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The Influence of Age, Work Experience, Education Level, and Score on a Standardized
Pre-employment Competency Exam on the Outcome of a
Pre-employment Polygraph Exam

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requirements for the degree of
Doctor of Education

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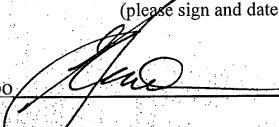
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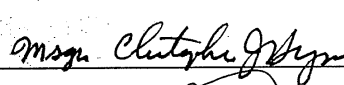
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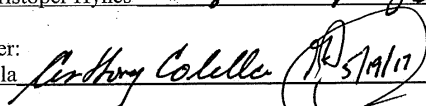
APPROVAL FOR SUCCESSFUL DEFENSE

David M. Torres, has successfully defended and made the required modifications to the text of the doctoral dissertation for the Ed.D. during this Spring Semester 2017.

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Abstract

This study examined the influence of age, work experience, education level, and score on a standardized pre-employment competency exam on the outcome of a pre-employment polygraph exam. Due to the strict selection requirements and competitive nature of sensitive government and public safety positions, organizations compete in the costly endeavor to hire qualified applicants efficiently and effectively. As these organizations fail to meet the required hiring levels, their responsibilities in public and national security cannot be carried out. This study was conducted in an effort to reduce the time and financial resources an organization must appropriate on applicants that cannot successfully navigate the stringent pre-employment screening process. The data were obtained from the human resources department of an organization that concentrates on national security and public safety. These data were de-identified, anonymous archival data derived from a random sample of three hundred ($n = 300$) applicants during the period between 2015 and 2016. This study utilized binary logistic regression, a discriminant analysis, and a multiple linear regression to analyze the data. The quantitative analysis utilized in this study accounted for the variables of age, work experience, education level, and score on a standardized pre-employment competency exam. The results of these analyses indicated that certain characteristics did influence the likelihood of whether an applicant would continue in the hiring process after the pre-employment polygraph examination. Work experience, education level, and score on a standardized pre-employment competency exam were all found to be significant.

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CHAPTER 1

INTRODUCTION

Background

In the 21st century, military, federal, and state law enforcement agencies, private security firms, and other government entities recruit similar individuals; consequently, competition for qualified applicants has grown during the past decade (Wilson, Dalton, Scheer, & Grammich, 2010). The population that meets minimum qualifications for these positions has dwindled. The world has changed since September 11, 2001, specifically in the government and law enforcement communities. By 2006, Congress had appropriated approximately \$271.5 billion in government funding to protect the country against terrorism (DeRugy, 2006). In addition, more demands have been made on government and law enforcement agencies because of technological advancement, globalization, and general increase in public awareness (Wilson et al., 2010). Kraska (2007) analyzed this change in-depth and discussed the post 9/11 blurred lines between police agencies and the military. The researcher found an increase in use of larger military style weapons by police agencies and an increase in cross training between these two groups (Kraska, 2007). Last, Kraska noted the military has become more involved in domestic affairs and intelligence. Police agencies are also more involved with counterterrorism and help support federal authorizes at ports of entry (land, air, and sea) and other critical infrastructure facilities, such as water supplies, nuclear facilities, and pipelines (Raymond, Hickman, Miller, & Wong, 2005). Because of this increased involvement, the pool of applicants for such public services has become much smaller and more competitive (Wilson et al., 2010).

Government and law enforcement officers must be able to objectively assess their environment, work under stressful conditions, execute their authority based on sound judgment, and be able to perform the required task in an efficient and effective manner as safely as possible (Hibler & Kurke, 1995; Simmers, Bowers, & Ruiz, 2003). Laguna, Agliotta, and Mannon (2015) stated, “Law enforcement officers play a vital role in the safety, security, and welfare of families and communities across the nation” (p. 1). Those in government and law enforcement must be able to work with and within a diverse community. As such, these individuals need to collaborate, communicate, work, and interact with a wide array of individuals and cultures. Therefore, these officials must be able to be analytical, problem-solve, de-escalate dangerous situations, think in a critical and strategic way, and possess current technological skills (Miller, 2008; Raymond et al., 2005; Scrivner, 2006; Wilson et al., 2010; Wilson & Grammich, 2009a). Quality officers all have a key factor in common; these officials are adaptable in stressful situations and are not tempted to misuse their legal authority. The officers resist temptation for personal gain, abide by the law, and resort to the use of force only as a last resort (Ostrov & Cavanaugh, 1987; Simmers et al., 2003).

Government and law enforcing agencies, like all employers, have the critically challenging task of recruiting the right employee for the right position. The task has become increasingly difficult with a global economy and a new emerging mobile workforce. In the 21st century, the new generation entering the workforce desires a better work-life balance with more-rapid advancement opportunities (Scrivner, 2008; Wilson et al., 2010; Wilson & Grammich, 2009). The younger generations entering the workforce are also more prone to seek non-militaristic and regimented careers in lieu of

more flexible work. Due to the current generational climate and various states legalizing marijuana, a large number of younger generations have experimented with or used drugs, are not physically fit, or have excessive debt (Raymond et al., 2005). All of these attributes have significantly decreased the pool of qualified applicants.

The retirement of senior government and law enforcement officials compounded with the inability of these organizations to quickly replace them adds to the current retention problem. Thus, officials who stay in these organizations have increasing workloads and increasing responsibilities. In addition, because of military requirements, such as the activation of National Guard units, law enforcement agencies are being depleted of their personnel. Increased attrition and a reduction of an interested and/or qualified applicant supply has made it increasingly difficult for these types of agencies to meet the required demand for their services (Wilson et al., 2010).

The government and law enforcement communities require a broad range of skills that not all candidates possess (Raymond et al., 2005; Wilson et al., 2010). Lack of competitive benefits furthers this problem, as government and law enforcement salaries lag behind those of many professions. Benefits and compensation for these employees have increased faster than those for the private sector have, but they are still not competitive (Wilson et al., 2010).

No shortage of applicants exists when vacancy announcements are published. However, reducing the applicant pool down to the most qualified of applicants for government security and law enforcement officers is a long, expensive process. Lindsey and Kelly (2004) stated the following:

By the time an agency selects a candidate, it has spent a great deal of money to determine if that new officer is physically, mentally, emotionally, morally, and ethically fit to do the job. In some cases, an agency may spend as much as \$100,000 to recruit, select, and train one police officer in the first year. (p. 2)

Eligibility criteria, such as a criminal history or drug use, can be immediate disqualifiers. However, most criteria requirements are subject to the whole person approach. As stated in the Adjudicative Guidelines (2015) of the Code of Federal Regulations (C.F.R.), “The adjudicative process is the careful weighing of a number of variables known as the whole person concept” (32 C.F.R. § 147.2). This allows for a more comprehensive profile of an applicant. Other potential factors that may be considered are work experience, level of physical fitness, education level, financial history, medical standards, physiological assessments, written competency examinations, and others factors as determined by each organization (Guffey, Shook, Larson, & Zimmerman, 2007).

Applicant interviews can no longer suffice as the sole determining factor for employment decisions. “Efficiency, accuracy, and fairness are but a few of the concerns for departments in structuring this crucial task in the recruitment process” (Wilson et al., 2010, p. 83). Employers use an array of pre-employment screening techniques as a process to verify applicant information, such as education, work history, medical fitness, and credit history. The integrity of the applicant may even be determined via integrity tests or polygraph examinations. This pre-employment screening process serves to identify important and relevant information regarding an applicant’s past and present behavior, which can help the employer determine the suitability and potential risk posed by the applicant. In addition, more in-depth screenings, such as background

investigations, can reveal prior behaviors, including bankruptcy, driving records, criminal history or convictions, and other civil litigation (Kinsey, n.d.).

However, a large percentage of the applicants do not meet the minimum requirements for becoming a member of these communities. Raymond, Hickman, Miller, and Wong (2005) contended, “It is becoming more difficult for the general population to meet minimum qualifications, such as a clean criminal record, little to no drug use, good physical health, and financial stability” (p. 14). According to Wilson and Grammich (2009), government and law enforcement careers are no longer viewed as desirable because of residency and specialized requirements and the length and complexity of the hiring process. These all affect recruitment. In addition, the limited and regimented opportunities for advancement and special assignments are just some additional organizational factors that can dissuade interest in government and law enforcement occupations (Wilson et al., 2010).

Many applicants entering the workforce seem to adopt a lax acceptance of their appearance, inclusive of tattooing, piercings, hairstyling, and facial hair. Law enforcement agencies hold themselves to stricter standards of acceptance of their appearance. In addition, careers in law enforcement, such as those in the military, focus on a strong work ethic within a strict chain of command. These individuals also must endure grueling work hours and erratic schedules with large personal sacrifices to themselves and their families. These employees are “on duty” even when they are not in uniform or at work. When choosing to enter these types of career, it is their code of honor and ethics that they put their lives in harm’s way to ensure the safety of others (Wilson et al., 2010). A similar trend in the decline of military recruiting has occurred, as

younger generations are not interested in abiding by these types of behaviors (Bowyer, 2007; Wilson et al., 2010).

Picano and Roland (2012) stated the following regarding assessing the suitability for military jobs:

High-risk military personnel typically engage in critical and sensitive national security missions; employ non-routine, nonstandard, or unconventional military tactics; deploy frequently and often for prolonged durations to hostile environments in various cultural settings, operate independently, and deal with uncontrolled situations. (p. 148)

This suitability no longer applies solely to the military. The government and law enforcement communities, as well as other public service organizations, increasingly find themselves working in conditions that coincide with Picano and Roland's assertions. Police, fire, and other governmental agents are being sent to wildfires, violent and unruly antipolice protests, and riots throughout the county. These individuals are placed in "critical positions of trust to safely, effectively train and transition recruits into service" (Ogle, Barron, & Fedotova, 2016, p. 50).

Many law enforcement and government agencies are struggling to fill vacancies to ensure public safety and national security. A simple Google search reveals hundreds of job opportunities in law enforcement from large departments, such as the Los Angeles Police Department and the New York Police Department, to smaller municipal departments all across the county. Similarly, a plethora of articles exist describing departments failing to meet their recruitment and hiring mandates. These problems are also applicable to organizations within the federal government.

As members of the Congressional Research Service (CRS), Painter and Schwemle (2016) provided Congress with their Department of Homeland Security (DHS)

Appropriations in FY2016:

The Senate Appropriations Committee report stated that although Congress has provided for the increased personnel that the department has consistently requested, “DHS has failed to bring those funded positions on board for a myriad of reasons including delays in obtaining suitability determinations and a backlog in polygraphs” (S. 1619, 2015, p. 19). According to the committee, hiring difficulties are exacerbated by qualified applicants who have withdrawn from the process or accepted other positions by the time an offer of employment is made. Hiring times have increased department-wide, from 146 days in 2013 to 163 days in 2014, and at CBP from 278 days in 2013 to 308 days in 2014. While noting that the U.S. Secret Service improved its hiring times from 327 days in 2013 to 295 days in 2014, the committee report stated that the hiring process “still takes an inordinately long time.”

The Senate report directed the department to report on its strategy to reduce hiring times and time to hire statistics within 60 days after the act’s enactment. In addition, DHS and its major components were directed to develop metrics to track the status of hiring actions, including measuring the time spent on actions within each step of the process. (pp. 13-14)

The acronym CBP refers to Customs and Border Protection.

In addition, the Committee on Appropriations submitted House Report No. 114-215, 2015, which further stated the following:

For the last few years, DHS has suffered from the inability to hire people in a timely manner. Compounding this problem are attrition rates that outpace hiring in several DHS components. According to DHS documents, the Department expects to end fiscal year 2015 more than 6,000 FTEs below the number for which funds were provided. To achieve the requested fiscal year 2016 FTE level, more than 7,000 FTEs would have to be hired between July 2015 and September 30, 2015. Given its attrition rate and the length of time it takes to vet new staff, the Committee is unconvinced DHS will be able to spend the funds requested in the budget. (p. 4)

The acronym FTE refers to full time employees.

Theoretical Framework

According to Creswell (2014), a theoretical framework in a quantitative method approach is necessary for the study, because the study is designed to test a theory. O'Neill, Hansen, and May (2002) state that the theoretical framework is to be used to expand on and explore new research opportunities and theories. This theoretical framework should be used to focus on an issue and to identify gaps in the issue. It is this gap that should be investigated in continuance of the field of study (Merriam & Simpson, 2000). Ultimately, the theoretical framework is “the structure, the scaffolding, the frame of your study” (Merriam, 2001, p. 45).

In accordance with Rocco and Plakhotnik (2009), the researcher attempted to use multiple theories, related concepts, and previous research as the basis of this theoretical

framework to explore a gap in the existing literature. Wright and McMahan (1992) state the following:

Theories, if accurate, fulfill the objectives of prediction (knowledge of the outcome) and understanding (knowledge of the process) regarding the relationships among the variables of interest. Thus, a good theory enables one to both predict what will happen given a set of values for certain variables, and to understand why this predicted value should result. (p. 296)

Human Resource Management and Strategic Human Resource Management

Jackson and Schuler (1995) define human resource management as an overarching term that encompasses all human resource practices. Among these practices are the recruitment and selection processes which, like other human resource practices, define an organization's human resource philosophies and values. Cummins (2015) states that the recruitment and selection process is the largest financial expense and one of the most crucial functions of human resource management. Lavigna and Hays (2005) describe recruitment and selection as a strategic process. They conclude that it is the function of human resource management to operate in a well-planned, effective, coordinated approach to the recruitment and selection process. This in turn will help an organization achieve its objectives, ensure consistency and fairness, and reduce financial costs pertaining to human capital. Additionally, Kaplan and Norton (2004) argue that an organization's recruitment and selection policies and procedures require continuous monitoring and evaluation to ensure the relevance and effectiveness of such policies.

One concept in human resource management is the strategic selection approach to recruitment and selection. Gerstein and Reisman (1983) identify strategic selection as a

strategy that consists of specialized job requirements, a logical structure for job descriptions, evaluation of individual capabilities, and assessment techniques that serve to collect data to determine an applicant's capabilities to successfully perform in the position.

Strategic human resource management takes a somewhat broader view of human resource management. Wright and McMahan (1992) make the distinction that human resource management has historically been viewed as isolated functions that operate independently of one another and are not performed in a coordinated approach across the various human resources functions. Therefore, Wright and McMahan (1992) define strategic human resource management as “the pattern of planned human resource deployments and activities intended to enable an organization to achieve its goals” (p. 298).

According to Schuler and Jackson (1987), an organization's success is dependent on having a competitive advantage through strategic initiatives. These strategic initiatives are an organization's ability to capture specialized behaviors in a specific market to dominate competitors. Schuler and Jackson (1987) further identify three competitive strategies organizations use to achieve the competitive advantage. These strategies are innovation, quality enhancement, and cost reduction strategy. Schuler and Jackson (1987) link these competitive strategies with human resource management based on what is required from employees aside from specific technical skills, knowledge, and abilities that are needed to perform their jobs. They argue that this serves as the basis for predicting, studying, refining, and modifying human resource strategy and practices.

Behavioral Perspective

A theoretical model that attempts to guide human resource practices is the behavioral perspective. According to Wright and McMahan (1992), the behavioral perspective is a major theoretical model used in strategic human resource management.

The behavioral theory is based on the assumption that for a successful organization's business strategy, specific behaviors are required from employees. Wright and McMahan (1992) acknowledge that the behaviors required by organizations will differ depending on the type of organization, their purpose, and the individual organizational strategy. As a result, different employee behaviors require different human resource practices. For the purpose of this study, the ability to cull applicants who possess the required behaviors from the larger pool of applicants early in the application process would implement all three of the competitive strategies and the behavioral perspective.

As Schuler and Jackson (1987) indicate, there are multiple options in human resource practices that can determine or promote the desired employee behaviors required by an organization. However, they caution that the strategies that an organization implements must coincide with strategic human resource management principles, and be consistent with each other and the organization's mission. According to Wright and McMahan (1992), the behavioral perspective assumes that different approaches to human resource management practices will elicit the required employee behaviors that benefit the organization.

Multi-level Theory

Ployhart (2006) explains a multi-level theory of human resource management.

Ployhart (2006) identifies organizations as intrinsically categorized and hierarchical in their nature and purpose.

Multi-level theory describes theoretical processes for both *contextual* effects and *emergent* effects. Contextual effects are “top-down” effects from higher to lower levels (e.g., changing an organization’s HR practices changes the behavior of individual employees). Emergent effects are “bottom-up” effects from lower to higher levels. (Ployhart, 2006, p. 885)

According to Ployhart (2006), it is the emergent effects or bottom-up process that unites organizational staffing research because it explains how individual differences in knowledge, skills, abilities, and other characteristics contribute to organizational differences. The mixture of employee homogeneity and heterogeneity behaviors can be used to an organization’s benefit. Kozlowski and Klein (2000) and Bliese (2000) indicate that highly similar behaviors or traits from employees can reinforce an organization’s culture, while the variability of behaviors and traits can add diversity (as cited by Ployhart, 2006).

Ployhart (2006) indicates that multi-level theory can be used to create a cohesive organization and explain how individual differences can contribute to organizations and influence staffing practices. For the purpose of this study, the ability to recruit and select a workforce consisting of the necessary homogenous character traits, such as honesty, integrity, and trustworthiness, with a heterogeneous workforce that is diverse and possesses a variety of experience and skills would help cultivate organizational growth and success.

Problem Statement

Local, state, and federal government organizations are struggling to hire new employees for sensitive security positions. These organizations have implemented pre-employment screening processes to extract only the most qualified applicants, worthy of the trust and confidence of the organizations in which they serve. However, current screening processes take a significant amount of time to process applicants and are costly. The strict selection requirements and competitive environment, as organizations vie for the same applicants, drain limited financial resources and are compounded by the imminent need to fill these public safety positions. This lack of employees has created a dire situation for public and national security organizations. Because of the increase in terrorism and threats to national security, public and national security organizations have increased responsibilities and workloads. However, these organizations fall increasingly short of qualified staff to ensure their critical and expanding responsibilities in public and national security can be carried out.

Purpose of the Study

The researcher's purpose for this study was to determine if age, work experience, education level, and the score on a standardized pre-employment competency exam are significantly related to candidates' results on a pre-employment polygraph examination and if such relationships might influence the outcome of the pre-employment polygraph examinations. The researcher hopes that the results of this study will provide policy makers and administrators, such as human resource administrators and government organizations, with information and data that can be utilized to (a) streamline pre-employment hiring processes, (b) save on financial resources, and (c) alter the

qualifications of sensitive public safety positions to process a lower quantity of applicants with a higher yield of employment.

Research Questions

Research Question 1: What influence, if any, does an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam have on the probability of their being continued in the hiring process after a pre-employment polygraph examination?

Research Question 2: What combination of an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam best discriminates candidates who pass or do not pass the pre-employment polygraph examination?

Research Question 3: What is the influence, if any, of an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam on his or her pre-employment polygraph examination results?

Null Hypotheses

Null Hypothesis 1: There is no statistically significant relationship between an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam and the probability of passing the pre-employment polygraph examination phase.

Null Hypothesis 2: There is no statistically significant relationship between any combination of an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam that discriminates candidates who pass or do not pass the pre-employment polygraph examination?

Null Hypothesis 3: There is no statistically significant relationship between an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam on his or her pre-employment polygraph examination results.

Significance of the Study

A considerable amount of time, effort, and financial resources is required to hire new employees for sensitive public safety positions. Employers place a significant emphasis on the integrity of an applicant and his or her ability to meet a high standard of personal conduct and behavior. Pre-employment screening processes are composed of multiple types of assessments. Therefore, it is necessary to examine and determine what influences the outcomes on pre-employment assessments. An applicant's apparent qualifications, as well as his or her individual performance on each pre-employment assessment, when combined with past history and behavior, presents a challenge to hiring officials.

An extensive examination of the research literature indicated pre-employment screening processes are widely used and highly effective (Ajila & Okafor, 2012; Befort, 1997; Carrigan, 2007; Schmidt & Hunter 1998). The literature also revealed that researchers have studied age, work experience, and education level relating to the effects on integrity testing, with varied results (Dawson, 1997; Kohlberg, 1984; Rest, 1984). However, a gap exists in the literature regarding the influence of standardized pre-employment competency exams on integrity testing. Furthermore, no researchers have analyzed how these variables might relate to or influence pre-employment polygraph examination results. Because of the lack of quantitative research on this topic, hiring

rates for sensitive public safety positions cannot increase. Furthermore, the pre-employment hiring process cannot be improved or streamlined to increase efficiency and become more time and cost effective.

Through this study, the researcher sought to explain the non-physiological influences on pre-employment polygraph examinations, which prior researchers have not examined. Since this polygraph has become a vital assessment tool in pre-employment hiring for sensitive public safety positions, it is essential to analyze and explain the influence on such examination outcomes. The polygraph examination is a controversial assessment tool, but it continues to be used by government organizations and its use upheld by legal authorities (National Research Council, 2013). This study will provide new insight regarding factors that may influence the results and streamline hiring practices. Government organizations, as well as individuals who seek employment in sensitive public safety positions, will have a more significant understanding of the potential influence on pre-employment polygraph examinations.

From a public policy perspective, this study was intended to provide much needed information to build on the existing body of research and literature regarding integrity tests, specifically the pre-employment polygraph examination. Beyond pre-employment testing, the prospect that non-physiological factors may influence polygraph examination outcomes may further influence public policy decisions regarding the pre-employment screening process and furthermore may have a potentially profound effect on polygraph examinations given for criminal and national security purposes.

Study Design

This study is a non-experimental, relational, explanatory design. The researcher

used pre-existing data to determine if the independent variables influence the dependent variable and if any relationships exist between the variables. The researcher obtained the data from the human resources department of an organization that concentrates on national security and public safety. This organization employs approximately 3,500 men and women who are subject to the above specified hiring process. Each year this organization receives thousands of applications for a few hundred available positions. The data provided consisted of the age, work experience, education level, score on a standardized pre-employment competency exam, and the results of a pre-employment polygraph examination.

For this study, the dependent variable was the dichotomous outcome of the pre-employment polygraph examination. The study included four independent or predictor variables: age, work experience, education level, and the scores on a standardized pre-employment competency exam. The quantitative analysis used to explore the relationships between the independent/predictor variable and the dependent/outcome variables was multiple linear regression analysis, logistic regression, and discriminant analysis.

Limitations

This quantitative study is non-experimental. The researcher designed the study to explain the influence, if any, of age, work experience, education level, and score on a standardized pre-employment competency exam on the outcome of the pre-employment polygraph examination.

The independent variable being assessed was the outcome on the pre-employment polygraph examination. Many researchers argue that polygraph results can be subject to

the polygraph examiner's own bias (Abrams, 1999; Elaad, Ginton, & Ben-Shakhar, 1994; Iacono & Lykken, 1999; National Research Council [NRC], 2003). In addition, each organization that administers a pre-employment polygraph examination utilizes a different set of questions. Through this study, the researcher sought to determine what influences a set of fixed factors had on the pre-employment polygraph examination results. Last, the standardized pre-employment competency exam used was a proprietary exam, used only by this organization that concentrates on national security and public safety. Other organizations utilize similar examinations, but not all competency exams may be equal in nature.

The researcher focused on the pre-employment polygraph outcomes of one organization's requirements and assessment methods pertaining to initial qualifications, age range, and score on a proprietary standardized pre-employment competency exam. Polygraph and competency exam assessments are widely used throughout the law enforcement and government communities in the United States and serve as a tool to screen out job applicants. The results of this study may be relevant beyond this organization in determining if non-physiological factors have the potential to influence such an integrity test as the polygraph examination.

Delimitations

The data collected included 300 systemic randomly selected applicants during the period from 2015 through 2016. The data were limited to the applicants applying to one organization with strict security standards and a proprietary standardized pre-employment competency exam. These applicants were all U.S. citizens living around the world of all cultures, races, and religious beliefs. The results of this study reflect the influences of

only four variables on the pre-employment polygraph examination from this particular organization.

Definition of Terms

The researcher retrieved the defined terms from the U.S. DHS, Office of the Chief Security Officer's (2009a) *DHS Instruction Handbook 121-01-007* regarding DHS personnel suitability and security program.

Access to Classified Information (Access): The ability and opportunity to obtain knowledge of classified information. *Access* is implicitly authorized access. When conveying the notion that a person was able to obtain classified information improperly, qualifiers include *unauthorized*, *improper*, or *illicit* (Executive Order No. 12968, 1995).

Security Access Adjudication (Adjudication): Final decision based on evaluation of data and evidence. *Adjudication* includes pertinent data contained in a background investigation or any other available relevant reports, used to determine whether an individual is eligible for access to classified information and for federal employment.

Applicant: A person who has entered into the hiring processes in the hope of obtaining employment.

Background Investigation: Consists of a National Agency check, personal interviews with the individual and other sources, credit checks, law enforcement agency checks, residences checks, and employment checks.

Classified Information: Information determined to require protection against unauthorized disclosure, pursuant to Executive Order No. 12958 (1995), as amended, or a

predecessor order. Such information is marked to indicate its classified status when in documentary form.

Confidential Information: Information, the unauthorized disclosure of which could be expected to cause damage to U.S. national security.

Denial of Security Clearance: An adjudicative decision that a covered individual whose duties require access to national security information, or a contractor employee whose duties require access to sensitive compartmented information, is not eligible for access to classified information.

Derogatory Information: Information that potentially justifies unfavorable suitability or security adjudication; such information may prompt a request for additional investigation or clarification for resolution of an issue.

Nonsensitive/Low Risk: Positions that have the potential for limited effect on the integrity and efficiency of the federal service. These positions involve duties and responsibilities of limited relation to an agency or program mission.

Moderate Risk: Positions that have the potential for moderate to serious effect on the integrity and efficiency of the federal service. These positions involve duties that are considerably important to the agency or program mission with significant program responsibility or delivery of service.

High Risk: Positions that have the potential for exceptionally serious effect on the integrity and efficiency of the federal service. These positions involve duties that are especially critical to the agency or program mission with a broad scope of responsibility and authority.

Federal Employee: A person other than the President and Vice President, employed by, detailed to, or assigned to a federal agency.

Fitness: This is the level of character and conduct determined necessary for an individual to perform work for or on behalf of a federal agency as an employee in the excepted service (other than a position subject to suitability) or as a contractor employee.

Fitness Determination: A decision by an agency that a person has or does not have the required level of character and conduct necessary to perform work for or on behalf of a federal agency as an employee in the excepted service (other than a position subject to suitability) or as a contractor employee.

National Security Positions: Positions that involve activities of the U.S. government concerned with the protection of the nation from foreign aggression or espionage, as defined under Executive Order No. 10450 (1953) and No. 12968 (1995). These include positions involved with developing defense plans or policies, intelligence or counterintelligence activities, foreign relations, and related activities concerned with preserving the military strength of the United States and positions that require regular use of, or access to, classified information.

Need-to-Know: A determination made by an authorized holder of classified information that a prospective recipient requires access to specific classified information to perform or assist in a lawful and authorized governmental function.

Public Trust Positions: Positions that may involve policy making, major program responsibility, public safety and health, law enforcement duties, fiduciary responsibilities, or other duties demanding a significant degree of public trust. These positions include individuals with access to, operation of, or control of financial records,

with a significant risk for causing damage or realizing personal gain, as defined under 5 C.F.R. § 731 (Suitability, 2015).

Secret Information: Information, the unauthorized disclosure of which could reasonably be expected to cause serious damage to U.S. national security.

Sensitive Compartmented Information: Classified information concerning or derived from intelligence sources, methods, or analytical processes requiring handling exclusively within formal access control systems established by the Director of Central Intelligence.

Sensitive Information: Any information, the loss, misuse, disclosure, unauthorized access to, or modification of which could adversely affect national or homeland security interests, the conduct of federal programs, or the privacy to which individuals are entitled under section 5 U.S.C. § 552a (the Privacy Act), but which has not been specifically authorized under criteria by an Executive Order or an Act of Congress to be kept secret in the interests of national defense, homeland security, or foreign policy.

Suitability: A determination based on an individual's character or conduct that may have an effect on the integrity or efficiency of the federal service. During a suitability determination, the department may consider identifiable character traits and past conduct that are sufficient to determine whether or not a given individual is likely to carry out the duties of a job with appropriate integrity. Suitability-screening standards and determinations are distinct from security clearance standards and determinations, which address whether an individual is eligible for access to classified information.

Suspension of Security Clearance: A decision that a person who had access to classified information is temporarily ineligible to continue such access.

Top-Secret Information: Information, the unauthorized disclosure of which could reasonably be expected to cause exceptionally grave damage to U.S. national security.

Organization of the Study

Chapter I contained the background information pertaining to hiring for sensitive positions of public safety and trust. In addition, the chapter provided the context for the pre-employment screening process and the inherent current problems in hiring for positions within the law enforcement and government communities. Thus, the researcher presented an overview of the problem related to hiring and the advantage of influencing or predictive variables on an integrity assessment, such as the pre-employment polygraph examination, contained within pre-employment screening processes.

Chapter II contains a review of research literature regarding pre-employment screening processes and the influence of non-physiological variables on integrity tests. Chapter III, in tandem with Chapter I, details the design methods and procedures for this study. The data collected on the variables were retrieved from the organization at which all the applicants applied for a position. Chapter IV contains the analysis of the quantitative data used to determine the influence of the independent variables on the dependent variable. Chapter V contains the results of the analysis. Based on the findings, the researcher administrates policy recommendations as well as provides topics for future research.

CHAPTER II

LITERATURE REVIEW

Introduction

The purpose for this study was to determine if specified variables can be used to predict an applicant's likelihood of continuing in the hiring process after a pre-employment polygraph examination. Limited existing research exists regarding the influence of such variables on integrity tests, and no research exists regarding the polygraph examination specifically. The main research question pertains to what influence, if any, an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam has on the probability of an applicant passing the pre-employment polygraph examination. This question guided the review of the literature. The literature review involved identifying variables that researchers have previously studied and their influence on integrity test results, as indicated from the studies. The researcher attempted to focus such predictor variables on the pre-employment polygraph examination and determine if significant influences exist. This can provide employers who require high levels of public trust and integrity, as well as researchers, with evidence that can be used when processing and screening applicants for a public trust position.

Literature Search Procedures

The researcher identified multiple sources to provide a comprehensive literature review regarding the use of predictor variables on pre-employment polygraph examinations. This review is broken down into five sections, apart from the introduction. The first section provides a general description and need for pre-employment screening

and testing. The second section details the influence of age, work experience, education level, and standardized exam score on integrity testing. The third section clarifies the distinction among applicant qualifications, including suitability and security clearance eligibility. In the fourth section, the researcher discusses the use of the pre-employment polygraph examination. The fifth and final section is the conclusion.

The search techniques employed during this literature review included a comprehensive physical and electronic review of government documents, federal regulations and statutes, and case law as well as books, articles, and research studies retrieved from peer-reviewed journals. The researcher searched and retrieved this literature using various online databases, which included the Seton Hall University Library's Inter-Library Loan Internet accessible database (ILLiad). In addition, databases searched included ProQuest, Google Scholar, Harvard Law Review, and Lexis Nexis. The researcher reviewed each piece of literature for relevant data and additional research sources.

The search techniques included searching for keywords or phrases. Keyword phrases included but were not limited to *pre-employment screening, pre-employment testing, application process, integrity testing, polygraph, influence of age, influence of work experience, influence of education level, and influence of standardized exam, qualifications, government suitability, security clearances, and security clearance eligibility*. Literature reviewed included law reviews as well as experimental, quasi-experimental, and meta-analysis studies. When researching the predictor variables, considerable conflicting opinions and research results existed.

Pre-Employment Testing

Ogle, Barron, and Fedotova (2016) conducted a job analysis on the U.S. Air Force military training instructors. The researchers concluded the following:

Abuse of power, specifically exploitative and criminally and sexually abusive behavior by even a small number of instructors, as occurred in United States Air Force (USAF) basic military training between 2010 and 2012, may result in a broad loss of public trust. (Ogle et al., 2016, p. 50)

In addition, the researchers pointed out that each branch of the Armed Forces has different standards and policy requirements when making employee selections (Ogle et al., 2016). According to the U. S. Army (2009), disqualifiers for the Army include drug or alcohol abuse, previous disciplinary action, a history of emotional instability, sexual misconduct, and any other unfavorable information developed.

Having unqualified employees negatively affects an organization, which is why it is important to have a thorough selection process (Cochrane, Tett, & Vandecreek, 2003). According to Kinsey (n.d.), employers can be held legally responsible for injuries that their employees cause if it is determined the employer was negligent in properly screening their employees prior to making an employment selection. This determination can be made even when the employer did not know about the employee's past history or behaviors. If the employer had not taken due diligence to ensure the selection was based on informed discoverable information, then the employer can be liable (Kinsey, n.d.).

Shusman, Inwald, and Landa (1984) conducted studies of psychological testing in corrections officers and found that several purposes existed for conducting pre-employment screening tests for law enforcement positions. Such processes screen out

applicants who may fail on the job or create a breakdown in public safety trust as well as trust amongst fellow officers. In addition, employment screening could prevent costly expenses from departmental discipline procedures, terminations, absenteeism, and legal costs because of court litigation. Pre-employment screening could prevent such litigation, as in the case of *Bonsignore v. City of New York*, in which a New York City police officer shot his wife and then committed suicide. Mrs. Bonsignore, the officer's wife, sued the New York Police Department (NYPD) for not taking responsible steps to determine her husband was not psychologically fit to carry a weapon. The NYPD was found liable. In addition to paying Mrs. Bonsignore, the NYPD received a significant amount of bad publicity because the department was seen to be reckless and irresponsible for not conducting psychological evaluations of officers (Bonsignore v. City of New York, 1981; Cochrane et al., 2003; Shusman, Inwald, & Landa, 1984). Considering the duties of government administrators and law enforcement, the following is noted:

There is little room for error. Besides the military, there is perhaps no other profession that has the authority to use force on others if necessary and invade the privacy of citizens. The consequences of officers' behavior can result in negative effects for the department, individuals, and the community. (Cochrane et al., 2003, p. 28)

Employee selection is more difficult to conduct than other personnel decisions, such as promotional decisions or other personnel decisions, because the employer does not have previous experience or knowledge of the applicant. Since it is not acceptable to evaluate an applicant on the observed performance during interviews, other mechanisms must be utilized (Cochrane et al., 2003. In 1973, the National Advisory Commission on

Criminal Justice Standards and Goals recommended a standard be implemented for the prescreening of all law enforcement applicants for police agency employment. The hiring process for law enforcement was advised to consist of a written aptitude test, a psychological examination, an oral interview, and a background investigation (Cochrane et al., 2003; Dantzker, 2011; Simmers et al., 2003).

Since 1973, many government, military, and security agencies follow similar pre-employment or selection protocols when screening applicants. “As a result, pre-employment testing paves the way for a more thorough and efficient selection of potential job applicants as opposed to only relying on reviewing resumes, applications, and references/background checks” (Carrigan, 2007, p. 39). Implementing a pre-employment recruitment process can minimize poor hiring decisions. The consideration of previous work history, education, and reference verification and a series of position-appropriate background checks are preferable (Kinsey, n.d.).

Human resource managers from various companies, corporations, and agencies are utilizing the process of pre-employment screening. The screening process can be strict and tedious, but a well-thought-out screening process can increase efficiency and ensure more reliability of the hired employee. Employers will make the hiring decision based on all the pertinent detailed information concerning a potential employee’s education, work experience, background, and other security checks. In addition, the probability of the employee’s longevity on the job with the company, corporation, or agency is stronger (Carrigan, 2007).

Pre-employment screening allows employers to select the most competitive and skilled applicants for employment via a methodical hiring processes that is cost effective.

Using testing strategies makes for a more cohesive hiring process (Carrigan, 2007) and the ability for current employees and new hires to blend more efficiently into the workplace.

According to Carrigan (2007), “Pre-employment testing has become one of the fastest-growing tools used to select successful employees within organizations” (p. 35). Most government and law enforcement agencies engage in extraordinary efforts to select qualified officers. Law enforcement and government agencies often spend as much as \$100,000 on a single law enforcement officer in the first year (Lindsey & Kelly, 2004). Each candidate must endure a battery of physical challenges and a variety of oral interviews and counseling to ensure his or her emotional and psychological capacity to fulfill his or her duties. Polygraph testing is also used to further evaluate a candidate’s ethical and moral values (Guffey et al., 2007; Lindsey & Kelly, 2004).

“Traditionally, the hiring process was one of the least regulated aspects of the employment relationship” (Cook, 1993, as cited in Befort, 1997, p. 366). However, this has changed in recent years. Especially in the realm of government and law enforcement hiring, an extensive set of regulations, laws, and legal precedents exists that sometimes act as obstacles to the hiring process, the purpose of which is to ensure no discrimination occurs and to protect the employer. The legal system had “held employers who fail to screen out potentially dangerous applicants in the hiring process liable for substantial damages by virtue of the emerging tort of negligent hiring” (Befort, 1997, p. 366).

According to Carrigan (2007), “Pre-employment testing is a vital tool that will protect organizations by allowing them to analyze testing measures and have the necessary tools to make good sound employment hiring decisions” (p. 35). Applicants

need to be patient while navigating all the phases of the pre-employment hiring process. Often, time gaps occur between the written examination and the psychological, physical, interview, and background investigation phases (Wilson et al., 2010). The intent of pre-employment screening is to select the best qualified applicant. It is vital to the integrity of the hiring process that a screening process must be applied in a cohesive and consistent manner (Carrigan, 2007). Kinsey (n.d.) has posited the following:

The Equal Employment Opportunity Commission (EEOC) has issued guidelines to help employers utilize background information in the recruitment process, and the Fair Credit Report Act (FCRA) is a federal law which regulates the use of background information for employment purposes, and guarantees certain rights to applicants. (p. 5)

Testing

For pre-employment tests to be legally defensible, the tests must meet specified criteria. The tests have to measure qualities and traits relevant to job performance. Testing materials must be based on the actual skills required to perform a specified job. The purpose of such a test must be to measure predefined traits or characteristics that have been proven to directly relate to the actual job duties and performance of a specified position (Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act, 2015; U.S. Equal Employment Opportunity Commission [EEOC], 2010).

Many different types of tests and selection procedures exist, including those that test for cognitive skills, knowledge and ability, physical agility or endurance, psychological or mental characteristics, personality tests, integrity tests, educational

proficiency, medical examinations, credit checks, and criminal background checks (EEOC, 2010). The effect and results of each component of any pre-employment screening process must be monitored by employers with 15 or more employees to ensure no specific population is negatively affected (Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act, 2015). Legal precedents have been set as courts have ruled that law enforcement and government employers have a responsibility to protect the public and those in the communities where they serve and to ensure these organizations are inclusive (Simmers et al., 2003).

Legal

The U.S. Equal Employment Opportunity Commission (EEOC, 2010) acknowledges the use of tests and other selection screening procedures as an effective way to distinguish which applicants are most qualified for specific job positions. While the screening process has become the “normal standard” for scrutinizing applicants by many employers, it is their obligation to be well versed regarding the parameters of the federal antidiscrimination laws. Employers cannot knowingly or disproportionately exclude an applicant for employment based on race, color, sex, religious affiliations, national origin, disability, or age (EEOC, 2010).

In contrast to previous job application processes, many job applicants are utilizing social networking engines and online processes to seek and apply for job opportunities (EEOC, 2010). Employers are adopting even higher testing measures to effectively screen a large number of applicants and further secure the safety of the workplace against violence and perhaps potential liability on the employer’s part. These measures have

moved to the forefront of the hiring process and have significantly heightened since 9/11 and the subsequent threats worldwide.

In general, three federal statutes exist that employees and prospective employees often use to combat issues with pre-employment screening activities and testing: (a) Title VII of the Civil Rights Act of 1964 (Title VII), (b) the Americans with Disabilities Act of 1990 (ADA), and (c) the Age Discrimination in Employment Act of 1967 (ADEA). According to the EEOC (2010), “In 1978, the EEOC adopted the Uniform Guidelines on Employee Selection Procedures under Title VII” (p. 3). The Uniform Guidelines on Employee Selection Procedures (1978) states the following:

The Equal Employment Opportunity Commission, the Civil Service Commission, the Department of Labor, and the Department of Justice jointly adopted the uniform guidelines to facilitate the Federal Government’s need for a uniform set of principles on the question of the use of tests and other selection procedures and to apply the same principles to the Federal Government as are applied to other employers.

(p. 211)

The statute further states that the purpose of the guidelines is to ensure that tests and other selection procedures are used properly (Uniform Guidelines on Employee Selection Procedures, 1978).

Title VII of the Civil Rights Act of 1964 prohibits employment discrimination for both new hires and current employees based on race, color, religion, sex, or national origin. Pre-employment and promotion testing are permissible under Equal Employment Opportunities (2015) as long as they are not “designed, intended or used to discriminate

because of race, color, religion, sex or national origin” as stated in 42 U.S.C. § 2000e (2)(h). In addition, employers are prohibited from altering the results of employment-related tests or using different scoring methods on the basis of race, color, religion, sex, national origin, age, or disability (Equal Employment Opportunities, 2015); EEOC, 2010).

Title I of the ADA states that employers cannot willfully discriminate against persons with disabilities based on their disability. The ADA specifies when an employer can require a medical examination, specific medical information, and ask specific questions pertaining to a disability. The employer has the right to require individuals to undergo medical testing. In accordance with 42 U.S.C. § 12112(d)(2), conditional job offers must be made to a prospective applicant prior to the required medical examination and must be a requirement for all applicants (Equal Opportunity for Individuals with Disabilities – Discrimination, 2015; Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act, 2015).

In accordance with the ADA (2015), it is also unlawful to utilize any kind of employment test or procedure that eliminates or is likely to screen out an individual or class of individuals with a disability. However, if an employer can prove such a test is specifically job-related and consistent with its business, it may be lawful (Equal Opportunity for Individuals with Disabilities – Discrimination, 2015; EEOC, 2010). The EEOC dictates that all pre-employment screening and selection procedures, to include all testing, are properly validated for the positions and purposes for which they are used. To be validated, all testing, screening, and selection procedures must be job-related, and the results should be appropriate to the employer’s purpose (EEOC, 2010).

In accordance with the Age Discrimination in Employment Act (ADEA, 2015), it is unlawful for an employer to discriminate against an individual based solely on age, specifically 40 years and older. In the event that a selection for employment or promotion is based on age, it would be a violation of the aforesaid act. The employer maintains the burden of proof that any test or selection procedure is reasonable and lawful if an effect on age is believed to exist (Age Discrimination in Employment Act, 2015; EEOC, 2010).

Usage of Pre-employment Screening

The hiring process is the first step of the ongoing relationship between an employer and a potential employee (Herriot, 1989). Pawlowski and Hollwitz (2000) concluded the following:

A company's ethical climate affects its human resources practices. Employees make judgments about how fairly a company treats them during the application process and on the job. These judgments help determine the attractiveness of the organization, the likelihood of accepting a position offer, and the incidence of litigation arising from selection, training, and compensation procedures. (p. 59)

According to Macan, Avedon, Paese, and Smith (1994), applicants who believe the hiring process is fair and reasonable are more likely to be satisfied with the selection, the job, and the organizations. In short, employers who are seen as having a fair and reasonable hiring and selection process are also more likely to have a satisfied workforce, with reduced discipline, turnover, and absenteeism (Pawlowski & Hollwitz, 2000).

Current pre-employment screening processes go far beyond the traditional resumes, reference checks, and possible job interview. In general, the hiring process

includes two phases that most government and law enforcement organizations utilize. The first phase consists of the application and submittal of required forms, such as resume and educational transcripts. These applicants are then vetted to see if they meet minimal qualification. Once it is determined that an applicant meets the minimal qualification, the hiring manager performs the interviews, skill-based exams, cognitive-ability testing, and physical-agility testing. Hiring managers may also conduct nonmedical types of psychological assessments.

Once this first phase is completed, per 42 U.S.C. § 12112(d)(2), a conditional job offer must be made (Equal Opportunity for Individuals with Disabilities – Discrimination, 2015). This allows the employer to conduct drug and alcohol testing, detailed medical exams, medical-type psychological examinations, a polygraph and other honesty and integrity-type testing, credit and financial checks, and background investigations.

Finding and implementing an appropriate and inexpensive formula to conduct such pre-employment screening is difficult but important to organizations (Pawlowski & Hollwitz, 2000). Hough and Oswald (2000) confirmed pre-employment screening may help predict an applicant's job performance, especially in dynamic and multidimensional positions. As a result, "Employers should only use valid and reliable pre-employment testing tools that will provide accurate and consistent scores" (Carrigan, 2007, p. 39).

In a 2003 national survey of 155 municipal law enforcement departments, Cochrane, Tett, and Vandercreek (2003) found that most departments incorporated all or most pre-employment testing with large inclusion rates. Out of the 155 municipal law enforcement departments, 99.4% incorporated a background investigation; 98.7% issued

medical examinations; 98.1% utilized interviews; 91.6% used a physiological assessment; 88.4% had drug testing; 80% participated in a physical fitness test; 65.8% administered a polygraph; and 49.7% used a civil service written exam, with another 46.5% using another type of knowledge, skills, and ability exam (Cochrane et al., 2003).

Other industries outside government and law enforcement communities utilize these pre-employment screening methods. According to Arnald (2012), “Research commonly shows that 20% to 50% of applications and résumés contain material misrepresentations” (p. 2). Arnald further asserted, “According to a 2005 report released by the Association of Certified Fraud Examiners, U.S. organizations lose \$600 billion annually to fraudulent activity, an amount that exceeds the annual budget for the U.S. Department of Defense” (p. 4).

Wonderlic Inc., a national employee and selection consulting firm whose founder E. F. Wonderlic is widely published on the subject of pre-employment testing, cited research conducted in a 2007 survey ascertaining what types of pre-employment screening tools the leading U.S. retailers used. Through a survey, the researchers found that pre-employment screening differed between retail stores, distribution centers, and the corporate level. The majority of retail stores (90%) used integrity, personality, or aptitude assessments, while only 40% of distribution centers and corporate level stores used such assessments. When discussing the use of criminal background checks, 70% of retail stores, 80% of distribution centers, and 70% at the corporate-level employed this process. Last, regarding drug testing, 50% of retail stores, 60% of distribution centers, and 40% of the retailers at the corporate level utilized this process (Pre-Employment Assessments, 2012).

Human resource management is about matching applicants to an employer's strategic and operational needs and ensuring the full utilization of that individual's talents and abilities (Ajila & Okafor, 2012). In 2015, employee dishonesty and theft caused retailers in the United States a loss of \$60 billion dollars (Leinbach-Reyhle, 2015). Blonigen et al. (2011) stated that "e-employment integrity tests are a popular frontline strategy to address these issues and are intended to screen out applicants likely to engage in counterproductive workplace behaviors" (p. 18).

Pre-employment screening consists of two types of screening. Handler (2009) referred to these two types as screening-in and screening-out. "Screening-in refers to those methods by which employers test applicants for the competencies needed to perform well in their respective organization. Screening-in assessments include tests of knowledge, skill, and ability" (Handler, 2009, p. 248). The screening-in function attempts to identify attributes that are predictive of good job performance (Befort, 1997).

According to Handler (2009), "Screening-out, in contrast, is the process of identifying vulnerabilities that would make a candidate a risk to the employer" (p. 248). Select-out assessments can involve medical issues, work history, criminal history, or other results of background investigations. Honesty and integrity testing, as well as psychological assessments, can all screen out those who are unfit for assignment (Handler, 2009; Picano & Roland, 2012). The screening-out function attempts to identify applicants who possess negative traits and attributes for the positions (Befort, 1997).

Interviews

Interviews are an important part of the pre-employment screening process and usually one of the early assessments in the process. Some organizations may interview

individual applicants multiple times and during different phases of the hiring process. Topics normally discussed during an interview typically include but are not limited to employment history, education, abilities, beliefs, job descriptions, situational judgment, and compliance with laws and regulations (Ben-Porath et al., 2011).

In a meta-analysis of employment interviews, Huffcutt, Culbertson, and Weyhrauch (2014) indicated in their results that pre-employment interviews retain their place among the useful selection methods. The researchers additionally noted that interviews should be combined with ability testing for a more effecting selection process (Huffcutt, Culbertson, & Weyhrauch, 2014). These results echo other meta-analyses conducted on the usefulness of pre-employment interviews, which concluded that pre-employment interviews served as high predictors of supervisory ratings of job performance (Huffcutt & Arthur, 1994; McDaniel, Whetzel, Schmidt, & Maurer, 1994).

Some researchers indicated that structured interviews can predict ethical integrity during the pre-employment screening process (Pawłowski & Hollwitz, 2000). For example, Pawłowski and Hollwitz (2000) concluded that some interviews “function similarly to other pre-employment integrity measures and may particularly offer benefits to applicants' confidence in a selection procedure's fairness” (p. 72). Interviews can serve as a useful pre-employment screening assessment as long as employers spend time understanding the intricate detail of the position for which an interview is conducted (Hamdani, Valcea, & Buckley, 2014).

Cognitive Testing

Cognitive tests assess memory, reasoning, perceptual speed, and accuracy as well as intellectual and academic skills such as math and reading comprehension. These

assessments can also test knowledge of a particular function or job (EEOC, 2010; Narvaez, 2016). Cognitive assessment tests may come in the form of written exams, performance tests, or simulated work assessments to measure performance and aptitude on particular tasks (EEOC, 2010). Ajila and Okafor (2012) stated, “Group administered, pencil-and-paper tests of general intelligence have been used in personnel screening for some time” (p. 94).

The Wonderlic Personnel Test is an example of a widely utilized general intellectual capacity test. After researching this test, Hawkins, Faraone, Pepple, Seidman, and Tsuang (1990) stated that they “support the value of the Wonderlic as a highly economical measure of general intelligence” (p. 198). Many government positions and most law enforcement agencies use cognitive tests, such as Civil Service Exams and Police Officer Selection Tests, to screen applicants for positions. The testing of specific cognitive skills should be determined by an actual defined job analysis and should be viewed as meeting professional standards. Cognitive tests are valid and hiring managers can use these tests to support the selection process (Schmidt, 2012).

Psychological Testing

Arguably, the most crucial aspect of all testing in the processing of applicants for governmental and law enforcement positions is psychological testing. An applicant must be psychologically fit for employment with an agency wherein the security of others is the main objective (Laguna, Agliotta, & Mannon, 2015).

In 1967, the President’s Commission on Law Enforcement and Administration of Justice determined all departments should conduct tests regarding emotional stability (Simmers et al., 2003; Meier, Farmer, & Maxwell, 1987). Later this same year, the

National Advisory Commission on Criminal Justice Standards and Goals recommended all police agencies conduct psychological testing on applicants by 1975 (Meier et al., 1987). The International Association of Chiefs of Police (IACP) has developed several guidelines for pre-employment psychological evaluations (Ben-Porath et al., 2011; Cochrane et al., 2003). The IACP also established a specialized committee within the IACP that focuses on psychological services (Meier et al., 1987; Simmers et al., 2003).

Pre-employment psychological assessments have shown that the analysis of personality and human behavioral characteristics is essential in determining how an individual may react within his or her respective working environment. These assessments allow employers to maximize their employee selection choices (Carrigan, 2007). Court decisions (*Bonsignore v. City of New York*, 1981 and *Clark v. City of Chicago*, 1984) “have held administrators responsible for the negligent acts of their employees when, in the opinion of the courts, they have been psychologically unfit for the job of a police officer” (Moriarty, 1989, p. 36).

Ben-Porath et al. (2011) purported that pre-employment psychological screening should be used for all employees in law enforcement, regardless of whether they carry a firearm or not. All employees must be able to “tolerate the stresses of working in a fast-paced environment, follow rules, use resources responsibly, behave in a trustworthy manner, use good judgment, and refrain from off-duty behavior that would reflect poorly on the department” (p. 2).

According to Find (2013), “Psychological assessments can vary in terms of the competencies they measure, ranging from mental abilities and skills to personality traits” (p. 282). Assessments can also range from paper-and-pencil tests to thorough meetings

with psychologists and psychiatrists. Court decisions have validated proper use of psychological assessments for pre-employment selections. However, such decisions divide psychological assessments into two groups. In *Karraker v. Rent-A-Center* (2005), the Court of Appeals made two distinctions between the various types of psychological tests. The Court qualified psychological tests designed to identify a mental disorder or impairment as medical examinations. However, psychological tests that measure personality traits, such as honesty, preference, and habits, are not qualified medical examinations (*Karraker v. Rent-A-Center*, 2005).

Companies use psychological assessments for pre-employment selection to determine psychological suitability, which “refers to both the absence of job-relevant risk factors and the presence of job-critical personal and interpersonal qualities” (Ben-Porath et al., 2011, p. 2). The goal of the psychological assessment is to screen out individuals with personality characteristics that impair judgment or indicate a lack of capacity to perform specified skills indicated for government, military, and law enforcement positions (Laguna et al., 2015).

These psychological assessments indicate certain traits or dispositions of a person. Screen-in traits are dependability, cooperativeness, safety, attention to details, judgment, resilience, integrity, and the ability to handle stress. Screen-out traits are the likelihood that a person will engage in theft, absenteeism, dishonesty, and mental or emotional conditions reasonably expected to interfere with safe and effective job performance (Ben-Porath et al., 2011; EEOC, 2010; Laguna et al., 2015).

Each government or law enforcement agency needs to develop and implement a comprehensive pre-employment screening process to determine the psychological fitness

of applicants (Simmers et al., 2003). “The determination of an applicant’s psychological suitability for specialized, high risk assignments requires a thorough evaluation of an individual’s psychological and emotional health risks, training potential, job performance potential, and risk for personal misconduct and counterproductive work behaviors” (Picano & Roland, 2012, p. 150).

Honesty and Integrity Testing

Honesty and forthrightness are traits required in government and law enforcement applicants because of their unique job functions, which include public safety, confidentiality, and dealing with the public’s trust (Laguna et al., 2015).

“Since their inception into the field of psychological assessment, pre-employment integrity tests have been a popular means addressing issues of employee theft and dishonesty” (Blonigen et al., 2011, p. 19). The purpose of integrity tests is to screen-out applicants who possess character traits that indicate a high propensity of dangerous, counterproductive, or dishonest work behaviors. Such behaviors include but are not limited to violence, fraud, theft, bribery, misuse of information, drug use, or use of force (Blonigen et al., 2011; Fine, 2013; Murphy, 1993; Sackett & DeVore, 2001).

Hornsby, Kuratko, and Honey (1992) stated, “These tests try to probe honesty issues and at the same time assess whether the individual is attempting to lie or falsify any part of the exam. Some of these tests, such as the pencil and paper approach, can be low cost, both in time and money” (p. 25). Other tests, such as the polygraph, can be costly and labor intensive.

Two categories of integrity tests are generally referred to as *overt tests* and *covert tests* (Sackett, Burris, & Callahan, 1989; Wanek, 1999). Sackett, Burris, and Callahan

(1989) called the covert tests “personality-oriented tests” (p. 491). Overt integrity tests look for undesirable attitudes, behaviors, beliefs, and admissions of dishonest and illegal acts. Covert tests determine other deviant behavior but are not as obvious and transparent to the test taker. These tests assess applicants to determine if they fit into social norms. In addition, the tests allow hiring managers to look for such traits as dependability, recklessness, conscientiousness, and if the applicant is averse to authority (Sackett et al., 1989; Wanek, 1999).

According to Ones, Viswesvaran, and Schmidt (1993), since approximately 1983, interest in integrity tests has significantly increased; and tremendous research evidence and meta-analytic evidence validate the use of such tests during the selection process to predict counterproductive work behaviors. “However, for any tool to be operationally effective, it needs to be properly implemented into the organization's overall recruitment and selection process” (Fine, 2013, p. 282). Honesty and integrity testing is best used in a multiple assessment system. When all else is equal, choosing the candidate with the highest integrity test score decreases the number of applicants who may be counterproductive (Wanek, 1999). Bartram, Lindley, Marshall, and Foster (1995) studied recruitment and selection by small businesses and determined through job analyses and surveys that integrity was consistently identified as one of the most critical job requirements, even when compared to ability and aptitude.

Researchers continue to validate an increase in both research and use of integrity testing as evidence pertaining to the usefulness of integrity testing for screening job applicants (Fine et al., 2012; Ones & Viswesvaran, 2001; Wanek, 1999). Ones et al. (1993) validated the use of integrity tests after conducting a meta-analysis. The

researchers found that both covert and overt integrity tests correlated with employee performance (Ones et al., 1993). Ones et al. further concluded that integrity tests can be used to predict the broad set of undesirable behaviors and traits better than they predict a specific trait, such as theft alone. In other meta-analysis pertaining to personnel selection processes, researchers found that a process combining a sample work test, a structured interview, and an integrity test was the most valid method to make selection decisions (Hough & Oswald, 2000; Schmidt & Hunter 1998). Fine et al. (2012) also validated the use of pre-employment integrity testing. The researchers determined that their study “provides initial empirical evidence for the validity, utility and fairness of integrity testing in Israel, and implies that integrity tests are likely to be effective tools for use in personnel selection in international settings” (p. 88). The following year, Fine (2013) wrote guidelines for implementing pre-employment integrity tests. Fine stated, “Integrity tests have been well researched in recent decades and have consistently been found to be effective predictors of counterproductive behaviors in a variety of occupational settings” (p. 281).

According to Hornsby et al. (1992), some risk is associated with using paper-and-pencil honesty and integrity testing. These paper-and-pencil tests rely on the self-reporting of applicants regarding multiple-choice questions pertaining to an applicant’s personal history and behaviors. Researchers use the questions to predict criminal behavior, drug and alcohol use, and attitudes toward theft and company policies. An alternative to the paper-and-pencil tests is the polygraph examination, commonly referred to as a lie-detector test.

Polygraph

Employers use the polygraph examination, or lie detector test, to validate the integrity of information that has already been provided. The examination measures a person's physiological responses as they are asked and answer questions. These physiological responses are blood pressure, heart or pulse rate, frequency and depth of respirations, and skin perspiration or conductivity (Adler, 2002). New methods may also include a retina scan to determine eye movement and pupil dilation. The polygraph community believes that when a person lies, a physiological reaction occurs and can be captured (Gamer, 2011; Khan, Nelson, & Handler, 2009; Matte, 1996; Pivovarova, Edersheim, Baker, & Price, 2014; Timm, 1982; Tomash & Reed, 2013; Visu-Petra, Buş, & Miclea, 2011). However, this is a contentious and widely debated issue (Iacono, & Lykken, 1999; Lewis & Cuppari, 2009; Kleinmuntz & Szucko, 1982; Lykken, 1998; Saxe, 1991, 1994).

The polygraph exam is purported to indicate deception based on the arousal of the autonomic nervous system (Lykken, 1998; Saxe, 1991). In other words, as a person lies, he or she experiences physiological changes in blood pressure, breathing, heart rate, and skin moisture. Two methods of polygraph testing exist: the Control Question Test (CQT) and the Guilty Knowledge Test (GKT) (Horvath & Palmatier, 2008; Lewis & Cuppari, 2009; Myers & Arbuthnotm 1997). Many researchers (Horvath & Palmatier, 2008; Saxe, 1994) contended that the CQT method is the most popular and accepted method. According to Lewis and Cuppari (2009), "The standard polygraph is often the CQT since it is most often used in criminal investigations" (pp. 87–88). However, hiring managers

can use either the CQT or the GKT methods of a polygraph for pre-employment screening.

The CQT method involves asking two types of questions: control questions and relevant questions. According to Horvath and Palmatier (2008), “Simply stated, more pronounced and more consistent physiological responses to control than to relevant questions leads to a decision of truthfulness whereas greater responses to relevant questions leads to a decision of deception” (p. 889).

The GKT method involves asking specific questions pertaining to the topic in question, and determines the physiological response. When using this method, it is imperative that the person being polygraphed is not aware of what information is known or unknown. Myers and Arbuthnotm (1997) stated “that the GKT is a more difficult test to conduct as it requires complete cooperation among all members of the criminal investigation in keeping knowledge concerning the crime from the suspect” (p. 1423).

Many researchers argue that polygraph results can be subject to the polygraph examiner’s own bias (Abrams, 1999; Elaad et al., 1994; Iacono & Lykken, 1999; NRC, 2003). In a study of polygraph examiners’ personal biases affecting test results, Elaad, Ginton, and Ben-Shakhar (1994) found that partial support existed for those who believe the judgments of polygraph examiners affect the results of analyzing polygraph charts. Similarly, Iacono and Lykken (1999) found that “polygraph examiners are perhaps the group whose opinions concerning the techniques are paradoxically of the least value” (p. 592). Abrams (1999) reported that the polygraph examiner’s bias, intended or not, can influence the way an examiner administers the exam. The National Research Council (NRC; 2003) reported the following:

Polygraph testing in the field are plagued by selection and measurement biases, such as the inclusion of tests carried out by examiners with knowledge of the evidence and of cases whose outcomes are affected by the examination. In addition, they frequently lack a clear and independent determination of truth. Due to these inherent biases, observational field studies are also highly likely to overestimate real-world polygraph accuracy. (p. 4)

Use of lie detecting techniques first appeared in Europe and later came into use in the United States. As early as 1907, the use of lie detecting occurred in Boise, Idaho. The state wanted to determine if Harry Orchard assassinated the governor of the state as part of a conspiracy (Alder, 2002). Between the 1970s and 1980s, the use of polygraphs as screening tools gained acceptance within the U.S. private sector. By the 1980s, researchers estimated that as many as two million people in the United States were administered the polygraph in the private sector (Alder, 2007; Handler, Honts, Krapohl, Nelson, & Griffin, 2009). According to the NCR (2003), the U.S. government administered thousands of polygraph exams a year as a screening tool for job applicants and current employees (NRC, 2003). It is widely argued the U.S. government is the largest user of the polygraph exam (Handler et al., 2009; Krapohl, 2002; NRC, 2003).

The use of the polygraph has become much more restricted because of several decades of legal precedents determined through litigation. In addition, the controversial scientific foundation and subjective validity of the polygraph caused Congress to enact the Employee Polygraph Protection Act of 1988 (AELE, 2011). Under this Act (29 U.S.C §§ 2001-2009), most employers are not permitted to require or request an employee or a job applicant to undergo a polygraph exam. Furthermore, the employer is

prohibited from discriminating, disciplining, or discharging anyone for not taking a polygraph (29 U.S.C § 2002).

However, several exemptions are made under this Act, as outlined in 29 U.S.C § 2006. Federal, state, and local governments and their respective subdivisions are exempt from the restrictions of this Act and can use polygraphs on current employees as well as a pre-employment tool on job applicants. In addition, all employers who have a nexus to business that deals with national defense or national security are exempt from the Act. Such businesses include private employers who contract with the government. The Act further excludes private employers whose primary business involves security, security alarms, counterintelligence, protection of buildings, money, resources that have a significant effect on society, or the manufacturing, use, storage, dissemination, or research of controlled substances (Polygraph Protection Act, 2015).

Many governmental entities and other public service organizations, such as law-enforcement, currently require pre-employment polygraph examinations, which serve as a support tool intended to add incremental validity to the pre-employment screening process (Handler et al., 2009). Meesig and Horvath (1995) conducted a study to determine how prevalent the use of pre-employment polygraphs were in U.S. police agencies. From their sampling, the researchers determined that 99% of large law enforcement agencies and 90% of small law enforcement agencies in the United States require a polygraph screening examination as a condition of employment for applicants to sworn positions (Meesig & Horvath, 1995). The honesty, integrity, and reliability of government and public safety employees is of great concern to employers, given their role and positions of public trust and safety (AELE, 2012). In the realm of public safety

and national security, these employees must be trustworthy and honest to have access to critical and potentially dangerous information.

Many researchers have argued that the use of polygraph examinations, even by the government and other public service organizations, as exempted in the Employee Polygraph Protection Act of 1988 are a violation of privacy and constitutional rights of self-incrimination. However, applying for government and public service positions, such as law enforcement, is a voluntary process; and courts have ruled in favor of the use of polygraphs by such entities. In *Croddy v. FBI* (2006), a federal court ruled against applicants who applied to the FBI and the Secret Service after being denied employment because of failing the polygraph test. The applicants claimed that the polygraph test violated their Fifth Amendment right and their right to privacy under the U.S. Constitution (*Croddy v. FBI*, 2006). Similarly, in *Anderson v. Philadelphia*, a federal appeals court ruled the due process of job applicants seeking employment in the police department or correctional facilities was not violated by the use of a pre-employment polygraph exam as a screening tool (*Anderson v. Philadelphia*, 1988).

Meesig and Harvath (1995) found that law enforcement agencies of all sizes used polygraphs primarily because of its deterrent effect. The polygraph deters applicants who are not suitable for the position, while it helps to corroborate an applicant's background history. Kraphol (2002) concurred with Meesig and Harvath in the deterrence of the polygraph. Kraphol found that departments that use pre-employment polygraphs to screen applicants believe that applicants are prone to be more forthright during the process because they know they will be subject to a polygraph. In addition, Meesig and Harvath (1995) found that police departments' main concerns for using the pre-

employment polygraph centered on an applicant's criminal history, drug usage, and overall honesty.

Meesig and Harvath's (1995) findings also show that departments that use polygraphs do not use them as a substitute for other techniques. Agencies that employed polygraphs used more rather than fewer processes and techniques in their screening protocol than did those who did not use polygraphs. According to Krapohl (2002), the use of polygraph pre-employment screening is more likely to be part of an overall multi-faceted screening process than a stand-alone method. Krapohl posited two conclusions from the data. First, polygraph screening is not a redundant process, but rather it contributes unique information (Krapohl, 2002). Second, pre-employment polygraph examination results are not used exclusively to make hiring decisions, but rather employers utilize the information in addition to considering other information obtained during the screening process. Hornsby et al. (1992) further supported this tiered combination of screening processes and determined that most law enforcement and government agencies that use the polygraph examination as a screening tool use it in conjunction with a thorough background investigation. In addition, both screening processes utilized together serve as the essential tools for predicting honesty and integrity.

The use of polygraph examinations as a pre-employment screening assessment by governments and police agencies filters applicants into a pool who are the most suitable for employment. Handler, Honts, Krapohl, Nelson, and Griffin (2009) stated the following:

Unlike diagnostic tests, which are used for criminal investigation polygraphs,

screening examinations are conducted in the absence of any known incident or allegation. Screening polygraphs and screening tests in general are often constructed to investigate in a cost effective and expedient manner the applicant's history of involvement in a range of possible activities of concern to hiring officials. (p. 240)

These pre-employment polygraph examinations test the applicant's credibility pertaining to many subjects and behaviors simultaneously and during an extensive time period. The tests help the investigating agency look for patterns of behavior that have been previously associated with high risk, thus allowing employers to screen-out those who are undesirable or are determined to be high risk. In addition, applicants may be truthful on selected issues or topics and deceptive on others (Handler et al., 2009).

“Applicants are often asked to complete a background questionnaire prior to undergoing a polygraph examination, which serves as a basis for some questions to be asked by the examiner” (AELE, 2011, p. 204). As such, the information not provided may be as significant as the information provided. “It is relatively easy to understand that the presence or absence of reactions to any or all of the test questions of an investigative polygraph would signal involvement or non-involvement in a single known incident” (Handler et al., 2009, p. 248). The following was reported by the AELE (2011):

Knowing that they will be undergoing polygraph examination, and believing, whether correctly or not, that a polygraph examiner will be able to tell whether a dishonest answer concerning past involvement in criminal conduct is false, there are candidates who voluntarily reveal information on such questionnaires that may be used to disqualify them. (p. 204)

The polygraph may deter applicants from applying for a position. Reducing the number of unsuitable or unqualified applicants early in the process saves the hiring agency time, money, and resources.

Many government and law enforcement agencies have indicated that the pre-employment polygraph examination provides some of the most significant information on applicants, and therefore the polygraph is the most crucial screening tool for job applicants (Handler et al., 2009; Krapohl, 2002; Messig & Horvath, 1995). The use of the pre-employment polygraph examination is viewed as highly important for government and law enforcement agencies. Congress has acknowledged this by providing these types of organizations exemptions from the Employee Polygraph Protection Act of 1988.

In 2003, the National Academy of Sciences and the U.S. Department of Energy agreed to participate in a study to review the scientific evidence regarding the use of the polygraph. NRC (2003) stated the following:

The National Research Council convened the Committee to Review the Scientific Evidence on the Polygraph. The subsequent report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. (p. i)

The review committee discussed the criticism shadowing the validity of polygraph testing and acknowledged such testing remains a debatable issue. Notwithstanding any objections, the committee acknowledged that the testing is still appropriately effective in minimizing employment applicants from potential security misdoings. The reviewers

concluded that an applicant's belief that the polygraph test is accurate and valid may contribute to the success of the tool in screening applicants and determining the truth (NRC, 2003).

Background

Background checks serve to verify the information an applicant has disclosed as well as provide the applicant's criminal history (EEOC, 2010). Background checks further provide the verification of employment and employment history; financial history, such as credit and bankruptcy reporting; and driving record, which can all lead to a reduction in employee misconduct (Kinsey, n.d.). Background checks verify all previously gathered information throughout the hiring process. Any discrepancies need to be investigated and may serve as a warning flag to the employer. Kinsey (n.d) argued that "simply announcing to all applicants the intention to conduct background checks will discourage some candidates from applying. At a minimum, candidates will be more likely to represent themselves honestly while not discouraging good qualified applicants" (p. 2).

In the 21st century, background information is more easily obtained electronically and through social media. Social media serves as an easy tool for employers to determine how applicants conduct themselves while not at work and may expose potentially dangerous behaviors, or at least poor taste and judgment, by an applicant. Checking for embarrassing or compromising information, mistruths, or financial instability may prevent an employer from hiring a person who is susceptible to coercion or blackmail. A thorough background check can help ensure public safety, confidentiality, and protect the employer from legal liability. Conducting background checks on applicants also hinders

the likelihood of that employee adding to the turnover and having to re-announce for the same position again. One essential caveat to conducting background checks is that employers obtain all of the information and records legally and have a well-crafted policy to guide human resource selections (Howie & Shapero, 2002).

Pre-employment screening processes need to take a whole person approach. As such, all aspects of the applicant's life and history should be taken into consideration and evaluated. Suitability is then determined by weighing the good versus the bad (Handler, 2009). Previous researchers attested that the best selection results follow an integrative pre-employment screening approach, whereby cognitive testing, interviews, psychological evaluations, honesty and integrity assessments, and a background check are combined.

“Pre-employment testing is shaping the way American businesses hire qualified, successful, and performance driven employees, in today's dynamic and ever-changing workforce” (Carrigan, 2007, p. 42). The human resource personnel in government and law enforcement communities need to select the most qualified applicants who are physically and emotionally stable. These individuals are the frontline for the safety and the welfare of the public.

The influence of Age, Work Experience, Education Level, and Standardized Competency Exam on Integrity

Many researchers have studied integrity tests, such as the polygraph and other psychological testing (Hornsby, Kuratko, & Honey, 1992; Meesig & Harvath, 1995; Sackett et al., 1989; Sackett & Wanek, 1997; Saxe, 1994). The majority of research on the polygraph examination is based on physiological factors that may affect the outcome (Gamer, 2011; Khan et al., 2009; Matte, 1996; Timm, 1982; Tomash & Reed, 2013). For

example, MacNeill and Bradley (2016) concluded that room temperature can influence the electrodermal and cardiovascular activity of a person during a polygraph, with a concerning effect at lower temperatures. Hence, when a room is colder, a person's electrodermal and cardiovascular activity may change, which influences the polygraph readings. However, virtually no published research exists that involved examining what, if any, influence age, work experience, education level, and standardized scores on a written competency exam may have on who passes or fails the polygraph. Research on this topic could improve human capital strategies and methods for recruiting and selecting qualified applicants who meet the integrity threshold to obtain a government "Top Secret" security clearance.

As noted, an abundance of research exists regarding how age, work experience, and education level may influence an individual's ethics, morality, and integrity (Dawson, 1997; Kohlberg, 1984; Rest, 1984). Since the polygraph examination is a test of honesty, this research is relevant. A person with high ethics, morality, and integrity would not lie about past practices or behavior when taking a polygraph exam.

Age

Age represents the most studied variable when discussing moral and ethical issues. Kohlberg (1984), a noted psychologist, is widely published on the topic of moral psychology. Kohlberg theorized a positive relationship exists between age and moral development. As an individual ages, he or she matures and experiences an increased sense of morality and ethics. Many researchers have proven this theory correct. According to Swaidan, Vitell, and Rawwas (2003), past research has supported Kohlberg's theory by finding that younger individuals are less ethical than older individuals.

Examples of researchers who affirm this theory are plentiful. In a study of the ethical behavior among marketing researchers, Kelley, Ferrell, and Skinner (1990) found that marketing researchers in the 50 and older age category significantly rated themselves as more ethical than all other research age groups. Swaidan et al. (2003) found that older African Americans rejected illegal activity and questionable activities more than younger African-American consumers did. In another study, Serwinek (1992) examined ethical predictors among 423 employees of small businesses. The researcher found that as the age of the subjects increased, their ethical attitudes became more conservative (Serwinek, 1992). In accordance with this finding, younger employees possessed a more liberal view of unethical situations.

“Extensive longitudinal, cross sectional and sequential studies indicate that people do change, and they change in the direction postulated by developmental theory” (Wimalasiri, Pavri, & Jalil, 1996, p. 1333). In essence, moral reason increases with age. In their study of morality among business managers in Singapore, Wimalasiri, Pavri, and Jalil (1996) found that age did in fact affect a subject’s moral reasoning. In another study regarding the ethical conduct of employees of a large nonprofit organization, Deshpande (1997) concluded that subjects 40 years of age or older were more likely to rate issues pertaining to gifts, favors, falsifying reports, and preferential treatment as more unethical than younger subjects.

Many other researchers found similar results. In a study of business professionals, Peterson, Rhoads, and Vaught (2001) found that the younger age groups demonstrated a lower standard of ethical beliefs. While investigating consumer attitudes and beliefs in various questionable consumer practices, Vitell, Singh, and Paolillo (2007)

found that age significantly affected the attitudes where questionable activities were involved.

While studying the ethics of 2,196 business students, Ruegger and King (2013) found that age is a significant determining factor for ethical beliefs. Similar to Kelley et al. (1990), Ruegger and King found the 40 and older age group to be the most ethical, followed by the 31–40 age group, the 22–30 age group, and the 21 and younger age group as the least ethical. Other researchers indicated that as individuals age, they become more ethical (Callan, 1992; Mudrack, 1989; Peterson, Rhoads, & Vought, 2001; Rawwas & Singhapakdi, 1998; Vitell, 1986, 1991).

Mudrack (1989) conducted a study of age-related differences in Machiavellianism among adults. Machiavellianism is defined as “characterized by subtle or unscrupulous cunning, deception, expediency, or dishonesty” (Machiavellianism, n.d.). The researcher found that Machiavellianism scores declined with age, with the sharpest and most notable decline after the age of 37 (Mudrack, 1989). Mudrack premised that, “older individuals probably have greater experience in social situations than younger people do simply because they have likely encountered a greater range of situation” (p. 1049).

In a meta-analysis on ethical attitudes and behavior of business students, Borkowski and Ugras (1998) also supported Kohlberg’s (1984) theory that a positive relationship exists between age and ethical behavior. “Of 35 studies, nineteen found no significant relationship, one mixed study did not report findings, thirteen found that older (younger) students responded more (less) ethically, while two studies found the opposite” (Borkowski & Ugras, 1998, p. 1124).

Still, other researchers have found evidence that debunks Kohlberg's (1984) theory. Ede, Panigrahi, Stuart, and Calcich (2000) studied the effects of multiple variables as they pertain to ethics in small minority businesses. Age was the only variable to produce a significant main effect. Subjects 40 years old or younger were statistically more ethical than subjects older than 50 years of age. This result directly contradicts the findings of Kelley et al. (1990) and Ruegger and King (2013).

In a study regarding the ethical behavior of industrial buyers, Browning and Zabriskie (1983) also found younger individuals to be more ethical. Their findings indicated that the older the person was, the more likely he or she believed that it was permissible to be entertained or to receive gifts and favors from vendors with whom they did not currently do business (Browning & Zabriskie, 1983). Younger individuals, who were also more educated, viewed gifts as bribes and determined such gifts to be unethical. In this research study, younger, better-educated buyers possessed a higher ethical viewpoint. Other researchers, such as Nikoomaram, Roodposhti, Ashlagh, Lotfi, and Taghipourian (2013), studied the ethical decision-making of accountants and found no significant differences between the age of an individual and ethical decision-making practices or beliefs.

Work Experience

Dawson (1997) studied the ethical differences between men and women in sales. The result indicated that a parallel exists between age and years of experience. As age and experience increased, so did the level of ethical behavior (Dawson, 1997). Trevino (1986) also asserted, "Work represents a major component of the life of most adults. Thus, work experiences may provide the stimulus for adult moral development" (p. 607).

Hunt and Vitell (1986, 1992, 2006) theorized that ethical judgments can be affected and changed because of normal practices conducted in specific workplaces. According to Hunt and Vitell (1986), “Both industrial and organizations norms are proposed as significant determinants of ethical judgments” (p. 10). Thus, depending on where an individual works and for how long, work experience could produce a more conservative or more liberal ethical judgment. Vermillion, Lassar, and Winsor (2002) supported this theory, also called the Hunt-Vitell theory, to strengthen business relationships for a mutual increase of profits.

In a study of the ethical perceptions of managers, Kidwell, Stevens, and Bethke (1987) found the only consistently significant variable for the level of ethical judgment was the length of time in the workforce. Those who were employed longer had a significantly higher response to ethical decisions and situations. In researching the effects of gender and career stages on ethical judgment, Weeks, Moore, McKinney, and Longenecker (1999) also found that individuals who were employed longer, and thus in later stages of their career, had higher ethical judgments than those in lower stages of their career.

In a study on journalists and their ethical decision-making, Motlagh, Hassan, Bolong, and Osman (2013a) found that a journalist who had more work experience also made better ethical decisions in uncertain situations. Motlagh et al. also found that the more experience a journalist has correlates to the increased perception he or she has pertaining to journalism codes of ethics. Kelley et al. (1990) found similar results of work experience when researching the ethical behavior among marketing researchers. Kelley et al. found that marketing researchers employed at the same job for 10 or more

years were found to make better ethical decision than those researchers employed in their positions for between 3 to 5 years.

However, not all researchers have found the same results when looking at work experiences and ethical behavior. In research conducted by Keller, Smith, and Smith (2007) on work experience and education levels of U.S. accountants, results indicated that accountants with more work experience had lower ethical behavior. The researchers reported that “people with work experience tend to have more disdain for this ethic (which is really no ethic at all)” (Keller, Smith, & Smith, 2007, p. 310). In a study of ethical judgment and whistleblowing in China, Chiu (2003) found that ethical judgment decreased with work experience. The researcher implied that this might have to do with the Hunt-Vitell theory of workplace norms (Chiu, 2003).

Still, other researchers have found that no relationship exists between work experience and ethics or integrity. Barnett and Valentine (2004) studied 300 marketing professionals and found that work experience was not a factor in ethical behaviors or judgments. Similarly, Nikoomaram et al. (2013) did not find any significant relationship between the work experience and ethical behavior of accountants.

Education Level

Rest (1984), a noted psychologist and follower of Kohlberg, published extensively on moral judgment and believed that increased intelligence was a contributing factor to increased morality. Many researchers in the field, such as Rest and Kohlberg, believe that a positive relationship exists between education level and ethical and moral practices. Researchers have found that education is another significant predictor of ethical beliefs (Goolsby & Hunt, 1992; Kelley, Ferrell, & Skinner, 1990;

Swaidan, Vitell, & Rawwas, 2003). As Keller et al. (2007) stated, “At a minimum, additional education potentially exposes students to more lectures and readings on ethical issues” (p. 305).

As with work experiences, a potential of parallels with age and education level exist. In general, those with advanced degrees are older and therefore more ethical. However, Thoma and Davison (1983) conducted a study on the development of moral reasoning and graduate education levels. While controlling for age and sex, the researchers determined that education level had no effect on a person’s morality (Thoma & Davison, 1983). In addition, they found that age and education level did not significantly interact with one another.

Rest and Thoma (1985) conducted a longitudinal study regarding the development of moral judgment and formal education. This study began with 198 students grouped into three groups: (a) those in junior high school, (b) those who were beginning high school, and (c) seniors in high school. Every two years, the student subjects that responded to the previous questionnaire cycles were asked to continue with a new questionnaire (Rest & Thoma, 1985). After six years, 39 subjects completed the study (Rest & Thoma, 1985). Those students who continued their education and who entered the high-education group showed increased moral judgment as opposed to those students who entered the low-education group. Rest and Thoma concluded that higher education significantly increased the predictability of moral judgment. In another longitudinal study, Colby, Kohlberg, Gibbs, and Lieberman (1983) studied the moral judgment development of 58 boys ranging between the ages of 10 and 16 during a 20-year period.

The researchers also found that years of formal education directly correlated with moral judgment (Colby, Kohlberg, Gibbs, & Lieberman, 1983).

Wimalasiri et al. (1996) conducted a study of moral judgment regarding business managers and business students. The researchers found a positive correlation of moral judgment development and education level (Wimalasiri et al., 1996). As education level increased, so did moral judgment. Browning and Zabriskie (1983) questioned the ethical behavior of industrial buyers. The researchers found that those buyers of a younger age who had higher education levels also had a higher ethical viewpoint (Browning & Zabriskie, 1983). Along the same lines, Deshpande (1997) conducted a study of the ethical conduct of business managers. Managers who had a Ph.D. or master's degree were more ethical and viewed the padding of expense accounts as unethical. Swaidan et al. (2003) also found a direct positive relationship between the level of education and ethical activities. The researchers determined that older, more educated African Americans were more ethical than those who were younger or lesser educated. Goolsby and Hunt (1992) explored the moral reasoning process individuals in marketing used to make ethical judgments and found that education level is significantly related to moral reasoning. Those marketing professionals with graduate degrees scored higher on cognitive moral development tests than those without.

However, not all researchers have confirmed that higher education levels increase ethical behavior. When looking at the ethical behavior of marketing researchers, Kelley et al. (1990) found marketing researchers with graduate degrees were rated less ethical than marketing researchers without a college degree. In fact, those without a degree were rated the most ethical of all the education levels explored. In their study of the ethical

decisions of accountants, Nikoomaram et al. (2013) found a significant negative correlation between education level and ethical decision-making. The researchers determined, with a 95% confidence rate, that ethical judgments decreased as education level increased (Nikoomaram, Roodposhti, Ashlagh, Lotfi, & Taghipourian, 2013). Those with a Ph.D. were the least ethical and those with a bachelor's degree were the most ethical.

Numerous researchers have failed to find a relationship between education and morality and ethics. Contrary to the findings of Rest and Thomas (1985), Ede et al. (2000) studied the ethics of small minority businesses. The researchers found no significant relationship between education and business ethics. Motlagh et al. (2013a) found similar results in their study pertaining to journalists' ethics. No difference existed in the ethical decision-making of journalists based on education level. Dubinsky and Ingram (1984) studied the ethical beliefs and behaviors of salespeople and found that no relationship existed between the level of education and the ethics of salespeople. Serwinek (1992) examined the predictors of age and education on the ethical behaviors of employees of small businesses. Serwinek confirmed that no difference in ethical behaviors attributed to educational levels existed.

Standardized Competency Exam

No research exists regarding a standardized competency exam and how it can be used to predict or influence an integrity test. The role of a standardized competency exam is to determine if a person is capable of performing certain tasks for employment. An example would be if a person is capable and competent to perform statistical equations for employment as a statistician. As long as the competency exam is validated

and related directly to the competencies required for the position, it may be used as a tool in pre-employment. However, the exam must be given to all applicants considered for the position, and it cannot show or have demonstrated bias toward any one group of individuals. No research exists to determine whether competency tests can be used to predict aspects of integrity.

Qualifications, Suitability, and Security Clearance Eligibility

An applicant seeking employment with the federal government and government contractors must meet several legal requirements prior to receiving an official offer of employment. The applicants must first meet the basic qualifications for the position. Once the applicant is determined to be qualified, he or she must meet suitability requirements. Finally, if the position requires a security clearance, the applicant must meet the eligibility requirements for the appropriate level of security clearance. Once the applicant is vetted through all of these steps, an official job offer can be made.

Not all positions within the federal government require a security clearance. If this is the case, as long as the applicant is deemed qualified and suitable, he or she can receive an official job offer. However, if a security clearance is required for a position, the applicant must also meet the security clearance eligibility requirements. It is not uncommon for an applicant to be deemed qualified and suitable for work within the federal government but not be eligible for a security clearance. If this occurs, then the person is disqualified from the process and is not eligible for the position.

Qualifications

In accordance with the U.S. Office of Personnel Management (OPM), all federal government agencies and organizations must publish vacancy announcements for each

position for which they are looking to hire someone (5 CFR § 330.104). Each vacancy announcement must include the general and specialized experience as well as any education requirements for the position listed in each announcement. These requirements are the minimum qualification standards to determine those applicants who are more likely to successfully perform the job functions and screen out those who would not (U.S. Office of Personnel Management [OPM], n.d.a.).

Qualification standards assist the hiring authority to determine if an applicant is likely to perform the required functions in a satisfactory manner for a specific position or occupational series (OPM, n.d.a.). Qualification determinations can include the applicant's work experience, education, knowledge, skills, and abilities. Some qualifications may also require more specific educational, licensure, or certification requirements that apply only to specific positions in an occupational series (OPM, n.d.a.). Qualifications standards often get confused with suitability requirements. "Suitability involves an assessment of past and present conduct. The assessment is intended to establish a reasonable expectation that the individual will protect the integrity or promote the efficiency of the agency" (U.S. Department of Homeland Security [DHS], 2009b, pp. 4–5).

Suitability

To ensure the interest of public trust and safety, the federal government maintains the requirement of high standards of integrity for many employment positions (OPM, n.d.b). The DHS (2009a) stated the following:

Pursuant to the authority delegated by the President of the United States by law, 5 C.F.R. § 731; 5 U.S.C. §1104 and 5 U.S.C. § 3301, and by Executive Order

10577, individuals seeking admission to the civil service must undergo an investigation to establish their suitability for employment. Suitability adjudication, denial, and due process procedures are conducted in accordance with 5 C.F.R. § 731. (p. 8)

Suitability determinations are based on the character or conduct of a person, which could affect the integrity or efficiency of the position or agency (Suitability, 2015). The OPM (n.d.b.) stated the following:

Suitability refers to identifiable character traits and conduct sufficient to decide whether an individual is likely to carry out the duties of the Federal job with appropriate integrity, efficiency, and effectiveness. Suitability is distinguishable from a person's ability to fulfill the qualification requirements of a job, as measured by experience, education, knowledge, and skills. (p. 1)

According to Suitability (2015) in the Code of Federal Regulations, "There are criteria for making suitability determinations and applicants can be denied a Federal Government employment if they do not meet the standards of the criteria" (5 C.F.R. § 731.202). Additionally, as stated in 5 C.F.R. § 731.202 (Suitability, 2015) and further quoted in DHS (2009a), the criteria are as follows:

Misconduct or negligence in employment; Criminal or dishonest conduct; Material, intentional false statement or deception or fraud in examination or appointment; Refusal to furnish testimony as required by 5 C.F.R. § 5.4; Alcohol abuse, without evidence of substantial rehabilitation, or a nature and duration that suggests that the applicant or appointee would be prevented from performing the duties of the position in question, or would constitute a direct threat to the

property or safety of others; Illegal use of narcotics, drugs, or other controlled substances, without evidence of substantial rehabilitation; Knowing and willful engagement in acts or activities designed to overthrow the U.S. Government by force; Any statutory or regulatory bar which prevents the lawful employment of the person involved in the position in question. (p. 10)

The federal government will consider all of the above suitability criteria per applicant and determine whether or not the applicant is likely to perform the position duties appropriately with honesty and integrity (DHS, 2009a). Per Suitability (2015) in the Code of Federal Regulations, the following apply:

A suitability action may be taken against an applicant or an appointee when OPM or an agency exercises delegated authority under this part finds that the applicant or appointee is unsuitable for the reasons cited in § 731.202, subject to the agency limitations of § 731.103(g). (5 C.F.R. § 731.203(c))

Additional factors may be used when determining suitability, such as (a) the nature of the position the person is applying for or employed under; (b) the seriousness, timeframe, and circumstances surrounding any questionable conduct; and (c) the age of the applicant when the questionable conduct took place, and whether any contributing societal conditions existed with the conduct. Last, consideration may be given if there appears to be rehabilitation or efforts made to rehabilitate (DHS, 2009a; Suitability, 2015). However, disqualification is not automatic if any of the above criteria are met. The agency has discretion in determining if an applicant has made reasonable or successful efforts for rehabilitation and is therefore worthy of trust and integrity (Holst, 2014; Suitability, 2015).

Finance and credit checks, as well as checks on the applicant's name, fingerprints, address, education, and employment, are all preliminary steps to determine suitability. These checks provide a cursory perspective regarding whether the job applicant can work for the federal government without compromising national security or public trust (DHS, 2009b).

Then, a thorough background investigation is conducted on the job applicant to determine if the information provided is true and accurate. The background investigation is one of the major phases of the hiring process used to determine qualification. Depending on the security level of the position the applicant is seeking, the background will span a specified period of the applicant's life. Further interviews and the possible administration of a polygraph exam will also be considered to determine if the applicant is an acceptable risk. Federal hiring officials, such as security clearance adjudicators, will then make a determination whether any conduct or action is incompatible with the core duties of a position (DHS, 2009b; National Security Positions, 2015).

As previously stated, employment qualifications are often confused with suitability requirements. Suitability requirements and determinations are also further confused with security clearance determinations. Security clearance determinations indicate an applicant's eligibility for access to classified information. An applicant can be either eligible or not eligible to access classified material (DHS, 2009a). In addition, when making a suitability determination, the hiring manager takes into consideration an applicant's past and present personal conduct. A security clearance determination is much broader and looks at an applicant's associations, relatives, travel, and influences from foreign contacts (Executive Order No. 10450, 1953; Executive Order No. 12968,

1995; National Security Positions, 2015; OPM, n.d.b). Therefore, an applicant with a positive suitability determination is not necessarily entitled access to classified information (Executive Order No. 12968, 1995). These two determinations are separate and distinct from one another.

Security Clearance Eligibility

Once a favorable suitability determination is made and the applicant's employment requires a security clearance, the applicant can then enter the investigative process to determine eligibility of a security clearance. Generally, only U.S. citizens are eligible to be considered for a security clearance (Executive Order No. 12968, 1995). "A security clearance is a determination that a person is able and willing to safeguard classified national security information" (DHS, 2009a, p. 20). According to the DHS (2009a), "Classified information has been determined to require protection against unauthorized disclosure. Such information is marked to indicate its classified status when in documentary form" (Executive Order No. 12958, 1995, Part 1, Section 1.1[c]).

Once the suitability determination is decided, the security clearances determination occurs. The security clearance determination "addresses risk to national security based on concerns that may be unrelated to the individual's character and conduct" (OPM, 2008, p. 9). The adjudicative guidelines for determining eligibility for access to classified information are determined by 32 C.F.R. § 147 (Adjudicative Guidelines, 2015). As such, concern pertaining to access to classified material may derive from individuals that an applicant resides or associate with, relatives, or through foreign contacts. In addition, issues, such as a criminal history, emotional, mental, or personality disorders, drug and alcohol usage, sexual behavior, financial misconduct,

non-loyal actions against the United States, or poor judgment or discretion can all be used to determine if an applicant is worthy of being issued a security clearance (Adjudicative Guidelines, 2015; OPM, 2008). All of these actions and character traits help to determine if the applicant is worthy of being trusted, is confident, reliable, and not subject to influences of coercion or exploitation.

Only the federal government can grant a security clearance as directed by various executive orders as well as Department of Defense Personnel Security Program Regulations, (2015). “Executive Order 10450 required agency heads to establish effective security programs and set minimum background investigation requirements for federal employment based on risk designation” (DHS, 2009b, p.8). In addition, a “security clearance is a privilege granted by the Federal Government, and it can be revoked at any time if unfavorable information about the employee is discovered” (DHS, 2009b, p. 7). No one is entitled to be granted a security clearance. Furthermore, if an individual is deemed ineligible for a security clearance and is therefore denied employment, the individual cannot sue. The granting of a security clearance is the sole domain of the Executive Branch of the federal government and cannot be ordered by any court of law (Newman, 2008). Executive Order No. 12968 (1995) requires each agency to have an appeals process. Each agency has its own version of a Personal Security Appeals Board. Applicants are able to appeal a negative determination through the agency that denied the security clearance for further consideration (DHS, 2009b).

“Executive Order 12958 ensured that certain information related to national interest is maintained through a classification system” (DHS, 2009b, p. 8). Three levels of security clearance exist: confidential, secret, and top-secret. Executive Order No.

12958 (1995) defined these levels, later updated by Executive Order No. 13526 (2009).

The following presents the definitions of Executive Order No. 13526 (2009), as published in DHS (2009a).

Confidential information means the unauthorized disclosure of which could reasonably be expected to cause damage to the National Security of the United States.

Secret information means the unauthorized disclosure of which could reasonably be expected to cause serious damage to the National Security of the United States.

Top Secret information means the unauthorized disclosure of which could reasonably be expected to cause exceptionally grave damage to the National Security of the United States. (pp. B2–B8)

Even within the Top Secret level, there are sublevels: Sensitive compartmented information and special access programs (Executive Order No. 12958, 1995).

In addition to the three levels of security clearance, two types of risk or sensitivity designations to all of federal government positions exist: public trust and national security (DHS, 2009b). Public trust positions pertain to policymaking, law enforcement duties, public safety or health, or control of financial records, or possess a significant risk of causing damage or personal gain (National Security Positions, 2015). National security positions involve sensitive activities of the government and require employees' use of and access to classified information that could affect national security (National Security Positions, 2015). National security positions have an elevated risk when compared to that of public trust positions.

Depending on the levels of security clearance a position requires, a background

investigation on the applicant may be required (DHS, 2009b; Executive Order No.10450, 1953; OPM, 2008). The agency, usually the human resource or security management department, designates the risk or sensitivity level and potential level of security clearance, if any, required for each position within the federal government (Suitability, 2015). In addition, each position description has a written statement of the major duties, responsibilities, and supervisory relationships of the position (OPM, n.d.a). As the level a security clearance escalates from confidential to top secret, so do the legal requirements for a background investigation (DHS, 2009b, p. 2). At the conclusion of the process, the individual must meet all of the national security character standards and be deemed trustworthy (Executive Order No. 12968, 1995).

Access to any information classified at three levels is severely restricted to those employees who require the information and have a “need to know.” Once an individual has completed all of the phases within an agency’s hiring process and has obtained a positive suitability determination and a position securing clearance determination that is commensurate with the level of access required for the position, he or she can be hired and granted a security clearance (DHS, 2009a; OPM, 2008).

The Office of the Director of National Intelligence (ODNI; 2013), which coordinates U.S. intelligence, also tracks security clearance. According to the ODNI 2012 Report on Security Clearance, approximately 4.9 million individuals held some level of security clearances as of October 2012. Specifically, this number included 3,507,782 individuals at secret or confidential security levels and 1,409,969 at the top-secret security level (Office of the Director of National Intelligence [ODNI], 2013). In addition, the report indicates that it took 73 to 454 days for various agencies to make top-

secret security clearance determinations and 73 to 454 days to make secret or confidential security clearance determinations (ODNI, 2013)

However, the OPM has the statutory authority of all federal hiring and personnel security programs. The OPM (n.d.d.) stated the following:

OPM oversees all policy created to support Federal human resources departments — from classification and qualifications systems to hiring authorities and from performance management to pay, leave, and benefits. Along with making those policies, we are responsible for ensuring they are properly implemented and continue to be correctly carried out. (par. 5)

Conclusion

This literature review provided a framework of the application process for government and law enforcement positions, or that of other positions of public trust and national security. These positions require a lengthy and detailed screening process to ensure the best applicant is selected for employment. This pre-employment screening process is costly to the employer and is labor intensive. An abundance of research exists on each stage of the pre-employment applicant screening process as well as the need for a screening process altogether. In addition, current and historical research exists on the influences of age, work experience, and education level regarding honesty and integrity aspects of moral or ethical judgments. However, a lack of research literature, if any, exists pertaining to the influence of these variables on a pre-employment polygraph exam. No research exists regarding scores of a standardized pre-employment competency exam as a variable. Given that the ultimate purpose of a polygraph exam is to determine honesty and integrity, any research that predicts who may successfully pass

a polygraph exam is highly valuable. If applicants can positively navigate the hiring process from beginning to completion, resulting in the selection and hiring of those applicants, then predicting this designation earlier in the process would result in a significant financial gain. Subsequently, employers who require high levels of public trust and integrity may be able to adjust hiring requirements or qualifications or prioritize applicants who have been proven more likely to successfully complete the screening process. Ultimately, the goal for employers is to reduce the pool of applicants into a more qualified group and thus process a smaller quantity of applicants that will result in a greater larger yield of selections and hires.

CHAPTER III

METHODOLOGY

The researcher conducted this quantitative research study to explore the influence of age, work experience, education level, and competency-based standardized entrance exam scores on whether a job applicant will pass a pre-employment polygraph exam. While demand for qualified law enforcement applicants has increased significantly, the pool of participants qualified for these positions has diminished (Wilson et al., 2010). In order to address this developing issue, government and law enforcement employers need to understand how their hiring procedures affect employment outcomes. The polygraph is one hiring procedure commonly used in the government and law enforcement field (Adler, 2002; Handler, 2009). While there has been some research exploring non-physiological variable influences on integrity-type tests (Blonigen et al., 2011; Fine, 2013; Murphy, 1993; Sackett & DeVore, 2001), there is a lack of research on non-physiological variable influences on the polygraph test.

As such, the researcher explored possible influences on pre-employment polygraph exams. This study will contribute to the existing literature on integrity tests, which in turn will provide researchers and Human Resource policy makers with additional data. These individuals may potentially use these data to streamline hiring processes for specialized law enforcement, security, and government positions.

This chapter outlines the research design and methodology followed. First, the overall research design is justified. Next, the independent and dependent variables are described as well as the participants and data collection procedures. Instrumentation is then defined, followed by a description of the data analysis procedures.

Research Design

The design employed in this study was quantitative, non-experimental, and predictive-correlational. A non-experimental design was appropriate to use, as the hallmarks of a true experimental study—a control group and a treatment group—were not utilized (Cramer, 1998). As this study sought to explore the predictive relationship between an applicant’s demographic factors and standardized competency exam scores on the outcome of a pre-employment polygraph examination, the predictive-correlational design was also appropriate (Craighead & Nemeroff, 2001). A binary logistic regression, a discriminant analysis, and a multiple linear regression was utilized to analyze the relationship between the predictor variables of age, work experience, education level, and scores on a standardized competency-based entrance exam and the dependent variable of polygraph outcome. These variables comprised archival data obtained from an employment organization that concentrates on national security and public safety.

Dependent/Outcome Variable

Polygraph Outcome

This is a dichotomous variable that corresponds to the outcome of a pre-employment polygraph examination. The applicant is either continued in the hiring process after the polygraph exam or is discontinued in the hiring process after the polygraph examination. The polygraph outcomes were coded “0” for “was not continued in the hiring process,” and “1” for “continued in the hiring process.”

Independent/Predictor Variables

Age

This was a continuous variable that ranged from 21 to 40 years of age.

Work Experience

This was a categorical variable corresponding to applicants' previous law enforcement/military experience. In order to be used in the regression, dummy coding was necessary. The category of "no law enforcement or military experience" was the reference category across all dummy codes. This resulted in three dummy variables, which consisted of law enforcement experience (coded "0" for other than law enforcement experience and "1" for law enforcement experience); military experience (coded "0" for other than military experience and "1" for military experience); and both law enforcement and military experience (coded "0" for other than both and "1" for both law enforcement and military experience).

Education Level

This was a categorical variable detailing applicants' highest level of education, ranging from no college to post graduate education. Four dummy variables were created. The category of "some college" was considered the reference variable across all dummy codes. These variables consisted of no college (coded "0" for other than no college and "1" for no college); bachelor's degree (coded "0" for other than B.A./B.S. degree and "1" for B.A./B.S. degree); master's degree (coded "0" for other than master's degree and "1" for master's degree); and law degree (coded "0" for other than law degree and "1" for law degree).

Standardized Pre-employment Competency Exam Scores

This was a continuous scale variable obtained from the applicants' competency exam performance. The scores ranged on a scale from 0 – 100, with a minimum passing

score of 70. All applicants with a passing score were continued in the applicant hiring process.

Participants and Data Collection

The population consisted of all 2015 and 2016 applicants to the organization who were administered a pre-employment polygraph examination. All applicants to this organization must meet minimum requirements for employment as required by the organization; accordingly, this population was composed only of individuals who are U.S. citizens between the ages of 21 and 40 years of age with a high school or equivalent diploma. All applicants must meet the threshold required to achieve top-secret security clearance at the time of employment as stated in 5 C.F.R. § 732 (National Security Positions, 2015).

The organization's hiring process begins with determining whether the applicant meets these minimum requirements. Next, they undergo a panel interview, followed by a competency exam and then a physical abilities test. Applicants must then provide a detailed life history, undergo a security interview, and pass a physical and medical screening. A polygraph exam then determines the veracity of the information the applicant has provided thus far. The results of this exam also determine whether or not the applicant is continued in the hiring process. If the applicant is continued, then a thorough background check is performed and a final hiring panel decides whether the applicant is hired or not.

A medium effect size is appropriate to expect when there is no indication in the literature of what effect size to expect (Cohen, 1992). With an alpha of $\alpha = .05$, a generally accepted power level of .80, and a medium effect size, an appropriate sample

size for a logistic regression is 300 participants (Hseih, Block, & Larson, 1998). After dividing the obtained archival data into two categories (those who were continued or not continued in the hiring process after the pre-employment polygraph exam), systemic sequential random sampling was utilized to acquire 150 participants from each category. This archival data were provided by the Human Resources department of the organization, who de-identified the data before releasing them to the researcher. As such, participant anonymity was maintained throughout the process. All data were entered into IBM Statistical Package for the Social Sciences (SPSS) for analysis. These data were kept on the researcher's secure, password-protected and encrypted work computer and an encrypted thumb drive; these data will be kept for a minimum of three years before they are securely deleted from the computer and thumb drive.

Instrumentation

As this study utilized archival data, there were no instruments directly used by the researcher to measure the independent and dependent variables. Instrumentation for this study consisted of the organization's pre-employment competency exam and the pre-employment polygraph examination.

Standardized Pre-employment Competency Exam

This exam consists of multiple choice questions pertaining to logic, language usage, observation details, and decision-making. This is a private, proprietary exam which has not been published. Consequently, no direct validity or reliability information can be reported. However, the organization, in conjunction with a third party non-biased vendor, ensured the validity and legal defensibility of the standardized pre-employment competency examination. The organization followed principles set forth by the Society

for Industrial and Organizational Psychology for proper validation and use of employee selection procedures (Society for Industrial and Organizational Psychology, 2003).

Additionally, the organization followed the Uniform Guidelines on Employee Selection Procedures (1978), as required by the Office of Personnel Management (OPM), Department of Labor, and the Equal Employment Opportunity Commission (EEOC) regulations (EEO, 1978).

Polygraph Exam

The pre-employment polygraph exam is administered to determine the veracity of all documentation and statements the applicant has provided. This examination is in compliance with all OPM and EEO regulations as required by law under the Polygraph Protection Act, 2015.

Data Analysis

The archival data were entered into SPSS for analysis. Prior to analysis, the data were assessed for outliers. Standardized scores were created for all scale data; any scores falling beyond ± 3.29 standard deviations from the mean were considered outliers (Tabachnick & Fidell, 2014), which were removed. The dataset was also assessed for missing data; cases with considerable amounts of missing data (>50%) were removed. Descriptive statistics were then conducted. Means and standard deviations for all continuous demographic variables and frequencies and percentages for all categorical demographic variables were calculated.

Research Questions

Research Question 1

What influence, if any, does an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam have on the probability of their being continued in the hiring process after a pre-employment polygraph exam?

To address this research question, a binary logistic regression was conducted. The binary logistic regression is appropriate to utilize when the researcher seeks to explore the relationship between a set of predictor or independent variables and a dichotomous dependent variable (Stevens, 2009). These independent variables can be continuous or categorical or a combination of continuous and categorical. Due to the nonparametric nature of this test, the logistic regression does not require the same stringent assumption testing as its parametric equivalent, the linear regression (Tabachnick & Fidell, 2014).

For this particular analysis, the independent or predictor variables were age, work experience, education level, and competency exam score. The dependent variable was polygraph outcome. As indicated by Tabachnick & Fidell (2014), the overall model was evaluated using the χ^2 coefficient; if this was significant, the overall model could be said to significantly predict the participants' outcomes. If the overall model was significant, the Nagelkerke R^2 was used to determine the percentage of variance accounted for by the predictor variables (Tabachnick & Fidell, 2014). The individual predictors were then examined; the exponentiated regression coefficients (Exp (β)) were used to determine how each predictor variable contributed to the prediction of participants' polygraph outcomes (Tabachnick & Fidell, 2014).

Research Question 2

What combination of an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam best discriminates candidates who pass or do not pass the pre-employment polygraph examination?

In order to examine the same problem from a different perspective, this research question was reiterated and examined using a different analysis. A discriminant analysis was utilized to assess whether the predictor variables of age, work experience, education level, and pre-employment competency exam score can be used to classify placement into the grouping variable of being continued in the hiring process.

Discriminant analysis is used in order to assess whether a set of one or more continuous or dichotomous variables can be used to predict or classify observations into two or more groups (Tabachnick & Fidell, 2014). Prior to the analysis, the assumptions of discriminant analysis was examined, including normality, homogeneity of variance and covariance, and absence of multicollinearity. Normality was assessed using a Kolmogorov-Smirnov (KS) test. According to Tabachnick & Fidell (2014), if the KS test is not significant, normality can be assumed. Homogeneity of variance was assessed with Levene's test, and the multivariate equivalent—homogeneity of covariance—was assessed using Box's M test; similarly to the KS test, no significance indicated that the assumptions were met (Tabachnick & Fidell, 2014). In order to check for issues of multicollinearity, multiple linear regression was utilized. The standard method of entry was used for the discriminant analysis, so that all variables were entered into the model at the same time. This analysis used the F statistic; if the F test was significant, the model

could be said to be able to distinguish between groups (continued vs. not continued in the hiring process) based on the combination of predictors (Tabachnick & Fidell, 2014).

Research Question 3

What is the influence, if any, of an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam on his or her pre-employment polygraph examination results?

In order to ascertain any further possible relationship, a multiple linear regression was utilized to assess whether the predictor variables of age, work experience, education level, and pre-employment competency exam score can be used to predict whether an applicant is continued in the hiring process after the pre-employment polygraph examination. Most commonly, multiple linear regressions are only used to predict continuous dependent variables. However, several researchers such as Cohen and Cohen (1975), Pedhazier (1982), and Tatsuoka (2015) have indicated that using a multiple linear regression to determine a dichotomous dependent variable does not unduly affect the results, concluding that it is mathematically similar to performing a logistic regression and thus a valid analysis to use (as cited in Bauer, 2015). Ash (2008) and Thayer (1986) further support the use of a multiple linear regression to determine a dichotomous dependent variable.

Prior to the analysis, the assumptions of the multiple linear regression were examined, including normality, homoscedasticity, and absence of multicollinearity. Normality was assessed using a Normal P-P plot. According to Stevens (2009), if the data closely follows the diagonal normality line, the assumption is met. Homoscedasticity was assessed using a scatterplot of the residuals. If the data appear

approximately evenly distributed, with no apparent cone-shaped pattern, then homoscedasticity can be assumed (Stevens, 2009). In order to check for issues of multicollinearity, VIF values were reported; VIF values below 10 indicate that absence of multicollinearity can be assumed (Stevens, 2009).

As indicated by Tabachnick & Fidell (2014), the overall model was evaluated using the *F* statistic; if this is significant, the overall, combined model can be said to significantly predict the participants' outcomes. If the overall model was significant, the R^2 coefficient was used to determine the percentage of variance accounted for by the predictor variables (Tabachnick & Fidell, 2014). The individual predictors were then examined; the regression coefficients were used to determine if and how each predictor variable contributed to the model (Tabachnick & Fidell, 2014).

Summary

This chapter detailed the research design and methodology that were utilized in this study. De-identified archival data were obtained from a paramilitary organization detailing the demographic and exam score information of applicants to that organization. A binary logistic regression, discriminant analysis, and multiple linear regression were performed in order to determine the possible predictive effect of age, work experience, education level, and competency exam scores on the outcome of a polygraph exam. The next chapter details the results of these data analysis procedures.

CHAPTER IV

ANALYSIS OF THE DATA

The pre-employment screening processes involve considerable time, effort, and financial resources for government and law enforcement organizations. In an effort to extract the most qualified and trustworthy applicants, many of these organizations have incorporated pre-employment polygraph examinations as part of the applicant screening process. Additional research is needed on whether non-physiological characteristics can influence the results of a pre-employment polygraph exam. As such, the purpose of this study was to determine if age, work experience, education level, and the score on a standardized pre-employment competency exam are significantly related to the outcome of a pre-employment polygraph examination.

Organization of the Chapter

This chapter describes the results of the analyses introduced in Chapter III. First, the pre-analysis data cleaning procedures are described. Next, a description of the participant sample is provided. Following this are the results of the main analyses performed in order to answer each of the research questions. Finally, a brief chapter summary is provided.

Pre-Analysis Data Cleaning

The original sample consisted of 300 participants. Proportional, sequential random sampling was used to acquire this sample from de-identified archival data obtained from the Human Resources Department of a paramilitary organization. This dataset was assessed for significant missing cases, which were defined as missing >50% of data. There were no significant missing cases found. The dataset was also assessed

for outliers, which were defined as scores with standardized values that were beyond ± 3.29 standard deviations from the mean (Tabachnick & Fidell, 2014). There was one extremely low outlier, which was removed. As such, the total sample size used was 299.

Descriptive Statistics

The mean applicant age was 30.15 ($SD = 4.01$). For work experience, most applicants either had law enforcement experience (32.8%) or did not have military or law enforcement experience (32.4%). There were slightly fewer applicants that had only military experience (20.4%), and 14.4% of the sample had both law enforcement and military experience. The education level of the majority of applicants (57.9%) was at the bachelor's degree level. The second largest concentration of applicants had a master's degree (29.4%), while 5.4% possessed a law degree, 5.7% had some college, and 1.7% had no college at all. The scores on a standardized pre-employment competency exam ranged from 64.17 to 90.37, with a mean of 77.81 ($SD = 5.13$). There were 150 participants (50.2%) who were continued in the hiring process after the polygraph exam. Table 1 presents all means and standard deviations for each of the variables in the analysis, and Table 2 presents all frequencies and percentages.

Table 1

Means and Standard Deviations of Continuous Variables

| Variable | Min | Max | <i>M</i> | <i>SD</i> |
|-----------------|-------|-------|----------|-----------|
| Age | 23.00 | 40.00 | 30.15 | 4.01 |
| Competency Exam | 64.17 | 90.37 | 77.81 | 5.13 |

Table 2

Frequencies and Percentages of Categorical Variables

| Variable | <i>n</i> | % |
|---------------------------------|----------|------|
| Work | | |
| No Law Enforcement or Military | 97 | 32.4 |
| Law Enforcement | 98 | 32.8 |
| Military | 61 | 20.4 |
| Both Law Enforcement & Military | 43 | 14.4 |
| Education | | |
| No College | 5 | 1.7 |
| Some College | 17 | 5.7 |
| B.A./B.S. Degree | 173 | 57.9 |
| Master's Degree | 88 | 29.4 |
| Law Degree | 16 | 5.4 |
| Polygraph | | |
| Not Continued in Hiring Process | 149 | 49.8 |
| Continued in Hiring Process | 150 | 50.2 |

Prior to any analysis, the categorical data were dummy coded in order to be used in the analyses. Polygraph outcomes were coded “0” for was not continued in the hiring process, and “1” for continued in the hiring process. Work experience was coded into three dummy variables, which consisted of law enforcement experience (coded “0” for other than law enforcement experience and “1” for law enforcement experience); military experience (coded “0” for other than military experience and “1” for military experience); and both law enforcement and military experience (coded “0” for other than both and “1” for both law enforcement and military experience). Education was recoded into four dummy variables. These variables consisted of no college (coded “0” for other than no college and “1” for no college); bachelor’s degree (coded “0” for other than B.A./B.S. degree and “1” for B.A./B.S. degree); master’s degree (coded “0” for other than master’s

degree and “1” for master’s degree); and law degree (coded “0” for other than law degree and “1” for law degree). See Table 3 for a breakdown of the coding of these variables.

Table 3

Dummy Coding of Predictor Variables

| Variable | Type/Level of Measure | Dummy Coding |
|--|-----------------------|---|
| Age | Continuous | N/A |
| Work Experience (Ref: No Law Enforcement or Military) | Categorical/Nominal | |
| Law Enforcement | | Other than LE = 0 LE = 1 |
| Military | | Other than Mil = 0 Mil = 1 |
| Law Enforcement & Military | | Other than LE & Mil = 0 LE & Mil = 1 |
| Education (Ref: Some College) | Categorical/Ordinal | |
| No College | | Other than No College = 0 No College = 1 |
| B.A./B.S. Degree | | Other than B.A./B.S. = 0 B.A./B.S. = 1 |
| Master's Degree | | Other than MA = 0 MA = 1 |
| Law Degree | | Other than Law = 0 Law = 1 |
| Competency Exam | Continuous | N/A |
| Polygraph Outcome | Categorical/Nominal | Not Continued = 0 Continued = 1 |

Results

Research Question 1

What influence, if any, does an applicant’s age, work experience, education level, and score on a standardized pre-employment competency exam have on the probability of their being continued in the hiring process after a pre-employment polygraph exam?

This research question was addressed using a binary logistic regression. In this analysis, the dependent variable was polygraph outcome, coded as *continued in the hiring*

process and *not continued in the hiring process*, with *not continued* as the referent category. The independent predictor variables were age, work experience, exam scores, and education level. Dummy coding was performed as described in Chapter III. Prior to the analysis, any issues of multicollinearity were assessed using variance inflation factors (VIFs). VIF scores above 10 indicate that there is problematic multicollinearity amongst the predictor variables (Stevens, 2009). Dummy coding for education introduced issues of multicollinearity due to the small group size in the referent category. After changing the referent category to *some college*, which had a larger group size, there were no VIF scores above 10 (see Table 4), indicating that absence of multicollinearity can be assumed.

The results of the overall binary logistic regression model were significant, $\chi^2(9) = 27.25, p = .001$. This indicates that collectively, the predictors significantly predict group membership in the dependent variable. The Hosmer and Lemeshow test was not significant ($p = .702$), indicating acceptable fit of the model (Tabachnick & Fidell, 2014). The Nagelkerke R^2 , which can range up to one and indicates the proportion of variance accounted for by the model, was 0.117 and the Cox & Snell R^2 was .087. These measures indicate that between 8.7% and 11.7% of the variance in the outcome can be accounted for by the model. As the overall model was significant, the individual predictors were examined.

Age was not an individually significant predictor, $p = .966$. As for work experience, one of the four variables was significant. Neither having law enforcement experience, $p = .945$, or having military experience, $p = .756$ were individually significant predictors. However, having both military and law enforcement experience

was a significant predictor, $B = -0.83$, $p = .050$, $\text{Exp}(B) = 0.44$. This is a negative association, indicating that those who have both law enforcement and military experience have 0.44 times the odds (i.e., lesser odds) of being continued in the hiring process when compared to those that have no military and law enforcement experience. They are 56% less likely to be continued in the process.

A significant predictor was also found under education level. Not having any college education, $p = .071$; possessing a bachelor's degree, $p = .052$, or the possession of a law degree, $p = .740$ were not individually significant predictors. It should be noted that possessing a bachelor's degree approached significance at $p = .052$. Possessing a master's degree was a significant predictor, $B = 1.31$, $p = .043$, $\text{Exp}(B) = 3.69$. This suggests that those that hold a master's degree were 3.69 times more likely to be continued in the hiring process after the pre-employment polygraph examination than those that only had some college. Those candidates that possessed an M.A. were 269% more likely to be continued in the process.

The score on a standardized pre-employment competency exam was an individually significant predictor, $B = 0.09$, $p < .001$, $\text{Exp}(B) = 1.09$. This was a positive association, indicating that for every one unit increase in competency exam score, the odds of being continued in the hiring process after the administration of a pre-employment polygraph increase by a factor of 1.09. This indicates that for every one unit increased on the competency exam the likelihood of a candidate being continued in the process was improved by 9%. As some demographic factors were able to be used to predict the outcome of a pre-employment polygraph exam, the null hypothesis was rejected. Table 4 presents the full results of this analysis.

Table 4

Results of the Binary Logistic Regression

| Variable | B | S.E. | Wald | <i>p</i> | Exp(B) | VIF |
|---|-------|------|------|----------|--------|------|
| Age | 0 | 0.03 | 0 | 0.966 | 1.00 | 1.20 |
| Work Experience (Ref: No Law Enforcement or Military) | | | | | | |
| Law Enforcement | 0.02 | 0.33 | 0.01 | 0.945 | 1.02 | 1.68 |
| Military | -0.11 | 0.37 | 0.10 | 0.756 | 0.89 | 1.51 |
| Law Enforcement & Military | -0.83 | 0.42 | 3.83 | 0.050 | 0.44 | 1.47 |
| Education (Ref: Some College) | | | | | | |
| No College | 2.02 | 1.12 | 3.27 | 0.071 | 7.54 | 1.31 |
| B.A./B.S. Degree | 1.19 | 0.62 | 3.77 | 0.052 | 3.30 | 4.81 |
| Master's Degree | 1.31 | 0.65 | 4.08 | 0.043 | 3.69 | 4.61 |
| Law Degree | 0.28 | 0.86 | 0.11 | 0.740 | 1.33 | 2.14 |
| Competency Exam | 0.09 | 0.03 | 11.7 | 0.001 | 1.09 | 1.05 |

Research Question 2

What combination of an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam best discriminates candidates who pass or do not pass the pre-employment polygraph examination?

This research question was conceived and included in order to conduct an additional analysis to describe the relationship from a different perspective. Thus, a discriminant analysis was performed. Prior to the analysis, the assumptions of normality, homogeneity of variance, homogeneity of covariance, and absence of multicollinearity were tested. Absence of multicollinearity had already been established for this set of predictors (see Table 4). For the normality assumption, the continuous variables were assessed using a Kolmogorov-Smirnov (KS) test. The KS test was significant for both age ($p < .001$) and exam score ($p < .001$). This indicates that normality cannot be assumed. Levene's test was significant ($p < .001$) for all variables except for exam score ($p = .610$) and age ($p = .267$), indicating that homogeneity of variances cannot be

assumed. Box's M test was significant ($p < .001$), indicating that homogeneity of covariances cannot be assumed. As the discriminant analysis is sensitive to violations of assumptions (Tabachnick & Fidell, 2014), the results of the analysis should be treated with caution. The analysis was continued in an exploratory manner.

Wilks' lambda was significant, $\lambda = .91$, $\chi^2(9) = 26.61$, $p = .002$, partial $\eta^2 = .03$, all of which indicates that the entire model with all of the variables included was able to significantly discriminate the two groups. Although the value for partial η^2 (.03) indicated a weak to medium or typical effect size, the discriminant function analysis was able to correctly classify 64.4% of the cases. Age was not a significant discriminant, $p = .339$. Having law enforcement experience was not a significant discriminant, $p = .367$. Having military experience was not a significant discriminant, $p = .840$. Having both law enforcement and military experience was a significant discriminant, $F(1, 296) = 4.85$, $p = .028$.

Having no college was not a significant discriminant, $p = .664$. Having a master's degree was not a significant discriminant, $p = .415$. Having a law degree was not a significant discriminant, $p = .117$. Exam score was a significant discriminant, $F(1, 296) = 14.34$, $p < .001$. The standardized canonical discriminant function coefficient for exam score (0.70) was larger in magnitude than the coefficient for law enforcement and military experience (-0.48), indicating that exam score has the greatest impact on group classification. However, these interpretations may be inaccurate due to the violations of assumptions for this analysis. Table 5 presents the results of the discriminant analysis.

Table 5
Results of the Discriminant Analysis

| Variable | <i>F</i> (1, 296) | <i>p</i> | Standardized Canonical Correlation Coefficients |
|---|-------------------|----------|---|
| Age | 0.92 | .339 | 0.01 |
| Work Experience (Ref: No Law Enforcement or Military) | | | |
| Law Enforcement | 0.82 | .367 | 0.01 |
| Military | 0.04 | .840 | -0.08 |
| Law Enforcement & Military | 4.85 | .028 | -0.48 |
| Education (Ref: Some College) | | | |
| No College | 0.19 | .664 | 0.41 |
| B.A./B.S. Degree | 0.84 | .359 | 0.88 |
| Master's Degree | 0.67 | .415 | 0.89 |
| Law Degree | 2.47 | .117 | 0.06 |
| Competency Exam | 14.34 | <.001 | 0.70 |

Research Question 3

What is the influence, if any, of an applicant's age, work experience, education level, and score on a standardized pre-employment competency exam on his or her pre-employment polygraph examination results?

This research question was addressed using a multiple linear regression, as a follow-up to the discriminant analysis, since the results of the discriminant analysis could be considered questionable due to the violations of assumptions. According to Ash (2008) and Thayer (1986), using multiple linear regressions to determine a dichotomous dependent variable is a valid analysis, similar to performing a logistic regression. Cohen and Cohen (1975), Pedhazur (1982), and Tatsuoka (1971), further support the use of multiple regression when determining a dichotomous dependent variable (as cited in Bauer, 2015). Prior to the analysis, the assumptions of the multiple linear regression were assessed. Like the discriminant analysis, the linear regression requires that data be normally distributed and homoscedastic. These assumptions were shown to be violated

in the previous analysis. The violations of these assumptions were confirmed in this analysis (see Figures 1 and 2). Figure 1 shows that data greatly deviate from the normality line, and Figure 2 shows data that are not evenly distributed. However, multiple regression is a more robust statistic than discriminant analysis; and as such, violations of the assumptions with respect to normality when the sample size is large is much less troublesome (Field, 2013). Additionally, scatterplots of residuals are generally more interpretable when the dependent variable is not dichotomous as in the case here. Absence of multicollinearity was apparent, as no VIF value was above 10 (see Table 6).

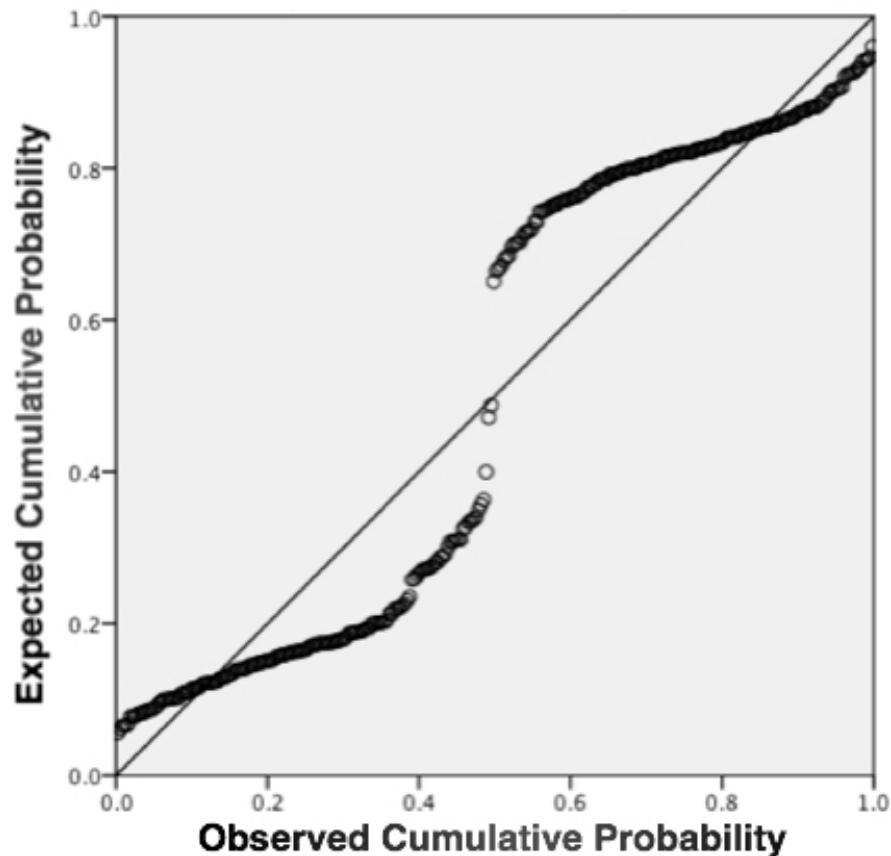


Figure 1. Normal P-P plot for the multiple linear regression.

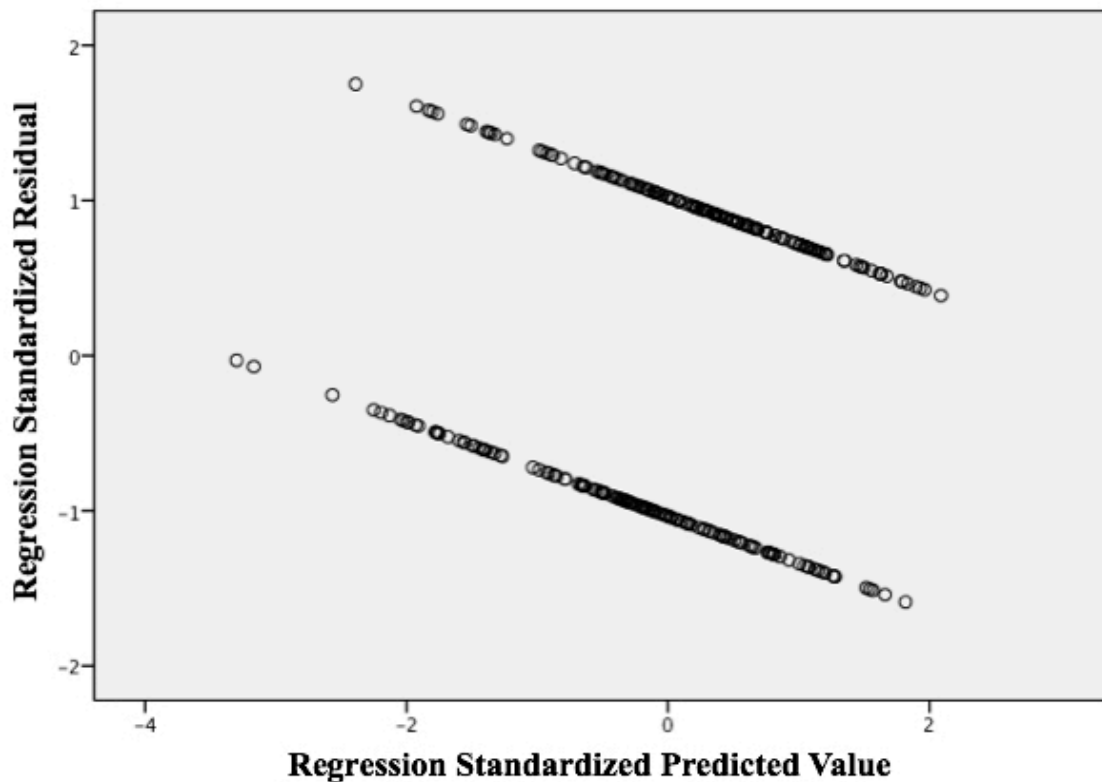


Figure 2. Scatterplot of the residuals for the multiple linear regression.

The results of the overall regression model were significant, $F(9, 288) = 3.06$, $p = .002$, $R^2 = .09$. This indicates that the combined set of predictor variables accounts for up to 9% of the variance in the dependent variable.

Age was not an individually significant predictor, $p = .954$. As for work experience, one of the three variables was significant. Neither having law enforcement experience, $p = .956$, nor having military experience, $p = .742$, were individually significant predictors. However, having both military and law enforcement experience was a significant predictor, $B = -0.19$, $p = .048$, indicating that those who have both law enforcement and military experience are less likely to be continued in the hiring process.

By squaring the values of the standardized beta, the percentage of the variance that is explained by the individual predictor can be determined. For having both military and law enforcement experience, $B^2 = .04$, indicating that 4% of the variance in the dependent variable can be accounted for by this predictor.

Significant predictors were also found under education level. Not having any college education, $p = .078$ or the possession of a law degree, $p = .832$, were not individually significant predictors. Possessing a bachelor's degree was an individually significant predictor, $B = 0.25$, $p = .045$, indicating that those who held a bachelor's degree were more likely to be continued in the hiring process. Having a bachelor's degree accounts for up to 6% of the variance in the dependent variable. Possessing a master's degree was a significant predictor, $B = 0.28$, $p = .038$, which suggests that those who held a master's degree were more likely to be continued in the hiring process. Possessing a master's degree accounts for up to 8% of the variance in the dependent variable. Score on a standardized pre-employment competency exam was an individually significant predictor, $B = 0.02$, $p < .001$. This indicates that those who have higher scores on the competency exam were more likely to be continued in the hiring process. Scores on the competency exam account for $< .00$ percent of the variance in the dependent variable. See Table 6 for the full results of this analysis.

Table 6

Results of the Multiple Linear Regression

| Variable | B | S.E. | β | t | p | VIF |
|---|-------|------|---------|-------|-------|------|
| Age | 0 | 0.01 | 0 | 0.06 | 0.954 | 1.20 |
| Work Experience (Ref: No Law Enforcement or Military) | | | | | | |
| Law Enforcement | 0 | 0.08 | 0 | 0.06 | 0.956 | 1.68 |
| Military | -0.03 | 0.09 | -0.02 | -0.33 | 0.742 | 1.51 |

| | | | | | | |
|-------------------------------|-------|------|-------|-------|-------|------|
| Law Enforcement & Military | -0.19 | 0.10 | -0.14 | -1.98 | 0.048 | 1.47 |
| Education (Ref: Some College) | | | | | | |
| No College | 0.45 | 0.25 | 0.11 | 1.77 | 0.078 | 1.31 |
| B.A./B.S. Degree | 0.25 | 0.13 | 0.25 | 2.01 | 0.045 | 4.81 |
| Master's Degree | 0.28 | 0.13 | 0.25 | 2.08 | 0.038 | 4.61 |
| Law Degree | 0.04 | 0.18 | 0.02 | 0.21 | 0.832 | 2.14 |
| Competency Exam | 0.02 | 0.01 | 0.20 | 3.50 | 0.001 | 1.05 |

Summary

The purpose of this chapter is to present the results of the analyses described in Chapter III. A binary logistic regression, a discriminant analysis, and a multiple linear regression were all performed. The results of these analyses indicated that certain characteristics did influence the likelihood of whether an applicant would continue in the pre-employment hiring process or not. Applicants who had higher scores on a standardized pre-employment competency exam were more likely to be continued in the hiring process, whereas applicants who had both law enforcement and military experience were less likely to be continued in the hiring process than those who had no military or law enforcement experience. Additionally, applicants who possessed a master's degree were more likely to be continued in the hiring process. Results differed slightly depending on the type of analysis. However, the assumptions for the discriminant analysis were not met, indicating that the results of the binary logistic regression and the multiple linear regression, which do not rest upon the same stringent assumptions, should be treated with the most confidence out of the three analyses. The following chapter discusses these results within the context of the existing literature. Furthermore, the implications of the study are discussed, and recommendations for future research are proposed.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to determine if age, work experience, education level, and scores on a standardized pre-employment competency exam were significantly related to candidates' results on a pre-employment polygraph examination and if such relationships might influence pre-employment polygraph examinations results. The variables of age, work experience, and education level have been previously studied in terms of their effects on integrity testing. The present study adds to the existing research literature by including standardized pre-employment competency exam scores. The pre-employment polygraph has become a vital assessment tool in pre-employment hiring for sensitive government and public safety positions. How these variables might relate to or influence pre-employment polygraph examination results can advance hiring rates for sensitive government and public safety positions. Furthermore, the pre-employment hiring process can be improved or streamlined to increase efficiency and become more time and cost effective. Information from this study might provide policy makers and human resource and government administrators with information that could be used to (a) streamline pre-employment hiring processes, (b) save on financial resources, and (c) alter the qualifications of sensitive public safety positions to process a lower quantity of applicants with a higher yield of employment.

Considerable amounts of time, effort, and financial resources are required to hire new employees for sensitive public safety positions. Government and law enforcement organizations struggle to fill vacancies to ensure public safety and national security. Such positions require a high level of integrity and a high standard of personal conduct

and behavior. The pre-employment polygraph is an important pre-employment screening assessment for integrity. Determining what influences the outcomes on pre-employment polygraphs could be useful in saving time and financial resources. This chapter includes sections summarizing and interpreting the results of the study; recommendations for policy, practice, and further research, and ends with a conclusion.

Summary of the Findings

Three types of statistical analyses were performed to determine if age, work experience, education level, and scores on a pre-employment competency exam influenced whether an applicant would be continued in the hiring process after a pre-employment polygraph examination. First, a logistic regression was performed for Research Question 1. The analysis revealed that an applicant's age had no significance in the outcome. However, work experience was determined to be a relevant factor. It was found that those who had no prior military or law enforcement experience were significantly more likely to be continued in the screening process after the administration of the pre-employment polygraph examination. In addition, applicants who held a master's degree were also more likely to be continued in the hiring process, while applicants who held a bachelor's degree were on the margin of being significant. As for the standardized pre-employment competency exam, the higher an applicant's scores on the competency exam were, the more likely they were to be continued in the hiring process after the pre-employment polygraph.

Next, a discriminant analysis was performed for Research Question 2. This analysis also determined that age was not a significant factor. This analysis also revealed that not having law enforcement and military experience was a significant factor. No

education factors were found to be significant. The scores on the pre-employment competency exam were found to have the most significant effect on whether an applicant would be continued in the hiring process or not after the pre-employment polygraph examination. However, these results must be considered cautiously because of the violations of the assumptions with this particular statistical analysis.

Finally, a multiple regression analysis was performed for Research Question 3. This analysis also revealed that age was not a significant factor. In accordance with the findings of the other two types of analyses, applicants who had both law enforcement and military experience were significantly more likely to not be continued in the hiring process. Having a bachelor's degree or a master's degree were found to be significant predictors in continuing in the hiring process after the pre-employment polygraph. Like that of the other two analyses, scores on the pre-employment competency exam were significant predictors to continuing in the hiring process. (See Table 7 for a statistical analysis comparison.)

Table 7

Statistical Analysis Comparison

| Variable | RQ1 Logistic Regression | RQ2 Discriminant Analysis | RQ3 Multiple Regression |
|---|--------------------------|---------------------------|-------------------------|
| Age | Not Significant | Not Significant | Not Significant |
| Work Experience (Ref: No Law Enforcement or Military) | | | |
| Law Enforcement | Not Significant | Not Significant | Not Significant |
| Military | Not Significant | Not Significant | Not Significant |
| Law Enforcement & Military | Significant | Significant | Significant |
| Education (Ref: Some College) | | | |
| No College | Not Significant | Not Significant | Not Significant |
| B.A./B.S. Degree | Slightly Not Significant | Not Significant | Significant |
| Master's Degree | Significant | Not Significant | Significant |
| Law Degree | Not Significant | Not Significant | Not Significant |
| Competency Exam | Significant | Significant | Significant |

Interpretation of the Findings

The pre-employment screening process utilized by government and law enforcement organizations to hire new employees is costly and time consuming. Because of the sensitive nature of these types of positions, hiring the right person for these positions is paramount. New government and law enforcement employees must be competent and worthy of the public's trust. The research literature indicated that pre-employment screening processes are widely used and highly effective (Ajila & Okafor, 2012; Befort, 1997; Carrigan, 2007; Schmidt & Hunter 1998). The literature also revealed that researchers have studied age, work experience, and education level relating to the effects on integrity testing (Dawson, 1997; Kohlberg, 1984; Rest, 1984). The majority of research on the polygraph examination is based on physiological factors that may affect the outcome (Gamer, 2011; Khan et al., 2009; Matte, 1996; Timm, 1982; Tomash & Reed, 2013). However, virtually no published research exists on whether age, work experience, education level, and scores on the standardized competency exam are connected to individuals continuing in the hiring process after a pre-employment polygraph exam. Insight into the non-physiological influences such as these factors could have a tremendous impact on integrity testing and polygraph assessment specifically.

The influence of age has often been studied in relation to moral and ethical issues and testing with mixed and inconclusive results. For example, some researchers found that increases in age were positively linked to increases in integrity (Kohlberg, 1984; Ruegger & King, 2013), while others found that age may negatively influence integrity (Browning & Zabriskie, 1983). In the present study, age was not a significant factor and

did not influence the outcome of the polygraph. This is similar to the recent findings of Nikoomaram, Roodposhti, Ashlagh, Lotfi, and Taghipourian (2013), who found the age of an individual had no impact on their ethical decision-making practices or beliefs. The findings of the present study add to the mixed and inconclusive nature of the literature on the connection between age and integrity testing, indicating more research may be needed in this area.

Work experience is another variable that has been found to be both a positive and negative influence on integrity. However, work experience is most usually measured in terms of length of time (Kidwell, Stevens, & Bethke, 1987). In the present study, work experience was measured specifically as individuals not having law enforcement or military experience, having law enforcement experience, having military experience, or having both law enforcement and military experience. All three statistical analyses found that those applicants who had both law enforcement and military work experience were less likely to continue in the hiring process than all others.

Education has been found to be a significant factor when determining integrity (Goolsby & Hunt, 1992; Rest, 1984; Wimalasiri et al., 1996). Like age and work experience, however, findings have been mixed. Some researchers have determined that increased education levels have a negative influence on integrity (Kelley et al., 1998; Nikoomaram et al., 2013). Conversely, other researchers have found that education level did not significantly influence morality or integrity (Thoma & Davison, 1983). The analyses in the present study also revealed mixed results. Having a master's degree was determined to be a significant factor by both the logistic and multiple regressions analyses. Multiple regression also revealed that possession of a bachelor's degree was

significant, while logistic regression revealed that having a bachelor's degree was just outside the scope of indicating significance. The discriminant analysis did not reveal any educational factor to be a significant variable. Having a law degree was not significant in any of the analyses.

No previous research was found to determine whether a standardized competency exam could predict or influence an integrity test. Standardized competency exams are designed to determine an applicant's capability to perform specialized tasks required for employment, not to determine an applicants' integrity. The present study showed that the score on a standardized pre-employment competency exam was significant in all three analyses. Additionally, it was consistently the most significant variable in determining an applicant's likelihood of continuing in the hiring process after the pre-employment polygraph examination. The higher the test score, the more likely an applicant was to be continued in the hiring process.

Policy Implications

This study revealed that there are variables that influence the results of the pre-employment polygraph exam. This study provides evidence to support the two leading theories of human resource management. The first theory is that of strategic human resource management (Wright & McMahan, 1992). This approach to recruitment allows human resource departments to specifically implement human resource policies and employment selections to increase an organization's likelihood of success in its marketplace. The second theory is behavioral theory, which calls for organizations to seek out specific behaviors of prospective employees to increase the organization's business and competitive strategy (Wright & McMahan, 1992). Both of these theories

encourage human resource departments to dissect their respective organizational needs and target recruitment and employee practice in the most beneficial manner, thus, adding to an organization's competitive advantage.

The pre-employment polygraph examination continues to be used by law enforcement and government organizations as an assessment tool to screen applicants for honesty and integrity. As such, it is important to research the non-physiological influences on the pre-employment polygraph examinations to predict and explain the influences on such examination outcomes. A better understanding of non-physiological influences—such as age, work experience, education level, and scores on a standardized pre-employment competency examination—can help to increase hiring rates and decrease financial expenses for sensitive public safety positions and those in law enforcement and government organizations. Furthermore, the pre-employment hiring process can be improved and streamlined to increase efficiency and become more time and cost effective.

The purpose of this study was to provide new insight regarding factors that may influence the results and subsequently streamline hiring practices. Law enforcement and government organizations, as well as individuals who seek employment in sensitive public safety positions, can have a better understanding of the potential influences on pre-employment polygraph examinations and the subsequent outcomes.

From a public policy perspective, this study provides detailed information on the variables of age, work experience, education level, and scores on a standardized competency exam to build on the existing body of research and literature regarding integrity tests, specifically the pre-employment polygraph examination. In addition, this

study fills a gap in the existing literature pertaining to the influence of scores on a standardized pre-employment competency exam on an integrity test. Beyond pre-employment testing, the prospect that non-physiological factors do influence polygraph examination outcomes should further influence public policy decisions regarding the pre-employment screening process.

Recommendations for Practice

Local, state, and federal government organizations struggle to hire new employees for sensitive security positions. In an effort to streamline the hiring process and narrow the pool of qualified applicants, policy makers and administrators can use the data of this study to streamline pre-employment hiring processes, save on financial resources, and alter the qualifications of sensitive public safety positions. This would enable organizations to process a smaller quantity of applicants in a shorter time while simultaneously increasing the hire rates to meet employment demands.

In accordance with the results of this study, organizations that require a pre-employment polygraph exam for sensitive security and public safety organizations should target recruit applicants who do not have law enforcement or military experience but possess a bachelor's or master's degree. The organization that provided the data for this study does not require a college degree but routinely directs recruiting efforts to law enforcement and military communities. While these communities should not be ignored completely, the organization would get applicants who are more likely to successfully navigate the hiring process and the pre-employment polygraph examination from organizational communities outside of these disciplines, who also require a bachelor and/or master's degree. In addition to targeted recruiting, job qualifications should be

modified to require specified education levels; this alone would provide organizations with a smaller pool of applicants who are significantly more likely to successfully navigate the hiring process.

These organizations should also administer the pre-employment standardized competency exam early in the screening process and raise the passing score for continuing in the process. The organization that provided the results for this study maintains a passing score of 70. However, the average passing score of the 150 applicants who were continued in the hiring process after the pre-employment polygraph examination was 79. By administering the competency exam early in the process and raising the passing score, applicants who would be less likely to continue in the hiring process would be eliminated early, resulting in processing fewer applicants at more costly phases of the screening process.

In an effort to increase the likelihood of applicants being continued in the hiring process, applicants who have no law enforcement and military experience, possess a bachelor's or master's degree, and who score a 79 or greater on the pre-employment standardized competency exam should be prioritized in the hiring process. Processing these applicants would be more cost effective because they would be more likely to successfully complete the screening processes for employment.

Recommendations for Future Research

The independent variable being assessed was the pre-employment polygraph examination results. Other government and law enforcement organization that administers a pre-employment polygraph examination may utilize a different set of questions during a pre-employment polygraph. In addition, not all organizations of these

types use the same method of a pre-employment polygraph examination. Therefore, further studies of this nature should be conducted in multiple and various organizations that administer pre-employment polygraph examinations, as not all pre-employment polygraph examinations may be equal in nature.

This study utilized data from one specific organization, which administers its own proprietary pre-employment competency exam. Additional research should be conducted to assess whether other types of pre-employment competency examinations are also found to be significant predictors. While pre-employment competency examinations in the law enforcement and government communities are similar, each may test for different competences or have different scoring formulas. In addition, the organization that participated in this study should determine if there are any correlations in test answers among those that were continued after the pre-employment polygraph exam. If, for example, all of the applicants that were continued in the hiring process, performed better or worse on specific sections of the exam or responded similarly to specific questions, a psychological component to the exam that predicts integrity may be discovered.

This study should be recreated with a larger sample spanning over a longer period of time. This study focused on applicant information from 299 applicants collected over a two-year period. Perhaps all the applicants for this period should be researched. A larger sample size would provide a better understanding of the actual applicants during this time period.

While applicants who had both law enforcement and military experience were less likely to be continued in the hiring process, it is unknown what type of work experience would be advantageous in increasing the likelihood of being continued in the

hiring process. Further research on more specific work experience is recommended.

A qualitative research study that interviews or surveys applicants that are not continued in the hiring process after a pre-employment polygraph exam should be conducted. Such a study could determine if applicants can expand on details of why they believe they were not continued in the hiring process. Interviews may seek to determine if these applicants approach the pre-employment polygraph exam knowing that they do not qualify for the positions but with a belief that they can beat the system. These applicants may believe they are smarter than the polygraph exam or doubt the accuracy of the application. Applicants may also possess the belief that they have nothing to lose and everything to gain by making the attempt. A detailed qualitative study may identify other variables, traits, or experiences that can be used to assess an applicant's integrity.

Conclusion

The purpose of pre-employment screening processes, including the pre-employment polygraph exam, is to reduce the number of applicants into a pool of only the most qualified applicants. Increased world turbulence, such as terrorism and threats to national security, have greatly increased the responsibilities and workloads of public and national security organizations, necessitating an increased workforce in these areas. The results of this study can be used to target, recruit, and prioritize applicants who are likely to successfully navigate through the pre-employment screening processes. This would provide hiring organizations useful tools to screen out applicants less likely to complete the hiring process and save precious time and financial resources.

Public and national security organizations would save financial resources and decrease the time needed to fill vacancies, as these organizations have increasingly more

job vacancies to fill. Applicants must not only be competent, but they must be worthy of the trust and confidence of those whom they serve. Screening processes take time to screen out applicants and are costly. Due to the strict selection requirements and competitive nature of sensitive government and public safety positions, organizations compete in the costly endeavor to hire qualified applicants efficiently and effectively. As these organizations fail to meet the required hiring levels, their responsibilities in public and national security cannot be carried out.

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