2019

Predicting Maritime Pilot Selection with Personality Traits

Tara Brook Barca
Walden University

Follow this and additional works at: https://scholarworks.waldenu.edu/dissertations

Walden University

College of Management and Technology

This is to certify that the doctoral dissertation by

Tara B. Barca

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Elizabeth Thompson, Committee Chairperson, Management Faculty
Dr. Terry Halfhill, Committee Member, Management Faculty
Dr. Aridaman Jain, University Reviewer, Management Faculty

The Office of the Provost

Walden University
2019

Abstract

Predicting Maritime Pilot Selection with Personality Traits

by

Tara B. Barca

MBA, University of Phoenix, 2006

BA, Binghamton University, 2003

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

Walden University

November 2019

Abstract

Maritime pilots provide a vital service in facilitating the safe and efficient passage of vessels into and out of ports and waterways worldwide. Lack of effective selection of maritime pilots can jeopardize the welfare of people, property, and marine ecosystems. Based on Edwards' conceptualization of person-job fit theory, this quantitative, ex post facto study was an examination of whether personality traits, as measured by the Personality Research Form E (PRF-E), could predict maritime pilot selection. The research questions were: (a) Is there a significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job and (b) How significant is the relationship between each of the 22 PRF-E scale ratings and selection for a maritime pilot job. Using a sample of 328 maritime pilot applicants, binary logistic regression was conducted to determine if any of the PRF-E variables were significant predictors of pilot selection. The results of the logistic regression analysis illustrated a significant predictive relationship between 9 of the 22 PRF-E scales and maritime pilot selection, specifically the traits of abasement, achievement, change, cognitive structure, dominance, harmavoidance, sentience, desirability, and infrequency. Future research should examine the relationship between selected maritime pilots' personality traits and job performance. Potential contributions to positive social change include improving the capability of maritime pilot commissions and associations to make more informed and effective selection decisions. The continued assessment of maritime pilot candidates' personality traits could support the prevention of future vessel accidents, ecological damage, human injuries, and fatalities.

Predicting Maritime Pilot Selection with Personality Traits

by

Tara B. Barca

MBA, University of Phoenix, 2006

BA, Binghamton University, 2003

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

Walden University

November 2019

Dedication

I dedicate this dissertation to my husband, Jason, whose love, encouragement, and patience were instrumental in making this achievement possible. Thank you for your steadfast confidence in my ability to succeed, especially on days when my sense of self-efficacy wavered. Your reassurance and support were essential in making this lifelong dream a reality.

Table of Contents

i

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Introduction

Maritime pilots are highly trained, expert mariners responsible for safely directing ships through difficult ports and waterways (Chambers & Main, 2015). The maritime pilot vocation is one of the most dangerous and high-risk jobs within the maritime industry (Hongbin, 2018). In ensuring the safe passage of vessels into and out of ports worldwide, maritime pilots directly influence the safety, efficacy, and overall success of maritime transportation operations.

Despite their critical role in stimulating safety and efficiency within the seafaring industry, maritime pilot preemployment screening processes remained insufficiently researched. In this study, I addressed this knowledge gap by investigating the relationship between personality traits and selection for a maritime pilot job. The research was important in identifying the personality traits of selected candidates compared to rejected applicants. This knowledge facilitated my creation of a personality profile of selected candidates that maritime pilot commissions and associations could reference during maritime pilot selection processes.

The results of this study facilitate positive social change by underpinning the selection of maritime pilots whose personality traits align with criteria established by maritime pilot commissions and associations. The research findings could support the prevention of vessel accidents, ecological damage, human injuries, and fatalities. The balance of this chapter includes the study background; problem statement; purpose; research questions; hypotheses; theoretical framework; nature; definitions; assumptions;

scope; delimitations; limitations; and significance of the study to theory, practice, and positive social change.

Background of the Study

Maritime accidents cause injuries and deaths, property damage, and total losses as well as environmental disasters (Maritime Injury Guide, 2017). In 2017, accidents within the maritime transportation industry killed 1,163 people and caused $197 million in insured losses (Insurance Information Institute, 2018). Comparatively, accidents involving recreational boats resulted in 5.5 deaths per 100,000 registered personal vessels and caused approximately $46 million in damage in 2017 (U.S. Coast Guard, 2017). The international shipping industry accounts for approximately 90% of global trade and generates over $500 trillion U.S. dollars in freight rates (Allianz Global Corporate & Specialty, 2017). In the United States, vessel safety is of paramount importance to economic stability and competitive advantage.

In facilitating the passage of large vessels within confined, congested, and dangerous waterways, maritime pilots significantly contribute to port safety, security, productivity, and prosperity (Hongbin, 2018). The critical nature of maritime piloting obligations requires the appointment of individuals who demonstrate utmost levels of concern for safety. Researchers have determined that workers' personality traits affect on-the-job safety behaviors (Beus, Dhanani, & McCord, 2015; Hogan & Foster, 2013).

Intrinsic characteristics that contribute to effective maritime piloting are often difficult to cultivate through formal or informal learning methods (Fjærli, Øvergård, & Westerberg, 2015). These dimensions include self-confidence, autonomy, clear

communication skills, situational awareness, risk assessment aptitudes, and the capacity to maintain composure under extreme pressure (Lo, 2015). Traditional preemployment interviews may not sufficiently aid hiring decision-makers in detecting the presence or absence of these and other attributes in candidates (Stuart, 2015). In identifying and quantifying candidates' noncognitive, behavioral, and motivational traits and preferences, prehiring personality assessments assist in appraising applicants' person-job (P-J) fit and ultimately enrich selection decisions (Peltokangas, 2014; Van Hoye & Turban, 2015).

Public safety agencies regularly administer preemployment personality assessments to measure and evaluate candidates' psychological fitness, noncognitive characteristics, and P-J fit (Colaprete, 2012). Researchers have established the effectiveness of conducting prehiring personality assessments for public safety vocations, including police officers, firefighters, and military personnel (Butcher, Ones, & Cullen, 2006; Lin, 2016; Lough & Von Treuer, 2013). Researchers have not affirmed the efficacy of preemployment personality testing for maritime pilot candidates. There is no standardized process among U.S.-based maritime pilot commissions or groups for recruiting, evaluating, and selecting maritime pilots (Kirchner & Diamond, 2011). Maritime pilot commissions and associations do not publicize the details of selection criteria and do not release the names of adopted preemployment assessments (Kirchner & Diamond, 2011).

In this study, I addressed both a gap in knowledge regarding personality traits as contributing elements of maritime pilot P-J fit and a gap in knowledge concerning the efficacy of a personality assessment, the Personality Research Form E (PRF-E; Jackson,

1984), in predicting maritime pilot selection and rejection outcomes. The study was needed because empirical research on personality characteristics that contribute to maritime pilot P-J fit was limited. Research on the relationship between personality traits and maritime pilot selection was notably absent.

Problem Statement

Maritime pilots function as expert leaders, protectors, consultants, and guides within high-traffic and hazardous waters (Orlandi & Brooks, 2018). The general problem was that errors made by selected maritime pilots could cause loss of life, injury to self and others, environmental catastrophes, and costly property damage (see Håvold, 2015). Despite their essential role in ensuring the welfare of people, property, and aquatic ecosystems, maritime pilot prehiring and selection processes remained insufficiently researched.

Maritime pilot commissions and associations use assessments to evaluate applicants' personality traits and job fit; however, disparities are prevalent within and between U.S. coastal states (Kirchner & Diamond, 2011). The specific problem was to determine whether personality instruments are effective in predicting the selection of maritime pilots. The results of this study may fill a gap in the research by indicating if personality traits were predictors of maritime pilot selection.

Purpose of the Study

The purpose of this quantitative, ex post facto study was to assess P-J fit theory by examining the relationship between personality traits, as measured by Jackson's (1984) PRF-E, and selection for a maritime pilot job. I used binary logistic regression to analyze

the predictive ability of personality dimensions on maritime pilot selection. The independent variables were the 22 scales of the PRF-E (see Jackson, 1984). The dependent variable was the selection outcome, selected or not selected for a job as a maritime pilot.

Research Questions and Hypotheses

Research Question 1: Is there a significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job?

Research Question 2: How significant is the relationship between each of the 22 PRF-E scale ratings and selection for a maritime pilot job?

H_0: There is no significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job.

H_1: There is a significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job.

Theoretical Foundation

I used Edwards' (1991) conceptualization of P-J fit theory as the theoretical framework for this quantitative, ex post facto study. P-J fit explores the connection between an individual's attributes, such as personality traits, and the characteristics required to perform a specific job (Edwards, 1991). Harmony between the individual and the job leads to positive individual and organizational outcomes (Follmer, Talbot, Kristof-Brown, Astrove, & Billsberry, 2018).

Sound P-J fit yields enhanced engagement, performance, satisfaction, commitment, and trust as well as decreased stress and turnover (Christiansen, Sliter, &

Frost, 2014; Kooij, van Woerkom, Wilkenloh, Dorenbosch, & Denissen, 2017; Kristof-Brown, Zimmerman, & Johnson, 2005; Peng & Mao, 2015). During the prehiring process, talent acquisition specialists attempt to distinguish suitable candidates from individuals whose qualities are incompatible with job activities and responsibilities (Chen, Yen, & Tsai, 2014; Chuang & Sackett, 2005). To determine if applicants possess appropriate levels of P-J fit, researchers have emphasized the importance of assessing candidates' personality traits (de Beer, Rothmann, & Mostert, 2016; Peltokangas, 2014; Van Hoye & Turban, 2015).

In this study, I applied the P-J fit paradigm as a theoretical basis to explore the relationship between candidates' personality traits, as measured by the PRF-E (Jackson, 1984), and selection for a maritime pilot job. Empirical research on personality traits as predictors of selection for the specific vocation of a maritime pilot was notably deficient. The study results expanded the body of P-J fit literature regarding personality as a potential antecedent of selection for the maritime pilot applicant population.

Nature of the Study

The nature of this study was quantitative research using a nonexperimental, ex post facto design and secondary analysis approach. The design was ex post facto because I retrospectively analyzed archived data with preexisting outcome groups without interfering (see Salkind, 2010). I did not use random sampling, random assignment, or variable manipulation techniques in this study, which are customary in conducting true experiments (see Goertzen, 2017).

The fundamental aim of quantitative research is to establish, verify, or support statistically significant relationships among measurable variables to inform and expand theory (Barnham, 2015). Researchers who employ quantitative methods attempt to observe, document, measure, and report phenomena in an objective, value-free manner (Donovan & Hoover, 2014). To generate impartial, unbiased, accurate, and conclusive results, quantitative researchers actively attempt to disprove their own theories by testing the null hypothesis (Warner, 2013).

A quantitative method was most appropriate to use in this study because the historical data were in numerical form. My primary research objective was to determine if there was a statistically significant relationship between personality traits, as measured by the PRF-E (Jackson, 1984), and selection for a maritime pilot job. The research questions and hypotheses arose from known variables. Considering the timeframe for this study and the sample size ($N = 328$), the use of a qualitative method would have hindered the feasibility of the study as well as the potential positive impact on theory, practice, and social change.

The population consisted of individuals who applied for a job as a maritime pilot within the United States. The sample consisted of 328 candidates who applied for a maritime pilot job within a particular maritime pilot organization located in the United States. Of the 328 candidates, 111 were selected and 217 were not selected for the maritime pilot job. As part of the prehiring process, the maritime pilot group contracted a third-party consulting organization to administer a battery of tests to the 328 applicants, including the PRF-E (Jackson, 1984). I compared archived numerical data that the third-

party consulting organization derived from applicants' completed PRF-E assessments with applicants' selection decisions.

The maritime pilot organization contracted the third-party organization and made applications available to the public biennially from 1998 to 2018. The third-party organization collected, analyzed, and archived applicants' PRF-E (Jackson, 1984) ratings and selection decisions over a period of 11 years. The third-party organization electronically coded, compiled, and anonymized the data using Microsoft Excel.

The independent variables in this study were the 22 scales of the PRF-E (see Jackson, 1984). The dependent variable was the dichotomous selection outcome, selected or not selected for a job as a maritime pilot. A binary logistic regression model was suitable to determine if respondents' PRF-E ratings predicted selection for maritime pilot job openings. Binary logistic regression analysis predicts the relationship between multiple independent variables, known as predictor variables, and one dependent variable, known as the outcome variable (Emerson, 2018). A quantitative binary logistic regression analysis was the most appropriate research method for this study because the dependent variable, selection as a maritime pilot, was dichotomous in nature as applicants were either selected or not selected (see Warner, 2013). Using a quantitative, ex post facto analysis, I identified the personality traits that were most predictive and least predictive of selection for a maritime pilot job.

Definitions

Maritime pilot: An individual who commands "ships to steer them into and out of harbors, estuaries, straits, or sounds, or on rivers, lakes, or bays" (O*NET, 2018, para. 1).

Maritime pilot association: A company that organizes maritime pilots to operate within a specific "port or waterway area" and that works collaboratively with a maritime pilot commission or board to select and train maritime pilots (American Pilots' Association, 2015b, para. 5).

Maritime pilot commission or board: A "state-recognized governmental entity that is part of a state agency or of a local municipality or port authority" responsible for selecting, training, and issuing licenses to maritime pilots and overseeing maritime pilot association operations (American Pilots' Association, 2015b, para. 2).

Maritime pilot selection: The process of interviewing, evaluating, and selecting individuals for maritime pilot vacancies with the objective of choosing candidates who demonstrate compatibility with the job tasks, organization, and work environment (Ardıç, Oymak, Özsoy, Uslu, & Özsoy, 2016; Kirchner & Diamond, 2011).

Maritime pilot selection outcome: The state of an individual being accepted or not accepted for a job as a maritime pilot (Kirchner, 2008).

Person-job (P-J) fit: The degree of compatibility between an individual's characteristics and the attributes required to perform a job effectively (Edwards, 1991).

Personality Research Form E (PRF-E): A 352-item personality assessment that measures 20 personality traits in respondents (i.e., abasement, achievement, affiliation, aggression, autonomy, change, cognitive structure, defendence, dominance, endurance, exhibition, harmavoidance, impulsivity, nurturance, order, play, sentience, social recognition, succorance, and understanding) and two control variables (i.e., desirability

and infrequency; Jackson, 1984). See Appendix A for the operational definitions of PRF-E variables.

Personality trait: A characteristic or quality that reflects an individual's attitudes, outlooks, actions, and motivations (Eysenck, 1976).

Assumptions

My first assumption concerning this research was that maritime pilot commissions and associations strive to select maritime pilots who will demonstrate positive posthire safety performance. Another assumption was that certain personality traits correlate with safe performance, whereas others correlate with unsafe performance. I also assumed that accidents, injuries, fatalities, and environmental damage occur when maritime pilots lack the personality traits that are associated with conducting operations safely. It was also assumed that the study sample was representative of the larger maritime pilot candidate population. Another assumption was that participants honestly and accurately responded to the PRF-E (Jackson, 1984) items. I assumed that the PRF-E is a well-calibrated, psychometrically sound instrument to use in personality research. It was also assumed that the hiring maritime pilot organization formed selection decisions based in part on applicants' PRF-E results. A final assumption was that the data met the assumptions associated with conducting binary logistic regression analysis.

Scope and Delimitations

I confined the scope of this study to the impact of personality trait ratings on maritime pilot job selection. The sample included 328 individuals who applied for a maritime pilot job biennially from 1998 to 2018 within a specific U.S.-based maritime

pilot organization. The research was focused on determining whether personality trait ratings, as measured by the PRF-E (Jackson, 1984), predicted maritime pilot selection outcomes.

I chose this specific focus because there was no empirical research to support the use of personality assessments to inform maritime pilot selection decisions. The study was delimited to maritime pilot job applicants and the results were not generalizable to other populations. I selected P-J fit theory as the theoretical basis for this study because the paradigm enables hiring decision-makers to evaluate compatibility between a candidate's characteristics, such as personality traits, and the qualities required to perform a particular job (see Edwards, 1991).

In this study, I used archived data supplied by a private organization that a maritime pilot group contracted to prescreen maritime pilot applicants and provide selection recommendations. The archived, numerical data were best suited to a quantitative analysis. A nonexperimental, ex post facto design was suitable for this study because I did not randomly select the sample, the maritime pilot organization previously assigned participants to groups, and I did not manipulate any of the variables (see Salkind, 2010). Binary logistic regression was the optimal mode of analysis for this study because the dependent variable was dichotomous (see Warner, 2013). The research aim was to evaluate the probability of maritime pilot selection occurring based upon the 22 personality traits measured by the PRF-E (see Jackson, 1984).

Limitations

One limitation of this study was that the sample was restricted to individuals who applied for a maritime pilot job within one maritime pilot organization. The sample included 308 males and 20 females; therefore, the ratio of male to female respondents was disproportionate. Because I used an ex post facto research design in this study, the maritime pilot organization previously assigned participants to outcome groups, namely, selected or not selected for a maritime pilot job. It was impossible to demonstrate that the independent variables, rather than confounding variables, caused the difference between groups. Participants' PRF-E (Jackson, 1984) ratings were one of several criteria in making maritime pilot selection or rejection decisions.

The generalizability of the results to the larger maritime pilot applicant population may be limited because I did not randomly select participants. I did not randomly assign participants to treatment and control groups or manipulate the variables, potentially weakening internal validity (see Salkind, 2010). Selection bias is a typical concern in nonexperimental predictive studies because researchers may lack information regarding participant dropouts (Tabachnick & Fidell, 2018). I obtained confirmation from the third-party organization to ensure that the final sample included data from all eligible applicants beginning at the time that job postings were made available to the public.

The PRF-E (Jackson, 1984) data were self-reported by participants who knew that they were completing the assessment as part of a prehiring process, which could have introduced response bias. The PRF-E instrument includes two control variables, desirability and infrequency, which could reduce the potential negative effect of response

bias (see Jackson, 1984). These variables were designed to measure respondents' test-taking attitudes and to identify instances of participants responding to questions in a careless or purposeful manner (Jackson, 1984).

To achieve adequate statistical power, logistic regression analysis requires 15 to 50 outcome events per independent variable (see Hosmer, Lemeshow, & Sturdivant, 2013; Warner, 2013). This study included 22 independent variables; therefore, the minimum number of outcome events should have been 330. Data from 328 selection outcome cases were available for this quantitative, ex post facto study; however, the accumulation of data over a considerable period, specifically 11 years, assisted in establishing a collective culture of personality patterns within the sample.

Another potential limitation of this study was the separation of roles, namely me as the researcher versus being a former employee of the third-party organization that collected the data. I took preemptive measures throughout every research phase to minimize bias and to ensure the absence of conflicts of interest between myself and the data. A final limitation was that there was limited scholarly research on the relationship between personality traits and selection for a maritime pilot job. I referenced supporting literature in which researchers explored the relationship between P-J fit, personality traits, and selection of candidates within similar public safety service roles, such as law enforcement, military, and firefighting.

Significance of the Study

Significance to Theory

Empirical researchers have not adequately examined factors that contribute to

maritime pilots' P-J fit. The results of this study advanced theory by filling a gap in the literature concerning personality traits as antecedents of suitable P-J fit levels within the maritime pilot applicant population. Empirical research on personality traits as predictors of selection for the specific vocation of a maritime pilot was notably absent. The findings of this study also filled a gap in the literature concerning the effectiveness of a personality instrument, the PRF-E (Jackson, 1984), in predicting selection for a maritime pilot job.

Significance to Practice

Preemployment personality assessments assist hiring decision-makers in appraising candidates' P-J fit (Ehrhart & Makransky, 2007). High levels of P-J fit can promote positive individual and organizational effects (Christiansen et al., 2014). In studying the relationship between personality traits and maritime pilot selection outcomes, a personality trait pattern emerged that facilitated the development of a personality profile of selected maritime pilot applicants. Such a profile could enhance maritime pilot applicants' prehire P-J fit evaluations. Maritime pilot commissions and associations could use this profile to screen out misfit candidates and identify the applicants who possess desired personality traits. The results of this study positively influenced advances in practice by guiding maritime pilot commissions and associations in selecting candidates who demonstrate personality dimensions that align with those of selected maritime pilot applicants. Improved understanding of personality traits as predictors of selection for a maritime pilot job could assist maritime pilot commissions and associations in making more informed and effective selection decisions.

Significance to Social Change

The results of this study stimulate positive social change by assisting maritime pilot commissions and associations in selecting maritime pilots who demonstrate sound P-J fit. The potential consequences of selecting misfit maritime pilots include squandered financial resources related to selection and training, property damage, ecological integrity breaches, and most significantly, threats to human safety. In predicting if maritime pilot candidates possess the personality traits that are most critical in upholding organizational and public safety standards, the findings of this study could assist in preventing serious on-the-job accidents, environmental harms, injuries, and fatalities.

Summary and Transition

I intended this study as a starting point to explore the predictive ability of personality traits, as measured by the PRF-E (Jackson, 1984), on maritime pilot selection. The capacity to select candidates who will demonstrate utmost levels of on-the-job safety is critical to the overall welfare of the maritime transportation industry. The results of this study provided a fundamental foundation that maritime pilot commissions and associations could use to enhance the efficacy of their talent acquisition operations.

Chapter 1 of this study included the introduction, background, problem statement, purpose, research questions, and hypotheses. This chapter also contained the theoretical framework, nature, definitions, assumptions, scope, delimitations, and limitations of the study. I also highlighted the significance of the study to theory, practice, and positive social change. I uncovered gaps in the literature concerning the assessment of personality traits in forecasting maritime pilot applicants' P-J fit and regarding the effectiveness of

the PRF-E (Jackson, 1984) in predicting maritime pilot selection. An enhanced understanding of the predictive ability of personality traits on maritime pilot selection could enable more effective hiring decisions, ultimately improving public safety.

In Chapter 2, my review of the literature will encompass Edwards' (1991) conceptualization of P-J fit theory, the maritime pilot's role in the marine transportation industry, and preemployment personality assessments used by public safety agencies. Chapter 2 will also include a review of background literature on quantitative, ex post facto research design and binary logistic regression. Chapter 3 will contain descriptions of the research design and rationale, methodology, data analysis plan, and threats to validity. In Chapter 4, I will incorporate the results of the study, whereas Chapter 5 will include a discussion on the research conclusions and recommendations.

Chapter 2: Literature Review

Introduction

The purpose of this quantitative, ex post facto study was to assess P-J fit theory by examining the relationship between personality traits, as measured by Jackson's (1984) PRF-E, and selection for a maritime pilot job. Maritime pilots serve as expert leaders, protectors, advisors, and guides within congested and dangerous waters (Orlandi & Brooks, 2018). Errors made by maritime pilots could cause loss of life, injury to self and others, environmental catastrophes, and costly property damage (Håvold, 2015). Researchers have not sufficiently investigated the relationship between the maritime pilot selection process and candidates' personality traits. Due to maritime pilots' crucial role within the marine transportation industry, a critical need existed for research regarding the relationship between personality traits and selection for maritime pilot vacancies.

Many agencies within public service industries, such as military, law enforcement, and firefighting, use personality assessments as part of prehiring processes to screen applicants for psychological fitness and job fit (Salters-Pedneault, Ruef, & Orr, 2010; Stark et al., 2014; Tarescavage, Corey, Gupton, & Ben-Porath, 2015). Research has supported the effectiveness of conducting prehiring personality screenings for public safety job candidates (Lowmaster & Morey, 2012; Niebuhr et al., 2013; Tarescavage, Cappo, et al., 2015). Although maritime pilot commissions and associations use assessments to evaluate applicants' personality traits and job fit, variations are prevalent within and between U.S. states (Kirchner & Diamond, 2011).

In the subsequent review of the literature, I demonstrate that there is a need to determine whether personality instruments are effective in predicting the selection of maritime pilots. This chapter contains current and seminal research on the theoretical framework of Edwards' (1991) P-J fit theory; the maritime pilot's role in the maritime transportation industry; preemployment assessments in talent acquisition; the quantitative, ex post facto research design; and binary logistic regression. In discussing these topics through both historical and contemporary perspectives, I identify a gap in the literature and reinforce the need for research that explores the relationship between personality traits and selection for a job as a maritime pilot.

Literature Search Strategy

My search strategy for this study consisted of using seminal literature; scholarly, peer-reviewed articles published mainly after 2013; conference papers; maritime-related websites; and books. The following databases and search engines were used to acquire extant research: Academic Search Complete, Business Source Complete, Directory of Open Access Journals, Emerald Insight, Expanded Academic ASAP, Google Books, Google Scholar, Hospitality & Tourism Complete, InfoTrac LegalTrac, IEEE Xplore Digital Library, MEDLINE with Full Text, ProQuest, PsycARTICLES, PsycINFO, Science Citation Index, ScienceDirect, Social Sciences Citation Index, and SocINDEX with Full Text. Search terms and combinations of search terms used for research were as follows: *maritime personality traits*, *maritime pilot*, *maritime safety*, *personality assessment*, *personality traits*, *personality traits and selection*, *person-job fit*, *prehiring*

personality screening, *public safety employee personality traits*, and *public safety employee selection.*

There was a significant gap in the scholarly literature regarding personality traits as predictors of selection for a maritime pilot job. To counteract this gap, I located peer-reviewed articles that examined the relationship between personality traits and selection for comparable public safety jobs, including military, law enforcement, and firefighting vocations. No scholarly literature was available on maritime pilot selection and hiring processes. I accessed government, maritime piloting, and maritime news websites to identify current, pertinent information on the aforementioned processes.

Table 1

Literature Review Source Types

	Peer-reviewed journals	Conference proceedings	Books	Dissertations	Websites	Assessment manuals
Number cited	104	4	27	1	23	15

Theoretical Foundation

The theoretical framework for this quantitative study was Edwards' (1991) conceptualization of P-J fit, emphasizing that alignment between a person's characteristics and the responsibilities and activities of a job positively influence individual and organizational results. P-J fit is a concept that researchers have investigated in various contexts since the early 20th century (Bayram, 2018). Edwards defined P-J fit as the degree of harmony between an employee's capacities and the qualities required to perform a job effectively. The fundamental premise of P-J fit is that

a person's attributes and those of a specific job work jointly to determine outcomes (Edwards, 1991).

P-J fit is one type of person-environment (P-E) fit, a concept grounded in Lewin's (1951) field theory, which postulated that human behavior is a function of interconnected individual characteristics and environmental factors that form a psychological energy field called the life space. P-E fit assesses the degree of fit between an individual's characteristics, such as personality traits, values, objectives, knowledge, and abilities, and environmental factors, including organizational cultures, occupational norms, vocational characteristics, and job demands (Cai, Cai, Sun, & Ma, 2018). In addition to P-J fit, types of fit that researchers have studied under the P-E fit umbrella are person-organization fit, person-supervisor fit, person-group fit, person-vocation fit, and person-person fit (Seong, Kristof-Brown, Park, Hong, & Shin, 2015).

Researchers have underpinned P-J fit theory with other models that emphasized a relationship between individual and environment characteristics. These models include Murray's (1938) need-press theory of personality called personology, Holland's (1973) theory of vocational choice, and Schneider's (1987) attraction-selection-attrition model (Ehrhart, 2006; Ehrhart & Makransky, 2007; Follmer et al., 2018; Sharif, 2017). Recent literature within various social science disciplines, including business management, industrial-organizational psychology, organizational behavior, organizational development, and human resource management, has focused on strategies to assist employees and organizations achieve increased levels of P-J fit (de Beer et al., 2016; Kooij et al., 2017; Lee, Reiche, & Song, 2010; Peltokangas, 2014).

Edwards (1991) made a distinction between two perspectives of P-J fit: demands-abilities fit and needs-supplies fit. Demands-abilities fit stipulates that an individual possesses the knowledge, skills, and abilities (KSAs); education; and experience to meet or exceed job demands, including performance and workload requirements (Edwards, 1991). Needs-supplies fit occurs when the occupational, organizational, and job attributes match an individual's personality, psychological and biological needs, desires, goals, values, interests, and preferences (Edwards, 1991; Kristof, 1996). Researchers have affirmed that high levels of both demands-abilities fit and needs-supplies fit positively affected employees' well-being, job satisfaction, and performance (Lin, Yu, & Yi, 2014; Peng & Mao, 2015).

Sound P-J fit is widely regarded by researchers as a significant predictor of various employee outcomes. Workers' contextual and task performance, engagement, productivity, satisfaction, organizational commitment, and trust positively increased when the job details and requirements matched their personal attributes and professional qualifications (Christiansen et al., 2014; Kooij et al., 2017). High levels of P-J fit increased employees' overall well-being, decreased stress, inhibited undesirable behaviors, and reduced turnover (Follmer et al., 2018; Kristof-Brown et al., 2005).

Sound P-J fit positively influences self-efficacy, or the belief an individual possesses in their innate capacity to organize and implement the courses of action that are required to attain goals (Bandura, 1997). Peng and Mao (2015) asserted that those who possessed the personal attributes needed to meet job demands experienced less work-related stress and were more likely to receive constructive recognition from supervisors.

These factors led to enhanced perceptions of personal capacity, self-confidence, and ultimately, job satisfaction (Peng & Mao, 2015). van Loon, Vandenabeele, and Leisink (2017) found that P-J fit fully mediated the relationship between public service motivation, or a person's drive to positively influence society, and in-role behavior, or performing assigned tasks in a manner that meets standards.

A lack of P-J fit can lead to negative individual and organizational outcomes. Kristof-Brown et al.'s (2005) meta-analysis highlighted numerous undesirable consequences of poor P-J fit, including employee resignations, demotions, and terminations. Ardıç et al. (2016) emphasized that as P-J fit levels increased, employees' intentions to quit their jobs decreased. Likewise, Brenninkmeijer, Vink, Dorenbosch, Beudeker, and Rink (2018) argued that self-perceptions of job misfit can interfere with work performance and prompt employees to pursue other jobs that offer higher levels of fit.

Sound P-J fit denotes favorable correspondence between an individual's personal characteristics and the responsibilities and activities of a particular occupation (Chen et al., 2014). Christiansen et al. (2014) emphasized that misfit between personality traits and job demands prompts feelings of anxiety, discomfort, and distress, which negatively affect levels of employee motivation, performance, and job satisfaction. When supervisors ask employees to perform tasks that deviate from their preferences, capacities, and comfort levels, they can become withdrawn, cynical, and disengaged from their work (Christiansen et al., 2014; Follmer et al., 2018).

Cai et al. (2018) purported that organizations can positively influence employees' P-J fit perceptions by providing development opportunities that strengthen alignment between personal qualities and job demands. Cai et al.'s research findings aligned with de Beer et al.'s (2016) assertion that employers can enrich employees' P-J fit perceptions and subsequently foster positive states of work engagement by providing job resources that correspond with workers' needs. To enhance P-J fit perceptions postappointment, those tasked with making hiring decisions must first establish that prospective employees possess suitable P-J fit levels during the recruitment and selection process (de Beer et al., 2016).

Researchers have identified a significant connection between candidates' personality traits, intent to hire, and job selection (Ehrhart & Makransky, 2007; Peltokangas, 2014; Shane, Cherkas, Spector, & Nicolaou, 2010). P-J fit is a fundamental criterion that organizational leaders and hiring managers assess in applicants during initial and subsequent job interviews (Chuang & Sackett, 2005). To maximize the positive individual and organizational outcomes that result from congruence between employee characteristics and job attributes, the assessment of P-J fit is a critical component of the selection process.

In the increasingly complex and continually evolving global business environment, contemporary organizations strive to achieve sustainable competitive advantage while communicating a compelling, unified vision that appeals to a diverse range of stakeholders (Schuler, Jackson, & Tarique, 2011). Human resource scalability, or the capacity of an organization to attract, hire, and engage individuals who fulfill job

tasks in a manner that yields positive organizational outcomes, is a potent source of competitive advantage (Dyer & Erikensen, 2005). To foster long-term success and sustainability, organizational decision-makers must analyze and prepare for all of the components within the talent management lifecycle, specifically recruitment, selection, development, engagement, retention, and transition (Mirchandani & Shastri, 2016).

Traditionally, P-J fit researchers focused on congruence between a person's KSAs and job demands. Ehrhart (2006) identified a critical deficiency in prior research concerning personality as an antecedent of P-J fit. Contemporary researchers have also emphasized that individuals' personality traits are critical determinants of job fit (Christiansen et al., 2014; Peltokangas, 2014; Van Hoye & Turban, 2015). Neumann (2016) found that job seekers were most attracted to positions offering intrinsic and extrinsic motivational incentives that matched their own personal interests, needs, values, and motivations. Muldoon, Kisamore, Liguori, Jawahar, and Bendickson (2017) emphasized that successful selection decisions and subsequent positive performance relied on evaluating candidates' personality traits in the context of specific job situations.

Almost three decades ago, Bowen, Ledford, and Nathan (1991) urged organizational decision-makers to reform their conventional selection processes in favor of more comprehensive paradigms that evaluate both immediate and long-term P-J fit. To stimulate optimal selection decisions and maximize P-J fit, hiring personnel should determine how well candidates' entire makeups, not merely their KSAs, align with current job requirements, anticipated future job functions, and organizational cultures (Bowen et al., 1991). Personality testing is one method that organizations use to

determine if an applicant's character traits match those required to perform job tasks (Ehrhart & Makransky, 2007).

Researchers have studied various types of fit that focus on achieving harmony between a person and a work environment, organization, or group; however, P-J fit was the optimal paradigm for this study because it encompasses a structure that appraises compatibility between an individual's characteristics, including personality traits, and the attributes required to perform a specific job. In this study, I built upon existing P-J fit theory by determining if there was a significant relationship between personality traits and selection for a job as a maritime pilot. The results supplemented the limited body of literature concerning personality as a potential antecedent of selection and P-J fit for the maritime pilot applicant population.

The Pilot's Role in the Maritime Transportation Industry

Maritime transportation involves the movement of people and products via masses of water on various types of sea vessels, including ships, boats, and barges (Paine, 2015). Evidence of organized maritime transport dates back approximately 40,000 to 50,000 years ago when humans of the Upper Paleolithic period migrated from Asia to Australia using primitive rafts or boats (Woodman, 2012). Early seafarers constructed watercrafts using natural materials, such as animal skins and plant materials, and navigated waterways using their hands or long poles until the invention of the oar in approximately 4,000 B.C. (Chopra, 2017).

In advancing the construction of wooden boats with sails, the Mesopotamians, Phoenicians, and Egyptians made it possible to complete longer voyages with heavier

loads and less physical labor (Woodman, 2012). In the 19th century, the widespread use of steam engines, iron, and steel transformed seafaring vessels into powerful ocean navigators with increased cargo space and a reduction in required crewmembers (Paine, 2015). Modern shipbuilders continue to use welded steel in the construction of large vessels, although they also use lightweight materials, such as aluminum, fiberglass, and plastics in building smaller ships (Woodman, 2017). The modern international maritime transportation industry accounts for approximately 90% of global trade and generates over $500 trillion U.S. dollars in freight rates (Allianz Global Corporate & Specialty, 2017).

The Roots of Maritime Pilotage

Customarily, captains of large oceangoing vessels are expert navigators who possess intricate knowledge of their ships' specifications, load capacities, and limits (Canaveral Pilots, 2014). Despite their expertise, they often lack the shiphandling experience and knowledge of local ports that are required to safely and efficiently maneuver, dock, and undock vessels in restricted waterways (Li, Yu, & Desrosiers, 2016). Throughout history, captains have relied on the local knowledge and experience of maritime pilots, also known as harbor pilots, marine pilots, ship pilots, or simply, pilots (Chakrabarty, 2016; Ernstsen & Nazir, 2018; Kirchner, 2008).

The maritime pilot vocation is one of the oldest and least publicly known of the maritime professions. The historical roots of ship pilotage can be traced to the 6th century B.C. in the Hebrew Bible's Book of Ezekiel in which the term pilot is described four times as a ship's guide (Eze 27:3b-11; Fédération Française des Pilotes Maritimes, 2018).

In ancient Greek and Roman civilizations, authors such as Homer and Virgil wrote about pilots as seafarers who guided ships through dangerous waterways (Bach, 2009). Marco Polo employed Arab pilots during his first voyage to Asia in 1275 A.D. (The New Jersey Maritime Pilot and Docking Pilot Commission, 2011).

Prior to the establishment of regulated pilotage boards, early pilots were customarily fishermen hired by trading vessel captains to ensure the safe passage of goods and passengers within confined waterways (Canaveral Pilots, 2014). Competition for pilotage assignments was fierce amongst unlicensed boatmen, known as hobblers, who possessed intricate knowledge of local waters (Cunliffe, 2001). In the late 18th century, the demands and complexities of the global maritime transportation industry increased, prompting the need to regulate the issuance of pilot licenses and implement uniform operational pilotage standards (Kirchner & Diamond, 2011).

The Contemporary Maritime Pilot

At 1:30 a.m. on a frigid February morning, a lone individual leaps from a small boat rocking violently in rough waters to an icy rope ladder hanging from a moving 1,000 ft crude oil tanker with 300,000 tons of deadweight. High crested waves, heavy snow, and strong wind gusts make visibility nearly impossible as the person climbs 30 feet up the side of the vessel's hull. The individual is calm, alert, focused, and precise, knowing that a minor misstep will result in severe injury or certain death.

The person safely boards the vessel, proceeds to the bridge, quickly develops rapport with the bridge team, and exchanges pertinent information with the captain, including local conditions, the navigation plan, and vessel characteristics. Immensely

high stakes persist as the individual provides helm and engine commands to the officer steering the massive vessel, precisely maneuvering it into a busy harbor teeming with other commercial ships, tugboats, fishing boats, and pleasure crafts. One misdirection could lead to property damage, ecological harm, injury, and loss of life.

After safely directing the ship through inland waters, the individual directs and oversees the process of berthing or anchoring the vessel. The vessel's crew works with landside personnel to deliver 2 million barrels of crude oil valued at over $100 million. Once the captain confirms fulfillment of the vessel's business in port, the individual again provides navigation guidance to the captain and officer at the con to exit the port. Upon safely navigating the ship out of port to open water, the individual climbs down the rope ladder, boards the awaiting escort boat, and anticipates orders to complete this process again aboard the next incoming ship. This is a typical day in the life of a contemporary maritime pilot.

O*NET (2018) described a maritime pilot as an individual who commands "ships to steer them into and out of harbors, estuaries, straits, or sounds, or on rivers, lakes, or bays" (para. 1). Modern maritime pilots are expert mariners responsible for safely guiding large vessels into and out of confined ports and waterways worldwide (Lobo, 2016). They serve as ambassadors of their respective countries and are often the first point of contact to foreign captains and crews aboard arriving ships (Hongbin, 2018).

Known as a high-risk profession within the maritime industry, maritime pilotage requires the planning, executing, and monitoring of multifaceted, interdependent procedures (Chambers & Main, 2015). Due to each port's unique topography, fluctuating

traffic, and differing navigational hazards, the maneuvering of large oceangoing vessels as they enter and exit ports is often the most dangerous part of a sea voyage (Li et al., 2016). Captains of such vessels request the advice and assistance of maritime pilots (Fritelli, 2008).

Maritime Pilotage Training, Licensing, and Regulations

Maritime pilots are essential figures in protecting human life, property, and marine ecosystems within harbors, sounds, straits, rivers, bays, and lakes (Kirchner, 2008). Prospective maritime pilots must fulfill rigorous application, study, practical training, testing, and licensing requirements. In the United States, the act of maritime pilotage remained unregulated until 1789 when the first U.S. Congress concluded that each state should regulate pilotage within their respective waters under the Commerce Clause of the U.S. Constitution (American Pilots' Association, 2015b; Kirchner & Diamond, 2011). In U.S. waters, two governmental bodies, state and federal, govern contemporary pilotage operations.

Maritime pilots working in one of the 24 coastal U.S. states are required to obtain a state-issued license granted by a state-specific maritime pilot commission or board, with the exception of Hawaii in which pilot regulations are governed "by an official within the state's Department of Commerce and Consumer Affairs" (Kirchner & Diamond, 2011, p. 190). U.S. federal law requires certain incoming coastwise vessels to procure the services of a maritime pilot who holds a federal first class pilot's license issued by the United States Coast Guard (USCG) (American Pilots' Association, 2015b; Kirchner & Diamond, 2011). All state licensed pilots must also attain a federal pilot

license for specific waterways (International Maritime Pilots' Association, 2018).

Because each port's details are drastically different, both state and federal licensed pilots

are restricted to working within the waterways specified in the respective license

(Kirchner & Diamond, 2011).

The minimum education requirement to become a maritime pilot trainee is a high

school diploma or maritime vocational school certificate (Florida Harbor Pilots, 2019).

Most state maritime pilot commissions and associations require that applicants hold a

bachelor's degree conferred by a federal or state merchant marine academy (O*NET,

2018). Some state maritime pilot commissions and associations require that applicants

hold a minimum of the USCG third mate unlimited deck license, whereas others require

the USCG unlimited master license, which permits the holder to wholly command any

size and type of vessel (Kirchner & Diamond, 2011). Age restrictions often accompany

state pilot applicant eligibility requirements. For instance, the Board of Pilot

Commissioners for Harris County Ports in Houston, Texas requires that applicants be a

minimum of 25 years old and a maximum of 68 years old (Board of Pilot Commissioners

for Harris County Ports, 2017).

Prior to becoming eligible for U.S. state pilot training programs or

apprenticeships, which typically range from 4 to 7 years, maritime pilots customarily

work extensively in various maritime industry settings, such as aboard commercial

vessels that sail deep-sea or on tugboats operating within inland waters (American Pilots'

Association, 2015b). In conjunction with classroom and simulator-based training, state

pilot trainees complete rigorous route-specific, hands-on training aboard various vessel

types under the supervision of experienced pilots (Kirchner, 2008). After many years of

training and study, prospective pilots sit for state pilot examinations that assess

seamanship KSAs and require applicants to draw detailed pilotage route charts from

memory (Florida Harbor Pilots, 2019).

State licensed pilots must fulfill continuing education requirements established by

state maritime pilot commissions, including courses in emergency shiphandling,

electronic navigation technology, and bridge resource management (American Pilots'

Association, 2015b). Federal pilot license continuing education requirements are minimal

in that license holders must "transit the particular pilotage route" for which they are

licensed every five years (Kirchner & Diamond, 2011, p. 197). State-recognized maritime

pilot commissions or boards govern pilot associations and are responsible for overseeing

pilot selection, training, the issuance of state licenses, and accident or complaint

investigation processes (American Pilots' Association, 2015b).

Maritime Pilot Application and Selection Processes

Local maritime pilot associations collaborate with state maritime pilot

commissions to recruit, screen, select, hire, and train maritime pilots who work in a

specific body of water as independent contractors (Patraiko, 2017). Although organized

within a pilot association, state maritime pilots are typically self-employed professionals

(American Pilots' Association, 2015b). As independent nonemployees, the fiscal burdens

and expectations of state maritime pilot commissions, port authorities, and shipping firms

do not influence maritime pilots (Canaveral Pilots, n.d.). Consequently, maritime pilots

can objectively evaluate conditions and fulfill duties in a manner that minimizes risk and maximizes safety.

Historically, existing pilots passed down the maritime pilotage profession from one generation to another and even in contemporary instances, family members and friends of incumbent pilots have received preferential treatment in the maritime pilot application and selection process (Dolan & Pringle, 2016). Highly competitive application, screening, and selection methods have predominantly replaced the antiquated practice of hiring relatives or acquaintances for maritime pilot vacancies (Winters, 2004). The majority of U.S. maritime pilot commissions and associations have abolished nepotistic hiring practices and select maritime pilot trainees based on various factors, including the element of P-J fit, that discount ancestral connections (American Pilots' Association, 2015b).

Although contemporary U.S. maritime pilot commissions and associations typically conduct prehiring application, assessment, and interviewing processes, there is no single common process of soliciting, assessing, and selecting applicants among them (Kirchner & Diamond, 2011). Maritime pilot commissions and associations usually announce maritime pilot vacancies and outline minimum application requirements on their websites and/or in maritime newsletters (American Pilots' Association, 2015b). However, they do not make public the specific details of maritime pilot prehiring and selection procedures and do not disclose the names of prescreening assessments that measure applicants' intelligence levels, job knowledge, aptitudes, personality traits, and vocational interests.

KSAs and Personal Attributes of Maritime Pilots

Upon selection, apprentice maritime pilots undergo specialized training to maneuver numerous types of vessels, including cargo ships, container ships, bulk freighters, tankers, and passenger ships, through congested or dangerous waterways in various weather conditions (Kitamura, Murai, Hayashi, Fujita, & Maenaka, 2014). They defend local waterways against a myriad of apparent and underlying threats and safeguard vessels against damage, protect the lives of numerous individuals on and around those vessels, and prevent environmental disasters (Main & Chambers, 2015). Organizations within the maritime sector rely on pilots for their expert knowledge, sound judgment, proactive communication skills, and capacity to perform effectively in extremely high-pressure situations (Boudreau, Lafrance, & Boivin, 2018). Even a seemingly minute error of misdirection, misjudgment, or miscommunication can endanger lives, harm the environment, and cost millions of dollars in property damage (Canaveral Pilots, n.d.).

Maritime pilots possess specialized knowledge of port conditions, including local marine traffic, water depths, tides, currents, weather, and winds (Chakrabarty, 2016). They also maintain expert, up-to-date knowledge of a diverse range of vessel types; ships' specifications; and a wide variety of marine technology, equipment, and navigational instruments (Okazaki & Ohya, 2012). The skills requisite to effective maritime pilotage include physical agility; sound judgment; planning; communication; decision-making; situational awareness; quick reflexes; diplomacy; and the capacity to maintain a composed, commanding, and reassuring presence in critical conditions (Lobo,

2016). A maritime pilot's expert local knowledge and experience, sound judgment, critical decision-making skills, effective communication capacities, and proactive safety attitudes are vital in ensuring optimum levels of health and safety (Lobo, 2016).

Although maritime pilots refine their shiphandling skills, vessel acumen, and knowledge of local waters over time, they naturally demonstrate a certain persona (Lo, 2015). Through intensive study, training, and practical experience, maritime pilots acquire some of the competencies that are essential to the effective piloting of ships (Patraiko, 2017). Many fundamental personality traits and skills required for successful pilotage are innate or are difficult to attain through formal learning channels (Fjærli et al., 2015).

These dimensions include charisma, interpersonal communication skills, composure, and rapidly making critical decisions in a manner that reduces risk and enhances safety (Lo, 2015). Such traits assist in ensuring that maritime pilots cultivate positive affiliations with captains and crews; facilitate open lines of communication among vessel staff, dispatch personnel, and operators of nearby vessels; calmly respond to emergencies; and refrain from acting or making decisions impulsively. Property damage, environmental disasters, injuries, and even death can occur if maritime pilots lack these critical personality traits.

Ensuring a vessel's safe passage into and out of the port is the most critical aspect of maritime pilotage operations (International Maritime Pilots' Association, 2018). Researchers have found that 80% to 85% of maritime accidents involved human errors in performance (Ernstsen & Nazir, 2018). McLaughlin (2015) asserted that the majority of

vessel collisions and groundings stemmed from miscommunication among crewmembers.

Abramowicz-Gerigk and Hejmlich (2015) emphasized that maritime piloting accidents can stem from other human factors, including attention deficiencies, faulty decision-making, inability to cope with stress, failure to take appropriate action in critical situations, and inadequate risk assessment. Ernstsen and Nazir (2018) determined that additional human errors jeopardized safe pilotage operations, including absent or inadequate communication, uncooperativeness, lack of team-orientation, insufficient situational awareness, the propensity to act impulsively and take avoidable risks, and not taking action when appropriate. The use of preemployment assessments can assist pilot commissions and associations in determining whether maritime pilot applicants possess the personal characteristics that are required to safely and effectively perform job tasks.

Preemployment Assessments in Talent Acquisition

The practice of conducting prehiring screenings dates back to the 3rd century A.D. when Chinese imperial leaders used assessments to appraise potential civil servants' intelligence levels, special aptitudes, and ethical veracity (Chamorro-Premuzic, 2015). Although aptitude and personality assessments were used in the United States and Europe during World War I (1914–1918) to facilitate military selection processes, U.S. businesses did not widely employ formal job screening tests until after World War II (1939–1945) (Chamorro-Premuzic, 2015; Schmitt, 2012). To assist in selecting the most suitable employees for vacant positions, 89% of contemporary organizations in North

America use prehiring assessment and selection tests as part of their talent acquisition systems (Talent Board, 2017).

Globally recognized as a vital component of successful candidate recruitment and selection processes, preemployment assessments assist organizations in identifying candidates who best fit the job and organization (Roberts, 2017). Modern prehiring assessments include those aimed at measuring a candidate's job-specific KSAs, intelligence, vocational interests, work ethic, cognitive abilities, personality characteristics, and culture fit (Talent Board, 2017). In conjunction with preemployment assessment tools, organizations frequently construct comprehensive candidate profiles by conducting structured or semistructured interviews, physical ability tests, job task simulations, and drug screenings as well as background, reference, and credit checks ("Conducting Background Investigations," 2018; Schmitt, 2012; Stuart, 2015).

In the United States, hiring organizations must ensure that adopted preemployment assessments comply with applicable employment laws and regulatory standards (Willner, Sonnenberg, Wemmer, & Kochuba, 2016). Employers must demonstrate that they do not use employee selection tools and techniques that violate laws enforced by the U.S. Equal Employment Opportunity Commission's Uniform Guidelines on Employee Selection Procedures of 1978 ("Screening by Means," 2018). These laws include Title VII of the Civil Rights Act of 1964, the Americans with Disabilities Act of 1990, and the Age Discrimination in Employment Act of 1967 (Youngman, 2017).

The use of preemployment selection tools is widely accepted as a critical component of organizations' human resource management function (Chen, Perng, Chang, & Lai, 2016). Preemployment selection tools aid hiring personnel in isolating the candidate profiles that best suit or fail to satisfy job and business requirements (Mirchandani & Shastri, 2016). Prehiring assessments also assist in predicting whether candidates will perform effectively posthire and forecast important outcomes, such as employee engagement, satisfaction, and retention (Rojon, McDowall, & Saunders, 2015; Talent Board, 2017).

Organizations can improve the quality of hire by utilizing assessments to inform selection decisions, thus maximizing competitive advantage, financial health, and overall organizational success (Newman & Ross, 2014). In introducing the elements of objectivity, reliability, and validity, well-constructed preemployment assessments deliver informative candidate profiles that organizations can standardize across the applicant pool (Zielinski, 2018). To vet and compare job candidates, facilitate effective selection decisions, and streamline the talent acquisition process, organizations routinely use assessment instruments that demarcate and measure applicants' personality traits (Smith, Badr, & Wall, 2018).

Preemployment Personality Assessments

In identifying and measuring individuals' noncognitive, motivational, and behavioral traits, personality researchers seek to investigate the root causes and outcomes of people's similarities and differences in various situational contexts (Eysenck, 1976). Personality assessments are designed to measure various personal attributes, including

levels of emotional stability, conscientiousness, autonomy, self-esteem, achievement-orientation, aggressiveness, risk-taking, impulsivity, and endurance (Cattell, 2017). Nederström and Salmela-Aro (2014) emphasized the importance of identifying and rating candidates' personality traits during the interview process to assist in predicting posthire job performance.

Approximately 36% of organizations in North America use personality assessments as part of prehiring processes to assist in forecasting prospective employees' P-J fit (Talent Board, 2017). Personality measurement scales can assist hiring managers in identifying and assessing applicants' personal traits, motivations, attitudes, and values in relation to specific job-relevant criteria (Kulas, 2013). Many psychometric tests assess personality traits in relation to psychological and behavioral disorders and must be administered and interpreted by trained psychologists (Erard, Nichols, & Friedman, 2018).

In capturing potential employees' needs, values, and interests, prehiring personality assessments contribute to a comprehensive model of selection and assist in determining workers' capacity for positive organizational influence and advancement (Peltokangas, 2014). Personality assessments often detect applicants' adverse traits that would otherwise remain unidentified through traditional interviewing methods, such as the tendency to act aggressively under pressurized conditions or the propensity to take risks that jeopardize safety (Stuart, 2015). Organizations risk resources, time, money, and energy in selecting individuals whose personality traits are incompatible with job characteristics and demands.

Assessments that organizations frequently use to assess candidates' personality traits and inform selection decisions include the NEO Personality Inventory-Revised (NEO PI-R; Costa & McCrae, 1992), the Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1942), the Personality Assessment Inventory (PAI; Morey, 1991), the Hogan Personality Inventory (Hogan & Hogan, 1995), and the Sixteen Personality Factor Questionnaire (Cattell & Mead, 2008). This study included an analysis of the relationship between maritime pilot applicants' PRF-E (Jackson, 1984) ratings and selection outcomes. The PRF-E is a 352-item self-report questionnaire that provides measures of 20 personality traits, including achievement, affiliation, aggression, autonomy, change, dominance, harmavoidance, impulsivity, and understanding (Jackson, 1984). The instrument also includes two validity scales, desirability and infrequency, designed to measure respondents' self-perceptions of social desirability and to identify instances of participants randomly responding to questions (Dowd & Wallbrown, 1993).

Jackson (1984) constructed the PRF instrument based on Murray's (1938) theory of personality, also called personology. From the personological perspective, humans' behaviors reflect their personalities in that needs and motives control one's actions, such as behaving in a manner that leads to independence, achievement, acceptance, power, or survival (Murray, 1938). The combination of humans' past life experiences and current circumstances dictates behavior. This holistic view of personality asserts that individuals respond to external stimuli differently due to their accumulated life experiences and their perceptions of immediate conditions (Murray, 1938).

Researchers have cited the PRF (Jackson, 1984) over 1,500 times within empirical literature (SIGMA Assessment, n.d.). Investigators have used the PRF assessment to investigate the relationship between individuals' personality dimensions and various outcomes, including employee selection (Khorramdel, Kubinger, & Uitz, 2014; Nederström & Salmela-Aro, 2014; Schermer & MacDougall, 2013). Overall, researchers have confirmed that the PRF-E is a well-calibrated, psychometrically sound instrument to use in personality research.

Personality Traits and Workplace Safety Behaviors

Researchers have extensively studied the relationship between personality traits and occupational safety behaviors. Arslan, Kurt, Turan, and De Wolff (2016) argued that both individual and collective attitudes, characteristics, experiences, and principles shape workplace safety behaviors. Hogan and Foster (2013) asserted that individual differences in human performance, including those linked to certain personality traits, are central in explaining safe or unsafe vocational behavior. Håvold (2015) found that maritime employees' personal characteristics, knowledge of rules and regulations, risk behaviors, safety attitudes, work climate/supportive culture, and reporting culture predicted safety performance.

In a meta-analysis, Beus et al. (2015) reported that employees' personality traits could influence safety-related behavior, which in turn may affect the occurrence of workplace accidents. In conceptualizing personality using the Five-Factor Model (FFM; McCrae & Costa, 1999), Beus et al. demonstrated that higher levels of extraversion ($p = .10$) and neuroticism ($p = .13$) were positively associated with partaking in unsafe

behaviors, whereas higher levels of agreeableness ($p = -.26$) and conscientiousness ($p = -.25$) were negatively associated with unsafe behaviors. Contrary to expectations, Beus et al. found that higher levels of openness to experience ($p = -.02$) were not associated with unsafe behaviors. Findings suggested that individuals were more prone to engage in unsafe behaviors if they sought high levels of stimulation, were domineering, and lacked impulse control, whereas those who exhibited cooperativeness, order, and attentiveness were more likely to behave safely (Beus et al., 2015).

In a quantitative study with 413 seafarers, Hystad and Bye (2013) fit a hierarchical multiple regression model to determine the influence of personal values and personality hardiness on safety behaviors for maritime employees. Personal values encompass the constructs that guide an individual's decision-making processes and directly influence their behaviors, whereas personality hardiness describes a set of personal attributes that govern how a person thinks, makes decisions, and acts to achieve goals (Hystad & Bye, 2013). Mariners who made workplace decisions according to conservation values, such as security, conformity, and tradition, were more likely to exhibit safe behaviors than those who made choices based on openness to change values, such as self-direction, stimulation, and pleasure-seeking (Hystad & Bye, 2013). Study results supported Hystad and Bye's hypothesis that participants with high hardiness values of commitment, challenge, and control would self-report positive safety behaviors.

Hogan (2016) established that distinct behaviors immediately precede workplace safety incidents, and individuals with specific personality traits are more likely to adopt those behaviors. The six categories of accident-prone personalities are defiant, panicky,

irritable, distractible, reckless, and arrogant; employees who cause or who are involved in workplace accidents typically possess one or more of these six characteristics (Hogan, 2016). In contrast, the performance dimensions associated with safe workplace behavior are compliant, confident, vigilant, cautious, emotionally stable, and trainable (Hogan & Foster, 2013).

Those tasked with selecting employees for public safety roles frequently use personality assessments to establish if candidates' personality traits correspond to the characteristics required to maximize on-the-job safety (Xia, Wang, Griffin, Wu, & Liu, 2017). In identifying the personality traits that prompt safe posthire behaviors, talent acquisition professionals can increase the effectiveness of selection decisions, potentially leading to a reduction in workplace accidents. Rather than devising reactive job redesign strategies to alter workplace circumstances that pose safety risks, organizational leaders should strive to adopt a proactive approach in recruiting, screening, selecting, training, and evaluating employees. Organizations may prevent workplace accidents, injuries, and loss of life by utilizing well-calibrated personality inventories to identify candidates who do not exhibit the personality traits associated with unsafe behaviors (Hogan, 2016).

Personality Assessments in the Maritime Industry

MacLachlan (2017) noted that researchers have not adequately studied the personality traits of contemporary maritime employees. Empirical investigations included the personality traits of seafaring employees in relation to safety behaviors (Hystad & Bye, 2013), safety culture (Berg, 2013; Ek, Runefors, & Borell, 2014), and situational awareness (Cordon, Mestre, & Walliser, 2017). Yuen, Loh, Zhou, and Wong (2018)

determined that personality traits influenced seafarers' job performance and levels of satisfaction. Researchers have also studied maritime workers' personality traits concerning stress (Håvold, 2015); health behaviors (Lipowski, Lipowska, Peplińska, & Jeżewska, 2014); and temperament, resilience, and quality of life (Doyle et al., 2016; Jeżewska, Leszczyńska, & Grubman-Nowak, 2013). Tsai and Liou (2017) asserted that merchant marine seafarers' perceptions of welfare and career development opportunity determined their work attitudes, work performance, and employer loyalty. The researchers did not directly include the element of personality as a potential determinant of these outcomes.

Recent studies with maritime pilots as participants focused on various factors and outcomes, including stress, fatigue, and coping strategies (Chambers & Main, 2015) as well as technological advancements to support pilot maneuvering (Hontvedt, 2015; Ostendorp, Lenk, & Lüdtke, 2015). Researchers examined maritime pilots' alertness and psychomotor performance (Boudreau et al., 2018), mental workload and physiological functions (Kitamura et al., 2014; Orlandi & Brooks, 2018; Tanaka, Murai, & Hayashi, 2014), and psychophysiological health and well-being (Main & Chambers, 2015). Orlandi, Brooks, and Bowles (2015) investigated maritime pilots' planning and shiphandling skills, whereas Okazaki and Ohya (2012) assessed the importance of situational awareness and navigation skills.

Researchers have studied the link between personality characteristics and the selection of sailors (Ertürk, Demirel, & Polat, 2017) and maritime managers (Koutra, Barbounaki, Kardaras, & Stalidis, 2017). Empirical research on personality traits as

predictors of selection for the specific vocation of a maritime pilot is notably absent. The subsequent section includes research that demonstrates the effectiveness of using personality assessments to inform selection decisions and maximize posthire workplace safety within comparable public safety jobs, such as military, law enforcement, and firefighting vocations.

Personality Assessments in Public Safety Talent Acquisition

In the United States, government agencies customarily employ public safety workers, such as police officers, firefighters, and military personnel, who respond to both routine and emergency incidents (Klinger, Nalbandian, & Llorens, 2016). Although the work functions of these vocations differ considerably, employees in these professions are similar in that they provide critical public safety and crisis response services with the objective of protecting people and property (U.S. Department of Labor, Bureau of Labor Statistics, 2018a, 2018b, 2018c). Public safety workers regularly encounter multifaceted on-the-job challenges and certain individual characteristics are essential in effectively assessing, managing, and resolving hazardous situations (Toppazzini & Wiener, 2017).

Public safety employees' personality traits influence their interpersonal aptitudes and the manner in which they cope with dangerous, unpredictable, and stressful conditions (Lyrakos, Eva, Elisa, Piera, & Luca, 2015). Personality traits associated with positive public safety job performance and employee well-being include high levels of emotional stability, stress tolerance, self-confidence, composure, reliability, organization, decision-making, endurance, and collaboration (Perry, Witt, Luksyte, & Stewart, 2008). In screening out unsuitable candidates, preemployment assessments assist public safety

organizations in averting severe adverse consequences linked to substandard selection decisions (Colaprete, 2012).

Public safety agencies routinely use personality assessment tools to measure candidates' P-J fit, noncognitive competencies, and psychological fitness (Annell, Lindfors, & Sverke, 2015; Lin, 2016). Research supports the efficacy of performing preemployment personality screenings for public safety job applicants (Niebuhr et al., 2013; Tarescavage, Cappo, et al., 2015; Tarescavage, Corey, et al., 2015). Prehiring personality assessments used in public safety job selection processes include the MMPI (Hathaway & McKinley, 1942), the IPI (Inwald, 1992), the NEO PI-R (Costa & McCrae, 1992), the PAI (Morey, 1991), the Tailored Adaptive Personality Assessment System (Drasgow et al., 2012), the Assessment of Background and Life Experiences Questionnaire (White, Nord, Mael, & Young, 1993), and the Navy Computer Adaptive Personality Scales (Houston, Borman, Farmer, & Bearden, 2006).

The MMPI (Hathaway & McKinley, 1942) is the most widely cited personality assessment instrument within police officer selection research (Lough & Von Treuer, 2013). Military agencies and firefighting departments also use the MMPI to assess candidates (Butcher et al., 2006; Lin, 2016). An alternative version of the original MMPI that offers improved statistical rigor is the Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008/2011). The 338-item MMPI-2-RF objectively assesses personality traits and screens for clinical indicators of psychopathology by rating respondents on nine validity scales and 42 content scales, including thought dysfunction, antisocial behavior, self-doubt, anxiety, and aggression

(Sellbom, 2019). Empirical researchers have extensively endorsed the MMPI as a valid and reliable psychometric instrument for use in screening and selecting high-risk public safety employees (Dantzker, 2011; Detrick, Chibnall, & Rosso, 2001; Lough & Von Treuer, 2013; Salters-Pedneault et al., 2010; Tarescavage, Cappo, et al., 2015; Tarescavage, Corey, et al., 2015).

To inform selection processes, public safety agencies also frequently use the 310-item IPI (Inwald, 1992), the 344-item PAI (Morey, 1991), and the 240-item NEO PI-R (Costa & McCrae, 1992) (Lough & Von Treuer, 2013; Lowmaster & Morey, 2012; Salters-Pedneault et al., 2010). The IPI consists of one validity scale and 25 clinical scales designed to measure respondents' behavior patterns, attitudes, and personality characteristics, including tendencies associated with risk-taking, impulsivity, anxiety, timidity, and interpersonal difficulties (Inwald, 1992). The PAI consists of four validity scales and 18 content scales that measure a range of behavioral and personality characteristics, including aggression, anxiety, dominance, mania, and antisocial features (Morey, 1991).

Specifically designed to enhance public safety personnel screening decisions, the PAI Law Enforcement, Corrections, and Public Safety Selection Report (Roberts, 2000) supplements the original PAI instrument. This distinctive report "is based on a normative sample of more than 18,000 public safety job applicants" and includes risk statements that assist in identifying issues relevant to selection (Roberts & Johnson, 2014, para. 5). The MMPI-2-RF and IPI developers have also normed the instruments on public safety personnel samples, enabling comparison between respondents' scores and those of the

specific target population, namely high-risk public service employees (Detrick et al., 2001). Normative samples enhance the effectiveness of using personality instruments in public safety employment screenings because they allow for benchmarking to the reference population and assist in assessing candidates' P-J fit in relation to job-specific domains (Lough & Von Treuer, 2013).

Clinical mental health practitioners also use these personality instruments to screen respondents for potential mental disorders (Dantzker, 2011). According to the Americans with Disabilities Act of 1990, it is unlawful for employers to use preemployment assessment tools that may lead to the identification of a candidate's mental illness (Youngman, 2017). It is permissible for employers to use the MMPI-2-RF, IPI, and PAI to inform high-risk public safety and security selection decisions, particularly in circumstances when employees will be required to carry weapons (Colaprete, 2012; Detrick et al., 2001).

The NEO PI-R operationalizes the FFM of personality by measuring the domains of neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness as well as the six facets that comprise each domain (Costa & McCrae, 1992). In a quantitative study with 750 police officer candidates, Annell et al. (2015) found that three domains, namely conscientiousness, agreeableness, and emotional stability (reversed neuroticism), were most important in determining whether a candidate was suitable for selection. In a correlational study with 288 police officer applicants, Detrick and Chibnall (2013) performed a quantitative secondary analysis of respondents'

prehire and posthire NEO PI-R data, concluding that those selected scored very low on neuroticism and high on conscientiousness and extraversion.

Study results indicated that successful police officer candidates self-reported their personality profiles "as very emotionally stable, particularly nonimpulsive and steady under stress; people-oriented, outgoing, socially dominant, and excitement craving; and capable, ambitious, disciplined, and cautious" (Detrick & Chibnall, 2013, p. 375). Another quantitative secondary analysis of 206 police and firefighter candidates' NEO PI-R t-score profiles indicated that in comparison with the general population, respondents scored higher on the excitement-seeking facet of the extraversion domain (Salters-Pedneault et al., 2010). Because extraverts may compromise safety to attain prestige or competitive advantage, hiring decision-makers should carefully evaluate individuals who score very high on the extraversion domain (Beus et al., 2015).

The U.S. Department of Defense administers personality inventories as part of a test battery that typically includes the Armed Services Vocational Aptitude Battery (U.S. Department of Defense, 1984), vocational assessments, physical fitness tests, and background investigations (Farr & Tippins, 2017; Wall, 2018). The Tailored Adaptive Personality Assessment System (Drasgow et al., 2012), the Assessment of Background and Life Experiences Questionnaire (White et al., 1993), and the Navy Computer Adaptive Personality Scales (Houston et al., 2006) were created for use in screening and classifying U.S. military personnel (Stark et al., 2014). In measuring noncognitive abilities and behavior patterns such as levels of dedication, flexibility, achievement-orientation, integrity, self-control, stress tolerance, and cooperation, the assessments are

useful in predicting future military personnel job performance, satisfaction, commitment, and retention (Niebuhr et al., 2013; Oswald, Shaw, & Farmer, 2015; Stark et al., 2014).

As demonstrated above, the breadth of contemporary literature supporting the use of personality instruments as part of the selection process for public safety jobs is expansive. In contrast, empirical findings confirming the efficacy of personality assessments to inform the selection of maritime employees are very limited. In particular, a critical need exists for an examination of the utility of personality trait assessment in guiding the selection of maritime pilots.

Quantitative, Ex Post Facto Research Design

I applied a quantitative, ex post facto research design in this study using archived data consisting of maritime pilot job applicants' PRF-E (Jackson, 1984) scores and selection/rejection decisions. The Latin phrase ex post facto means "after the fact" (Giuffre, 1997, p. 192). The sociologist Francis Stuart Chapin is largely credited with classifying an ex post facto study as one in which a researcher investigates a phenomenon's determinants after they have occurred (Novakov & Janković, 2014).

Those who conduct ex post facto research attempt to determine if differences between established groups are attributable to one or more preexisting qualities or conditions (Salkind, 2010). Unlike true experiments, ex post facto studies are nonexperimental because the researcher does not manipulate any of the variables or randomly assign participants to treatment or control groups (Jarde, Losilla, & Vives, 2012). Random assignment ensures that the treatment, not some unobservable factor, caused the difference between groups (Mohajan, 2017). Because researchers who conduct

ex post fact studies do not randomly assign participants to groups, they cannot be certain whether confounding variables, rather than the independent variables, effected the difference between groups (Santos & Santos, 2015).

Researchers who employ ex post facto designs investigate differences between preexisting groups. Selection bias and self-selection bias are of concern because researchers may lack information concerning participant dropouts or the original rationale for including subjects within a particular group (Giuffre, 1997). Generalizability to the larger theoretical population is limited when ex post facto researchers do not randomly select samples (Bajpai & Bajpai, 2014). These limitations weaken the internal and external validity of an ex post facto study.

A primary advantage of ex post facto designs is the ability to examine correlations or determine cause and effect relationships when it would otherwise be impossible or unethical to manipulate variables or expose participants to interventions (Braga, Hureau, & Papachristos, 2011; Chapin, 1947). The process of collecting original data can be time consuming, costly, and resource-intensive. In identifying potential causes of an outcome retrospectively, researchers who conduct ex post facto studies use existing data, eliminating the burdens associated with gathering new data.

Binary Logistic Regression Analysis

The mode of data analysis for this quantitative, ex post fact study was regression, specifically binary logistic regression. Developed by statistician David Cox, logistic regression is a statistical probability model that uses a logit function to model a binary, or dichotomous dependent variable (Cox, 1958; Wilson & Lorenz, 2015). When the

dependent variable has only two possible values, researchers fit logistic regression models to predict the probability of an event occurring based upon explanatory variables (Cox & Snell, 1989).

Binary logistic regression is a statistical analysis technique that enables researchers to simultaneously assess the predictive value of various independent variables on one dichotomous dependent variable (Ranganathan, Pramesh, & Aggarwal, 2017). The primary objective of binary logistic regression is to predict the relationship between two or more independent variables and one categorical dependent variable (Emerson, 2018). Compared with multiple linear regression or discriminant analysis, logistic regression has fewer statistical hypothesis testing assumptions (Warner, 2013). The assumptions of logistic regression that I adhered to in this study are as follows:

1. The dependent variable is dichotomous; scores are typically coded 1 for occurrence and 0 for nonoccurrence.

2. Two or more independent variables are "quantitative variables, dummy-coded categorical variables, or both" (Warner, 2013, p. 1007).

3. Observations are statistically independent of each other.

4. Each participant included in the sample is a member of only one outcome group.

5. The model should not be overfit nor underfit.

6. To achieve adequate statistical power, a general rule suggests that a minimum of 15 outcome events per predictor variable is required, although some

researchers recommend the inclusion of up to 50 cases per independent

variable (see Hosmer et al., 2013; van Smeden et al., 2016; Warner, 2013).

Predictor variables in logistic regression do not have to be normally distributed,

linearly related, or possess equal variances within each outcome group (Osborne, 2015).

Because moderate or high correlations between independent variables can make it

difficult to determine the precise effect of each predictor variable, researchers should

check for multicollinearity among independent variables (Ranganathan et al., 2017).

Researchers who fit logistic regression models should identify and remove outliers,

which can considerably skew results (Mertler & Vannatta Reinhart, 2016).

To achieve adequate statistical power without risking overfitting, researchers must

determine an adequate sample size and appropriate number of independent variables to

include in a logistic regression model. Overfitting occurs when the model is overly

complex in relation to the amount of data included in the model (Tabachnick & Fidell,

2018). In predictive modeling, the use of small samples and too many independent

variables can lead to wide and inaccurate confidence intervals, large standard errors,

misleading regression coefficients, or the emergence of spurious relationships (Peng, Lee,

& Ingersoll, 2002; Ranganathan et al., 2017).

My primary objective in this quantitative, ex post facto study was to establish if

certain personality variables measured quantitatively were predictive of selection for a

maritime pilot job. The dependent variable, selection as a maritime pilot, was

dichotomous in nature as applicants were either selected or not selected. Binary logistic

regression was the most appropriate method of data analysis for this study because the criterion variable was binary.

Summary and Conclusions

This chapter contained current and seminal research on Edwards' (1991) P-J fit theory, the maritime pilot's role in the marine transportation industry, and evidence to support the utilization of personality tests in public safety talent acquisition. The chapter included background literature on quantitative, ex post facto research design and binary logistic regression analysis. A comprehensive literature review exposed a gap in the research regarding the appraisal of personality traits as predictors of maritime pilot selection. Although much of the supporting literature focused on assessing personality traits to inform selection decisions for police officers, firefighters, and military personnel, the information is applicable to candidate selection within the maritime pilot profession.

The findings of this study filled a gap in the literature concerning P-J fit assessment within the maritime pilot applicant population. The results of this study also filled a gap by assessing the effectiveness of the PRF-E (Jackson, 1984) in predicting selection for a maritime pilot job. An improved understanding of the predictive ability of personality traits on maritime pilot selection could assist maritime pilot commissions and associations in making more informed and effective hiring decisions, ultimately enhancing public safety.

Chapter 3 will include a discussion of the study's research design and rationale, methodology, and plan for data analysis. The chapter will contain information about the PRF-E (Jackson, 1984) instrument and its administration procedures as well as the

process for acquiring and using archival data for secondary analysis. The chapter will

incorporate an evaluation of threats to validity and an illustration of the procedures

employed to maximize compliance with ethical research principles.

Chapter 3: Research Method

Introduction

The purpose of this quantitative, ex post facto study was to assess P-J fit theory by examining the relationship between personality traits, as measured by Jackson's (1984) PRF-E, and selection for a maritime pilot job. I used binary logistic regression to analyze the predictive ability of personality dimensions on maritime pilot selection. This chapter contains descriptions of the research design and rationale, methodology, data analysis plan, threats to validity, and ethical procedures.

Research Design and Rationale

The independent variables in this study were the 22 scales of the PRF-E (see Jackson, 1984) measured quantitatively from 0 to 16. The dependent variable was the selection outcome for a job as a maritime pilot measured categorically, consisting of two categories: (a) selected or (b) not selected. The data set for this study contained the genders, years of candidacy, PRF-E scores, and selection outcomes of 328 maritime pilot applicants.

A quantitative research method with a secondary data analysis approach was most appropriate for this study because a third-party consulting organization collected, analyzed, and archived the numerical data for a purpose other than the present study (see Johnston, 2017). In contrast, a qualitative research method was not the most suitable approach for this study. Qualitative data includes information that researchers cannot initially measure numerically and are primarily collected using unstructured or semistructured techniques (Yin, 2016). In this study, I did not have direct contact with

participants, did not collect primary data, and used archived data that were in numerical form. Given the timeframe for this study and the sample size ($N = 328$), the use of a qualitative method would have obstructed the feasibility of the study.

A nonexperimental, ex post facto design was most appropriate for this study because I retrospectively analyzed historical data with preformed outcome groups without interfering (see Salkind, 2010). Unlike in an experimental design, I did not use random selection or random assignment techniques in this study or did not intentionally manipulate variables (see Novakov & Janković, 2014). This design choice was consistent with research designs used to compare values of independent and dependent variables without manipulating any of the variables (see Lohmeier, 2010; Santos & Santos, 2015; Silva, 2010).

I conducted regression analysis to determine if personality traits, as measured by the PRF-E (Jackson, 1984), predicted maritime pilot selection. In utilizing the PRF-E to assist in describing, predicting, explaining, and controlling various phenomena, researchers have established the validity and reliability of study results (Jackson, 1984). The most appropriate type of regression analysis for this study was logistic regression because the criterion variable, maritime pilot selection outcome, was binary (see Emerson, 2018). The study design met the assumptions associated with conducting binary logistic regression.

The research questions arose from existing data, which precluded the need to develop a new measurement tool or administer an existing measurement instrument to collect primary data. The archived data that I analyzed to answer the research questions

included PRF-E (Jackson, 1984) ratings and selection outcomes for individuals who applied for a maritime pilot position in even-numbered years from 1998 to 2018. At the close of each biennial selection process, the maritime pilot organization that solicited applicants assigned participants in this study to selected or not selected outcome groups.

Methodology

Population

The target population consisted of maritime pilot job applicants in the United States. Maritime pilot commissions and associations do not publish the number of candidates who apply for maritime pilot jobs; therefore, the precise target population size was not available. Members of the American Pilots' Association (2015a) encompass "approximately 60 groups of state-licensed pilots, representing virtually all the state pilots in the country, as well as the three groups of United States-registered pilots operating in the Great Lakes" (para. 1). Based on the archived data that I used for this study, I estimated that 50 individuals apply for a maritime pilot job within each maritime pilot group per application year. The approximate target population size was 3,000 maritime pilot applicants (i.e., 60 groups $\times$ 50 applicants = 3,000).

Sampling and Sampling Procedures

In this quantitative, ex post facto study, I used a convenience sample comprised of candidates who applied for a maritime pilot job within one maritime pilot organization located in the United States. I did not use random sampling techniques in this study. The sample consisted of 328 maritime pilot job applicants who completed a battery of preemployment tests, including the PRF-E (Jackson, 1984), administered biennially by a

third-party consulting organization from 1998 to 2018. The hiring maritime pilot association previously assigned participants to the selected or not selected outcome groups. Of the 328 participants, 111 were selected and 217 were not selected for the maritime pilot job.

I used G*Power Version 3.1.9.4 to compute a statistical power analysis to determine the minimum number of participants needed for this study (Faul, Erdfelder, Buchner, & Lang, 2019). I entered the input parameters recommended by Faul, Erdfelder, Buchner, and Lang (2017) into a G*Power Z test power analysis for logistic regression, including Demidenko's (2007) large sample approximation procedure. Based on a power of .80, an alpha of .05, a small effect size specified in terms of an odds ratio of 1.5, and a two-tailed test, the desired sample size was 208. In replicating these parameters while increasing power to .95, the desired sample size was 337.

Archival Data

In this study, I used archival data consisting of 328 maritime pilot applicants' genders, years of application/testing, PRF-E (Jackson, 1984) ratings, and selection outcomes. Every even year from 1998 to 2018, a U.S.-based maritime pilot organization accepted applications for a maritime pilot job. The maritime pilot organization reviewed applications and determined candidates' eligibility to advance to the next application phase.

The maritime pilot organization contracted a private third-party consulting organization to conduct the subsequent application phase, consisting of a preemployment application/testing process. The third-party consulting organization's purpose for

collecting the primary data was to assess applicants' suitability for employment as maritime pilots. Upon completion of the prehiring application/testing process, the third-party organization provided selection recommendations to the hiring maritime pilot group in the format of written reports. The maritime pilot group reviewed the written reports, interviewed applicants, and formulated final selection decisions.

To collect the primary data consisting of maritime pilot applicants' PRF-E (Jackson, 1984) ratings, the third-party consulting organization staff followed standardized administration and scoring procedures as outlined in the PRF manual. To collect the primary data consisting of maritime pilot applicants' selection outcomes, the maritime pilot organization provided the third-party organization with lists containing the names of selected and rejected applicants. Employees of the third-party organization input candidates' demographic information, year of application/testing, PRF-E scores, and selection outcomes into a Microsoft Excel spreadsheet.

To gain access to a data set containing maritime pilot applicants' genders, years of application/testing, PRF-E (Jackson, 1984) ratings, and selection outcomes, I contacted the third-party organization's president and acquired initial verbal approval to release the data. A mutual agreement was reached that the data set would be anonymized and e-mailed to me as a password-protected Microsoft Excel spreadsheet after I secured approval to conduct the study from the Walden University Institutional Review Board (IRB). I acquired a data use agreement from the third-party consulting organization that collected the data.

Instrumentation and Operationalization of Constructs

I collected data for this study from archival data, which included the results of the PRF-E (Jackson, 1984) instrument. The PRF, published by SIGMA Assessment Systems, Inc./Research Psychologists Press, Inc., was developed by Douglas N. Jackson in 1967 and revised in 1974 and 1984 (SIGMA Assessment, n.d.). Six PRF options are available in long and short formats for use in measuring normal personality within various populations (Jackson, 1984). The PRF-E is a 352-item, objectively scored, self-report personality assessment with a dichotomous response format (i.e., true/false) encompassing twenty 16-item personality trait scales and two 16-item validity scales (Jackson, 1984).

The PRF-E (Jackson, 1984) was an appropriate instrument to use in this study because it is a reliable and valid instrument that comprehensively measures personality traits that are relevant to the maritime pilot profession. Permission from SIGMA Assessment Systems, Inc./Research Psychologists Press, Inc. was not required for this study because I did not use the PRF-E to collect primary data. I acquired a research agreement to ensure compliance with the publisher's terms, conditions, and limitations and to gain permission to reprint materials from the PRF manual (see Appendix D).

Within empirical literature, researchers have cited the PRF (Jackson, 1984) over 1,500 times (SIGMA Assessment, n.d.). Investigators have used the PRF to study personality traits in relation to personnel selection and performance within various industries, including aviation, business management, law enforcement, and military settings (Hausdorf & Risavy, 2010; Khorramdel et al., 2014; Nederström & Salmela-Aro,

2014; Skinner & Jackson, 1977). Bretz, Ash, and Dreher (1989) emphasized that subject matter experts have extensively endorsed the PRF, asserting that the psychometric properties of the PRF are more sound compared to similar measures of normal personality. Data published in the PRF manual support the reliability of the instrument: (a) Kuder-Richardson Formula 20 internal consistency reliabilities for the 20 content scales ranged from .78 to .94 with a median reliability coefficient value of .91; (b) in a sample of 135 college students, test-retest reliabilities for Form AA ranged from .69 to .90; (c) in a sample of 192 college students, parallel form reliabilities for Forms AA and BB ranged from .57 to .85; and (d) in a sample of 84 college students, odd-even reliabilities for Form E ranged from .50 to .91 (Jackson, 1984).

Researchers have conducted a series of validation studies and confirmatory factor analyses to assess the validity of the PRF. Their results indicated robust evidence for convergent, discriminant, concurrent, and predictive validity (Bessmer & Ramanaiah, 1981; Bridgewater, 1981; Jackson, 1984). Correlations of PRF scale scores with peer ratings, related constructs of similar personality inventories, and performance outcomes were high, whereas correlations with dissimilar measures were low (Jackson, 1984; Valentine, 1969). In one study with 51 college students, the median correlation coefficient between PRF scales and related behavior ratings was .52 and between PRF scales and related trait ratings was .56 (Jackson, 1984). In another study with 90 roommates, the median correlation coefficient between PRF self-ratings and roommate ratings was .53 (Jackson, 1984; SIGMA Assessment, n.d.).

The PRF-E (Jackson, 1984) provides measures of 22 variables of personality, specifically abasement, achievement, affiliation, aggression, autonomy, change, cognitive structure, defendence, desirability, dominance, endurance, exhibition, harmavoidance, impulsivity, infrequency, nurturance, order, play, sentience, social recognition, succorance, and understanding. The process of defining these variables was largely grounded in Murray's (1938) definitions of personality dimensions and taxonomy of psychogenic needs. In Appendix A, I presented the operational definitions of PRF scales and trait adjectives for high and low scorers. Jackson (1984) emphasized that each PRF variable may be assessed independently. As illustrated in Appendix B, test interpreters may also organize the PRF variables into seven superordinate units based on related and contrasting personality orientations.

Trained employees of the third-party organization that collected the primary data followed standardized test administration procedures as outlined in the PRF manual (see Jackson, 1984). Employees provided respondents with a PRF-E test booklet, answer sheet, and pencils within a quiet environment and instructed respondents to work accurately and quickly. Respondents read each statement and decided if the statement was an accurate self-description or if they agreed with the statement by placing an X in either the true or false box on the answer sheet.

Upon test completion, third-party organization employees reviewed the answer sheets for completeness and used a standardized scoring template to hand score respondents' completed PRF-E answer sheets (Jackson, 1984). Per Jackson (1984),

Scoring proceeds by first carefully lining up the scoring template with the

orientation designs at the upper left and lower right hand corners of the answer

sheet. Next, the number of X's appearing in the two vertical columns

corresponding to each scale is tallied and recorded at the bottom of the answer

sheet in the space labelled with the abbreviation for the scale. (pp. 7–8).

The total number of X's for each personality variable was summed, resulting in a raw

score for each construct ranging from 0 to 16.

Employees transferred raw scores to a profile sheet based upon male and female

norms. Employees reviewed respondents' personality variable scores and interpreted

them by referring to the high and low scorers scale descriptions and adjectives as defined

in Appendix A. Low scores represented that respondents could likely be described by the

corresponding scale description and defining trait adjectives of low scorers. High scores

represented that a respondent could likely be described by the corresponding scale

description and defining trait adjectives of high scorers.

Data Analysis Plan

In this study, I used binary logistic regression to develop the relationship between

maritime pilot applicants' PRF-E (Jackson, 1984) scores and selection outcomes. Per

Faul, Erdfelder, Buchner, and Lang (2009), "logistic regression models address the

relationship between a binary dependent variable (or criterion) Y and one or more

independent variables (or predictors) Xj, with discrete or continuous probability

distributions" (p. 1157). Binary logistic regression was the most appropriate statistical

analysis to address the research questions because the test evaluated if multiple discrete

independent variables predicted one dichotomous dependent variable being observed or not observed in the sample. The research goal was to determine the probability of an event, being selected for a maritime pilot job, occurring or not occurring while controlling for other variables, specifically personality trait scores.

After I secured approval from the Walden University IRB to conduct this study, the president of the third-party organization e-mailed me the password-protected Microsoft Excel data set. I coded, entered, screened, cleaned, and analyzed the data set in Statistical Package for Social Sciences (SPSS) Version 25. Preliminary data screening procedures for logistic regression recommended by Warner (2013) included: (a) proofreading and comparing the SPSS data file with the original data source to identify data coding or entry errors, (b) screening for acceptable sample size to ensure that the ratio of the number of cases within each outcome group to the number of independent variables was sufficient to produce meaningful results, (c) screening for missing values, (d) screening for the presence of extreme outliers, and (e) screening for multicollinearity by checking for high intercorrelations among the predictor variables.

The 22 independent variables were the scales of the PRF-E (see Jackson, 1984) measured quantitatively. The one dependent variable was the dichotomous selection outcome, selected or not selected for a job as a maritime pilot. To create a dichotomous dependent variable in SPSS Version 25, I coded the selection outcome variable as $0 =$ not selected and $1 =$ selected. The research questions and hypotheses were:

Research Question 1: Is there a significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job?

Research Question 2: How significant is the relationship between each of the 22

PRF-E scale ratings and selection for a maritime pilot job?

H_0: There is no significant relationship between respondents' PRF-E scale

ratings and selection for a maritime pilot job.

H_1: There is a significant relationship between respondents' PRF-E scale

ratings and selection for a maritime pilot job.

I interpreted results based on key parameter estimates, probability values, and

odds ratios. As recommended by Hosmer et al. (2013) and Warner (2013), reported

results of the binary logistic regression analysis included: (a) the means and standard

deviations of the independent variables for the study sample; (b) a test of the full model

(with respondents' PRF-E; Jackson, 1984 scores as predictor variables) compared with a

constant-only or null model; (c) Cox and Snell's R^2 and Nagelkerke's R^2 values to assess

the strength of the association between respondents' PRF-E scores and respondents being

selected; (d) values of the Hosmer-Lemeshow goodness-of-fit test to assess how well the

data fit the model; (e) beta coefficients, Wald statistics, significance levels, and odds

ratios for each predictor variable; and (f) odds and probability values of being selected for

each predictor variable. The assumptions of logistic regression that I adhered to in this

study are as follows:

1. The dependent variable is dichotomous; scores are typically coded 1 for

   occurrence and 0 for nonoccurrence.

2. Two or more independent variables are "quantitative variables, dummy-coded

   categorical variables, or both" (Warner, 2013, p. 1007).

3. Observations are statistically independent of each other.

4. Each participant included in the sample is a member of only one outcome group.

5. The model should not be overfit nor underfit.

6. To achieve adequate statistical power, a general rule suggests that a minimum of 15 outcome events per predictor variable is required, although some researchers recommend the inclusion of up to 50 cases per independent variable (see Hosmer et al., 2013; van Smeden et al., 2016; Warner, 2013).

Threats to Validity

External Validity

A threat to external validity for this study was the potential negative effect of selection bias. In this ex post facto study, I used a convenience sample comprised of candidates who applied for a maritime pilot job within one maritime pilot organization located in the United States. There was limited generalizability to the larger population of maritime pilot applicants because I did not randomly select the sample (see Bajpai & Bajpai, 2014).

A second threat to external validity for this study was testing reactivity. Participants may have inaccurately responded to PRF-E (Jackson, 1984) items due to an awareness that employees of the third-party organization were observing them as part of a prehiring assessment process. Respondents were aware that employees of the third-party organization would scrutinize test results for the purpose of making selection recommendations for a maritime pilot job. The PRF-E instrument includes two control

variables, desirability and infrequency, which could reduce the potential negative effect of testing reactivity (see Jackson, 1984).

Internal Validity

A threat to internal validity for this study was nonrandom assignment. Random assignment ensures that the treatment, not some unobservable factor, caused the difference between groups (Mohajan, 2017). I did not randomly assign participants to treatment and control groups or manipulate any of the variables in this study (see Salkind, 2010). Because I used an ex post facto research design in this study, the maritime pilot organization previously assigned participants to outcome groups, namely, selected or not selected for a maritime pilot job. It was impossible to demonstrate that the independent variables, rather than unidentified confounding variables, caused the difference between groups.

Ethical Procedures

Prior to obtaining the archived data set from the third-party organization that collected the primary data, I obtained approval from the Walden University IRB. The IRB approval number for this study is # 06-06-19-0126261. I acquired a data use agreement from the third-party organization that collected the primary data.

I am a former employee of the third-party organization that supplied the archived data. Throughout every phase of this study, I took exhaustive measures to ensure that no conflicts of interest existed between myself and the data. I confirmed that the data set was anonymized, maintained strict objectivity in analyzing the data, and attempted to disprove the alternative hypothesis by testing the null hypothesis (see Warner, 2013).

After I secured IRB approval to conduct this study, the president of the third-party organization e-mailed the data set to me in the form of a password-protected Microsoft Excel spreadsheet. I saved the data to my password-protected personal computer and permanently deleted the e-mail containing the attached data set. I will store the data on this single computer for a period of 5 years. After that date, I will permanently destroy the data.

The data set did not include any information that could potentially expose the identities of participants, the hiring maritime pilot organization, or the third-party consulting organization. I alone had access to the data set. I gave thoughtful consideration to the nature of this study. I derived all data for this study from archival records and did not engage in direct contact with participants.

Summary

In this chapter, I have outlined the research method that I applied to conduct this study. I chose a quantitative, nonexperimental, ex post facto design using archival data to fill a gap in P-J fit literature and to determine predictors of maritime pilot selection using constructs of personality traits as measured by the PRF-E (Jackson, 1984). I discussed the research design and rationale, population, sampling and sampling procedures, archival data, instrumentation, operationalization of the constructs, data analysis plan, threats to external and internal validity, and ethical procedures. Chapter 4 will incorporate the results of the logistic regression analysis. Chapter 5 will include a discussion on the research conclusions, limitations, and recommendations.

Chapter 4: Results

Introduction

The purpose of this quantitative, ex post facto study was to assess P-J fit theory by examining the relationship between personality traits, as measured by Jackson's (1984) PRF-E, and selection for a maritime pilot job. The research questions and hypotheses were:

Research Question 1: Is there a significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job?

Research Question 2: How significant is the relationship between each of the 22 PRF-E scale ratings and selection for a maritime pilot job?

H_0: There is no significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job.

H_1: There is a significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job.

This chapter includes a presentation of the data collection procedures, descriptive statistics, and demographic characteristics of the sample. In this chapter, I also address the statistical assumptions associated with conducting binary logistic regression. The chapter concludes with the results of the study and a summary of the findings and answers to the research questions.

Data Collection

After IRB approved the data collection procedures for this study, the president of the third-party consulting organization e-mailed the data set to me in the form of a

password-protected Microsoft Excel spreadsheet. The deidentified archival data set

contained the genders, years of candidacy, PRF-E (Jackson, 1984) scores, and selection

outcomes of 328 maritime pilot applicants. I coded, entered, screened, cleaned, and

analyzed the data in SPSS Version 25.

The independent variables in this study were the 22 scales of the PRF-E (see

Jackson, 1984) measured quantitatively from 0 to 16. The PRF-E is a 352-item self-report

personality assessment with a dichotomous response format (i.e., true/false; Jackson,

1984). Each of the 22 PRF-E variables corresponds to 16 assessment items (Jackson,

1984). In this study, respondents read each item and indicated if the statement was an

accurate self-description or if they agreed with the statement by placing an X in either the

true or false box on the answer sheet. For each respondent, employees of the third-party

consulting organization summed the total number of X's for each personality trait using

the PRF-E scoring template, resulting in a score for each independent variable that ranged

from 0 to 16.

A score of 0 in a given trait signified that a respondent could very likely be

described by the corresponding scale description and defining trait adjectives of low

scorers, as outlined in Appendix A. Conversely, a score of 16 in a given trait signified

that a respondent could very likely be described by the corresponding scale description

and trait adjectives of high scorers, as outlined in Appendix A. As an example,

participants would likely receive low scores in the trait of abasement if they responded to

the following fictitious items as follows: (a) I allow others to take advantage of me if it is

for a good cause (False); (b) I do not apologize if I believe that I am right (True); (c) I

often agree to complete work tasks that are below my pay grade (False); (d) I do not feel guilty if someone takes offense to something that I said (True); (e) If someone makes a convincing argument, I easily change my opinion (False); (f) I stand up for myself if someone treats me rudely (True); and (g) I feel embarrassed when I make mistakes (False).

To create a binary dependent variable for the data set, I recoded the selection outcome variables as 0 = not selected and 1 = selected. There were no discrepancies in data collection from the plan I presented in Chapter 3. Table 2 indicates the baseline descriptive and demographic characteristics of the sample. Table 3 shows the means and standard deviations of respondents' PRF-E (Jackson, 1984) scores.

Table 2

Selection Outcome and Gender of Participants

Demographic	*N*	%
Selection outcome		
Not selected	217	66
Selected	111	34
Gender of participant		
Female	20	6
Male	308	94
Gender/selection outcome		
Females not selected	13	4
Females selected	7	2
Males not selected	204	62
Males selected	104	32

Note. N = 328.

Table 3

Descriptive Statistics of PRF-E Scores

PRF-E variable	*M*	*SD*
Abasement	8.16	3.16
Achievement	10.96	4.26
Affiliation	11.54	3.65
Aggression	6.67	3.27
Autonomy	6.96	3.10
Change	8.57	2.69
Cognitive structure	10.52	3.17
Defendence	4.45	2.72
Dominance	11.45	3.24
Endurance	13.40	2.02
Exhibition	8.82	3.28
Harmavoidance	6.68	3.52
Impulsivity	3.36	2.99
Nurturance	11.26	3.04
Order	11.99	3.22
Play	8.21	2.85
Sentience	8.67	3.15
Social recognition	7.33	2.75
Succorance	7.05	2.83
Understanding	9.53	2.99
Desirability	13.88	2.35
Infrequency	.25	.52

Note. $N = 328$.

In this quantitative, ex post facto study, I used a convenience sample comprised of 328 candidates who applied for a maritime pilot job within one maritime pilot organization located in the United States. I did not use random sampling or selection techniques because this study included the use of archival data with a preexisting number of maritime pilot job applicants. Random sampling would have led to a decrease in the number of participants included in this study, resulting in an inadequate final sample size and decreased statistical power. Of the 328 total maritime pilot applicants, 328 completed

the PRF-E (Jackson, 1984), which resulted in a 100% response rate. To my knowledge, this was the first study to include an exploration of whether PRF-E scores predicted maritime pilot selection outcomes. The results of this study may serve as a foundation to expand the research to the larger target population in the future.

<div align="center">**Study Results**</div>

The statistical assumptions of logistic regression that I adhered to in this study are as follows:

1. The dependent variable is dichotomous; scores are typically coded 1 for occurrence and 0 for nonoccurrence.

2. Two or more independent variables are "quantitative variables, dummy-coded categorical variables, or both" (Warner, 2013, p. 1007).

3. Observations are statistically independent of each other.

4. Each participant included in the sample is a member of only one outcome group.

5. The model should not be overfit nor underfit.

6. To achieve adequate statistical power, a general rule suggests that a minimum of 15 outcome events per predictor variable is required, although some researchers recommend the inclusion of up to 50 cases per independent variable (see Hosmer et al., 2013; van Smeden et al., 2016; Warner, 2013).

I confirmed the statistical assumptions of logistic regression in this study as follows:

1. The dependent variable, selection as a maritime pilot, was dichotomous; scores were coded 1 for occurrence of selection and 0 for nonoccurrence of selection.

2. The independent variables were the 22 scales of the PRF-E (see Jackson, 1984) measured quantitatively from 0 to 16.

3. Observations were statistically independent of each other, meaning that each participant's scores were not related to or influenced by the scores of other participants (see Warner, 2013).

4. Each participant included in the sample was a member of only one outcome group, namely, selected or not selected for a job as a maritime pilot.

5. The binary logistic regression model was not overfit nor underfit, meaning that the model included all relevant explanatory variables and did not include any irrelevant explanatory variables (see Warner, 2013).

6. This study included 22 independent variables; therefore, the minimum number of outcome events should have been 330. Data from 328 selection outcome cases were available for this quantitative, ex post facto study; however, the accumulation of data over a considerable period, specifically 11 years, assisted in establishing a collective culture of personality patterns within the sample.

The data set included an acceptable sample size ($N = 328$) and did not include missing values. I did not identify any data coding or entry errors. To screen for extreme outliers, I converted the 22 predictor variables to z scores in SPSS Version 25. I did not

identify extreme outliers because there were no cases with standardized residual absolute values greater than 3.29 or less than -3.29 (see Warner, 2013). My examination of boxplots confirmed the absence of extreme outliers. To assess for high intercorrelations among the 22 predictor variables, I performed the collinearity diagnostics function in SPSS Version 25. I did not identify the presence of multicollinearity because the collinearity tolerance values exceeded 0.1 and the variance inflation factor values were less than 10 (see Mertler & Vannatta Reinhart, 2016).

Research Question 1

I performed the binary logistic regression analysis to predict respondents being selected based on respondents' PRF-E (Jackson, 1984) scores. I simultaneously entered the 22 independent variables and one dependent variable into SPSS Version 25. The sample, N, was 328 individuals (i.e., 308 males and 20 females) who applied for a maritime pilot job within one maritime pilot organization located in the United States. To determine whether there was a significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job, I evaluated the results based on: (a) a test of the full model (with respondents' PRF-E scores as predictor variables) compared with a constant-only or null model, (b) Cox and Snell's R^2 and Nagelkerke's R^2 values to assess the strength of the association between respondents' PRF-E scores and respondents being selected, and (c) values of the Hosmer-Lemeshow goodness-of-fit test to assess how well the data fit the model.

A test of the full model (with respondents' PRF-E; Jackson, 1984 scores as the predictor variables) compared with a constant-only or null model was statistically

significant, $x^2(22) = 321.373$, $p = .000$. The strength of the association between

respondents' PRF-E scores and respondents being selected was relatively strong with

Cox and Snell's $R^2 = .625$ and Nagelkerke's $R^2 = .865$. Stated alternatively from

Nagelkerke's R^2, the model as a whole explained 87% of the variance in maritime pilot

selection. This number showed significant predictive value.

Because the full model included quantitative predictor variables (i.e., PRF-E;

Jackson, 1984 scores), I performed the Hosmer-Lemeshow goodness-of-fit test to assess

how well the data fit the model (chi-square = 1.163, significance = .997). The chi-square

was small and its corresponding p value was nonsignificant ($p > .05$), indicating that the

logistic regression model was a good fit against the data. Table 4 displays the statistics of

overall model fit. Whereas the null model correctly classified only 66.2% of the cases,

the full model correctly classified 92.4% of the cases (see Table 5).

Table 4

Statistics for Overall Model Fit

Test	x^2	df	p
Omnibus tests of model coefficients	321.373	22	.000
Likelihood ratio test	98.452		
Hosmer-Lemeshow goodness-of-fit test	1.163	8	.997

Note. Cox & Snell $R^2 = 63\%$. Nagelkerke $R^2 = 87\%$. Regression results indicated that the overall fit of the model was good (-2 Log Likelihood = 98.452). The full model displayed improvement from the null model as evidenced by a reduction in the -2 Log Likelihood of 321.373 from the initial -2 Log Likelihood of 419.826.

Table 5

Observed and Predicted Frequencies for Sample with Cutoff Value of 0.50

		Predicted		% correct
		Not selected vs. Selected		
Observed		0 Not selected	1 Selected	
Not selected vs. selected	0 Not selected	206	11	94.9
	1 Selected	14	97	87.4
Overall % correct				92.4

Note. Sensitivity: 97 / (97+14) = 87.4%. Specificity: 206 / (206+11) = 95%. False positive: 11 / (11+97) = 10%. False negative: 14 / (206+14) = 6.4%.

Research Question 2

I analyzed the results of the binary logistic regression analysis to determine how significant the relationship was between each of the 22 PRF-E (Jackson, 1984) scale ratings and selection for a maritime pilot job. I evaluated the results based on: (a) beta coefficients, Wald statistics, significance levels, and odds ratios for each predictor variable; and (b) odds and probability values of respondents being selected for each significant predictor variable. As depicted in Table 6, there was a significant predictive relationship between 9 of the 22 independent variables and maritime pilot selection. I determined that there was a significant predictive relationship between the traits of abasement, achievement, change, cognitive structure, dominance, harmavoidance, sentience, desirability, and infrequency and maritime pilot selection.

Table 6

Logistic Regression Predicting Likelihood of Maritime Pilot Selection

Predictor	B	S.E.	Wald	p	Exp(B)
Abasement	-.652	.171	14.608	.000*	.521
Achievement	.324	.139	5.457	.019*	1.382
Affiliation	.213	.139	2.364	.124	1.238
Aggression	-.158	.118	1.777	.183	.854
Autonomy	-.111	.108	1.059	.304	.895
Change	.393	.148	7.023	.008*	1.481
Cognitive structure	.351	.157	5.020	.025*	1.420
Defendence	-.082	.165	.247	.619	.921
Dominance	-.516	.131	15.606	.000*	.597
Endurance	.030	.157	.036	.850	1.030
Exhibition	.023	.093	.062	.803	1.023
Harmavoidance	.265	.102	6.768	.009*	1.304
Impulsivity	.263	.145	3.291	.070	1.300
Nurturance	-.102	.117	.747	.387	.903
Order	-.014	.110	.017	.896	.986
Play	.038	.119	.102	.749	1.039
Sentience	.322	.108	8.944	.003*	1.380
Social recognition	-.064	.114	.319	.572	.938
Succorance	-.078	.113	.474	.491	.925
Understanding	.186	.115	2.629	.105	1.205
Desirability	-.732	.221	10.978	.001*	.481
Infrequency	-2.838	.913	9.655	.002*	.059
Constant	2.918	4.639	.396	.529	18.512

Note. $N = 328$.

*$p < 0.05$

The independent variable of abasement was statistically significant ($p < .05$). There was a negative relationship between abasement and maritime pilot selection ($B = -.652$). For every one-unit increase in abasement score, compared to the previous abasement score, the odds of respondents being selected were lower by a factor of .521 or 48%, controlling for the other predictor variables.

The independent variable of achievement was statistically significant ($p < .05$). There was a positive relationship between achievement and maritime pilot selection ($B = .324$). For every one-unit increase in achievement score, compared to the previous achievement score, the odds of respondents being selected were higher by a factor of 1.382 or 38%, controlling for the other predictor variables.

The independent variable of change was statistically significant ($p < .05$). There was a positive relationship between change and maritime pilot selection ($B = .393$). For every one-unit increase in change score, compared to the previous change score, the odds of respondents being selected were higher by a factor of 1.481 or 48%, controlling for the other predictor variables.

The independent variable of cognitive structure was statistically significant ($p < .05$). There was a positive relationship between cognitive structure and maritime pilot selection ($B = .351$). For every one-unit increase in cognitive structure score, compared to the previous cognitive structure score, the odds of respondents being selected were higher by a factor of 1.420 or 42%, controlling for the other predictor variables.

The independent variable of dominance was statistically significant ($p < .05$). There was a negative relationship between dominance and maritime pilot selection ($B = -.516$). For every one-unit increase in dominance score, compared to the previous dominance score, the odds of respondents being selected were lower by a factor of .597 or 40%, controlling for the other predictor variables.

The independent variable of harmavoidance was statistically significant ($p < .05$). There was a positive relationship between harmavoidance and maritime pilot selection (B

= .265). For every one-unit increase in harmavoidance score, compared to the previous harmavoidance score, the odds of respondents being selected were higher by a factor of 1.304 or 30%, controlling for the other predictor variables.

The independent variable of sentience was statistically significant ($p < .05$). There was a positive relationship between sentience and maritime pilot selection ($B = .322$). For every one-unit increase in sentience score, compared to the previous sentience score, the odds of respondents being selected were higher by a factor of 1.380 or 38%, controlling for the other predictor variables.

The independent variable of desirability was statistically significant ($p < .05$). There was a negative relationship between desirability and maritime pilot selection ($B = -.732$). For every one-unit increase in desirability score, compared to the previous desirability score, the odds of respondents being selected were lower by a factor of .481 or 52%, controlling for the other predictor variables.

The independent variable of infrequency was statistically significant ($p < .05$). There was a negative relationship between infrequency and maritime pilot selection ($B = -2.838$). For every one-unit increase in infrequency score, compared to the previous infrequency score, the odds of respondents being selected were lower by a factor of .059 or 94%, controlling for the other predictor variables.

Suliman, AbdelRahman, and Abdalla (2010) asserted that a logistic regression model with nine significant independent variables (X_1 to X_9, the nine significant PRF-E; Jackson, 1984 traits) and a dichotomous dependent variable (Y, selected/not selected for a maritime pilot job) is represented by the following equation:

Prob(SEL = 1) =

$$P = \frac{e^{(\alpha + B_{Ab}X_{Ab} + B_{Ac}X_{Ac} + B_{Ch}X_{Ch} + B_{Cs}X_{Cs} + B_{Do}X_{Do} + B_{Ha}X_{Ha} + B_{Se}X_{Se} + B_{De}X_{De} + B_{In}X_{In})}}{1 + e^{(\alpha + B_{Ab}X_{Ab} + B_{Ac}X_{Ac} + B_{Ch}X_{Ch} + B_{Cs}X_{Cs} + B_{Do}X_{Do} + B_{Ha}X_{Ha} + B_{Se}X_{Se} + B_{De}X_{De} + B_{In}X_{In})}}$$

where:
SEL = maritime pilot selection outcome (1 = Selected)
e = the exponentiation function
α = the constant term
X_1-X_9 = given values of a respondent's PRF-E (Jackson, 1984) ratings for each of the nine significant predictor variables
B_1-B_9 = logistic regression coefficients for the independent variables X_1 to X_9, respectively
Ab = Abasement
Ac = Achievement
Ch = Change
Cs = Cognitive structure
Do = Dominance
Ha = Harmavoidance
Se = Sentience
De = Desirability
In = Infrequency

The possible score for each significant PRF-E (Jackson, 1984) trait ranged from 0 to 16. In this study, none of the respondents scored lower than a 1 on abasement, achievement, and change, lower than a 2 on cognitive structure and dominance, lower than a 5 on desirability, or higher than a 3 on infrequency. See Table 7 for the observed mean, median, minimum, and maximum value for each significant predictor variable based on maritime pilot selection outcome.

Table 7

Descriptive Statistics of Significant PRF-E Scores Based on Selection Outcome

PRF-E variable	Selection outcome	*M*	*Mdn*	Minimum	Maximum
Abasement	Selected	6.05	6.00	1.00	11.00
	Not selected	9.24	9.00	3.00	16.00
Achievement	Selected	13.71	14.00	9.00	16.00
	Not selected	9.55	10.00	1.00	16.00
Change	Selected	9.18	9.00	2.00	16.00
	Not selected	8.26	8.00	1.00	14.00
Cognitive structure	Selected	11.84	12.00	5.00	16.00
	Not selected	9.84	10.00	2.00	16.00
Dominance	Selected	9.16	9.00	2.00	16.00
	Not selected	12.63	13.00	3.00	16.00
Harmavoidance	Selected	8.24	8.00	1.00	16.00
	Not selected	5.88	6.00	0.00	14.00
Sentience	Selected	10.36	10.00	5.00	16.00
	Not selected	7.81	8.00	0.00	14.00
Desirability	Selected	12.32	13.00	5.00	16.00
	Not selected	14.69	15.00	8.00	16.00
Infrequency	Selected	0.04	0.00	0.00	2.00
	Not selected	0.36	0.00	0.00	3.00

Note. N = 328.

See Figure 1 for examples of fictitious PRF-E scale scores for a respondent who was selected and a respondent who was not selected for a job as a maritime pilot. Low scores in a given trait correspond to the scale description and defining trait adjectives of low scorers as outlined in Appendix A. High scores in a given trait correspond to the

scale description and defining trait adjectives of high scorers as outlined in Appendix A.
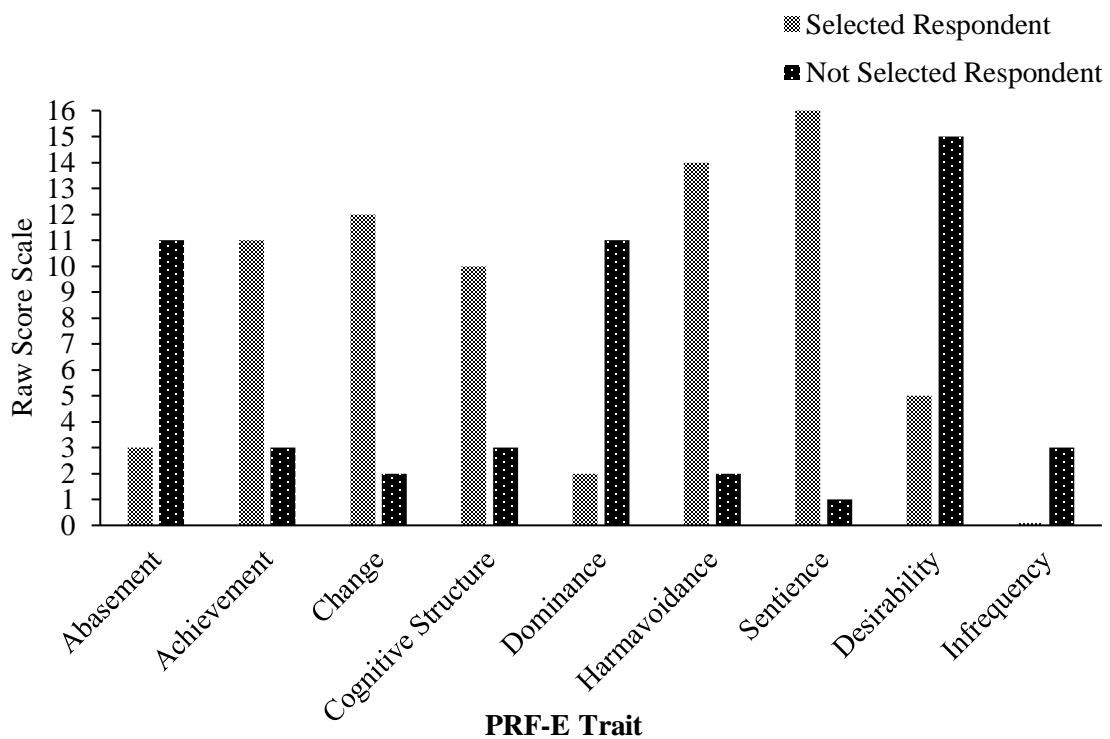
Figure 1. PRF-E scale and fictitious raw scores for selected and not selected respondents.

The odds of respondents being selected for the entire sample were .512. The probability of respondents being selected for the entire sample was .338. See Table 8 for the frequencies, predicted odds, and probabilities of respondents being selected for the significant predictor variables based on PRF-E (Jackson, 1984) score range. As illustrated in Table 8, the frequency, odds, and probability of selection for each significant trait were separated by score range to demonstrate differences between low scorers (0 to 8 score range) and high scorers (9 to 16 score range). As reflected in Table 8, the frequency, odds and probability of selection for the trait infrequency were separated by score range to

demonstrate differences between low scorers (0 to 1 score range) and high scorers (2 to 3 score range).

For the traits of abasement, dominance, and desirability, the odds and probability of selection were higher for participants who received scores in the 0 to 8 range, compared to participants who received scores in the 9 to 16 range. For the traits of achievement, change, cognitive structure, harmavoidance, and sentience, the odds and probability of selection were higher for participants who received scores in the 9 to 16 range, compared to participants who received scores in the 0 to 8 range. For the trait of infrequency, the odds and probability of selection were higher for participants who received scores in the 0 to 1 range, compared to participants who received scores in the 2 to 3 range.

Table 8

Predicted Odds and Probability of Respondents Being Selected for PRF-E Scores

PRF-E variable	Score range	Frequency: Selected	Frequency: Not selected	Frequency: Total	Odds of selection	Probability of selection
Abasement	0 to 8	96	102	198	0.941	0.485
	9 to 16	15	115	130	0.130	0.115
Achievement	0 to 8	0	95	95	0.000	0.000
	9 to 16	111	122	233	0.910	0.476
Change	0 to 8	46	110	156	0.418	0.295
	9 to 16	65	107	172	0.607	0.378
Cognitive structure	0 to 8	7	69	76	0.101	0.092
	9 to 16	104	148	252	0.703	0.413
Dominance	0 to 8	49	9	58	5.444	0.845
	9 to 16	62	208	270	0.298	0.230
Harmavoidance	0 to 8	59	172	231	0.343	0.255
	9 to 16	52	45	97	1.156	0.536
Sentience	0 to 8	32	124	156	0.258	0.205
	9 to 16	79	93	172	0.849	0.459
Desirability	0 to 8	14	1	15	14.000	0.933
	9 to 16	97	216	313	0.449	0.310
Infrequency	0 to 1	110	207	317	0.531	0.347
	2 to 3	1	10	11	0.100	0.091

Note. N = 328.

Summary

The first research question in this study was: Is there a significant relationship between respondents' PRF-E (Jackson, 1984) scale ratings and selection for a maritime pilot job? The findings of this study support my decision to reject the null hypothesis by observing that the logistic regression model was statistically significant ($x^2(22) = 321.373$, $p = .000$). The second research question in this study was: How significant is the

relationship between each of the 22 PRF-E scale ratings and selection for a maritime pilot job? Results of the binary logistic regression demonstrated that the PRF-E traits of abasement, achievement, change, cognitive structure, dominance, harmavoidance, sentience, desirability, and infrequency were statistically significant predictors of selection for a maritime pilot job.

This chapter incorporated the results of the logistic regression analysis and included an equation representing the fitted logistic regression model with the dependent variable and nine significant predictor variables. Chapter 5 will include an interpretation of the study findings in comparison to the peer-reviewed literature discussed in Chapter 2. Chapter 5 will also include a description of the limitations of the study; recommendations for further research; and implications for positive social change, theory, and practice.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to assess P-J fit theory by examining the relationship between personality traits, as measured by Jackson's (1984) PRF-E, and selection for a maritime pilot job. The nature of this study was quantitative research using a nonexperimental, ex post facto design and secondary analysis approach. I used binary logistic regression to analyze the predictive ability of personality traits, as measured by the PRF-E, on selection for a sample of 328 maritime pilot job applicants.

I conducted this study to determine if respondents' PRF-E (Jackson, 1984) ratings predicted maritime pilot selection. The findings of the study demonstrated a significant relationship between 9 of the 22 PRF-E scale ratings and selection for a maritime pilot job. I established a significant predictive relationship between maritime pilot selection and the PRF-E scale ratings of abasement, achievement, change, cognitive structure, dominance, harmavoidance, sentience, desirability, and infrequency. This knowledge facilitated my creation of a personality profile of selected applicants that maritime pilot commissions and associations could reference during maritime pilot selection processes.

Interpretation of Findings

This ex post facto research encompassed an investigation of whether 328 respondents' PRF-E (Jackson, 1984) scale ratings predicted maritime pilot selection outcomes. Edwards' (1991) conceptualization of P-J fit informed the research questions for this study. To my knowledge, this was the first study to include an exploration of the personality characteristics that contributed to maritime pilot selection and P-J fit. In

establishing that personality traits were determinants of selection, the findings of this research expanded knowledge of P-J fit theory for the maritime pilot applicant population.

With the first research question in this study, I asked: Is there a significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job? The decision to reject the null hypothesis was supported by observing that the overall model fit was statistically reliable in distinguishing between maritime pilot selection outcomes ($x^2(22) = 321.373$, $p = .000$). Whereas the null model correctly classified only 66.2% of the cases, the full model correctly classified 92.4% of the cases.

In the second research question of this study, I asked: How significant is the relationship between each of the 22 PRF-E scale ratings and selection for a maritime pilot job? The results of the binary logistic regression indicated that 9 of the 22 PRF-E scales were significant predictors of maritime pilot selection. The traits that I found to be statistically significant were abasement, achievement, change, cognitive structure, dominance, harmavoidance, sentience, desirability, and infrequency.

In the review of the literature in Chapter 2, I highlighted that effective maritime pilots characteristically work hard to overcome obstacles and can maintain composure under stress (see Lo, 2015; Lobo, 2016). Successful maritime pilots readily adapt to changing conditions, exhibit high levels of judgment, and strive to ensure paramount levels of safety through sound communication and decision-making (Abramowicz-Gerigk & Hejmlich, 2015). Investigators reported a reduction in accidents when maritime pilots effectively assessed and avoided risks, worked collaboratively with others, took action

when appropriate, and maintained positive situational awareness (Ernstsen & Nazir, 2018).

Researchers emphasized that workers who demonstrated safe on-the-job behaviors exhibited certain personality dimensions, including cooperativeness, attentiveness, confidence, self-control, determination, vigilance, and emotional stability (Beus et al., 2015; Hogan & Foster, 2013). Public safety job candidates were more likely to be selected if they displayed certain personality traits, such as agreeableness, ambition, caution, discipline, and social assertiveness (Annell et al., 2015; Detrick & Chibnall, 2013). High levels of achievement-orientation, self-tolerance, and flexibility in public safety job candidates were important dimensions in forming selection decisions and forecasting positive job performance (Niebuhr et al., 2013; Stark et al., 2014).

In this study, the PRF-E (Jackson, 1984) ratings of selected maritime pilot applicants aligned with extant researchers' findings concerning the core personality attributes of maritime pilots and public safety workers. Compared to maritime pilot applicants who were not selected in this study, selected candidates received higher scores in the traits of achievement, change, cognitive structure, harmavoidance, and sentience as well as lower scores in the traits of abasement, dominance, desirability, and infrequency. The findings of this study extended the body of P-J fit literature for the maritime pilot applicant population and also supported the effectiveness of the PRF-E in predicting maritime pilot selection outcomes.

The trait of abasement had a significant predictive effect on whether a maritime pilot applicant was selected from the sample of candidates. There was a negative

relationship between abasement and selection. Compared to selected individuals, respondents who were rejected received higher ratings in the trait of abasement. This finding indicated that selected applicants were more likely to maintain high levels of self-respect, demonstrate confidence and assertiveness when appropriate, and not accept undeserved blame or criticism (see Jackson, 1984).

Successful maritime pilots collaborate with foreign captains and crews while exhibiting self-assurance, calmness, and supportive authority (Lo, 2015). They conduct critical operations in a diplomatic, yet commanding manner and must rely on their experience and instincts to safely guide vessels into and out of congested and dangerous ports (Ernstsen & Nazir, 2018). To avoid safety infringements, maritime pilots should not readily yield to the opinions of those who may be unfamiliar with local topography, traffic, water, and weather conditions (Lobo, 2016). Researchers determined that effective high-risk public safety workers consistently exhibited suitable levels of self-confidence, composure, and positive social influence to evaluate, manage, and resolve hazardous situations (Colaprete, 2012; Perry et al., 2008). In the present study, selected applicants' low ratings in the trait of abasement aligned with existing researchers' assertions regarding the importance of an individual maintaining their convictions to ensure public safety, even in the face of criticism or differing opinions.

The trait of achievement had a significant predictive effect on whether a maritime pilot applicant was selected from the sample of candidates. There was a positive relationship between achievement and selection. Compared to selected individuals, respondents who were rejected received lower ratings in the trait of achievement. This

finding indicated that selected applicants were more likely to strive for excellence, be goal-oriented, enjoy competition, and exert maximum effort to overcome challenges (see Jackson, 1984).

The FFM (McCrae & Costa, 1999) trait of conscientiousness measures respondents' achievement orientation. The trait description of conscientiousness is comparable to the PRF-E (Jackson, 1984) trait description of achievement. Beus et al. (2015) determined that workers who scored lower in conscientiousness were more likely to engage in unsafe behaviors, such as compromising safety to complete tasks at a faster rate of speed. Researchers found that selected public safety candidates, including police officers, firefighters, and military personnel, received higher scores than rejected candidates in personality scales designed to measure achievement orientation (Salters-Pedneault et al., 2010; Stark et al., 2014; Tarescavage, Corey, et al., 2015). Findings indicated that individuals who were selected for high-risk public safety jobs were extremely hardworking, goal-driven, persistent, ambitious, and resourceful (Detrick & Chibnall, 2013). Due to the rigorous nature of application, study, training, testing, and licensing requirements, maritime pilots are widely regarded as "the elite of the mariner profession" (Kirchner, 2008, p. 9). In the current study, selected applicants' high ratings in the trait of achievement supported existing researchers' findings concerning robust levels of achievement orientation, which may facilitate enhanced on-the-job safety.

The trait of change had a significant predictive effect on whether a maritime pilot applicant was selected from the sample of candidates. There was a positive relationship between change and selection. Compared to selected individuals, respondents who were

rejected received lower ratings in the trait of change. This finding indicated that selected applicants were more likely to maintain flexibility, sustain composure in unexpected circumstances, enjoy new experiences, and readily adapt to changing environmental conditions (see Jackson, 1984).

To facilitate port safety, efficiency, and prosperity, maritime pilots must quickly and effectively adjust to a diverse range of changing and often highly unpredictable circumstances (Hongbin, 2018). Doyle et al. (2016) highlighted that resilience, or a person's ability to overcome obstacles, is a critical trait in seafarers. High levels of personality hardiness, a facet of resilience, enable mariners to effectively cope with stress, regard changing conditions as opportunities for personal development, and maintain control and commitment in the face of adversity (Doyle et al., 2016; Hystad & Bye, 2013). In the current study, selected applicants' high ratings in the trait of change aligned with existing researchers' findings concerning the importance of adaptability, resilience, and hardiness in seafarers.

The trait of cognitive structure had a significant predictive effect on whether a maritime pilot applicant was selected from the sample of candidates. There was a positive relationship between cognitive structure and selection. Compared to selected individuals, respondents who were rejected received lower ratings in the trait of cognitive structure. This finding indicated that selected applicants were more likely to demonstrate effective levels of discipline and organization, exhibit a high regard for structure and schedules, and seek out definite information to make decisions in a calculated manner (see Jackson, 1984).

The FFM (McCrae & Costa, 1999) trait of conscientiousness measures respondents' levels of self-discipline, readiness to follow rules, meticulousness in planning and completing tasks, and organization in establishing and pursuing objectives. The trait description of conscientiousness is comparable to the PRF-E (Jackson, 1984) trait description of cognitive structure. Beus et al. (2015) determined that workers who scored higher in conscientiousness were less likely to engage in unsafe behaviors. Hystad and Bye (2013) found that mariners who aligned workplace goals and decisions with personal conservation values, including conformity, security, and tradition, were more likely to demonstrate safe behaviors. In comparing existing researchers' findings with current study results, selected applicants' high ratings in cognitive structure may result in thorough information-gathering, methodical decision-making, adherence to rules, and safer overall maritime piloting operations.

The trait of dominance had a significant predictive effect on whether a maritime pilot applicant was selected from the sample of candidates. There was a negative relationship between dominance and selection. Compared to selected individuals, respondents who were rejected received higher ratings in the trait of dominance. This finding indicated that selected applicants were more likely to be approachable, work productively with others, and not exhibit an excessively overbearing presence (see Jackson, 1984).

The FFM (McCrae & Costa, 1999) trait of neuroticism measures respondents' likelihood to behave in an angry or hostile manner, whereas the trait of agreeableness measures respondents' expected cooperativeness and response to conflict. These traits are

comparable to the PRF-E (Jackson, 1984) trait descriptions of dominance for high and low scorers. Beus et al. (2015) found that workers who scored lower in neuroticism and higher in agreeableness were more likely to cultivate and sustain constructive interpersonal associations in both tranquil and stressful circumstances, resulting in enhanced communication and safety compliance. Although maritime pilots provide an indispensable service and possess specialized knowledge of local ports, they are guests upon the vessels that they are hired to pilot (Chakrabarty, 2016). Maritime pilots who exhibit an overly aggressive, domineering, uncooperative, or unprofessional demeanor can undermine teamwork and inhibit communication, endangering public safety and security (Patraiko, 2017). In the current study, selected applicants' low ratings in the trait of dominance may contribute to positive relationships with captains and crews, ultimately fostering team-oriented work environments and improved safety outcomes.

The trait of harmavoidance had a significant predictive effect on whether a maritime pilot applicant was selected from the sample of candidates. There was a positive relationship between harmavoidance and selection. Compared to selected individuals, respondents who were rejected received lower ratings in the trait of harmavoidance. This finding indicated that selected applicants were more likely to exhibit caution, maintain vigilance regarding apparent and unforeseen danger, avoid unnecessary risk-taking, and demonstrate concern for the safety and well-being of oneself and others (see Jackson, 1984).

The FFM (McCrae & Costa, 1999) domain of extraversion measures respondents' propensity for excitement seeking, which is comparable to the PRF-E (Jackson, 1984)

trait description of harmavoidance. Beus et al. (2015) found that compared to workers who scored lower in extraversion, those who scored higher in extraversion were more prone to engage in unsafe behaviors. Researchers emphasized that accidents and other safety infringements were more likely to occur when maritime pilots failed to effectively assess threats to safety or took avoidable risks (Abramowicz-Gerigk & Hejmlich, 2015; Ernstsen & Nazir, 2018). In comparing extant researchers' findings with current study results, high levels of harmavoidance in selected applicants may result in safer maritime piloting behaviors, including effective risk assessment and avoidance of safety breaches.

The trait of sentience had a significant predictive effect on whether a maritime pilot applicant was selected from the sample of candidates. There was a positive relationship between sentience and selection. Compared to selected individuals, respondents who were rejected received lower ratings in the trait of sentience. This finding indicated that selected applicants were more likely to effectively receive and process environmental cues, perceive and react to sensations, and exhibit an appreciation for natural surroundings (see Jackson, 1984).

Through a combination of cognitive and physiological functions, successful maritime pilots observe, process, and react to subtle changes in water depths, currents, tides, weather, and winds (Chakrabarty, 2016; Orlandi & Brooks, 2018). Researchers stressed that maritime piloting errors and complex accidents can stem from situational awareness deficiencies as well as the inability to effectively perceive and respond to environmental cues (Cordon et al., 2017; Ernstsen & Nazir, 2018). In the current study, selected applicants' high ratings in the trait of sentience aligned with existing researchers'

assertions regarding the importance of recognizing, perceiving, and processing environmental phenomena and potential natural threats. In evaluating this finding against existing research, selected candidates' sensory adaptation and situational response capacities may result in safer and more effective maritime piloting operations.

The trait of desirability had a significant predictive effect on whether a maritime pilot applicant was selected from the sample of candidates. There was a negative relationship between desirability and selection. Compared to selected individuals, respondents who were rejected received higher ratings in the trait of desirability. This finding indicated that this validity scale reliably measured applicants' responses and detected if participants responded to PRF-E (Jackson, 1984) statements with the intent of portraying themselves "in terms judged as desirable" (p. 6).

The trait of infrequency had a significant predictive effect on whether a maritime pilot applicant was selected from the sample of candidates. There was a negative relationship between infrequency and selection. Compared to selected individuals, respondents who were rejected received higher ratings in the trait of infrequency. This finding indicated that this validity scale reliably measured applicants' responses and detected if participants responded to PRF-E (Jackson, 1984) statements in a questionable manner.

In the current study, low ratings in the scales of desirability and infrequency confirmed the reliability of selected applicants' responses to PRF-E (Jackson, 1984) items as well as the validity of their full PRF-E profiles. Selected respondents did not respond to PRF-E statements in an improbable manner or attempt to present excessively

favorable self-descriptions. Low ratings in desirability and infrequency enabled me to analyze and interpret selected candidates' PRF-E results with confidence. These findings aligned with extant researchers' findings concerning the efficacy of other personality assessments used to evaluate high-risk public safety job candidates, including the MMPI (Hathaway & McKinley, 1942), the PAI (Morey, 1991), the IPI (Inwald, 1992), and the NEO PI-R (Costa & McCrae, 1992). See Appendix C for a summary of current research findings for selected maritime pilot job applicants in relation to previous research findings concerning the personality characteristics of high-risk public safety employees.

Limitations of the Study

A limitation of this study was that the sample was restricted to individuals who applied for a maritime pilot job within a single U.S.-based maritime pilot organization. The PRF-E (Jackson, 1984) is a reliable and valid standardized personality assessment based on normative samples. Because desirable personality traits are homogenous throughout the maritime pilot population, the results of this study could potentially be useful in assessing candidates within other maritime pilot organizations.

The sample included 308 males and 20 females, thus the ratio of male to female respondents was disproportionate. Because this study included the use of archival data, the hiring maritime pilot organization already assigned participants to outcome groups, namely, selected or not selected for a maritime pilot job. It was impossible to demonstrate that the independent variables, rather than confounding variables, caused the difference between groups. Participants' PRF-E (Jackson, 1984) ratings were one of several criteria in making maritime pilot selection or rejection decisions.

Generalizability of results to the larger maritime pilot applicant population was limited because I did not randomly select participants. I did not randomly assign participants to treatment and control groups or manipulate any of the variables, potentially weakening internal validity (see Salkind, 2010). Selection bias is a typical concern in nonexperimental predictive studies because researchers may lack information regarding participant dropouts (Tabachnick & Fidell, 2018). I obtained confirmation from the third-party organization that the final sample included data from all eligible applicants beginning at the time that job postings were made available to the public.

The PRF-E (Jackson, 1984) data were self-reported by participants who knew that they were completing the assessment as part of a prehiring process, which could have introduced response bias. The PRF-E instrument includes two control variables, desirability and infrequency, which reduced the potential negative effect of response bias (see Jackson, 1984). Study results revealed a negative relationship between desirability and selection and between infrequency and selection. These findings indicated that the probability of selection decreased when participants responded to PRF-E statements in a questionable manner or with the intent of portraying themselves "in terms judged as desirable" (Jackson, 1984, p. 6).

To achieve adequate statistical power, logistic regression analysis requires 15 to 50 outcome events per independent variable (see Hosmer et al., 2013; Warner, 2013). This study included 22 independent variables, thus the minimum number of outcome events should have been 330. Data from 328 selection outcome cases were available for this quantitative, ex post facto study; however, the accumulation of data over a

considerable period, specifically 11 years, assisted in establishing a collective culture of personality patterns within the sample.

Another limitation in this study was the separation of roles, namely me as the researcher versus being a former employee of the third-party organization that collected the data. Throughout every phase of this study, I took exhaustive measures to ensure that no conflicts of interest existed between myself and the data. I confirmed that the data set was anonymized, maintained strict objectivity in analyzing the data, and attempted to disprove the alternative hypothesis by testing the null hypothesis (see Warner, 2013).

A final limitation of this study was the restricted availability of scholarly research on the relationship between personality traits, P-J fit, and selection for the vocation of a maritime pilot. To address this limitation, Chapter 2 included supporting literature in which researchers explored the relationship between P-J fit, personality traits, and selection of candidates within similar public safety service roles, such as law enforcement, military, and firefighting. Chapter 2 also included information on maritime pilot selection processes retrieved from government, maritime piloting, and maritime news websites.

<div align="center">**Recommendations**</div>

This study included an exploration of the effectiveness of the PRF-E (Jackson, 1984) in predicting maritime pilot selection outcomes. Study results expanded the body of P-J fit literature regarding personality traits as antecedents of maritime pilot selection. This section includes recommendations for further research that are grounded in the

strengths and limitations of the current study as well as the literature reviewed in Chapter 2.

Researchers established that high levels of P-J fit yield positive outcomes, including enriched employee performance (Christiansen et al., 2014; Kristof-Brown et al., 2005; Lin et al., 2014). To extend the results of the current study beyond selection outcomes, further research would be beneficial in determining if selected participants exhibited positive on-the-job performance as maritime pilots. This additional research may assist in determining if personality traits, as measured by the PRF-E (Jackson, 1984), predicted safe and effective maritime pilot performance, ultimately contributing to sound P-J fit.

This nonexperimental, ex post facto study included data from 328 participants who I did not randomly select from the maritime pilot applicant population. To increase generalizability to the target population, further research should include a larger sample of maritime pilot job applicants who are randomly selected from multiple hiring organizations in the United States. A larger sample may increase the statistical power of the logistic regression model and strengthen the predictive ability of the PRF-E (Jackson, 1984) scales on maritime pilot selection.

In this study, 13 of the 22 PRF-E (Jackson, 1984) traits were not significant predictors of maritime pilot selection, specifically the traits of affiliation, aggression, autonomy, defendence, endurance, exhibition, impulsivity, nurturance, order, play, social recognition, succorance, and understanding. Results indicated that in making selection decisions, these 13 traits were not as important in comparison to the nine PRF-E traits

that I determined to be predictive of selection outcomes. To establish the reliability of these results, further research is needed with a larger and more diverse sample of maritime pilot applicants.

This ex post facto study included 308 males and 20 females. Because this study included a disproportionate number of males compared to females, I did not include respondents' gender as a predictor variable in the logistic regression model. To determine how respondents' gender predicts selection outcomes, further research should include a more equal number of male and female maritime pilot job applicants.

Another suggestion for future research is to administer the PRF-E (Jackson, 1984) to experienced maritime pilots. This research may assist in determining which, if any, personality traits, as measured by the PRF-E, are significant among existing maritime pilots in comparison to maritime pilot applicants. Results may assist maritime pilot commissions and associations in selecting candidates whose personality traits, as measured by the PRF-E, most closely match those of skilled maritime pilots.

In this study, respondents' PRF-E (Jackson, 1984) scale ratings were one of several criteria in making maritime pilot selection or rejection decisions. A final suggestion for further research is to analyze maritime pilot applicants' PRF-E scale ratings in conjunction with other preemployment assessments. Such tools include those designed to measure candidates' intelligence, aptitudes, job knowledge, culture fit, and vocational interests. This additional research may assist in determining whether a broader combination of prescreening assessments that capture multiple determinants of P-J fit more effectively predict maritime pilot selection outcomes.

Implications

Regarding the maritime pilot, Mark Twain (1876) wrote, "He must have good and quick judgment and decision, and a cool, calm courage that no peril can shake" (p. 94). Maritime piloting is one of the oldest and most highly respected professions within the global marine transportation industry. As guardians of inland waterways, maritime pilots diligently protect human life, aquatic ecosystems, and property. The critical nature of maritime piloting responsibilities requires the selection of individuals who exhibit personality traits that contribute to sound P-J fit. In investigating the relationship between maritime pilot applicants' personality traits and selection, this study offers potential implications for positive social change, practice, and theory.

The results of this study stimulate positive social change by demonstrating that certain PRF-E (Jackson, 1984) scale ratings effectively predicted respondents' maritime pilot selection outcomes. Findings illustrated that maritime pilot applicants who received higher ratings in the PRF-E traits of achievement, change, cognitive structure, harmavoidance, and sentience, along with lower ratings in the PRF-E traits of abasement, dominance, desirability, and infrequency, were more likely to be selected. Hiring maritime pilot commissions and associations could refer to these results to determine whether future maritime pilot candidates' personality traits align with this profile. The findings of this research promote positive social change by assisting in preventing vessel accidents, ecological damage, injuries, and most importantly, loss of life.

In studying the relationship between personality traits and maritime pilot selection outcomes, a personality trait pattern emerged that facilitated my development of a

personality profile of selected maritime pilot applicants. This profile could enhance maritime pilot applicants' prehire P-J fit evaluations, resulting in more informed and effective selection decisions. This research positively influences advances in practice by providing maritime pilot commissions and associations with new knowledge about applicants' personality traits. Maritime piloting organizations could use the results of this study to screen out misfit candidates and pinpoint the applicants who possess desired personality traits.

Prior to this study, researchers did not adequately examine contributing factors of P-J fit within the maritime pilot applicant population. The results of this research advanced theory by filling a gap in empirical literature regarding personality traits as antecedents of maritime pilot P-J fit. In addition, empirical research on personality traits as predictors of maritime pilot selection was notably absent in the literature. The findings of this study also filled a gap in scholarly research by establishing the efficacy of a personality assessment, the PRF-E (Jackson, 1984), in predicting maritime pilot selection and rejection outcomes.

Conclusions

This quantitative, ex post facto study included an examination of the relationship between 328 respondents' personality traits, as measured by the PRF-E (Jackson, 1984), and maritime pilot selection outcomes. The research provided foundational knowledge concerning the personality traits of candidates who applied for a maritime pilot job. An improved understanding of the predictive ability of personality traits on maritime pilot

selection could stimulate more constructive hiring decisions, ultimately enhancing the safety and effectiveness of maritime piloting operations.

The results of this study provided the odds and probability of being selected occurring or not occurring among maritime pilot applicants based on multiple predictor variables, specifically PRF-E (Jackson, 1984) scale ratings. Results indicated a significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job. Nine of the 22 PRF-E scales were significant predictors of maritime pilot selection, specifically the traits of abasement, achievement, change, cognitive structure, dominance, harmavoidance, sentience, desirability, and infrequency. To select candidates whose personality traits best fit the job, maritime pilot commissions and associations may refer to these results during maritime pilot selection processes.

To my knowledge, this was the first study to include an exploration of whether PRF-E (Jackson, 1984) scale ratings predicted maritime pilot selection outcomes. The research results supplemented findings in extant P-J fit literature and provided new information regarding the predictive ability of PRF-E scales on maritime pilot selection. This initial investigation may serve as a foundation to further explore the relationship between personality traits, selection, and P-J fit within the maritime pilot population. The continued empirical assessment of maritime pilot candidates' personality traits could underpin the prevention of future vessel accidents, environmental harms, human injuries, and fatalities.

References

Abramowicz-Gerigk, T., & Hejmlich, A. (2015). Human factor modelling in the risk

assessment of port manoevers. *TransNav: International Journal on Marine

Navigation and Safety of Sea Transportation*, *9*(3), 427-433.

http://dx.doi.org/10.12716/1001.09.03.16

Age Discrimination in Employment Act, 29 U.S.C. § 621 (1967).

Allianz Global Corporate & Specialty. (2017). *Safety and shipping review 2017: An

annual review of trends and developments in shipping losses and safety*. Retrieved

from

https://www.agcs.allianz.com/assets/PDFs/Reports/AGCS_Safety_Shipping_Revi

ew_2017.pdf

American Pilots' Association. (2015a). About APA.

http://www.americanpilots.org/about_apa/index.php

American Pilots' Association. (2015b). Pilotage in the United States. Retrieved from

http://www.americanpilots.org/pilotage_in_the_u_s/index.php

Americans with Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat. 328 (1990).

Annell, S., Lindfors, P., & Sverke, M. (2015). Police selection – implications during

training and early career. *Policing: An International Journal*, *38*(2), 221-238.

http://dx.doi.org/10.1108/PIJPSM-11-2014-0119

Ardıç, K., Oymak, Ö., Özsoy, T., Uslu, O., & Özsoy, E. (2016). Comparing person

organization fit and person job fit. *Journal of Economics & Management*, *25*(3),

5-13. http://dx.doi.org/10.22367/jem.2016.25.01

Arslan, V., Kurt, R. E., Turan, O., & De Wolff, L. (2016). Safety culture assessment and implementation framework to enhance maritime safety. *Transportation Research Procedia*, *4*(Transport Research Arena TRA2016), 3895-3904. http://dx.doi.org/10.1016/j.trpro.2016.05.477

Bach, A. (2009). A qualitative study of the interaction between maritime pilots and vessel traffic service operators. *World Maritime University Dissertations*, *259*, 1-56. Retrieved from http://commons.wmu.se/all_dissertations/259

Bajpai, S. R., & Bajpai, R. C. (2014). Goodness of measurement: Reliability and validity. *International Journal of Medical Science and Public Health, 3*(2), 112-115. http://dx.doi.org/10.5455/ijmsph.2013.191120133

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W. H. Freeman and Company.

Barnham, C. (2015). Quantitative and qualitative research. *International Journal of Market Research*, *57*(6), 837-854. http://dx.doi.org/10.2501/IJMR-2015-070

Bayram, A. (2018). Human energy at work and a research on identifying the antecedents. *Business and Economics Research Journal, 9*(4), 871-888. Retrieved from https://www.berjournal.com/

Ben-Porath, Y. S., & Tellegen, A. (2008/2011). *MMPI-2-RF (Minnesota Multiphasic Personality Inventory-2 Restructured Form) manual for administration, scoring, and interpretation.* Minneapolis, MN: University of Minnesota Press.

Berg, H. P. (2013). Human factors and safety culture in maritime safety

(Revised). *TransNav: International Journal on Marine Navigation and Safety of*

Sea Transportation, 7(3), 343-352. http://dx.doi.org/10.12716/1001.07.03.04

Bessmer, M. A., & Ramanaiah, N. V. (1981). Convergent and discriminant validity of

selected need scales from the adjective check list and the Personality Research

Form. *Psychological Reports*, *49*(1), 311-316.

http://dx.doi.org/10.2466/pr0.1981.49.1.311

Beus, J. M., Dhanani, L. Y., & McCord, M. A. (2015). A meta-analysis of personality

and workplace safety: Addressing unanswered questions. *Journal of Applied*

Psychology, *100*(2), 481-498. http://dx.doi.org/10.1037/a0037916

Board of Pilot Commissioners for Harris County Ports. (2017). Application procedures.

Retrieved from http://www.houstonpilotboard.com/application_procedure.html

Boudreau, P., Lafrance, S., & Boivin, D. B. (2018). Alertness and psychomotor

performance levels of marine pilots on an irregular work roster. *Chronobiology*

International, 35(6), 773-784. http://dx.doi.org/10.1080/07420528.2018.1466796

Bowen, D. E., Ledford, G. E., Jr., & Nathan, B. R. (1991). Hiring for the organization,

not the job. *Executive*, *5*(4), 35-51. http://dx.doi.org/10.5465/AME.1991.4274747

Braga, A. A., Hureau, D. M., & Papachristos, A. V. (2011). An ex post facto evaluation

framework for place-based police interventions. *Evaluation Review*, *35*(6), 592-

626. http://dx.doi.org/10.1177/0193841X11433827

Brenninkmeijer, V., Vink, M., Dorenbosch, L. W., Beudeker, D. A., & Rink, F. (2018).

Regulatory fit at work: Gravitational effects and associations with employee well-

being. *European Journal of Work & Organizational Psychology*, *27*(6), 809-821. http://dx.doi.org/10.1080/1359432X.2018.1540467

Bretz, R. D., Ash, R. A., & Dreher, G. F. (1989). Do people make the place? An examination of the attraction-selection-attrition hypothesis. *Personnel Psychology, 42*(3), 561-581. http://dx.doi.org/10.1111/j.1744-6570.1989.tb00669.x

Bridgewater, C. A. (1981). Construct validity of the Personality Research Form: Further evidence. *Educational & Psychological Measurement, 41*, 533-535. http://dx.doi.org/10.1177/001316448104100235

Butcher, J. N., Ones, D. S., & Cullen M. (2006). Personnel screening with the MMPI-2. In J. N. Butcher (Ed.), *MMPI-2: A practitioner's guide* (pp. 381-406). Washington, DC: American Psychological Association.

Cai, D., Cai, Y., Sun, Y., & Ma, J. (2018). Linking empowering leadership and employee work engagement: The effects of person-job fit, person-group fit, and proactive personality. *Frontiers in Psychology*, *9*, 1-12. http://dx.doi.org/10.3389/fpsyg.2018.01304

Canaveral Pilots. (n.d.). Why ships need pilots. Retrieved from https://canaveralpilots.com/why-ships-need-pilots/

Canaveral Pilots. (2014, January 31). What is a harbor pilot? Retrieved from https://canaveralpilots.com/what-is-a-harbor-pilot/

Cattell, H. E. P., & Mead, A. D. (2008). The Sixteen Personality Factor Questionnaire (16PF). In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *The SAGE*

handbook of personality theory and assessment, Vol. 2. Personality measurement and testing (pp. 135-159). Thousand Oaks, CA: SAGE Publications, Inc.

Cattell, R. B. (2017). *The scientific analysis of personality*. New York, NY: Routledge.

Chakrabarty, A. (2016). The importance of pilot-master relationships on ships. *Marine Insight*. Retrieved from https://www.marineinsight.com/marine-navigation/the-importance-of-pilot-master-relationship-on-ships/

Chambers, T. P., & Main, L. C. (2015). Symptoms of fatigue and coping strategies in maritime pilotage. *International Maritime Health*, *66*(1), 43-48. http://dx.doi.org/10.5603/IMH.2015.0011

Chamorro-Premuzic, T. (2015, July-August). Ace the assessment: More employers are using tests as part of the hiring process. Here's how to prepare for them. *Harvard Business Review*, 118-121. Retrieved from https://hbr.org/

Chapin, F. S. (1947). *Experimental designs in sociological research*. New York, NY: Harper.

Chen, C.-Y., Yen, C.-H., & Tsai, F. C. (2014). Job crafting and job engagement: The mediating role of person-job fit. *International Journal of Hospitality Management*, *37*, 21–28. http://dx.doi.org/10.1016/j.ijhm.2013.10.006

Chen, L.-C., Perng, S.-J., Chang, F.-M., & Lai, H.-L. (2016). Influence of work values and personality traits on intent to stay among nurses at various types of hospital in Taiwan. *Journal of Nursing Management*, *24*(1), 30-38. http://dx.doi.org/10.1111/jonm.12268

Chopra, K. (2017, January 4). The history of ships: Ancient maritime world. *Marine Insight*. Retrieved from https://www.marineinsight.com/maritime-history/the-history-of-ships-ancient-maritime-world/

Christiansen, N. C., Sliter, M., & Frost, C. T. (2014). What employees dislike about their jobs: Relationship between personality-based fit and work satisfaction. *Personality & Individual Differences*, *71*, 25-29. http://dx.doi.org/1.1016/j.paid.2014.07.013

Chuang, A., & Sackett, P. R. (2005). The perceived importance of person-job fit and person-organization fit between and within interview stages. *Social Behavior & Personality: An International Journal*, *33*(3), 209-226. http://dx.doi.org/10.2224/sbp.2005.33.3.209

Civil Rights Act of 1964 § 7, 42 U.S.C. § 2000e *et seq* (1964).

Colaprete, F. A. (2012). *Pre-employment background investigations for public safety professionals*. Boca Raton, FL: CRC Press.

Conducting background investigations and reference checks. (2018, September 20). *Society for Human Resource Management*. Retrieved from https://www.shrm.org/resourcesandtools/tools-and-samples/toolkits/pages/conductingbackgroundinvestigations.aspx

Cordon, J. R., Mestre, J. M., & Walliser, J. (2017). Human factors in seafaring: The role of situation awareness. *Safety Science*, *93*, 256-265. http://dx.doi.org/10.1016/j.ssci.2016.12.018

Costa, P. T., & McCrae, R. R. (1992). *NEO PI-R professional manual*. Odessa, FL: Psychological Assessment Resources.

Cox, D. R. (1958). The regression analysis of binary sequences. *Journal of the Royal Statistical Society, Series B, 20*(2), 215-242. Retrieved from https://www.rss.org.uk/RSS/Publications/Journals/Journal_Series_B/RSS/Publications/Journals_sub/Journal_Series_B.aspx?hkey=42bc0f7b-fd31-4e48-a771-b888de34dea8

Cox, D. R., & Snell, E. J. (1989). *Analysis of binary data* (2nd ed.). London, England: Chapman and Hall.

Cunliffe, T. (2001). *Pilots: The world of pilotage under sail and oar. Vol 1. Pilot schooners of North American and Great Britain*. Brooklin, ME: WoodenBoat Publications.

Dantzker, M. L. (2011). Psychological preemployment screening for police candidates: Seeking consistency if not standardization. *Professional Psychology, Research and Practice*, *42*(3), 276-283. http://dx.doi.org/10.1037/a0023736

de Beer, L. T., Rothmann, S., Jr., & Mostert, K. (2016). The bidirectional relationship between person-job fit and work engagement: A three-wave study. *Journal of Personnel Psychology*, *15*(1), 4-14. http://dx.doi.org/10.1027/1866-5888/a000143

Demidenko, E. (2007). Sample size determination for logistic regression revisited. *Statistics in Medicine, 26*(18), 3385-3397. http://dx.doi.org/10.1002/sim.2771

Detrick, P., & Chibnall, J. T. (2013). Revised NEO Personality Inventory normative data for police officer selection. *Psychological Services*, *10*(4), 372-377. http://dx.doi.org/10.1037/a0031800

Detrick, P., Chibnall, J. T., & Rosso, M. (2001). Minnesota Multiphasic Personality Inventory-2 in police officer selection: Normative data and relation to the Inwald Personality Inventory. *Professional Psychology: Research and Practice*, *32*(5), 484-490. http://dx.doi.org/10.1037/0735-7028.32.5.484

Dolan, J., & Pringle, P. (2016, June 11). How one of L.A.'s highest-paying jobs went to the boss' son. *Los Angeles Times*. Retrieved from http://www.latimes.com/local/lanow/la-me-adv-port-pilots-snap-story.html

Donovan, T., & Hoover, K. (2014). *The elements of social scientific thinking* (11th ed.). Boston, MA: Wadsworth.

Dowd, E. T., & Wallbrown, F. H. (1993). Motivational components of client reactance. *Journal of Counseling & Development*, *71*(5), 533-538. http://dx.doi.org/10.1002/j.1556-6676.1993.tb02237.x

Doyle, N., MacLachlan, M., Fraser, A., Stilz, R., Lismont, K., Cox, H., & McVeigh, J. (2016). Resilience and well-being amongst seafarers: Cross-sectional study of crew across 51 ships. *International Archives of Occupational and Environmental Health*, *89*(2), 199-209. http://dx.doi.org/10.1007/s00420-015-1063-9

Drasgow, F., Stark, S., Chernyshenko, O. S., Nye, C. D., Hulin, C. L., & White, L. A. (2012). *Development of the Tailored Adaptive Personality Assessment System (TAPAS) to support Army selection and classification decisions (Tech. Rep. No.*

1311). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Dyer, L., & Erikensen, J. (2005). In pursuit of marketplace agility: Applying precepts of self-organizing systems to optimize human resource scalability. *Human Resource Management, 44*(2), 183-188. http://dx.doi.org/10.1002/hrm.20062

Edwards, J. R. (1991). Person-job fit: A conceptual integration, literature review, and methodological critique. In C. L. Cooper & I. T. Robertson (Eds.), *International review of industrial and organizational psychology, Vol. 6* (pp. 283-357). New York, NY: Wiley.

Ehrhart, K. H. (2006). Job characteristic beliefs and personality as antecedents of subjective person-job fit. *Journal of Business and Psychology, 21*(2), 193-226. http://dx.doi.org/10.1007/s10869-006-9025-6

Ehrhart, K. H., & Makransky, G. (2007). Testing vocational interests and personality as predictors of person-vocation and person-job fit. *Journal of Career Assessment*, *15*(2), 206-226. http://dx.doi.org/10.1177/1069072706298105

Ek, A., Runefors, M., & Borell, J. (2014). Relationships between safety culture aspects – A work process to enable interpretation. *Marine Policy*, *44*, 179-186. http://dx.doi.org/10.1016/j.marpol.2013.08.024

Emerson, R. W. (2018). A continued examination of the uses and pitfalls of logistic regression. *Journal of Visual Impairment & Blindness*, *112*(5), 559-560. Retrieved from http://www.afb.org/afbpress/jvib.aspx

Erard, R. E., Nichols, D. S., & Friedman, A. (2018). Evaluating psychopathology with personality assessment instruments. In J. N. Butcher & J. M. Hooley (Eds.), *APA handbook of psychopathology: Psychopathology: Understanding, assessing, and treating adult mental disorders, Vol. 1*. (pp. 169-199). Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/0000064-008

Ernstsen, J., & Nazir, S. (2018). Human error in pilotage operations. *TransNav: International Journal on Marine Navigation and Safety of Sea Transportation*, *12*(1), 49-56. http://dx.doi.org/10.12716/1001.12.01.05

Ertürk, A., Demirel, O., & Polat, M. (2017). A holistic approach for HR selection and placement process: A model proposal for maritime industry. *Journal of Naval Science and Engineering, 13*(2)*,* 1-13. Retrieved from http://dergipark.gov.tr/jnse

Eysenck, H. J. (1976). *The measurement of personality*. Baltimore, MD: University Park Press. http://dx.doi.org/10.1007/978-94-011-6168-8

Farr, J. L., & Tippins, N. T. (Eds.). (2017). *Handbook of employee selection* (2nd ed.). New York, NY: Routledge.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149-1160. http://dx.doi.org/10.3758/BRM.41.4.1149

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2017, March 1). *G*Power 3.1 manual*. Universität Düsseldorf, Germany. Retrieved from http://www.gpower.hhu.de/

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2019, February 6). G*Power Version 3.1.9.4 [computer software]. Universität Düsseldorf, Germany. Retrieved from http://www.gpower.hhu.de/

Fédération Française des Pilotes Maritimes. (2018). *History of maritime pilots*. Retrieved from http://public.pilotes-maritimes.com/en/

Follmer, E. H., Talbot, D. L., Kristof-Brown, A. L., Astrove, S. L., & Billsberry, J. (2018). Resolution, relief, and resignation: A qualitative study of responses to misfit at work. *Academy of Management Journal*, *61*(2), 440-465. http://dx.doi.org/10.5465/amj.2014.0566

Fjærli, B. A. B., Øvergård, K. I., & Westerberg, T.V. (2015). Maritime managers of the future – what do they think is good leadership? *Transnav: International Journal on Marine Navigation and Safety of Sea Transportation, 9*(1), 107-111. http://dx.doi.org/10.12716/1001.09.01.13

Florida Harbor Pilots. (2019). Training & qualifications. Retrieved from https://floridapilots.com/about/training-qualifications/

Fritelli, J. (2008, February 8). Ship navigation in harbors: Safety issues. *Congressional Research Service*. Retrieved from https://crsreports.congress.gov/

Giuffre M. (1997). Designing research: Ex post facto designs. *Journal of PeriAnesthesia Nursing*, *12*(3), 191-195. http://dx.doi.org/10.1016/S1089-9472(97)80038-X

Goertzen, M. J. (2017). Chapter 3: Introduction to quantitative research and data. *Library Technology Reports*, *53*(4), 12-18. Retrieved from http://www.ala.org/tools/publications/techsource

Hathaway, S. R., & McKinley J. C. (1942). *Manual for the Minnesota Multiphasic Personality Inventory*. Minneapolis, MN: University of Minnesota Press.

Hausdorf, P. A., & Risavy, S. D. (2010). Decision making using personality assessment: Implications for adverse impact and hiring rates. *Applied HRM Research*, *12*(1), 100-120. Retrieved from https://catalog.princeton.edu/catalog/9792711

Håvold, J. I. (2015). Stress on the bridge of offshore vessels: Examples from the North Sea. *Safety Science*, 71, 160-166. http://dx.doi.org/10.1016/j.ssci.2014.03.009

Hogan, J., & Foster, J. (2013). Multifaceted personality predictors of workplace safety performance: More than conscientiousness. *Human Performance*, *26*(1), 20-43. http://dx.doi.org/10.1080/08959285.2012.736899

Hogan, R. (2016). The accident-prone personality. *People & Strategy*, *39*(1), 20-23. Retrieved from https://www.hrps.org/Pages/default.aspx

Hogan, R. T., & Hogan, J. (1995). *Manual for the Hogan Personality Inventory* (2nd ed.). Tulsa, OK: Hogan Assessment Systems.

Holland, J. L. (1973). *Making vocational choices: A theory of careers.* Englewood Cliffs, NJ: Prentice-Hall.

Hongbin, W. (2018). Application of modularization idea of fault tree in ship pilotage risk decision making. *Advances in Science, Technology and Engineering Systems,* *3*(4), 341-346. http://dx.doi.org/10.25046/aj030434

Hontvedt, M. (2015). Professional vision in simulated environments – Examining professional maritime pilots' performance of work tasks in a full-mission ship

simulator. *Learning, Culture and Social Interaction*, *7*, 71-84.

http://dx.doi.org/10.1016/j.lcsi.2015.07.003

Hosmer, D. W., Lemeshow, S., & Sturdivant, R. X. (2013). *Applied logistic regression*

(3rd ed.). Hoboken, NJ: John Wiley & Sons, Inc.

Houston, J. S., Borman, W. C., Farmer, W. L., & Bearden, R. M. (2006). Development of

the Navy Computer Adaptive Personality Scales (NCAPS). Millington, TN: Navy

Personnel Research, Studies, and Technology Division, Bureau of Naval

Personnel.

Hystad, S. W., & Bye, H. H. (2013). Safety behaviours at sea: The role of personal values

and personality hardiness. *Safety Science*, 57, 19-26.

http://dx.doi.org/10.1016/j.ssci.2013.01.018

Insurance Information Institute. (2018). Facts + statistics: Global catastrophes. Retrieved

from https://www.iii.org/fact-statistic/facts-statistics-global-catastrophes

International Maritime Pilots' Association. (2018). About IMPA. Retrieved from

http://www.impahq.org/about_impa.php

Inwald, R. E. (1992). *Inwald Personality Inventory technical manual (Revised)*. New

York, NY: Hilson Research.

Jackson, D. N. (1984). *Personality Research Form technical manual* (3rd ed.). Port

Huron, MI: SIGMA Assessment Systems, Inc./Research Psychologists Press, Inc.

Jarde, A., Losilla, J. M., & Vives, J. (2012). Suitability of three different tools for the

assessment of methodological quality in ex post facto studies. *International

Journal of Clinical Health & Psychology*, *12*(1), 97-108. Retrieved from

https://www.journals.elsevier.com/international-journal-of-clinical-and-health-psychology/

Jeżewska, M., Leszczyńska, I., & Grubman-Nowak, M. (2013). Personality and temperamental features vs. quality of life of Polish seafarers. *International Maritime Health*, *64*(2), 101-105. Retrieved from https://journals.viamedica.pl/international_maritime_health/index

Johnston, M. (2017). Secondary data analysis: A method of which the time has come. *Qualitative and Quantitative Methods in Libraries, 3*(3), 619-626. Retrieved from http://www.qqml.net/

Khorramdel, L., Kubinger, K. D., & Uitz, A. (2014). The influence of item order on intentional response distortion in the assessment of high potentials: Assessing pilot applicants. *International Journal of Psychology*, *49*(2), 131-139. http://dx.doi.org/10.1002/ijop.12015

Kirchner, P. G. (2008). A career as a ship pilot. *Proceedings of the Marine Safety and Security Council, 65*(3), 9-12. Retrieved from https://www.dco.uscg.mil/Featured-Content/Proceedings-Magazine/

Kirchner, P. G., & Diamond, C. L. (2011). Unique institutions, indispensable cogs, and hoary figures: Understanding pilotage regulation in the United States. *USF Maritime Law Journal, 23*(1), 168-205. Retrieved from https://usfmaritimelawjournal.wordpress.com/

Kitamura, K., Murai, K., Hayashi, Y., Fujita, T., & Maenaka, K. (2014). Measurement and analysis of marine pilot's performance using a large model sensor. *2014 IEEE*

3rd Global Conference on Consumer Electronics (GCCE), 37-41. http://dx.doi.org/10.1109/GCCE.2014.7031226

Klinger, D. E., Nalbandian, J., & Llorens, J. (2016). *Public personnel management: Contexts and strategies* (6th ed.). New York, NY: Routledge.

Kooij, D. T. A. M., van Woerkom, M., Wilkenloh, J., Dorenbosch, L., & Denissen, J. J. A. (2017). Job crafting towards strengths and interests: The effects of a job crafting intervention on person-job fit and the role of age. *Journal of Applied Psychology, 102*(6), 971-981. http://dx.doi.org/10.1037/apl0000194

Koutra, G., Barbounaki, S., Kardaras, D., & Stalidis, G. (2017). A multicriteria model for personnel selection in maritime industry in Greece. *2017 IEEE 19th Conference on Business Informatics (CBI),* 287-294. http://dx.doi.org/10.1109/CBI.2017.52

Kristof, A. L. (1996). Person-organization fit: An integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology*, *49*(1), 1-49. http://dx.doi.org/10.1111/j.1744-6570.1996.tb01790.x

Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. (2005). Consequences of individuals' fit at work: A meta-analysis of person-job, person-organization, person-group, and person-supervisor fit. *Personnel Psychology*, *58*(2), 281-342. http://dx.doi.org/10.1111/j.1744-6570.2005.00672.x

Kulas, J. T. (2013). Personality-based profile matching in personnel selection: Estimates of method prevalence and criterion-related validity. *Applied Psychology: An International Review*, *62*(3), 519-542. http://dx.doi.org/10.1111/j.1464-0597.2012.00491.x

Lee, Y., Reiche, B. S., & Song, D. (2010). How do newcomers fit in? The dynamics between person-environment fit and social capital across cultures. *International Journal of Cross Cultural Management*, *10*(2), 153-174. http://dx.doi.org/10.1177/1470595810370911

Lewin, K. (1951). *Field theory in social science*. New York, NY: Harper.

Li, W., Yu, J., & Desrosiers, R. (2016). Introduction and overview of China's pilot training regime. *TransNav: International Journal on Marine Navigation and Safety of Sea Transportation, 10*(4), 543-549. http://dx.doi.org/10.12716/1001.10.04.01

Lin, Y.-C. (2016). The use of core competency indicators for employee selection: The case of evaluation for the firemen selection in fire departments. *American Journal of Engineering Research, 5*(11), 43-58. Retrieved from http://www.ajer.org/

Lin, Y.-C., Yu, C., & Yi, C.-C. (2014). The effects of positive affect, person-job fit, and well-being on job performance. *Social Behavior and Personality, 42*(9), 1537-1547. http://dx.doi.org/10.2224/sbp.2014.42.9.1537

Lipowski, M., Lipowska, M., Peplińska, A., & Jeżewska, M. (2014). Personality determinants of health behaviours of merchant navy officers. *International Maritime Health*, *65*(3), 158-165. http://dx.doi.org/10.5603/IMH.2014.0030

Lo, C. (2015, May 14). Safe hands: The role of the maritime pilot. *Ship Technology*. Retrieved from https://www.ship-technology.com/features/featuresafe-hands-the-role-of-the-maritime-pilot-4574416/

Lobo, P. (2016, October 8). On the danger of becoming a marine pilot. *gCaptain*.

Retrieved from https://gcaptain.com/danger-becoming-marine-pilot/

Lohmeier, J. (2010). Nonexperimental designs. In N. J. Salkind (Ed.), *Encyclopedia of research design* (pp. 911-915). Thousand Oaks, CA: SAGE Publications, Inc. http://dx.doi.org/10.4135/9781412961288.n271

Lough, J., & Von Treuer, K. (2013). A critical review of psychological instruments used in police officer selection. *Policing: An International Journal*, *36*(4), 737-751. http://dx.doi.org/10.1108/PIJPSM-11-2012-0104

Lowmaster, S. E., & Morey, L. C. (2012). Predicting law enforcement officer job performance with the Personality Assessment Inventory. *Journal of Personality Assessment*, *94*(3), 254-261. http://dx.doi.org/10.1080/00223891.2011.648295

Lyrakos, D. G., Eva, G., Elisa, M., Piera, B., & Luca, R. (2015). The Personality and Behavior Inventory: Description, characteristics, psychometric properties and comparison with MMPI-II and PAI. *Procedia - Social and Behavioral Sciences*, *187*, 223-227. http://dx.doi.org/10.1016/j.sbspro.2015.03.042

MacLachlan, M. (Ed.). (2017). *Maritime psychology: Research in organizational & health behavior at sea*. Cham, Switzerland: Springer International Publishing AG.

Main, L. C., & Chambers, T. P. (2015). Factors affecting maritime pilots' health and well-being: A systematic review. *International Maritime Health*, *66*(4), 220-232. http://dx.doi.org/10.5603/IMH.2015.0043

Maritime Injury Guide. (2017). *Maritime job injuries: River and bar pilot accidents*. Retrieved from http://www.maritimeinjuryguide.org/maritime-job-injuries/

McCrae, R. R., & Costa, P. T., Jr. (1999). A five-factor theory of personality. In L. A. Lawrence & O. P. John (Eds.), *Handbook of personality: Theory and research, 2nd ed.* (pp. 139-153). New York, NY: Guilford Press.

McLaughlin, H. (2015). Seafarers in the spotlight. *Maritime Policy & Management*, *42*(2), 95-96. http://dx.doi.org/10.1080/03088839.2015.1006351

Mertler, C. A., & Vannatta Reinhart, R. (2016). *Advanced and multivariate statistical methods: Practical application and interpretation* (6th ed.). New York, NY: Routledge.

Mirchandani, U., & Shastri, N. (2016). Reimagining HR for 2025. *Workforce Solutions Review*, *7*(3), 4-7. Retrieved from http://www.ihrimpublications.com/

Mohajan, H. (2017). Two criteria for good measurements in research: Validity and reliability. *Annals of Spiru Haret University Economic Series, 17*(4), 59-82. http://dx.doi.org/10.26458/1746

Morey, L. C. (1991). *Personality Assessment Inventory professional manual*. Odessa, FL: Psychological Assessment Resources.

Muldoon, J., Kisamore, J. L., Liguori, E. W., Jawahar, I. M., & Bendickson, J. (2017). Moderators of the personality-performance relationship. *Personnel Review*, *46*(3), 474-489. http://dx.doi.org/10.1108/PR-02-2016-0040

Murray, H. A. (1938). *Explorations in personality*. New York, NY: Oxford University Press.

Nederström, M., & Salmela-Aro, K. (2014). Self-other agreement of personality judgments in job interviews: Exploring the effects of trait, gender, age and social

desirability. *Scandinavian Journal of Psychology*, *55*(5), 520-526.

http://dx.doi.org/10.1111/sjop.12154

Neumann, O. (2016). Does misfit loom larger than fit? Experimental evidence on

motivational person-job fit, public service motivation, and prospect

theory. *International Journal of Manpower*, *37*(5), 822-839.

http://dx.doi.org/10.1108/IJM-12-2014-0268

The New Jersey Maritime Pilot and Docking Pilot Commission. (2011). 2011 annual

report, 1-22. Retrieved from https://www.state.nj.us/transportation/maritimepilot/

Newman, E., & Ross, W. H. (2014). Using mobile devices for employment testing: The

future is now. *Employment Relations Today (Wiley)*, *41*(3), 1-11.

http://dx.doi.org/10.1002/ert.21458

Niebuhr, D. W., Gubata, M. E., Oetting, A. A., Weber, N. S., Feng, X., & Cowan, D. N.

(2013). Personality Assessment Questionnaire as a pre-accession screen for risk

of mental disorders and early attrition in U. S. Army recruits. *Psychological

Services*, *10*(4), 378-385. http://dx.doi.org/10.1037/a0032783

Novakov, M., & Janković, D. (2014). Ex post facto experiment. *TEME: Casopis Za

Društvene Nauke*, *38*(2), 877-890. Retrieved from

http://teme2.junis.ni.ac.rs/index.php/TEME

Okazaki, T., & Ohya, M. (2012). A study on situation awareness of marine pilot trainees

in crowded sea route. *2012 IEEE International Conference on Systems, Man, and

Cybernetics (SMC),* 1525-1530. http://dx.doi.org/10.1109/ICSMC.2012.6377952

O*NET. (2018). *Summary Report for: 53-5021.03 - pilots, ship*. Retrieved from

    https://www.onetonline.org/link/summary/53-5021.03

Orlandi, L., & Brooks, B. (2018). Measuring mental workload and physiological

    reactions in marine pilots: Building bridges towards redlines of

    performance. *Applied Ergonomics, 69*, 74-92.

    http://dx.doi.org/10.1016/j.apergo.2018.01.005

Orlandi, L., Brooks, B., & Bowles, M. (2015). A comparison of marine pilots' planning

    and manoeuvring skills: Uncovering mental models to assess shiphandling and

    explore expertise. *Journal of Navigation, 68*(5), 897-914.

    http://dx.doi.org/10.1017/S0373463315000260

Osborne, J. W. (2015). *Best practices in logistic regression*. Thousand Oaks, CA: SAGE

    Publications, Inc.

Ostendorp, M.-C., Lenk, J. C., & Lüdtke, A. (2015). Smart glasses to support maritime

    pilots in harbor maneuvers. *Procedia Manufacturing*, *3*, 2840-2847.

    http://dx.doi.org/10.1016/j.promfg.2015.07.775

Oswald, F. L., Shaw, A., & Farmer, W. L. (2015). Comparing simple scoring with IRT

    scoring of personality measures: The Navy Computer Adaptive Personality

    Scales. *Applied Psychological Measurement, 39*(2), 144-154.

    http://dx.doi.org/10.1177/0146621614559517

Paine, L. (2015). *The sea and civilization: A maritime history of the world*. New York,

    NY: Vintage Books.

Patraiko, D. (2017). The power of pilots. *The Navigator, 16*, 2. Retrieved from

    https://www.nautinst.org/en/Publications/the-navigator/

Peltokangas, H. (2014). The use of personality measures in personnel selection: The

    person-job fit and its relationship to leaders' performance and burnout. *American*

    International Journal of Social Science, 3(4), 185-193. Retrieved from

    http://www.aijssnet.com/

Peng, C.-Y. J., Lee, K. L., & Ingersoll, G. M. (2002). An introduction to logistic

    regression analysis and reporting. *Journal of Educational Research, 96*(1), 3-14.

    http://dx.doi.org/10.1080/00220670209598786

Peng, Y., & Mao, C. (2015). The impact of person-job fit on job satisfaction: The

    mediator role of self-efficacy. *Social Indicators Research*, (2), 805-813.

    http://dx.doi.org/10.1007/s11205-014-0659-x

Perry, S. J., Witt, L. A., Luksyte, A., & Stewart, R. W. (2008). Does the "right

    personality" protect public safety personnel in incident response? *European*

    Academy of Occupational Health Psychology 8th Conference, 283.

    https://dx.doi.org/10.1037/e573012012-240

Ranganathan, P., Pramesh, C. S., & Aggarwal, R. (2017). Common pitfalls in statistical

    analysis: Logistic regression. *Perspectives in Clinical Research*, *8*(3), 148-151.

    http://dx.doi.org/10.4103/picr.PICR_87_17

Roberts, G. (2017). Pre-hire talent assessments must be a part of your predictive talent

    acquisition strategy. *Workforce Solutions Review*, *8*(1), 32-34. Retrieved from

    http://www.ihrimpublications.com/

Roberts, M. (2000). *PAI Law Enforcement, Corrections, and Public Safety Selection Report manual.* Odessa, FL: Psychological Assessment Resources.

Roberts, M., & Johnson, M. (2014, October 12). The PAI Police and Public Safety Selection Report written for California POST. *Johnson, Roberts & Associates, Inc*. Retrieved from http://johnsonroberts.com/docs/PAI-Police-PublicSafetySelectionReport-POST-20141013.pdf

Rojon, C., McDowall, A., & Saunders, M. N. K. (2015). The relationships between traditional selection assessments and workplace performance criteria specificity: A comparative meta-analysis. *Human Performance*, *28*(1), 1-25. http://dx.doi.org/10.1080/08959285.2014.974757

Salkind, N. J. (Ed.). (2010). *Encyclopedia of research design*. Thousand Oaks, CA: SAGE Publications, Inc. http://dx.doi.org/10.4135/9781412961288.n145

Salters-Pedneault, K., Ruef, A. M., & Orr, S. P. (2010). Personality and psychophysiological profiles of police officer and firefighter recruits. *Personality and Individual Differences*, *49*, 210-215. http://dx.doi.org/10.1016/j.paid.2010.03.037

Santos, R. G., & Santos, R. B. (2015). Practice-based research: Ex post facto evaluation of evidence-based police practices implemented in residential burglary micro-time hot spots. *Evaluation Review*, *39*(5), 451-479. http://dx.doi.org/10.1177/0193841X15602818

Schermer, J. A., & MacDougall, R. (2013). A general factor of personality, social desirability, cognitive ability, and the survey of work styles in an employment

selection setting. *Personality and Individual Differences*, *54*(1), 141-144. http://dx.doi.org/10.1016/j.paid.2012.08.012

Schmitt, N. (Ed.). (2012). *The Oxford handbook of personnel assessment and selection*. New York, NY: Oxford University Press.

Schneider, B. (1987). The people make the place. *Personnel Psychology, 40*(3), 437-453. http://dx.doi.org/10.1111/j.1744-6570.1987.tb00609.x

Schuler, R. S., Jackson, S. E., & Tarique, I. (2011). Global talent management and global talent challenges: Strategic opportunities for IHRM. *Journal of World Business*, *46*(4), 506-516. http://dx.doi.org/10.1016/j.jwb.2010.10.011

Screening by means of pre-employment testing. (2018, September 10). *Society for Human Resource Management*. Retrieved from https://shrm.org/ResourcesAndTools/tools-and-samples/toolkits/Pages/screeningbymeansofpreemploymenttesting.aspx

Sellbom, M. (2019). The MMPI-2-Restructured Form (MMPI-2-RF): Assessment of personality and psychopathology in the twenty-first century. *Annual Review of Clinical Psychology, 15*, 8.1-8.29. http://dx.doi.org/10.1146/annurev-clinpsy-050718-095701

Seong, J. Y., Kristof-Brown, A. L., Park, W.-W., Hong, D.-S., & Shin, Y. (2015). Person-group fit: Diversity antecedents, proximal outcomes, and performance at the group level. *Journal of Management*, *41*(4), 1184-1213. http://dx.doi.org/10.1177/0149206312453738

Shane, S., Nicolaou, N., Cherkas, L., & Spector, T. D. (2010). Genetics, the big five, and the tendency to be self-employed. *Journal of Applied Psychology*, *95*(6), 1154-1162. http://dx.doi.org/10.1037/a0020294

Sharif, R. (2017). A model of creativity in organizations: John Holland's theory of vocational choice (1973) at multiple levels of analysis. *Journal of Creative Behavior*, *51*(2), 140-152. http://dx.doi.org/10.1002/jocb.91

SIGMA Assessment Systems, Inc. (n.d.). *Personality Research Form*. Retrieved from https://www.sigmaassessmentsystems.com/assessments/personality-research-form/

Silva, C. N. (2010). Ex post facto study. In N. J. Salkind (Ed.), *Encyclopedia of research design* (pp. 466-467). Thousand Oaks, CA: SAGE Publications, Inc. http://dx.doi.org/10.4135/9781412961288.n145

Skinner, H. A., & Jackson, D. N. (1977). The missing person in personnel classification: A tale of two models. *Canadian Journal of Behavioural Science / Revue Canadienne Des Sciences Du Comportement*, *9*(2), 147-160. http://dx.doi.org/10.1037/h0081616

Smith, R. A., Badr, K. S., & Wall, A. E. (2018). Personality testing by employers: Balancing the need for qualified workers with individual rights. *Competition Forum*, *16*(2), 76-83. Retrieved from https://www.questia.com/library/p150669/competition-forum

Stark, S., Chernyshenko, O. S., Drasgow, F., Nye, C. D., White, L. A., Heffner, T., & Farmer, W. L. (2014). From ABLE to TAPAS: A new generation of personality

tests to support military selection and classification decisions. *Military Psychology, 26*(3), 153-164. http://dx.doi.org/10.1037/mil0000044

Stuart, A. (2015). The rise of the hiring machines. *Inc*. Retrieved from https://www.inc.com/magazine/201502/alix-stuart/tipsheet-the-rise-of-the-hiring-machines-.html

Suliman, A. M., AbdelRahman, A. A., & Abdalla, A. (2010). Personality traits and work performance in a duty-free industry. *International Journal of Commerce & Management*, *20*(1), 64-82. http://dx.doi.org/10.1108/10569211011025961

Tabachnick, B. G., & Fidell, L. S. (2018). *Using multivariate statistics* (7th ed.). Boston, MA: Pearson Education, Inc.

Talent Board. (2017). *2017 Talent Board North American candidate experience research report*. Retrieved from https://www.thetalentboard.org/

Tanaka, M., Murai, K., & Hayashi, Y. (2014). Marine pilot trainee's mental workload for simulator based training using R-R interval. *2014 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, 1522-1526. http://dx.doi.org/10.1109/SMC.2014.6974132

Tarescavage, A. M. Cappo, B. M., Corey, D. M., Fischler, G. L., Hill, D. O., & Ben-Porath, Y. S. (2015). Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) predictors of police officer problem behavior and collateral self-report test scores. *Psychological Assessment*, *27*(1), 125-137. http://dx.doi.org/10.1037/pas0000041

Tarescavage, A. M., Corey, D. M., Gupton, H. M., & Ben-Porath, Y. S. (2015). Criterion validity and practical utility of the Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) in assessments of police officer candidates. *Journal of Personality Assessment*, *97*(4), 382-394. http://dx.doi.org/10.1080/00223891.2014.995800

Toppazzini, M. A., & Wiener, K. K. K. (2017). Making workplaces safer: The influence of organisational climate and individual differences on safety behaviour. *Heliyon*, *3*(6), 1-12. http://dx.doi.org/10.1016/j.heliyon.2017.e00334

Tsai, C.-L., & Liou, Y.-W. (2017) Determinants of work performance of seafarers. *Maritime Business Review, 2*(1), 36-51. http://dx.doi.org/10.1108/MABR-09-2016-0019

Twain, M. (1876). *Old times on the Mississippi*. Toronto, Canada: Rose-Belford Publishing Company.

Uniform Guidelines on Employee Selection Procedures of 1978, 29 U.S.C. § 1607 (1978).

U.S. Coast Guard. (2017). *2017 Recreational boating statistics*. Retrieved from https://www.uscgboating.org/library/accident-statistics/Recreational-Boating-Statistics-2017.pdf

U.S. Department of Defense. (1984). *Test manual for the Armed Services Vocational Aptitude Battery (DoD 1340.12AA)*. North Chicago, IL: U.S. Military Entrance Processing Command.

U.S. Department of Labor, Bureau of Labor Statistics. (2018a). Firefighters.

Occupational outlook handbook, 2017-2018 edition. Retrieved from

https://www.bls.gov/ooh/protective-service/firefighters.htm

U.S. Department of Labor, Bureau of Labor Statistics. (2018b). Military careers.

Occupational outlook handbook, 2017-2018 edition. Retrieved from

https://www.bls.gov/ooh/military/military-careers.htm

U.S. Department of Labor, Bureau of Labor Statistics. (2018c). Police and detectives.

Occupational outlook handbook, 2017-2018 edition. Retrieved from

https://www.bls.gov/ooh/protective-service/police-and-detectives.htm

Valentine, L. D. (1969). Review of Personality Research Form. *Professional

Psychology*, *1*(1), 82-83. http://dx.doi.org/10.1037/h0020870

Van Hoye, G., & Turban, D. B. (2015). Applicant-employee fit in personality: Testing

predictions from similarity-attraction theory and trait activation

theory. *International Journal of Selection & Assessment*, *23*(3), 210-223.

http://dx.doi.org/10.1111/ijsa.12109

van Loon, N. M., Vandenabeele, W., & Leisink, P. (2017). Clarifying the relationship

between public service motivation and in-role and extra-role behaviors: The

relative contributions of person-job and person-organization fit. *American Review

of Public Administration, 47*(6), 699-713.

http://dx.doi.org/10.1177/0275074015617547

van Smeden, M., de Groot, J. A. H., Moons, K. G. M., Collins, G. S., Altman, D. G.,

Eijkemans, M. J. C., & Reitsma, J. B. (2016). No rationale for 1 variable per 10

events criterion for binary logistic regression analysis. *BMC Medical Research Methodology, 16*(1), 1-12. http://dx.doi.org/10.1186/s12874-016-0267-3

Wall, J. E. (2018). Qualifying for military service as an enlistee and the importance of the ASVAB for military and civilian work. *Career Planning & Adult Development Journal*, *34*(1), 46-52. Retrieved from https://www.careernetwork.org/Journals.cfm

Warner, R. M. (2013). *Applied statistics: From bivariate through multivariate techniques* (2nd ed.). Thousand Oaks, CA: SAGE Publications, Inc.

White, L. A., Nord, R. D., Mael, F. A., & Young, M. C. (1993). The Assessment of Background and Life Experiences (ABLE). In T. Trent & J. H. Laurence (Eds.), *Adaptability screening for the Armed Forces*. Washington, DC: Office of the Assistant Secretary of Defense (Force Management and Personnel).

Willner, K. M., Sonnenberg, S. P., Wemmer, T. H., & Kochuba, M. (2016). Workplace personality testing: Towards a better way of determining whether personality tests are prohibited pre-offer medical exams under the Americans with Disabilities Act. *Employee Relations Law Journal*, *42*(3), 4-27. Retrieved from https://lrus.wolterskluwer.com/store/product/employee-relations-law-journal/

Wilson, J. R., & Lorenz, K. A. (2015). *Modeling binary correlated responses using SAS, SPSS and R*. New York, NY: Springer International Publishing.

Winters, E. C. (2004). *Northwest ¾ west: The experiences of a Sandy Hook Pilot, 1908-1945*. Mystic, CT: Mystic Seaport.

Woodman, R. (2012). *The history of the ship: The comprehensive story of seafaring from the earliest times to the present day*. London, England: Conway Maritime Press.

Xia, N., Wang, X., Griffin, M. A., Wu, C., & Liu, B. (2017). Do we see how they perceive risk? An integrated analysis of risk perception and its effect on workplace safety behavior. *Accident Analysis and Prevention*, *106*, 234-242. http://dx.doi.org/10.1016/j.aap.2017.06.010

Yin, R. K. (2016). *Qualitative research from start to finish* (2nd ed.). New York, NY: The Guilford Press.

Youngman, J. F. (2017). The use and abuse of pre-employment personality tests. *Business Horizons*, *60*(3), 261-269. http://dx.doi.org/10.1016/j.bushor.2016.11.010

Yuen, K. F., Loh, H. S., Zhou, Q., & Wong, Y. D. (2018). Determinants of job satisfaction and performance of seafarers. *Transportation Research Part A-Policy and Practice, 110*, 1-12. http://dx.doi.org/10.1016/j.tra.2018.02.006

Zielinski, D. (2018, January 22). Predictive assessments give companies insight into candidates' potential. *Society for Human Resource Management*. Retrieved from https://shrm.org/resourcesandtools/hr-topics/talent-acquisition/pages/predictive-assessments-insight-candidates-potential.aspx

Appendix A: Personality Research Form Scale Descriptions for High and Low Scorers

SCALES			
Description of high scorers	**Defining trait adjectives**	**Description of low scorers**	**Defining trait adjectives**
ABASEMENT			
Shows a high degree of humility; accepts blame and criticism even when not deserved; willing to accept an inferior position; tends to be self-effacing.	meek, self-accusing, self-blaming, obsequious, self-belittling, surrendering, resigned, self-critical, humble, apologizing, subservient, obedient, yielding, deferential, self-subordinating.	Refuses to take blame for others' mistakes; has a high self-opinion; does not experience guilt easily; does not allow others to take advantage of his or her good will; asserts own rights; avoids apologizing.	vain, proud, haughty, self-assured, egotistical, self-promoting, arrogant, patronizing, conceited, cocky, unapologetic, unobliging, ungenerous.
ACHIEVEMENT			
Aspires to accomplish difficult tasks; maintains high standards and is willing to work toward distant goals; responds positively to competition; willing to put forth effort to attain excellence.	striving, accomplishing, capable, purposeful, attaining, industrious, achieving, aspiring, enterprising, self-improving, productive, driving, ambitious, resourceful, competitive.	Tends not to set ambitious goals; prefers easy work over difficult challenges; does not strive for excellence; may respond negatively to challenges and competition; overestimates or exaggerates obstacles.	unmotivated, indolent, non-competitive, unproductive, enervated, underachieving, non-perfectionistic, lackadaisical.
AFFILIATION			
Enjoys being with friends and people in general; accepts people readily; makes efforts to win friendships and maintain associations with people.	neighborly, loyal, warm, amicable, good natured, friendly, companionable, genial, affable, cooperative, gregarious, hospitable, sociable, affiliative, good willed.	Satisfied being alone; does not actively seek out the company of others; has little urge to meet new people; does not initiate conversations; keeps people at an arm's length.	abrupt, uncommunicative, unsociable, standoffish, aloof, inaccessible, alienated, unapproachable, unpropitious, laconic, introverted, non-participating.

SCALES			
Description of high scorers	**Defining trait adjectives**	**Description of low scorers**	**Defining trait adjectives**

AGGRESSION

Enjoys combat and argument; easily annoyed; sometimes willing to hurt people to get own way; may seek to "get even" with people; perceived as causing harm.	aggressive, quarrelsome, irritable, argumentative, threatening, attacking, antagonistic, pushy, hot-tempered, easily angered, hostile, revengeful, belligerent, blunt, retaliative.	Imperturbable when faced with instigation to anger; avoids confrontations and conflicts; does not express hostility, either verbally or physically; is not concerned with "getting even"; is forgiving of others' mistakes.	forgiving, easy-going, compliant, mild-mannered, peaceable, calm, quietly behaved, gracious, concordant, even-tempered, non-retributive, non-threatening.

AUTONOMY

Tries to break away from restraints, confinement, or restrictions of any kind; enjoys being unattached, free, not tied to people, places, or obligations; may be rebellious when faced with restraints.	unmanageable, free, self-reliant, independent, autonomous, rebellious, unconstrained, individualistic, ungovernable, self-determined, nonconforming, noncompliant, undominated, resistant, lone-wolf.	Willingly accepts social obligations and attachments; prefers to follow rules imposed by people or by custom; listens to the advice and opinion of others; including superiors and leaders; is amenable to being easily led or influenced; is reliant on others for direction.	controllable, tractable, manageable, conforming, conventional, reconcilable, obedient, governable.

CHANGE

Likes new and different experiences; dislikes routine and avoids it; may readily change opinions or values in different circumstances; adapts readily to changes in environment.	inconsistent, fickle, flexible, unpredictable, wavering, mutable, adaptable, changeable, irregular, variable, capricious, innovative, flighty, vacillating, inconstant.	Prefers a familiar, constant physical environment; has little urge to visit or live in new places; accepts routine; avoids variety; dislikes the unexpected; has difficulty in adjusting to changes in environment; seeks regularity and continuity.	predictable, steadfast, invariable, uniform, constant, undeviating, inexorable, set-in-one's-ways, "homebody", unchanging.

SCALES			
Description of high scorers	**Defining trait adjectives**	**Description of low scorers**	**Defining trait adjectives**
COGNITIVE STRUCTURE			
Does not like ambiguity or uncertainty in information; wants all questions answered completely; desires to make decisions based upon definite knowledge, rather than upon guesses or probabilities.	precise, exacting, definite, seeks certainty, meticulous, perfectionistic, clarifying, explicit, accurate, rigorous, literal, avoids ambiguity, defining, rigid, needs structure.	Avoids making detailed plans or preparations; prefers not to follow a schedule; accepts uncertainty and ambiguity; may base decisions on uncertain information; does not engage in persistent or intense intellectual concentration.	equivocal, vague, lax, ambiguous, indefinite, lacking in precision, imperspicuous, unscheduled, imprecise, unstructured, inexact, undisciplined.
DEFENDENCE			
Ready to defend self against real or imagined harm from other people; takes offense easily; does not accept criticism readily.	self-protective, justifying, denying, defensive, self-condoning, suspicious, secretive, has a "chip on the shoulder", resists inquiries, protesting, wary, self-excusing, rationalizing, guarded, touchy.	Is willing to concede mistakes; willingly changes own opinions; is not angered or upset by criticism; is vulnerable to attack or question; is not easily offended; has "nothing to hide".	unoffended, unguarded, open, public, accepting, accommodating, reasonable, agreeable, affording, compatible, obliging, conciliatory.
DOMINANCE			
Attempts to control environment, and to influence or direct other people; expresses opinions forcefully; enjoys the role of leader and may assume it spontaneously.	governing, controlling, commanding, domineering, influential, persuasive, forceful, ascendant, leading, directing, dominant, assertive, authoritative, powerful, supervising.	Avoids positions of power, authority, and leadership; does not like to direct other people; prefers not to impose own opinions on others; rarely expresses opinions other than to agree.	unassertive, unauthoritative, unpersuasive, passive, uninfluential.

SCALES			
Description of high scorers	**Defining trait adjectives**	**Description of low scorers**	**Defining trait adjectives**
ENDURANCE			
Willing to work long hours; doesn't give up quickly on a problem; persevering, even in the face of great difficulty; patient and unrelenting in work habits.	persistent, determined, steadfast, enduring, unfaltering, persevering, unremitting, relentless, tireless, dogged, energetic, has stamina, sturdy, zealous, durable.	Gives up quickly on a problem; unwilling to work long hours; loses drive or effectiveness over time; prefers to rest when faced with obstacles or difficulties; is discouraged when success is not forthcoming quickly.	faltering, weary, unsteady, tired, lethargic, relaxed, nonchalant, flagging, distractible, unenergetic.
EXHIBITION			
Wants to be the center of attention; enjoys having an audience; engages in behavior which wins the notice of others; may enjoy being dramatic or witty.	colorful, entertaining, unusual, spellbinding, exhibitionistic, conspicuous, noticeable, expressive, ostentatious, immodest, demonstrative, flashy, dramatic, pretentious, showy.	Avoids the attention of others; prefers to go unnoticed; does not try to amuse or entertain others; prefers to remain anonymous; restrained in words and actions.	shy, inconspicuous, retiring, bashful, reserved, modest, self-conscious, demure, shrinking, diffident, blushing, reticent, quiet.
HARMAVOIDANCE			
Does not enjoy exciting activities, especially if danger is involved; avoids risk of bodily harm; seeks to maximize personal safety.	fearful, withdraws from danger, self-protecting, pain-avoidant, careful, cautious, seeks safety, timorous, apprehensive, precautionary, unadventurous, avoids risks, attentive to danger, stays out of harm's way, vigilant.	Enjoys exciting and dangerous activities in work or play; shows a fearless, daring spirit; is unconcerned with danger; enjoys thrills.	adventurous, daring, fearless, bold, intrepid, brave, audacious, rash, game, thrill-seeking, courageous.

SCALES			
Description of high scorers	**Defining trait adjectives**	**Description of low scorers**	**Defining trait adjectives**
IMPULSIVITY			
Tends to act on the "spur of the moment" and without deliberation; gives vent readily to feelings and wishes; speaks freely; may be volatile in emotional expression.	hasty, rash, uninhibited, spontaneous, reckless, irrepressible, quick thinking, mercurial, impatient, incautious, hurried, impulsive, foolhardy, excitable, impetuous.	Acts with deliberation; is on an even keel; ponders issues and decisions carefully; thinks before acting; avoids spontaneity.	thoughtful, prudent, inhibited, restrained, patient, steady, pensive, deliberative, reflective, planful, purposeful, self-controlled.
NURTURANCE			
Gives sympathy and comfort; assists others whenever possible, interested in caring for children, the disabled, or the infirm; offers a "helping hand" to those in need; readily performs favors for others.	sympathetic, paternal, helpful, benevolent, encouraging, caring, protective, comforting, maternal, supporting, aiding, ministering, consoling, charitable, assisting.	Disinclined to help others; expects others to do things for themselves regardless of their ability; tends to avoid caring for those who are in need of assistance; is not easily upset by others' difficulties	insensitive, callous, apathetic, uncaring, dispassionate, unsympathetic, unresponsive, unempathic, tough-minded, selfish.
ORDER			
Concerned with keeping personal effects and surroundings neat and organized; dislikes clutter, confusion, lack of organization; interested in developing methods for keeping materials methodically organized.	neat, organized, tidy, systematic, well-ordered, disciplined, prompt, consistent, orderly, clean, methodical, scheduled, planful, unvarying, deliberate.	Prefers not to organize surroundings neatly; is not concerned with neatness; lacks regularity or uniformity.	messy, erratic, impulsive, unstructured, arbitrary, random, haphazard, disordered, untidy, chaotic, unorganized.

SCALES			
Description of high scorers	**Defining trait adjectives**	**Description of low scorers**	**Defining trait adjectives**
PLAY			
Does many things, "just for fun"; spends a good deal of time participating in games, sports, social activities, and other amusements; enjoys jokes and funny stories; maintains a light-hearted, easy-going attitude toward life.	playful, jovial, jolly, pleasure-seeking, merry, laughter-loving, joking, frivolous, prankish, sportive, mirthful, fun-loving, gleeful, carefree, blithe.	Is subdued in thought, appearance, and manner; takes a serious approach to life and to work; does not seek fun or amusement; avoids frivolity and idle pursuits.	serious, sober, earnest, conservative, sedate, austere, grave, solemn, grim, somber, staid, prim.
SENTIENCE			
Notices smells, sounds, sights, tastes, and the way things feel; remembers these sensations and believes that they are an important part of life; is sensitive to many forms of experience; may maintain an essentially hedonistic or aesthetic view of life.	aesthetic, enjoys physical sensations, observant, earthy, aware, notices environment, feeling, sensitive, sensuous, open to experience, perceptive, responsive, noticing, discriminating, alive to impressions.	Does not seek or appreciate sensory experiences, such as those provided by art and natural phenomena; is unresponsive to aesthetics of physical surroundings.	artistically insensitive, detached, unaware, imperceptive, unnoticing, numb, unobservant.
SOCIAL RECOGNITION			
Desires to be held in high esteem by acquaintances; concerned about reputation and what other people think, works for the approval and recognition of others.	approval seeking, proper, well-behaved, seeks recognition, courteous, makes good impression, seeks respectability, accommodating, socially proper, seeks admiration, obliging, agreeable, socially sensitive, desirous of credit, behaves appropriately.	Unconcerned about reputation or social standing; insensitive to others' praise or disapproval; does not necessarily conform to socially-approved norms in behavior and appearance.	inelegant, gruff, non-conforming, non-clothes-conscious, unstylish.

SCALES			
Description of high scorers	**Defining trait adjectives**	**Description of low scorers**	**Defining trait adjectives**
SUCCORANCE			
Frequently seeks the sympathy, protection, love, advice, and reassurance of other people; may feel insecure or helpless without such support; confides difficulties readily to a receptive person.	trusting, ingratiating, dependent, entreating, appealing for help, seeks support, wants advice, helpless, confiding, needs protection, requesting, craves affection, pleading, help-seeking, defenseless.	Does not look to others for guidance or support; is able to maintain oneself without outside aid; has confidence in and exercises own judgment; confronts problems alone; does not seek advice or sympathy.	secure, strong, self-sufficient, liberated, self-reliant, self-assured.
UNDERSTANDING			
Wants to understand many areas of knowledge; values synthesis of ideas, verifiable generalization, logical thought, particularly when directed at satisfying intellectual curiosity.	inquiring, curious, analytical, exploring, intellectual, reflective, incisive, investigative, probing, logical, scrutinizing, theoretical, astute, rational, inquisitive.	Has little curiosity about academic or intellectual topics, cultural or scientific; prefers everyday activities and concerns; will not probe beyond the obvious or minimal information.	uninterested, narrow-minded, incurious, uninquisitive, non-intellectual, non-academic.
DESIRABILITY			
Describes self in terms judged as desirable; consciously or unconsciously, accurately or inaccurately, presents favorable picture of self in responses to personality statements.		Gives unfavorable description of self in response to personality statements; makes no effort, consciously or unconsciously, to present desirable impression of self.	

Description of high scorers	Defining trait adjectives	Description of low scorers	Defining trait adjectives
SCALES			
INFREQUENCY			
Responds in implausible or pseudorandom manner, possibly due to carelessness, poor comprehension, passive non-compliance, confusion, or gross deviation.		Responds in a plausible manner; no evidence of errors made in completing form; no evidence of pseudorandom or other unlikely response pattern.	

Note. From *Personality Research Form Technical Manual* (pp. 4-6), by D. N. Jackson, 1984, Port Huron, MI: SIGMA Assessment Systems, Inc./Research Psychologists Press, Inc. Copyright 1967, 1974, 1984 by SIGMA Assessment Systems, Inc./Research Psychologists Press, Inc. Reprinted with permission.

Appendix B: Personality Research Form Scales Organized as Units of Orientation

Group	Measures and scales
Measures of impulse expression and control	Impulsivity Change Harmavoidance Order Cognitive structure
Measures of orientation toward work and play	Achievement Endurance Play
Measures of orientation toward direction from other people	Succorance Autonomy
Measures of intellectual and aesthetic orientations	Understanding Sentience
Measures of degree of ascendancy	Dominance Abasement
Measures of degree and quality of interpersonal orientation	Affiliation Nurturance Exhibition Social recognition Aggression Defendence

Note. Opposing scales are separated by a solid line. From *Personality Research Form Technical Manual* (p. 3), by D. N. Jackson, 1984, Port Huron, MI: SIGMA Assessment Systems, Inc./Research Psychologists Press, Inc. Copyright 1967, 1974, 1984 by SIGMA Assessment Systems, Inc./Research Psychologists Press, Inc. Reprinted with permission.

Appendix C: Summary of Findings for Selected Maritime Pilot Applicants in Relation to Prior Research Findings

Significant PRF-E variable description and beta (*B*) coefficient sign	PRF-E score interpretation	Current research findings: Personality description of selected applicants	Relationship to prior research findings: Personality description of selected high-risk public safety applicants
Abasement: PRF-E items measure one's tendency to be self-effacing, easily humiliated, subservient, and accepting of blame/criticism, even when not deserved. Negative *B*	In the current study, selected applicants received low scores in abasement.	As outlined in Appendix A, low scores in abasement characterized selected applicants as: self-assured; has a high self-opinion; does not allow others to take advantage of his or her good will; asserts own rights.	Current study findings supported existing knowledge concerning measures of abasement in job applicants. Extant researchers established that selected high-risk public safety applicants were low in abasement and could be characterized as: self-confident; self-respecting; resilient in the face of adversity; maintains self-convictions despite criticism or differing opinions (Colaprete, 2012; Ernstsen & Nazir, 2018; Lobo, 2016; Perry et al., 2008).
Achievement: PRF-E items measure one's tendency to set ambitious goals and exert maximum effort to attain excellence. Positive *B*	In the current study, selected applicants received high scores in achievement.	As outlined in Appendix A, high scores in achievement characterized selected applicants as: striving; aspires to accomplish difficult tasks; maintains high standards and is willing to work toward distant goals.	Current study findings supported existing knowledge concerning measures of achievement in job applicants. Extant researchers established that selected high-risk public safety applicants were high in achievement and could be characterized as: conscientious; goal-oriented; ambitious; resourceful; strives to complete work tasks with utmost levels of vigor and distinction (Beus et al., 2015; Detrick & Chibnall, 2013; McCrae & Costa, 1999; Salters-Pedneault et al., 2010; Stark et al., 2014; Tarescavage, Corey, et al., 2015).

Significant PRF-E variable description and beta (*B*) coefficient sign	PRF-E score interpretation	Current research findings: Personality description of selected applicants	Relationship to prior research findings: Personality description of selected high-risk public safety applicants
Change: PRF-E items measure one's tendency to demonstrate receptiveness to new experiences/ideas and adjust quickly to changing conditions. Positive *B*	In the current study, selected applicants received high scores in change.	As outlined in Appendix A, high scores in change characterized selected applicants as: flexible; likes new and different experiences; adapts readily to changes in environment.	Current study findings supported existing knowledge concerning measures of change in job applicants. Extant researchers established that selected high-risk public safety applicants were high in change and could be characterized as: adaptable; resilient; high levels of personality hardiness; rapidly and effectively acclimates to changing and highly unpredictable situations (Doyle et al., 2016; Hongbin, 2018; Hystad & Bye, 2013).
Cognitive structure: PRF-E items measure one's tendency to exhibit orderliness, make detailed plans, and base decisions on explicit information. Positive *B*	In the current study, selected applicants received high scores in cognitive structure.	As outlined in Appendix A, high scores in cognitive structure characterized selected applicants as: precise; does not like ambiguous information; wants all questions answered completely; desires to make decisions based upon definite knowledge, rather than upon guesses or probabilities.	Current study findings supported existing knowledge concerning measures of cognitive structure in job applicants. Extant researchers established that selected high-risk public safety applicants were high in cognitive structure and could be characterized as: conscientious; exacting; meticulous; organized; methodical; aligns workplace objectives and decisions with personal conservation values (Beus et al., 2015; Hystad & Bye, 2013; McCrae & Costa, 1999).

Significant PRF-E variable description and beta (*B*) coefficient sign	PRF-E score interpretation	Current research findings: Personality description of selected applicants	Relationship to prior research findings: Personality description of selected high-risk public safety applicants
Dominance: PRF-E items measure one's tendency to attempt to control the environment, influence others aggressively, and express opinions forcefully.

Negative *B* | In the current study, selected applicants received low scores in dominance. | As outlined in Appendix A, low scores in dominance characterized selected applicants as: amenable; diplomatic; does not attempt to exert unwarranted control over environment; prefers not to impose opinions on others; functions well in work teams. | Current study findings supported existing knowledge concerning measures of dominance in job applicants. Extant researchers established that selected high-risk public safety applicants were low in dominance and could be characterized as: agreeable; pragmatic; tactful; cultivates positive social relationships; values teamwork; refrains from exhibiting an overly aggressive, domineering, uncooperative, or unprofessional persona (Beus et al., 2015; McCrae & Costa, 1999; Patraiko, 2017). |
| Harmavoidance: PRF-E items measure one's tendency to exhibit alertness, attentiveness to danger, and risk avoidance.

Positive *B* | In the current study, selected applicants received high scores in harmavoidance. | As outlined in Appendix A, high scores in harmavoidance characterized selected applicants as: vigilant; does not enjoy exciting activities, especially if danger is involved; avoids risk of bodily harm; seeks to maximize personal safety. | Current study findings supported existing knowledge concerning measures of harmavoidance in job applicants. Extant researchers established that selected high-risk public safety applicants were high in harmavoidance and could be characterized as: cautious; avoids unnecessary risk-taking; actively evaluates threats to safety; complies with safety standards; strives to prevent injuries, fatalities, accidents, and other safety breaches (Abramowicz-Gerigk & Hejmlich, 2015; Beus et al., 2015; Ernstsen & Nazir, 2018; McCrae & Costa, 1999). |

Significant PRF-E variable description and beta (*B*) coefficient sign	PRF-E score interpretation	Current research findings: Personality description of selected applicants	Relationship to prior research findings: Personality description of selected high-risk public safety applicants
Sentience: PRF-E items measure one's tendency to demonstrate perceptiveness and responsiveness to sensory experiences and natural phenomena. Positive *B*	In the current study, selected applicants received high scores in sentience.	As outlined in Appendix A, high scores in sentience characterized selected applicants as: observant; notices smells, sounds, sights, tastes, and the way things feel; remembers these sensations and believes that they are an important part of life; is sensitive to many forms of experience; may maintain an essentially hedonistic or aesthetic view of life.	Current study findings supported existing knowledge concerning measures of sentience in job applicants. Extant researchers established that selected high-risk public safety applicants were high in sentience and could be characterized as: situationally-aware; perceives and responds to environmental cues, resulting in decreased errors and accidents; effectively observes, processes, and reacts to subtle changes in water depths, currents, tides, weather, and winds (Chakrabarty, 2016; Cordon et al., 2017; Ernstsen & Nazir, 2018; Orlandi & Brooks, 2018).
Desirability: PRF-E items measure one's tendency to present oneself in an excessively favorable manner. Negative *B*	In the current study, selected applicants received low scores in desirability.	As outlined in Appendix A, low scores in desirability characterized selected applicants as: makes no effort, consciously or unconsciously, to present overly desirable impression of self.	Current study findings supported existing knowledge concerning measures of desirability in job applicants. Extant researchers established that selected high-risk public safety applicants were low in desirability. Empirically supported self-report personality assessments incorporate validity scales to detect instances of social desirability response bias and faking, including the MMPI (Hathaway & McKinley, 1942), the PAI (Morey, 1991), the IPI (Inwald, 1992), and the NEO PI-R (Costa & McCrae, 1992).

Significant PRF-E variable description and beta (*B*) coefficient sign	PRF-E score interpretation	Current research findings: Personality description of selected applicants	Relationship to prior research findings: Personality description of selected high-risk public safety applicants
Infrequency: PRF-E items measure one's tendency to respond in a questionable manner. Negative *B*	In the current study, selected applicants received low scores in infrequency.	As outlined in Appendix A, low scores in infrequency characterized selected applicants as: responds in a plausible manner; no evidence of errors made in completing form; no evidence of pseudorandom or other unlikely response pattern.	Current study findings supported existing knowledge concerning measures of infrequency in job applicants. Extant researchers established that selected high-risk public safety applicants were low in infrequency. Empirically supported self-report personality assessments incorporate validity scales to detect questionable response patterns, including the MMPI (Hathaway & McKinley, 1942), the PAI (Morey, 1991), the IPI (Inwald, 1992), and the NEO PI-R (Costa & McCrae, 1992).

Note. Refer to Appendix A for Personality Research Form scale descriptions for high and low scorers. From *Personality Research Form Technical Manual* (pp. 4-6), by D. N. Jackson, 1984, Port Huron, MI: SIGMA Assessment Systems, Inc./Research Psychologists Press, Inc. Copyright 1967, 1974, 1984 by SIGMA Assessment Systems, Inc./Research Psychologists Press, Inc. Reprinted with permission.

Appendix D: SIGMA Assessment Systems, Inc. Research Agreement

PTR1022

SIGMA ASSESSMENT SYSTEMS, INC.

RESEARCH AGREEMENT

RESEARCHER: **Tara Barca**

INSTITUTION: **Walden University**

DEPARTMENT: **College of Management and Technology**

ADDRESS:

PHONE NUMBER: EMAIL ADDRESS:

SIGMA Assessment Systems, Inc./Research Psychologists Press, Inc., (hereinafter the "Publishers") on this date, **June 14, 2019,** hereby authorizes **Tara Barca,** under the supervision of **Elizabeth Thompson,** to use the following material indicated below as the Work for research, subject to all of the terms, conditions, and limitations of this Agreement.

A. **The Work:** The Work means:

NAME: **Personality Research Form (PRF)**

AUTHOR(S): **Douglas Jackson, Ph.D.**

SPECIFIC FORM OF THE TEST OR THE WORK: **Form E; Scale Descriptions for High and Low Scores; Scales Organized as Units of Orientation**

PARTICULAR SCALES OR PARTICULAR WORK USED: **N/A**

B. **Description of Research:** The Researcher agrees to use the Work for the following purpose and no other: ·

The purpose of this quantitative, ex post facto study is to assess person-job fit theory by examining the relationship between personality traits, as measured by Jackson's (1984) Personality Research Form (PRF-E), and selection for a maritime pilot job. Binary logistic regression will be used to analyze the predictive ability of personality dimensions on maritime pilot selection.

Null Hypothesis, H0: There is no significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job.

Hypothesis, H1: There is a significant relationship between respondents' PRF-E scale ratings and selection for a maritime pilot job.

C. **Conditions:**

    i.   **Authorized Use:** Permission to use the Work for research use is only valid for the specific research study described in this Agreement and is only valid for the number of administrations specified in the section entitled Completion of Study.

ii.   **Prohibited Uses**: This Agreement does not provide the Researcher with the rights to adapt, revise, or otherwise reproduce, publish, or distribute any copies of the Work (neither separately nor as part of a larger publication, such as in articles, books, research bulletins, or dissertations, neither in print, nor electronically, nor by any other means), except as specifically permitted by the section entitled Authorized Use. Furthermore, the Researcher shall not directly sell or allow others to sell the Work without the express permission of the Publishers.

iii.   **Translations**: Researcher does not have permission to translate the Work as part of this study.

iv.   **Reservation of Rights**: All rights in the Work(s) not herein granted to the Researchers are expressly reserved by the Publishers.

v.   **Non-Transferability**: This Agreement is non-transferable. Any attempt to transfer the Agreement will automatically revoke it.

vi.   **Completion of Study**: This Agreement is valid until **December 1, 2019**. Research is based on a previous subset of data. No further administrations may be prepared. Further permission to use this material beyond this date will require a renewal of this Agreement between the Researcher and the Publishers.

D. **Data Sharing**: The Researcher agrees to share with the Publishers all results, reports, and data. The Researcher will send the Publishers an abstract summarizing the research within one (1) month of completing the study. The Researcher authorizes the Publishers to copy and distribute the abstract or report to interested parties, with credit given to the authors of the research.

E. **Fees:**

Permissions Fee	Waived
Test use royalty, including research discount	Waived
TOTAL	$ 000.00*

*does not include shipping and handling

F. **Required Signatures:** This Agreement is not effective unless signed by an authorized official of the Publishers and unless countersigned by the Researcher.

ACCEPTED AND AGREED

Researcher: _Tara Barca_   Date _6/14/2019_

Supervisor (if applicable): _____ confirms on this date _____, that I am qualified to supervise the research described in this Agreement, and I am willing to supervise the use of the Work.

Authorized Signature: _Mara Macey_   Date _6 / 17 / 2019_
SIGMA Assessment Systems, Inc./ Research Psychologists Press, Inc.