the statistical assessment software of Statistical

Package of Social Science, where the statistical analysis was conducted.

## Data Collection and Analysis

I uploaded the data to the Statistical Package of Social Science for quantitative

analysis. I screened the data for the detection and correction of erroneous data (see

Warner, 2013) and discarded incomplete data. I also performed tests on the data to ensure

they met all of the assumptions for the parametric analysis used for this study.

Assumptions included that the (a) the data of the DV should be continuous measured,

which was satisfied because EPPP license exam pass rates are a continuous measured

variable; (b) there should be no outliers in the dataset, (c) the data of the DV should be

normally distributed, and (d) homoscedasticity.

Descriptive statistics (e.g., percentage, frequency, mean, and standard deviation)

were calculated for each of the variables. Central tendency measures of mean, standard

deviation and minimum and maximum values were used to summarize data of continuous

measured variables of APA internship match rates, GRE scores, gender, percentage of

ethnic minority students, program type, rate of admittance, years to completion, and

EPPP license exam pass rates.

Multiple regression analysis was conducted to determine whether APA internship

match rates, GRE scores, gender, percentage of ethnic minority students, program type,

rate of admittance, and years to completion predict EPPP license exam pass rates. The

PVs in the regression model included APA internship match rates, GRE scores, gender,

percentage of ethnic minority students, program type, rate of admittance, and years to completion. The DV was EPPP license exam pass rates.

**Threats to Validity**

Validity is the extent to which a measurement is truthful, accurate, authentic, or free of system error with evidence supporting the conclusion (Jimenez-Buedo & Miller, 2010). Studies are valid if the instrument consistently measures what it is intended to measure. Threats to validity can be external or internal.

The internal validity of a quantitative study is the degree to which others can replicate results, the accuracy of the measurement, and the consistency of measurements over time (Pedhazur & Schmelkin, 2013). In the current study, there were no threats to internal validity because the data were secondary data from publicly available sources. I assumed that the data regarding the APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, years to completion, and EPPP license exam pass rates were accurate. A threat to internal validity was the wrong input of records in the database, which was an uncontrollable factor.

External validity is the degree to which conclusions from a study can be generalized to additional groups of persons, locations, or periods (Salkind, 2010). In the current study, the results remained true for APA-accredited clinical doctoral psychology programs. Outcomes from this study may not be generalized to additional study population groups. This threat was considered a limitation of the study and is discussed in the final chapter. Recommendations to address this threat in future studies are also included. Per the correlational design, findings did not indicate causal relationships

between the variables; only associations were addressed. The inability to adjust predictor variables to determine their impact on the criterion variable means a causal relationship could not be established.

## Ethical Assurances

Walden University's IRB approval was obtained prior to the commencement of the study. The objectives of the IRB are to ensure the protection, safety, and welfare of human subjects in relation to the execution of the study. Critical steps and processes are essential for the achievement of the goals and objectives of the IRB in the collection and analysis of data. I considered the method, design, and data collection appropriate for the study to mitigate ethical risks. Informed consent was not obtained because the data were publicly available. There was no risk associated with participation in this study. No conflicts of interest or issues with anonymity, confidentiality, privacy, or coercion were expected. Data used in this study were securely stored in a password protected, external hard drive, which will be kept for a minimum of five years, then electronically and physically destroyed.

## Summary

Chapter 3 discussed the research methodology, population and sampling, instrumentation, data collection procedures, and data analysis method that were used in the study. This quantitative study used a correlational, non-experimental research study. The study determined whether APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates. Secondary data obtained from publicly

available archival data were used to measure the study variables. Data analysis included

descriptive statistics and multiple regression analysis to address the research question of

the study. Chapter 4 contains the findings of the data analysis.

Chapter 4: Results

The objective of this study was to identify predictors of the EPPP pass rates. Data used to answer the proposed research question consisted of aggregated results from 176 psychology doctoral programs. Variables of interest used to potentially predict EPPP license exam pass rates included APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion for each program. Multiple regression analysis was used to assess the hypotheses related to the research question.

**Research Question and Hypotheses**

The research question that guided this study and its relevant hypotheses were as follows:

RQ: Do APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates?

$H_0$: APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion do not predict EPPP license exam pass rates.

$H_a$: APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion predict EPPP license exam pass rates.

Relationships between the predictor variables and the criterion variable were evaluated. Descriptive statistics were used to summarize the data and identify outliers in

each variable. Multiple regression was used to identify an optimal model useful for predicting EPPP license exam pass rates.

## Data Collection

Archival data from the following publicly available sources were used: ASPPB (2017), the Insider's Guide to Graduate Programs in Clinical and Counseling Psychology (Sayette & Norcross, 2020), and the Association of Psychology Postdoctoral and Internship Centers' Match Rates by Doctoral Program (2019). The data collected included clinical doctoral psychology programs from the years 2016 and 2017. Approval from Walden University's IRB was confirmed prior to data retrieval.

A total of 242 clinical PhD and PsyD programs from the years 2016 and 2017 were identified. The data collected included APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, years to completion, and EPPP license exams pass rates of doctoral psychology programs for each school. A total of 51 graduate programs missing information on one or more variables were removed from the data set, leaving 191 programs. Outliers were removed prior to analysis. Z-scores from each variable were calculated and used to investigate potential outliers. Z-scores greater than three or less than -3 for any variable were considered outliers and were removed. Fifteen observations contained z-scores with absolute values greater than three or less than -3 were removed, leaving 176 observations for data analyses.

**Statistical Assumptions**

Statistical methods require observations to adhere to assumptions to draw accurate inferences (Verma & Abdel-Salam, 2019). First, I assumed that any relationship between predictor variables and the response variable was linear. Of the six variables, gender was the only variable that was not correlated with EPPP license exam pass rates. Secondly, I assumed that predictor variables were not correlated with one another. Correlations between predictor variables were observed (see Table 2), revealing that all six variables did not correlate highly ($r = .9$ or higher).

Thirdly, it is necessary for errors from the fitted model to be independent and normally distributed. Finally, I assumed that errors were homoscedastic; that is, residuals were not dependent on predicted values. The model residuals suggested some nonnormality and possible heteroscedasticity in model errors. Heteroscedasticity was identified in residuals vs. fitted values, as variation in errors appeared to decrease at the higher end of fitted values. A Q-Q plot of standardized residuals also showed some deviation from normality, with standardized residuals appearing lower than theoretical quantiles at the upper and lower extremes. To test homoscedasticity of the residuals, I used a Breusch-Pagan test evaluated at a 0.05 significance level. The statistic from this test was 17.635; resulting in a *p*-value of 0.0137 and this confirmed that variance of the residuals was dependent on the predicted value.

Nonnormality and heteroscedasticity were likely a result of bounded values used to fit the model. EPPP license exam pass rates were collected as the percentage of students who passed the exam and were bounded by 0 and 100. Of the 176 observations

used in the analysis, 84 (47.7%) had a pass rate of 100%. Therefore, for predicted values that were high, the residuals were bounded at the upper extreme. Though statistical assumptions for parametric tests were not fully met, linear relationships were obtained and interpreted.

**Results**

Descriptive statistics (see Table 1) for each quantitative independent variable revealed an APA internship match rate mean of 96% ($SD = 7.93$), GRE scores mean of 314.33 ($SD = 6.54$), percentage of female students mean of 78% ($SD = 8.7$), percentage of ethnic minority students mean of 25% ($SD = 10.85$), rate of admission mean of 12 ($SD = 13.13$), and years to completion mean of 6 ($SD = 0.62$ ) of the sample ($N = 176$).The mean for the response variable, EPPP license pass rates, was 93 ($SD = 9.8$). Therefore, the average pass rate for the EPPP license exam was 93%. EPPP license exam pass rates were collected as the percentage of students who passed the EPPP license exam and were bounded by 0 and 100. Of the 176 programs used in the analysis, 84 (47.7%) had a pass rate of 100%. The EPPP license exam was scored on a scale from 200 to 800. The ASPPB proposed a scaled score for passing the EPPP license exam as 500 for independent practice, which is a raw score of approximately 70% (ASPPB, 2016). In the current study, values for EPPP license exam pass rates were rightly skewed, with nearly 75% of all values being greater or equal to 90. The categorical variable (program type) labeled each program as PhD or PsyD. Of the valid observations, 142 (80.7%) were PhD programs and 34 (19.3%) were PsyD programs.

Table 1

*Count and Summary Statistics for All Variables*

| Statistic | EPPP | GRE score | Admit rate | Gender | Minority % | Years | APA intern |
|---|---|---|---|---|---|---|---|
| N | 176 | 176 | 176 | 176 | 176 | 176 | 176 |
| Missing | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | 92.69 | 314.33 | 12.35 | 77.57 | 24.51 | 6.10 | 96.48 |
| Median | 96 | 314.5 | 7 | 77 | 23 | 6 | 100 |
| Std. deviation | 9.80 | 6.54 | 13.13 | 8.70 | 10.85 | 0.62 | 7.93 |
| Minimum | 56 | 298 | 1 | 54 | 0 | 5 | 60 |
| Maximum | 100 | 336 | 62 | 100 | 57 | 8 | 100 |

Table 2 shows the Pearson bivariate correlations between study variables. The EPPP license exam pass rates were positively correlated with predictor variables GRE scores, years to completion, and APA internship match rates, and were negatively correlated with predictor variables admission rates and percentage of ethnic minority students. Percentage of ethnic minority students was positively correlated with admission rates and negatively correlated with gender. GRE scores were positively correlated with years to completion and APA internship match rates and were negatively correlated with admission rates. Finally, APA internship match rates were negatively correlated with admission rates.

Table 2

*Pearson Correlations Between Variables*

|  | EPPP | GRE score | Admit rate | Gender | Minority % | Years | APA intern |
|---|---|---|---|---|---|---|---|
| EPPP | - | .454** | -.591** | -.058 | -.186* | .169* | .203** |
| GRE | .454** | - | -.601** | -.067 | -.045 | .239** | .178* |
| Admit | -.591** | -.601** | - | .030 | .172* | -.251** | -.356** |
| Gender | -.058 | -.067 | .030 | - | -.149 | .001 | .072 |
| Minority | -.186* | -.045 | .172* | -.149* | - | .088 | -.084 |
| Years | .169* | .239** | -.251* | .001 | .088 | - | .117 |
| APA | .203** | .178* | -.356** | .072 | -.084 | .117 | - |

*Note.* ** $p < .01$. * $p < .05$.

A multiple regression analysis (see Table 3) tested the hypotheses related to the research question. It was hypothesized that APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, admission rates, and years to completion would predict EPPP license exam pass rates. Data analysis indicated that the model was significant ($F$ (7, 166) = 14.904, $p < .001$) and explained 36% of the variance (adjusted $R^2$=.36). Therefore, the null hypothesis was rejected. Rate of admittance was the only significant predictor of the EPPP license exam pass rates ($\beta$ = -0.40, $p < .001$).

Table 3

*Regression Analysis for Variables Predicting EPPP License Exam Pass Rates*

| Variable | B | SE B | β | t | p |
|---|---|---|---|---|---|
| (Constant) | 30.60 | 39.15 | | 0.78 | 0.435 |
| GRE score | 0.22 | 0.12 | 0.15 | 1.91 | 0.058 |
| Admit rate | -0.3 | 0.07 | -0.4 | -4.46 | 0.001 |
| Gender | -0.04 | 0.07 | -0.03 | -0.59 | 0.558 |
| Minority % | -0.08 | 0.06 | -0.09 | -1.43 | 0.154 |
| Years to completion | -0.36 | 1.11 | -0.02 | -0.32 | 0.747 |
| APA internship | 0 | 0.08 | 0 | -0.04 | 0.969 |
| Program type | 3.46 | 2.13 | 0.14 | 1.63 | 0.106 |

*Note.* $R^2 = .36$ (N = 176 $p < .001$).

## Summary

The purpose of this study was to identify predictors of the EPPP license exam pass rates. Assumptions for statistical tests were not fully met because the value of the dependent variable was very close to 100%; however, linear relationships were obtained and interpreted. Multiple regression analysis was used to evaluate the relationship between predictor variables APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admission, years to completion, and EPPP license exam pass rates. Of the seven predictor variables, rate of admittance was the only significant predictor for EPPP license exam pass rates; therefore, the null hypothesis was rejected. The following chapter includes a discussion of the interpretation of the results, the limitations of the study, recommendations for future studies, and conclusion.

Chapter 5: Discussion, Conclusions, and Recommendations

The EPPP license exam is the basis for entry into the profession. Exam takers who do not pass cannot practice psychology independently, have difficulty securing employment, and may lose current jobs (Sharpless & Barber, 2013; Siegel & DeMers, 2016). There is scarce research addressing predictors concerning EPPP license exam pass rates. Although Sharpless and Barber (2013) identified key predictors of EPPP exam pass rates, the results were dated when considering the growth of the number of psychologists entering the field and the increase in ethnic minority students in doctoral-level psychology programs.

The current study addressed the gap in the literature on recent data regarding APA internship match rates, GRE scores, gender, percentage of ethnic minority students, program type, rate of admittance, and years to completion as predictors for the EPPP license exam pass rates. In this chapter, I discuss the results that were presented in Chapter 4. Findings are interpreted and discussed in relation to relevant literature presented in Chapter 2. The limitations, recommendations, and implications of this study are also discussed. The chapter concludes with a summary.

**Summary of the Findings**

Descriptive statistics for each quantitative independent variable revealed an APA internship match rate mean of 96% ($SD = 7.93$), GRE scores mean of 314.33 ($SD = 6.54$), percentage of female students mean of 78% ($SD = 8.7$), percentage of ethnic minority students mean of 25% ($SD = 10.85$), rate of admittance mean of 12 ($SD = 13.13$), and years to completion mean of 6 ($SD = 0.62$) of the sample ($N = 176$). The mean for the

response variable, EPPP license pass rates, was 93 (*SD* = 9.8). The Pearson correlation

revealed that EPPP license exam pass rates were positively correlated with predictor

variables GRE scores, years to completion, and APA internship match rates, and were

negatively correlated with predictor variables admission rates and percentage of ethnic

minority students. Multiple regression analysis was used to evaluate the relationship

between predictor variables APA internship match rates, GRE scores, gender, percentage

of ethnic minority students, program type, rate of admittance, years to completion, and

EPPP license exam pass rates. Of the seven predictor variables, rate of admittance was

the only significant predictor for EPPP license exam pass rates.

### Interpretation of the Findings

#### Rate of Admittance

The key finding of this study was that rate of admittance was the only significant

predictor for EPPP license exam pass rates. Rate of admittance was found to be

negatively correlated with EPPP license exam pass rates; therefore, an increase in

admission is related to a decrease in EPPP license exam rates.

Admission criteria for graduate programs mostly focus on GPA, GRE scores, and

recommendation letters (Chari & Potvin, 2019). However, recent developments in

education have involved more comprehensive admissions criteria for graduate programs.

GRE scores may have limited predictive validity of psychological practices, psychology

being a field that requires interpersonal skills (Van Allen, Littlefield, & Schmidt, 2018).

Admissions officers and policymakers have started to explore other ways to assess their

applicants.

Some graduate programs have initiated additional methods to screen incoming students, such as in-person interviewing (Callahan & Watkins, 2018). Interviewing allows admissions officers to consider nonacademic variables such as emotional intelligence and communication skills, which may be valuable for psychological training and practice (Callahan & Watkins, 2018). These additions and modifications to admissions criteria support the triarchic theory of intelligence, which emphasizes the value of nonanalytical skills in measuring intelligence (Sternberg, 2006). Sternberg (2006) found that a triarchically based measure, which included creative and practical measures, was more predictive of college GPA than the purely analytical SAT.

**GRE Scores**

The predictor variable GRE scores did not predict EPPP license exam pass rates. The results revealed positive relationship between GRE scores and EPPP license exam pass rates. That is, higher GRE scores were related to higher EPPP license exam pass rates. These results are consistent with how a significant number of schools relied on GRE scores as a basis for their admission criteria (Callahan & Watkins, 2018; Mandelman et al., 2016). Standardized tests such as the GRE have been noted as valid predictors of academic achievement, hence their prevalence in program admission use (Mandelman et al., 2016). Programs with stricter admission criteria requiring higher GRE scores would have lower admission rates (Callahan & Watkins, 2018). These perspectives are supported in the current finding that admission rates were the only variable that predicted EPPP scores.

Van Allen et al. (2018) cautioned against the use of such subjective measures because they can be biased and unreliable. This caveat may help explain why a significant number of programs continue to use the objective GRE scores, the main criterion for graduate psychology program admissions. Although supported by the triarchic theory of intelligence, what are seen as nonanalytic measures may need to be improved before they can dependably predict EPPP license exam pass rates and professional practice in psychology.

**Years to Completion**

In this study, the predictor variable years to completion did not predict EPPP license exam pass rates. Similarly, in the field of nursing, changing of program concentration, which increased years to program completion, was not a predictor of success in the nurse practitioner examination either (Richard-Eaglin, 2017). Few studies included years to completion as a possible predictor or licensure exam pass rates. Sayette and Norcross (2020), however, noted that PhD psychology programs usually take longer to complete, with an average of 6 years, than PsyD programs with an average of 5 years.

**APA Internship Match Rates**

In this study, the predictor variable APA internship match rates did not predict EPPP license exam pass rates. Although the Pearson correlation revealed a negative relationship between admission rates and EPPP license exam pass rate, the correlation did not hold in the regression model. The results were likely due to the dependent variable being close to its maximum of 100.

These findings were different from those of Sharpless and Barber (2013), who noted that APA internship match rates were among the significant, consistent predictors of EPPP performance. Shamp (2013) purported that the experiences of students through internship training may enhance their professionalism, and thus their EPPP license exam scores. Mandelman et al. (2016) stated that nonacademic abilities, which may be learned through internship, were predictors of GPA performance. In general, internship learning helped students enhance their clinical, ethical, scientific, and professional competence, bringing holistic training additional to academic work in preparation for becoming professional practitioners (Meyer et al., 2015; Perfect et al., 2015). Findings from prior studies revealed that internships might be a significant contributor to the enrichment of triarchic intelligence of students, thereby enhancing their overall performance in school and the licensure exam.

Further supporting this need is the proposed update for the EPPP license exam. The past few decades have seen more competency-based evaluations for professionals (Callahan et al., 2020). Because of this, the ASPPB has proposed the Enhanced EPPP, which adds a second portion to the existing EPPP that evaluates practical competence. This second part purportedly assesses performance in a clinical setting rather than the amount of information learned in classrooms. This update would strengthen the value of high-quality internships for graduate psychology students. Callahan et al. (2020) indicated that the Enhanced EPPP does not yet appear ready for use. Callahan et al. (2020) noted that the ASPPB has yet to establish its validity and has not subjected it to expert and peer reviews. In its current state, the Enhanced EPPP may not reflect the needs

of health service psychology (Callahan et al., 2020). It appears that the APA accreditation

process and the updating of the EPPP are still under development, and the individual

predictive value of APA internship matches found in the present study remains within the

existing version of the EPPP license exam.

**Percentage of Ethnic Minority Students**

The variable percentage of ethnic minority students did not predict EPPP license

exam pass rates. Although the Pearson correlation matrix revealed a negative relationship

between percentage of ethnic minority students and EPPP license exam pass rate, the

correlation did not hold in the regression model. The results were likely due to the

dependent variable being close to its maximum of 100.

This finding was different from those of Sharpless and Barber (2013), who noted

that doctoral psychology programs with a greater number of ethnic minority students

reported lower EPPP license exam pass rates. Sharpless (2018, 2019a) published two

more studies addressing demographic variables in relation to EPPP license exam pass

rates at an individual level. In those studies, White applicants generally had higher

passing rates than ethnic minorities. Notably, the failure rate for people who were Black

and Hispanic was more than double those who were White (Sharpless, 2018, 2019b).

These findings revealed that ethnic minorities were disadvantaged at an individual level

in terms of EPPP license exam pass rates.

The academic disadvantage of ethnic minorities may be observed in factors other

than licensure exam scores. Black and Hispanic individuals continue to be

underrepresented in the psychology workforce (Callahan & Watkins, 2018; Frisby &

Perez, 2018). Although Norcross et al. (2018, 2019a) noted an increase in ethnic

minorities in APA-accredited graduate training programs for clinical psychologists, this

increase still left them at 25%, a long way from equal representation. In the psychology

workforce, Whites took up 83%, while Blacks, Hispanics, Asians, and other ethnic

groups were divided into the meager 17% (Frisby & Perez, 2018). Callahan and Watkins

(2018) argued that the focus on GRE scores in program admissions could be related to

and could negatively influence diversity within psychology training and workforce.

Callahan and Watkins (2018) also noted that ethnic minority female students, except

Asian students, had higher attrition rates.

**Gender**

In the current study, the variable gender did not predict EPPP license exam pass

rates. This result was not fully supported by existing literature. Scalise et al. (2018)

presented qualitative findings showing the struggles of female applicants in pursuing

their licensure. The additional responsibilities engendered by motherhood or pregnancy

made it difficult for these female candidates to study for the EPPP license exam. Sulistio

et al. (2019) noted how female medical residents fared better in interpersonal and

communication skills, which are not currently part of the EPPP license exam. Even

within the field of accountancy, females appeared to be disadvantaged (Myers et al.,

2018). Myers et al. (2018) brought attention to possible gender biases in how subjects are

taught, which could contribute to lower exam scores for females. Contrasting evidence

has also been noted. In Sharpless's (2019b) study, females had higher passing rates than

males in the EPPP. Sharpless's (2019b) subsequent study, no significant difference was

noted between genders in EPPP first-time failure rates, showing support for the present study's finding.

**Program Type**

The variable program type did not predict EPPP license exam pass rates. The study revealed that clinical PhD programs performed better than clinical PsyD programs, which is consistent with related literature. Shamp (2013) noted that exam takers from clinical PhD programs fared better on the EPPP license exam than clinical PsyD programs. In Shaffer et al.'s (2013) study, PsyD programs had higher first-time pass rates in the EPPP license exam than PhD programs, but overall PhD programs had higher EPPP scores.

Sharpless and Barber (2013) found that PhD programs, particularly in the clinical subspecialty, had significantly higher EPPP pass rates than PsyD programs. Program type was related to time to completion and admission rates, which produced a simultaneous influence on EPPP license exam pass rates (Sharpless & Barber, 2013). In Sharpless's (2018, 2019a, 2019b) later studies, findings again revealed that PhD programs have higher EPPP pass rates than PsyD programs. Existing literature presented overwhelming support for the advantage of PhD programs over PsyD programs in terms of EPPP license exam pass rates.

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**Limitations of the Study**

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The findings of the present study had certain limitations—for instance, the use of 2017 archival data-limited findings to when the data were recorded. Although the data were from recently available sources, they may not accurately reflect current or future

situations, especially considering the proposed updates for the EPPP license exam as well as APA internship accreditation (see Callahan et al., 2020; Hatcher, 2013, 2015). Thus, the present study's findings cannot be generalized to other time frames. Also, the use of program-level data restricted the ability to study individual-level data.

Psychology doctoral programs did not report data regarding doctoral psychology students with learning disabilities or special exam accommodations; therefore, this group was not included in the study, which served as an additional limitation (see Sayette & Norcross, 2020). According to the triarchic theory of intelligence, integrating different abilities may improve exam success, especially for students who learn differently from others (Sternberg, 1985, 1988, 1998b). Although there has been an increase in students with learning disabilities enrolled in postsecondary education, about 24% of students do not disclose their disabilities (Zeng, Ju, & Hord, 2018). The National Center for Education Statistics (as cited in Snyder, de Brey, & Dillow, 2019) reported that over 200,000 college students have some form of learning disabilities. Despite the growing number of students with learning disabilities, academic institutions continue to provide support and interventions for student success (Snyder et al., 2019).

The correlational design of this study may have also served as a limitation to answer the research question fully. The present study was nonexperimental; therefore, no variables were controlled, and no intervention was administered. Thus, the findings simply showed correlations and not causality. Although certain variables may predict EPPP license exam pass rates, they do not necessarily cause changes in the EPPP license exam pass rates.

## Recommendations

It is recommended that future studies use individual-level data versus program-level data to identify information related to the individual student. Although the average pass rate for the EPPP license exam is 93%, the average pass rate for White psychologists is 92% compared to 83% for non-White psychologists (Bowman & Ameen, 2018). Macura and Ameen (2020) noted that White exam takers were significantly more likely to pass the EPPP license exam the first time compared to ethnic minority exam takers. Therefore, identifying how and why the likelihood of passing the EPPP license exam is lower for ethnic minority exam takers is important given the increase in ethnic minority students in the field of psychology and the importance of licensure. Research has shown that exam preparation through study materials and online tutoring sessions was effective and helped to improve learning outcomes and exam performance for licensure exams such as medical licensing (Oyewole, Animasahun, & Chapman, 2020). However, there is no research on the effectiveness of EPPP license exam prep materials.

Future studies regarding the exposure to EPPP license exam preparation materials during graduate school could benefit ethnic minority students. Exam takers performed better with exam preparation materials (Macura & Ameen, 2020). Therefore, identifying the effectiveness of EPPP license exam preparation materials could assist with an increase in ethnic minority student EPPP license exam pass rates.

## Implications

The findings of the present study have social change implications for practice, theory, and policy. In terms of practice, the study contributes to social change by

providing graduate programs and internship directors with information regarding predictor variables influencing EPPP license exam pass rates. For instance, graduate programs, and internship directors could introduce exam preparation materials which could benefit all students in particular to ethnic minority students since this study revealed a negative correlation between the percentage of ethnic minority students and EPPP license exam pass rates. Also, undergraduate and secondary programs could focus more on GRE preparation to prepare students for the EPPP license exam in advance, as higher GRE scores were related to higher EPPP license pass rates.

With regard to theory, the findings of the present study expand upon the triarchic theory of intelligence. The results showed that analytical skills, as reflected by GRE scores, correlated with EPPP license exam pass rate. The correlation of APA-internship match rates revealed that practical and creative skills may still hold value in the EPPP license exam. As the ASPPPB moves to include more practical and creative elements in the Enhanced EPPP, the triarchic theory of intelligence would hold even more relevance in the field (Callahan et al., 2020).

Findings also have implications for policymakers. The average APA accredited psychology doctoral program rate of admittance ranges between 8% and 15% (APA, 2018). This study revealed a rate of admittance of 12%. The rate of admittance for doctoral psychology programs is more competitive than other fields such as medical school, which has an average of 41% rate of admittance (Association of American Medical Colleges, 2018). Therefore identifying admission criteria and the expansion of

more APA accredited psychology doctoral programs would assist with allowing more prospective students into the profession of psychology.

## Conclusion

The purpose of this research study was to examine whether APA internship match rates, GRE scores, percentage of ethnic minority students, gender, program type, rate of admittance, and years to completion predict license exam pass rates. The findings of this study revealed that EPPP license exam pass rates were positively correlated with predictor variables GRE scores, years to completion, APA internship match rates, and negatively correlated with predictor variables rate of admittance and percentage of ethnic minority students. Rate of admittance resulted in the only statistically significant predictor for EPPP license exam pass rate out of the seven predictor variables. Rate of admittance was found to be negatively correlated with EPPP license exam pass rates; therefore, an increase in admission is related to a decrease in EPPP license exam rates. Rate of admittance appeared to be related and well-supported in the literature as predictors of EPPP license exam pass rates.

The study contributes to social change by providing doctoral psychology programs with further information regarding variables influencing license exam pass rates. Graduate and internship program directors may apply the findings to support the success of doctoral students and increase licensure pass rates. Results offer graduate programs, internship directors, and policymakers a valuable perspective by suggesting a focus realignment in assisting students and embedding triarchic intelligence in training and examination.

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