Police Cadet Attrition and Training Performance Outcomes

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Abstract

Research devoted to the predictive validity of criteria commonly used to screen police applicants has received little attention. The need has increased for police agencies to evaluate their various screening methodologies in the multiple-hurdles approach to police candidate selection. Grounded in Schmidt and Hunter's theory of general mental ability in job performance, this study examined the predictive validity of candidates' demographic profiles and results of the pre-academy screening polygraph to predict training outcomes and attrition. This quantitative study used logistical and linear regression analysis to determine whether these variables were viable screening mechanisms to predict attrition and training performance among police cadets at the Texas Department of Public Safety. Each independent variable (age, prior military service, level of education, and polygraph result) predicted cadet academy completion status (unsuccessful; successful). However, there was no evidence to suggest that age, prior military service, or level of education predicted training performance as measured by final academy grade point average or score on the Texas Commission on Law Enforcement Officer Standards and Education (TCLEOSE) exam. This study's findings relative to each independent variable support contemporary police research by identifying potentially valued characteristics of a successful police candidate. Additionally, these findings could allow police administrators to better implement training strategies that compliment agency goals; thus better preparing candidates to protect society. By understanding the validity of these screening procedures in candidate selection, police agencies could save time and money.

Keywords: *cadet, attrition, polygraph, screening, demographic profile*

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From a practical point of view, the most valuable determinant in training or job performance is the predictive validity of essential work functions (Schmidt & Hunter, 1998). However, in an ever-changing world, it is becoming increasingly difficult to find quality personnel for the police profession (Henson, Reyns, Klahm, & Frank, 2010). Additionally, scholars continue to debate which variables are the best predictors of quality personnel (Henson, et al., 2010). This leaves a gap with respect to which other variables consistently predict the best cadet. Given the existing array of selection criteria police agencies use in the preemployment process (e.g., age, prior military service, psychological and physical agility testing), it is important to examine their relationship to police cadet performance.

For more than 90 years researchers have studied psychological test data in the

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context of selecting law enforcement personnel (e.g., Terman & Otis, 1917); yet there exists some disagreement regarding the issue of best practices in the "multiple hurdles" approach to police cadet selection. Today, most candidates for the position of police cadet must, as a part of the screening process, participate in a background investigation and submit to psychological and polygraph tests (Fuss & Snowden, 2004). Contemporary screening methods also generally include written tests, physical agility tests, and meeting certain demographic thresholds (Decicco, 2000). These methods have dual functions: to select the most competent candidate for training as well as vet the candidate to ensure that agency goals are met and public safety is not compromised (Decicco, 2000).

Many organizations employ various selection techniques in the preemployment process, and often take action relative to the weights given to each point of view (Society for Industrial and Organizational Psychology, 2003). What this means for the cadet selection process is that the police agency is often burdened with the cost in time and money of using numerous techniques. Questions remain about which predictors correlate best with police cadet performance (White, 2010). The majority of psychological screening for police cadets in the United States uses personality measures (Hancock & McClung, 1987). Recent studies argue for the use of non-clinical personality assessments for police cadet selection (Forero, Pujol, Olivares, & Pueyo, 2009); while other studies suggest that demographics and residency have little to do with overall cadet success (White, 2010).

Important to this discussion is a strategy that effectively ties selection mechanisms that are part of the demographic and pre-academy screening data to cadet attrition and training performance. This, it was suggested, would provide a better bridge to existing disparities in police candidate selection research. There is a gap in the empirical research that connects the predictive validity of each predictor in this study to cadet attrition and training performance. Additionally, little research has been devoted to using multiple predictors to analyze police academy performance; with current efforts leaning heavily toward using psychological traits to predict the job performance of a police officer (White, 2008). Noting the importance of finding plausible links to the multiple predictors selected in this study, it is appropriate to make a brief introduction to the multiple hurdles approach to general and police employee selection (e.g., application, demographic characteristics used in the hiring process, interview, background investigation, psychological testing, and integrity testing). Additionally, a brief discussion of the history of the Texas Department of Public Safety (DPS) will provide the context for using the demographic data in this study.

Literature Review

The Texas DPS uses a non-compensatory model-better known as a successive or multiple hurdles approach to police cadet selection, where the applicant must pass a series of tests (Henson et al., 2010). For example, failing the physical fitness test eliminates a candidate from further consideration; the same is true of failing or performing below established thresholds in any screening process (medical, psychological, polygraph). In its equation for selecting cadets, the Texas DPS uses certain demographic criteria (minimum age, prior military service, education). There is no ceiling on age, but applicants must be at least 20 years of age upon graduation from the academy (Texas DPS, 2012). Applicants bring a mixture of experiences to the preemployment process. The Texas DPS addresses the issue in a number of ways. While applicants for the position of police cadet at the Texas DPS must have earned at least 60 credit hours from a regionally accredited college or university (Texas DPS, 2012), they can substitute prior military or law enforcement service for college education, equivalent to the 60-hour requirement.

Police agencies use many screening items in both the preemployment and training academy process (White, 2010). Harris, Dworkin, and Park (1990) examined the predictive validity of numerous screening procedures in the hiring process for large public companies. The three notable screening procedures reported as most accurate in selecting future superior workers were targeted interviews, accomplishment tests, and references. In contrast, physical ability tests, polygraph tests, and genetic tests were deemed most inaccurate in the selection of a superior worker; however, failed drug and polygraph tests were two of the most likely reasons employers gave that would affect hiring decisions (Harris et al, 1990). In order to provide a more broad understanding of applicant selection processes, a portion of the screening procedures utilized in previous studies incorporating both private companies and police agencies are included as predictors in the present study. For example, acade-

my tests, as well as the state licensing exam were utilized as predictors for accomplishment tests. Another study noted the work sample is considered to have a high degree of validity because of its practical nature (Osoian, Zaharie, & Lazar, 2011), while other employers look to cognitive ability tests as a predictor of hiring success (Lewis, Shimerda, & Graham, 1983).

Age as a Predictor of Training Performance

Perhaps no predictor in this study has been underrepresented in empirical police cadet selection research than that of age. There have been numerous attempts to explain age-related cognitive changes such as common cause theory, the processing speed theory, and the executive function hypothesis (Luszcz & Byran, 1999); however, these efforts have been difficult due to the various differences in statistical findings which make generalizations about age across time arduous at best (Clay et al., 2009). The specific focus in this study was to examine age as a predictor of cadet attrition and training performance using the theory of General Mental Ability GMA. Therefore, in this study, GMA would be represented by the cadet's c academic test results in a 28- week police academy. Age has long been judged a great variable in organizational contexts due to its common relationship to the goals and objectives of many agencies (Randhawa, 2007). Obvious correlations exist utilizing age as a predictor of physical performance in any setting; however, this study does not examine physical fitness as a predictor of training performance.

It is appropriate to now examine previous studies to assist in establishing a background perspective of age's relationship within law enforcement training contexts. Chappell (2008) used age, race/ethnicity, gender, military experience, education, special position (ranking officer in class), and type of academy as independent variables to assess cadet performance in a re-designed academy (community policing) versus a traditional academy setting. A literature review revealed one study that included age and training outcomes. White (2008) examined a large metropolitan police training class (n = 1,556) and found that as a cadet's age increases, their academy performance decreases. The practical value of age as it relates to police training appears to be largely unknown, thus making it necessary to examine this predictor's current status in police screening contexts.

Biographical data has been substantially correlated with GMA (Schmidt, 1988). Some scholars offer that police agencies prefer younger applicants because they are less rigid and more accepting of the community-based policing model recently adopted by many police agencies (LaRose, Caldero, & Gutierezz, 2006). Aamodt's (2004) review of 300 theses, dissertations, journal articles, and conference papers yielded several studies addressing academy performance, but included age only as a sample characteristic. However, recent research covering broad spectrum occupations (i.e. occupations other than public safety) asserts that workforce age is linked negatively to quantitative organizational performance, but positively associated with qualitative performance (Gellner, Schneider, & Veen, 2011). In other words, output appears to be correlated with being younger, whereas an older worker shows to produce more quality in their product. One viewpoint on age as it relates to police performance posits a likely paradigm shift from hiring younger police applicants, to recruiting older prospects. For example, some police departments have sought out second-career applicants from other professions not because of their previous law enforcement experience, but due to their maturity and documented stability (Bennett & Hess, 2004). Other studies examining age and work performance report that demographics point to an older workforce (Sharit, Czaja, Hernandez & Yang, Y, 2004). As it has been suggested, the reports in this area are dubious and provide for a perplexing understanding of age and police training performance.

The Utility of Prior Military Service

Police training programs have tended to follow militaristic patterns, which explains, in part, rationales for police agencies hiring former military members as patrol officers (Birzer, 2003). Historically, there has been a strong representation of individuals in law enforcement with prior military experience (Aamodt, 2004). Evidence of this can be seen in the roots of many police units throughout the United States. For example, police agencies adopted quasi-military models in the early 1900s in efforts to eliminate corruption (Fogelson, 1977).

Despite strong academic opinions, scholars continue the debate regarding the practical value and contextual meaning of the word "paramilitary". Law enforcement agencies traditionally have adopted a "paramil-

itary" model, despite a lack of empirical evidence supporting the utility of a military structure within law enforcement contexts (Bittner, 1990; Franz & Jones, 1987). Some scholars debunk the notion of police as a paramilitary organization (Cowper, 2000), while others agree the two share commonalities, but debate about a common definition of paramilitary when applied to a law enforcement environment (Jefferson, 1987, 1993; Waddington, 1993). Recent findings on the nature of policing suggest there appears to be a convergence of roles between police and military function (Campbell & Campbell, 2010). Prior research reveals positive correlations with police work performance, but there remains a void with respect to the usefulness of military service to police training.

College as a Determinant of Success

It is becoming more common for applicants who enter the police cadet selection process to have some level of college education, as studies reveal that 44% of police applicants have attended at least 1 year of college (Bennett & Hess, 2004). In contrast to the previous discussion on military service, statistics reveal that police applicants now have more college education than military background (Bennett & Hess). Using college experience as a predictor variable is an important component of this study given its unknown predictive validity in police training contexts. Another reason for the examination of college education as a predictor lies with the fact that the literature has produced mixed reviews with respect to correlating formal education and training success (Walker, 1994).

Criminal justice education has typically focused on a distinct, three-level system (high school diploma, associate's degree, and bachelor's degree) that in many ways ties into entry-level law enforcement jobs (Buerger, 2004). As a practical matter, the previous statement assists in establishing criteria for incorporating the three-level system (high school diploma, associate's degree, and bachelor's degree), with the addition of some college experience, as predictors. The practical value of having a college degree in the police profession is still largely misunderstood (Walker, 1994). One rationale for this uncertainly is grounded in the thought that individuals make decisions relative to pursing higher education on the foundation of a cost-benefit analysis (Brand & Xie, 2010).

As early as 1916, August Vollmer, the father of modern policing, underscored the importance of education for officers (Guthrie, 2000). The Wickersham Commission (1937) and the President's Commission on Law Enforcement and the Administration of Justice (1967) highlighted the significance of a post-secondary education for police officers (Bennett & Hess, 2004).

Although the previous discussion noted that more applicants come to the screening process with some level of college education, studies show that this is certainly not an expectation (Capsambelis, 2004). A study from the Bureau of Justice Statistics noted that nationally only 1% of police agencies required a 4-year degree; whereas only 6% required some college, and 8% mandated a 2-year degree (Paoline & Terrill, 2007). Advocates of the college experience argue that educated officers produce better reports, receive fewer complaints, and produce a better overall work product (Baker, 1995; Carter et al., 1989; Trautman, 1986; Vodicka, 1994). Other scholars stated that the college experience provides a better opportunity for an individual to mature, offers a broader base of general knowledge, and enhances verbal and communication skills (Armstrong & Polk, 2002). Taking this evidence into account, administrators would perhaps suggest the college experience a valuable criterion for cadet selection.

The TCLEOSE Exam

In 1965 the Texas State Legislature created the Texas Commission on Officer Standards and Education (TCLEOSE) to establish standards for peace officers (TCLEOSE, 1997). The Basic Peace Officer Course Format consists of 618 hours of academics related to entry-level policing and is a test of job content knowledge (TCLEOSE, 2008). The TCLEOSE Exam is comprised of 250 multiple choice questions that address: (a) Texas Penal Code; (b) Texas Code of Criminal Procedure; (c) The Texas Constitution; (d) Texas Traffic Law; (e) Drug Questions; (f) Police approaches to family violence and mental health; and (g) Civil Law (TCLEOSE, 2010). Applicants for the position of police cadet, who are not already peace officers, must first pass the TCLEOSE Exam before becoming commissioned troopers (Texas DPS, 2012). This study incorporated only datasets from subjects who had not previously taken the TCLEOSE exam.

A comprehensive literature review revealed that great disparity exists in the realm of research related to the validity of state police licensing examinations. Although not a civil service test, the TCLEOSE exam serves to

assess the cadet's knowledge of general police aptitude. Schroeder (1973) studied the validity of the entrance examination for the position of patrolman under the guidelines established by the Equal Employment Opportunity Commission (EOEC) and found exam scores were positively related to performance. A review of literature relating to the validity of the TCLEOSE exam yielded no results. However, it was discovered Peace Officer Standards and Training (POST) commissions are located in every state so as to set minimum requirements for entry-level law enforcement positions (Bennett & Hess, 2000).

The Polygraph

Although empirical studies fail to investigate polygraph's predictive validity for training performance in the screening process for officers, literature suggested the method of preemployment polygraph is only increasing (Krapohl, 2002). Additionally, there is strong evidence that integrity tests have practical application when paired against cognitive ability (Schmidt & Hunter, 1998). For example, GMA has produced more incremental validity regarding the prediction of private employee training performance than any other measured study to date (Schmidt & Hunter, 1998). Meesig and Horvath (1995) reported that 99% of large and 90% of small law enforcement agencies require the use of a polygraph as a condition of employment for sworn positions. The reliability of a candidate's truthfulness is of high value to police administrators throughout the police preemployment process. A meta-analysis of integrity test validities found that preemployment tests of honesty can predict certain organizational disruptive behaviors (Ones, Viswesvaran, & Schmidt, 1993). Extending on this idea, the prevalence of general preemployment polygraph screening appears to be on the rise. The use of the polygraph is prohibited in most private sector arenas because of the Employee Polygraph Protection Act of 1988 (EPPA) (Decicco, 2000). Platform for the inclusion of polygraph results in this study lies in the fact that virtually nothing is known about the existing relationship between polygraph results in preemployment settings and training performance in police cadets or officers. This is the first known study to incorporate polygraph examinations as a predictor of police cadet attrition and cadet performance.

One study (Ho, 2001) was found to have utilized polygraph results as one predictor for assessing the effect of a psychologist's recommendations for hiring. Ho (2001) used linear regression to examine the effects of independent predictors (demographics, gender, age, prior military service, self-reported drug usage, and prior encounters law enforcement) on each dependent measure. Past research has even examined the correlation between civilian preemployment tests and future employee behavior. Although much controversy still exists surrounding the validity of polygraph, many police departments today use this instrument as a tool for veracity in the officer selection process (e.g., Ben-Shakhar & Furedy, 1990; Lykken, 1981; Saxe, 1994). This would imply, in a purely non-systematic way that police administrators have found a certain value to the requirement of a polygraph as a condition of employment. More research is needed in the area of preemployment polygraph to facilitate knowledge with respect to its utility in these settings.

Theoretical Base

The theoretical base for this study was grounded in the framework of predicting occupational performance and the validity of paired combinations of general mental ability (GMA); defined as the outcome of GPA and scores from the TCLEOSE exam. This theory was introduced in 1904 by C. Spearman and, as Schmidt and Hunter (2004) noted, is often used for predicting occupational performance: "GMA predicts both occupational level attained and performance within one's chosen occupation and does so better than any other ability, trait, or disposition" (p. 162). According to Schmidt and Hunter (1998) the percentage of validity for preemployment personnel measures (i.e., integrity tests, biographical data measures, and years of education) increase together. The thrust of this study was to examine this theory by assessing GMA's ability to predict training performance.

There are two reasons for using GMA: (a) it has the highest level of validity in personnel selection and the lowest cost in terms of monetary measurement (Schmidt & Hunter, 1998) and; (b) it repeatedly provides the best evidence of validity among other measures (Hunter, 1986; Hunter & Schmidt, 1996; Ree & Earles, 1992; Schmidt & Hunter, 1981). This evidence makes GMA a viable avenue for future research on selecting cadets. In the present study, grade point average (GPA) and TCLEOSE exam scores were reported as a measure of GMA (e.g. cadet GPA at end of academy and TCLEOSE score). From a theoretical perspective, the utilization of GMA,

along with multiple predictors (i.e. age, prior military service, and education) was the best choice, considering the similarity of items used in Schmidt and Hunter's (1998) work and the screening methods used by the Texas DPS in the preemployment process.

The theory of GMA embraces general intelligence and specific aptitudes and abilities; it then shows important differences between groups (Schmidt & Hunter, 1998). This was important considering the proposed research questions in this study. Finally, elements that comprise GMA have been examined in both military and police occupations, thus supporting the idea of using the theory to predict training performance in a police academy. Grade Point Average (GPA) and the Texas Commission on Law Enforcement Officer Standards and Education (TCLEOSE) exam score were considered outcome or criterion variables since they were generated by the applicant throughout the police academy training.

The purpose of this quantitative study was to examine whether the two sets of variables, demographic profiles and pre-academy polygraph screening results, were significant predictors of police cadet attrition and training performance at the Texas DPS. It incorporated data from both the preemployment process and the training academy. Many studies have generalized various independent and dependent variables in attempts to correlate demographic data with training and job performance (Aamodt, 2004). Some studies have used biographical data with test data, while others have mixed interview data with archived data. However, no study was found in the literature that examined the predictive validity of age, education, academic performance, and polygraph results to predict cadet attrition and training performance.

Demographic variables are aspects of the applicant they bring into the selection process. For example, demographic variables in this study were age, prior military service, and level of education. A fourth predictor, preemployment polygraph results, was analyzed to assess the polygraph's ability to predict attrition as well as training performance. The polygraph result was incorporated as a predictor to determine its usefulness for predicting attrition rates among police candidates.

All candidates were administered a polygraph examination before admission into the academy. As per DPS policy, candidates determined to be either inconclusive or deceptive were interviewed and administered a second "break-out" examination. This process is established to assist the candidate in clearing inconsequential issues related to hiring, or to obtain additional information that may disqualify the candidate from the hiring process. Candidates receiving a second deceptive or inconclusive result were disqualified from the process. Those candidates who were administered a second break-out polygraph and scoring no deception were admitted to the academy. Because a portion of the candidates in the first inconclusive and deceptive group were ultimately cleared and admitted to the academy, they were separated from the first no deception first polygraph test group. This was considered by the researcher to be of value in determining the group's predictability in training success as opposed to the group who received no deception on the first examination.

It was hypothesized that younger cadets who possessed a college degree and prior military experience would perform better in a training academy environment as measured by GPA and the TCLEOSE exam score, as opposed to older cadets who possessed no formal college education or prior military service. Finally, it was hypothesized that cadets entering the academy with a polygraph result of "no deception indicated" on their first polygraph examination had a better chance of completing the academy, as opposed to those cadets having either a first examination result of "inconclusive" or "deception indicated"; thus requiring a subsequent "break-out" examination.

Hypotheses:

$H_1{}^1$: The demographics of cadet age, military experience, and level of education are predictive of academy completion for cadets who participated in the 2008 Texas Department of Public Safety Training Academy.

$H_1{}^2$: The demographics of cadet age, military experience, and level of education are predictive of overall training performance for cadets who participated in the 2008 Texas Department of Public Safety Training Academy.

$H_1{}^3$: Preemployment polygraph results of "No Deception Indicated" are predictive of academy completion for cadets who participated in the 2008 Texas Department of Public Safety Training Academy.

Methodology

This quantitative study used a non-experimental, descriptive design. Cadet demographics and pre-academy polygraph screening results were captured from Texas DPS records. Categorizing these predictor variables was consistent with Aamodt's (2004) research which examined each variable used in this study, other than polygraph test results, to police officer training and job performance. The demographics of the population under examination provided for a largely unified sample. This study included stratification of the population; incorporating true characteristics (e.g., White/Hispanic males) representative of the entire sample (Fowler, 2002). Specifically, 195 subjects were examined to find if demographic profiles and pre-academy polygraph screening results were significant predictors of attrition and training performance by the selected population. Eligibility for group classification included: (a) Each participant was to be an applicant for the position of police cadet at the Texas DPS for the 2008 academy; (b) The participant must have completed demographic information which documented age, any prior military service, and level of education as criteria for selection; (c) The participant had to numerically score no deception indicated, inconclusive, or deception indicated on a first or second attempt of the Texas Department of Public Safety Modified General Question Technique (DPSMGQT); and (d) The participant must have either failed to complete training after beginning the academy, or graduated from the Texas DPS academy with numerical scores for grade point average (GPA), as well as participated in a first attempt of the TCLEOSE exam, which provided a numerical score. Cadets are allowed to take the examination multiple times; therefore, the researcher included only numerical scores from the first attempt of the TCLEOSE exam so as to better compliment true test-taking ability. Prior police officers who held a TCLEOSE license at the time of training were not included in any dataset; as they were exempt from the state examination.

Instrumentation

Demographic data was derived from the preemployment polygraph questionnaire form (HR-39). Outcome variables were collected by obtaining scores from each cadet's cumulative grade point average (GPA) and score on the Texas Commission on Law Enforcement Officer Standards and Education (TCLEOSE) exam. Finally, pre-academy screening polygraph results were gathered from data produced on the Texas DPS Modified General Question Technique (DPSMGQT). As previously discussed, the TCLEOSE exam is comprised of 250 multiple choice questions and covers the topics of: (a) Texas Penal Code; (b) Texas Code of Criminal Procedure; (c) Texas Constitution; (d) Texas Traffic Law; (e) Drug Questions; (f) Police approaches to family violence and mental health and; (g) Civil Law (TCLEOSE, 2012). The polygraph instrument used for the collection of all physiological data was the Axciton Five-Channel Computerized Polygraph System. Channels within polygraph contexts refer to the individual components attached to the examinee. The data gathered from polygraph examinations administered in this study was exclusively archived. Those examinations were conducted at two locations: (a) The Texas DPS Headquarters in Austin, Texas- Physical Address 5805 North Lamar Boulevard, and (b) Building M at the Headquarters Complex in Austin, Texas.

Analysis

This study was driven by past methodology, as a number of studies have incorporated regression analysis in attempts to assess cadet training outcomes (Aamodt, 2004; Guller, 2003; Jacobs & Solomon, 1977; Sanders, 2008; Waugh, 1996), though no known study existed that incorporated the multiple screening criteria in this proposal in attempts to predict cadet attrition and training performance. Research consistently shows that regression analysis is the most appropriate statistical treatment with respect to predicting police academy performance, as it permits the relationship between variables to be inspected due to the correlation of variables (Bernstein, Schoenfeld, & Costello, 1982; Waugh, 1996). The core of the analysis was linear and logistical regression for all three hypotheses. Regression analyses are used to predict the relationship between predictor variables and outcome or criterion variables (Tabachnick & Fidell, 2001). More specifically, regression analyses are used to study the relationship of a dependent variable y to two or more independent variables, using a regression model that is represented by the equation $y = ß0 + ß1x1 + ß2x2 + \varepsilon$. This model also includes ε, or an error variable, which is a random variable that refers to the variability in y that the listed independent variables do not account for.

Training performance (GPA and TCLEOSE exam score) and cadet attrition were treated as two separate analyses. Addition-

ally, GPA and TCLEOSE results were not reported for a cadet that failed to complete the academy. The rationale behind this methodology was based on the premise that a cadet would be required to graduate in order to capture a cumulative GPA and qualify to sit for the state licensing exam. Within this context, a cadet selected to the academy that ultimately resigned for undisclosed reasons or failed out was included in the polygraph dataset, as this supported the hypothesis for cadet attrition. Cadets that were expelled or resigned were treated as analogous.

Results

Among the 195 study participants, 190 (97.4%) were male and 5 (2.6%) were female. The ethnic distribution was 132 (67.7%) White; 56 (28.7%) Hispanic; and 7 (3.6%) Black. The education distribution was 48 (24.6%) high school graduate or possessing a GED; 44 (22.6%) with some college; 40 (20.5%) possessing an associate's degree, and; 63 (32.3%) holding a bachelor's degree. The average (and standard deviation) age was 27.8 (6.4) and the range was 20 to 52. There were 121 (62.1%) study participants that had no prior military service and 74 (37.9%) with prior military service. A total of 150 (76.9%) study participants completed the academy and 45 (23.1%) failed to complete the academy. The average (and standard deviation) academy GPA was 92.1 (3.35) and the range was 83.1 to 97.6. The average (and standard deviation) TCLEOSE exam score was 80.2 (6.2) and the range was 67 to 93. Polygraph decisions were used as the measure for inter-rater reliability. Cohen's Kappa statistic *K* to measure inter-rater reliability of the polygraph test (n = 10 polygraphs; 2 raters) was .40 (moderate agreement). A total of 121 (62.1%) study participants had a polygraph result of "No deception indicated" and 74 (37.9%) "Inconclusive or deception indicated" (see Tables 1 - 3).

Table 1 Descriptive Statistics for Ethnic Distribution

	Frequency	%	Valid percent	Cumulative %
White	132	67.7	67.7	67.7
Hispanic	56	28.7	28.7	96.4
Black	7	3.6	3.6	100.0
Male	190	97.4	97.4	
Female	5	2.6	2.6	
Total	195	100.0	100.0	

Note: Among the 195 study participants, 190 (97.4%) were male and 5 (2.6%) were female. The ethnic distribution was 132 (67.7%) Caucasian; 56 (28.7%) Hispanic; and 7 (3.6%) Black.

Table 2 Descriptive Statistics for Age by Academy Completion Status

Academy Completion Status	N Valid	N Missing	Mean	SD	Minimum	Maximum
Unsuccessful	45	0	29.67	6.779	21	52
Successful	150	0	27.19	6.147	20	52

Note: The average age was significantly smaller for those who completed the academy compared to those who failed the academy. The average (and standard deviation) age was 29.7 (6.8) versus 27.2 (6.1) for those who failed the academy and those who completed the academy, respectively, $t(193) = 2.31$; $p = .022$. This finding was consistent with the findings from hypotheses 1 and 3 where older age was associated with lower odds of completing the academy.

Table 3 Frequency Distribution of Study Participant's Polygraph Result

	Frequency	Percent
No Deception Indicated	121	62.1
Inconclusive or Deception Indicated	74	37.9
Total	195	100.0

Note. Ten polygraph examinations were scored by two examiners. Their scores were then utilized to calculate inter rater reliability using the *K* statistic.

Hypothesis 1 was tested using stepwise multiple logistic regression analysis. The dependent variable was academy completion status (successful; unsuccessful). As Table 4 illustrates, all three independent variables were found to be statistically significant. This means that prior military service ($p = .004$), age ($p = .006$), and level of education ($p = .011$) provided independent information in predicting academy completion status. That is, the three independent variables explained independent variance in academy completion status. The Nagelkerke R-Square Statistic associated with prior military experience was .05; .054 for age, and; .045 for level of education.

Table 4 Stepwise Multiple Logistic Regression Analysis of Academy Completion versus Age, Prior Military Service, and Level of Education

		b	SE	Wald	df	p-value	OR [e]	95% C.I. for OR Lower	95% C.I. for OR Upper
Model [a]	AGE [b]	-.078	.028	7.617	1	.006	.925	.875	.978
	PMS [c]	1.232	.423	8.485	1	.004	3.429	1.497	7.857
	EDU1 [d]	-1.017	.400	6.448	1	.011	.362	.165	.793
	Constant	3.289	.829	15.729	1	.000	26.816		

Note. The most important predictor of completion status was prior military service, age, and finally level of education. The three independent variables collectively explained 10.4% of the variance in completion status.

Hypothesis 2 was tested using stepwise multiple linear regression analysis. There were two separate measures of training performance (dependent variables): (1) Academy GPA, and; (2) TCLEOSE exam score. Therefore, this analysis was repeated for each of the two measures. For the first regression analysis, the dependent variable was the academy GPA. The independent variables entered into the stepwise model selection procedure were age (measured on a continuous measurement scale in years), prior military experience (0 = No; 1 = Yes), and; level of education. As was done in testing hypothesis 1, education was re-coded into dummy variables prior to conducting the analysis. None of the independent variables met criteria for entry into the model (i.e. $p < .05$). As Table 5 illustrates, the null hypothesis was not rejected and it was concluded that neither age, prior military service, or education level were predictive of academy GPA. The *p*-values for each of the independent variables were .96 for age; .68 for prior military service; .86 for EDU1 (high school diploma); .96 for EDU2 (some college) and; .19 for EDU3 (college degree).

Table 5 Stepwise Multiple Linear Regression Analysis of Academy Grade Point Average [a] versus Age, Prior Military Service, and Level of Education

	Unstandardized Coefficients		Standardized Coefficients		
Model [a]	b	SE	Beta	t	p-value
(Constant)	91.729	1.351		67.884	.000
AGE [b]	.002	.047	.004	.048	.962
PMS [c]	-.261	.639	-.039	-.409	.683
EDU1 [d]	.156	.860	.018	.181	.856
EDU2 [e]	.043	.861	.005	.050	.960
EDU3 [f]	1.062	.805	.151	1.320	.189

Note. It was found that neither age, prior military service, or education level were predictive of academy GPA. Age = cadet age (measured on a continuous measurement scale in years); PMS =prior military service; EDU = level of education; b = Estimated values of raw (unstandardized) regression coefficients; SE = standard error.

For the second regression analysis, the dependent variable was the academy TCLEOSE exam score. The independent variables entered into the stepwise model selection procedure were age (measured on a continuous measurement scale in years), prior military experience (0 = No; 1 = Yes), and; level of education. As was done previously, level of education was re-coded into dummy variables prior to conducting the analysis. Table 6 shows that only EDU2 (some college experience) met criteria for entry into the model, $p = .023$. The null hypothesis was not rejected and it was concluded that age, prior military service, and level of education do not explain independent variance in TCLEOSE exam scores. The equation of the model is: TCLEOSE = 80.82 -2.82*EDU2, where TCLEOSE = the average Texas Commission on Law Enforcement Officer Standards and Level of Education Score; EDU2 = level of education (0 = Not Associate's degree; 1 = Associate's degree).

Table 6 Stepwise Multiple Linear Regression Analysis of TCLEOSE [a] Exam Scores versus Age, Prior Military Service, and Level of Education

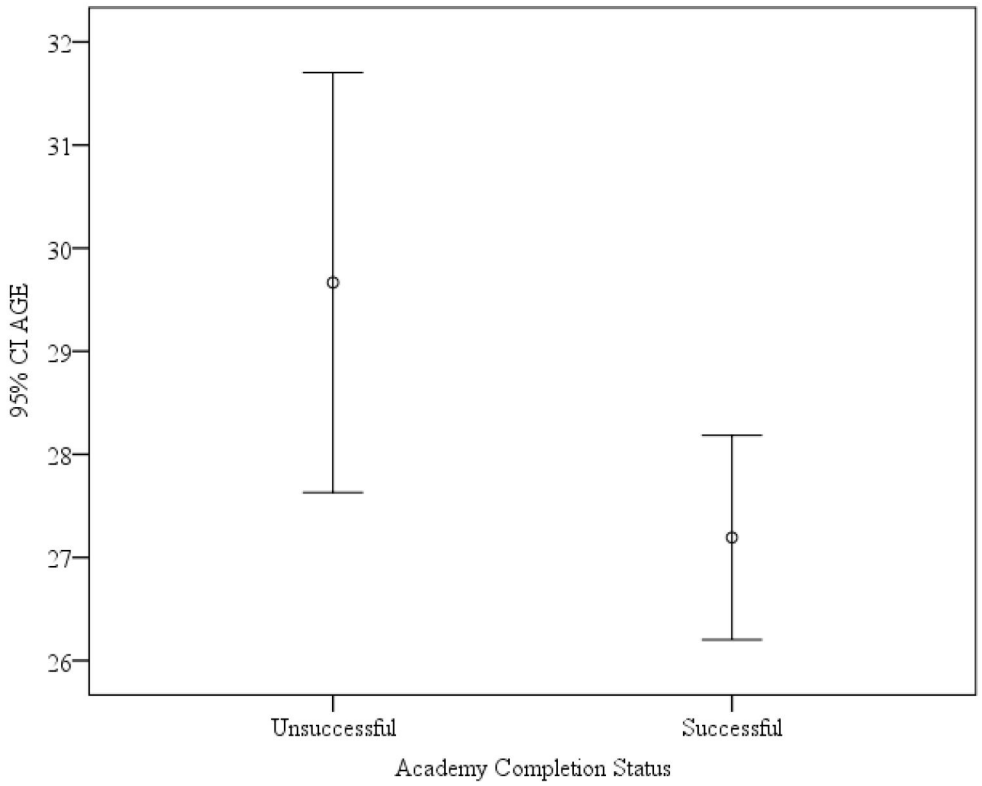
Model [a]	Unstandardized Coefficients		Standardized Coefficients		
	b	SE	Beta	t	p-value
(Constant)	80.822	.566		142.788	<.001
EDU2 [b]	-2.822	1.225	-.186	-2.303	.023

Note. Only EDU2 (some college experience) met criteria for entry into the model, $p = .023$. The null hypothesis was not rejected and it was concluded that age, prior military service, and level of education do not explain independent variance in TCLEOSE exam scores. *b* = Estimated values of raw (unstandardized) regression coefficients; *SE* = standard error; *t* = sample value of the *t*-test statistic; *p*-value = probability value.

Hypothesis 3 was tested using simple logistic regression analysis. The dependent variable was academy completion status (successful; unsuccessful). The independent variable was the initial polygraph test result ("No deception indicated"; Inconclusive or Deception Indicated"). The null hypothesis was rejected and it was concluded that polygraph test results are predictive of academy completion (see Table 4). The Nagelkerke *R* Square statistic was .044, which means that the polygraph test results explained only 4.4% of the total variance in academy completion status.

Considering that the results for testing Hypothesis 1 showed that age, prior military service and level of education were predictive of academy completion status, it was of interest to determine if the polygraph test result explained additional variation in academy completion status, above and beyond the variance explained by the three demographic variables. A stepwise multiple logistic regression analysis was performed in order to address this. The independent variables entered into the stepwise model selection procedure were age, prior military experience, initial polygraph test result, and level of education. All four independent variables were statistically significant. This means that polygraph test result ($p = .011$), age ($p = .003$), prior military service ($p = .003$), and education level ($p = .011$) provided independent information in predicting academy completion status. That is, the four independent variables explained independent variance in academy completion status. The Nagelkerke *R* Square statistic was .054 for age; .050 for prior military service; and .048 for polygraph test result, and; .043 for level of education. Thus, the most important predictor of completion status was age, followed by prior military service, polygraph test result, and level of education. The four independent variables collectively explained 19.5% of the variance in completion status.

Figure 1 illustrates the age disparity between successful and unsuccessful cadets.



Exploratory Analysis

The results of testing Hypotheses 1 and 3 showed that age, prior military service, level of education, and polygraph test results contributed independent information in predicting academy completion status. In order to further explore the relationships between the independent and dependent variables, bivariate analyses were conducted. A two-sample *t*-test was used to compare the average age between those who did, and did not, complete the academy. Chi-square tests were used to evaluate the relationships between prior military service, education level, and polygraph test results, and the dependent variable, academy completion status.

The average age was significantly smaller for those who completed the academy compared to those who failed the academy. Figure 1 is an error bar chart that shows the average and 95% confidence interval for the average age by academy completion status. The figure gives strong evidence that those who completed the academy tend to be younger on average, compared to those who fail the academy. The profile for Figure 1 illustrates the 95% confidence interval for age, as well as distributes the two categories of cadet age by completion status. Figure 1 clearly reveals disparity between the two status groups. The average (and standard deviation) age was 29.7 (6.8) versus 27.2 (6.1) for those who failed the academy and those who completed the academy, respectively, $t(193) = 2.31$; $p = .022$. This finding was consistent with the findings from hypotheses 1 and 3 where older age was associated with lower odds of completing the academy.

A chi-square test was performed in order to determine if there was an associationbetween level of education and academy completion status. There was not a statistically significant difference in the percentage of cadets that completed the academy among the four education groups, X^2 (3) = 5.85; p = .12. Although not statistically significant, the largest standardized residual (in absolute value) was 1.8, which shows the "some college" group contributed the most to the magnitude of the Chi-Square statistic. In particular, the percentage of cadets with "some college" that completed the academy (63.6%) was less than the percentage that completed the academy among the other 3 education groups (79.2% to 82.5%). This finding was consistent with the results from hypotheses 1 and 3 where the "some college" group was found to have lower odds of completing the academy compared to the other education levels. Specifically, age, prior military status and polygraph test results explained some of the variance in academy completion status. The residual variance (the variance left over) could be better attributed to other factors (i.e. level of education).

A chi-square test was performed in order to determine if there was an associationbetween polygraph test results and academy completion status. There was a statistically significantly smaller percentage of cadets that completed the academy with initial "Inconclusive or deception indicated" polygraph results, compared to those with a polygraph test result of "no deception indicated". The number (and percentage) of cadets that completed the academy was 100 (82.6%) versus 50 (67.6%) for the "No deception indicated" and "Inconclusive or deception indicated" groups, respectively, X^2 (1) = 5.88; p = .015. This finding was consistent with the findings from Hypotheses 1 and 3 where a polygraph test result of "inconclusive or deception indicated" was associated with lower odds of completing the academy.

Conclusion

There is an increasing body of research within police personnel selection; however, gaps remain as to what predictors tend to make the best cadet. Extending on the aforementioned statement, future research should consider how the process of training translates into making a better police officer. Physical fitness should be examined from the perspective of its impact to cadet attrition. Within this context, age would, on the surface, appear to hold some validity when considering high rates of cadet fallout. Anecdotal evidence suggests younger cadets would have less difficulty than older cadets in completing the physical challenges associated with state police academies. Research should consider peripheral analyses that incorporate academics and level of education at the time of attrition. Including this analysis might provide independent information as to which characteristics enhance cadet successfulness, as well as provide answers to the role of general intelligence in cadet attrition. Military experience has been shown to better prepare individuals for police academy settings (Campbell & Campbell, 2010). However, studies must be conducted that examine the military occupational specialty's (MOS) role in training (i.e., identifying which MOS better prepares an individual for a police academy). Additionally, it would be of interest to know which military

service (i.e. Air Force, Army, Marine Corps, or Navy) produces the best police cadet. Isolating these variables could assist military personnel in their transition out of the service and into the United States workforce. Police administrators could find such data useful in future recruiting endeavors. Meta-analysis studies should be conducted that expose the true utility of preemployment polygraph screening.

Research supports that age, prior military experience, and level of education have, to some degree, been shown as viable factors that predict cadet and future police officer performance (Aamodt, 2004; Peterson, 2002). Research also documents that GMA better predicts training and job performance than any other measure (Schmidt & Hunter, 1998), however, the current study did not support GMA (defined by test-taking ability) in predicting cadet training performance. Taking these ideas into context, it might be postulated that external stakeholders (society) would be better served by an officer who fits a certain demographic profile (i.e. age, military experience, level of education).

More effort is needed in the areas of research dedicated to general intelligence and polygraph results as they pertain to cadet performance. Empirical research documents the increasing utilization of polygraph testing in these settings. However, research fails to capture the essence of why government agencies place such trust in an instrument that is continually scrutinized for its controversy. Longitudinal studies that examine multiple polygraph testing techniques are needed to formulate hypotheses that either support or refute its usefulness in screening for the best cadet. Conducting research in these areas may tie together mechanisms that better predict cadet attrition and training performance; thus producing a better police officer.

Police agencies continue to evolve and scholars must produce research that is fruitful in the area of police personnel selection. More research is needed in the areas of effective measures of GMA and polygraph results as they relate to police personnel selection.

By examining current hiring procedures, police agencies stand a better chance to effectively implement strategies that compliment both agency and societal goals. Ultimately, this means incorporating hiring standards that are not only fair and legal, but remain competitive in order to facilitate the best possible outcome. From a police organizational perspective, a positive outcome is identifying hiring procedures that effectively capture the essence of what society demands; a competent officer that can protect his or her citizens. This, in turn, might provide police executives with insight as to the qualities they desire in a future officer. From a public safety standpoint, society is the benefactor by having the best qualified officers protecting their communities in an ever-changing world.

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