AN EXAMINATION OF INDIVIDUAL COMPETENCIES AMONG STUDENTS MATRICULATING THROUGH AN UNDERGRADUATE HEALTHCARE ADMINISTRATION PROGRAM

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DEDICATION

This dissertation is dedicated to my wife, Jane Lindsey Lieneck, for encouraging me to continue my dream as a lifelong learner; and to my daughters Emery Grace and Eve Analee Lieneck. Thank you for your support and understanding.

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ABSTRACT

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Descriptive and psychometric analyses were conducted to examine alternate forms of comprehensive exit examinations for an undergraduate healthcare administration program. The variables: a) comprehensive demographics; b) personality type; c) mentor presence; and, d) prior healthcare experience served as explanatory or predictor variables in an exploratory regression analysis to identify relationships and/or influential predictors of early careerist healthcare administration competency. Results posit several areas for future research, including a methodological framework for test development and revision in order to establish parallel healthcare administration comprehensive exit exams.

CHAPTER I

INTRODUCTION TO THE STUDY

The U.S. healthcare industry in the 21st century is becoming more comprehensive due to several reasons, including the increased prevalence of advanced medical procedures, patient diagnoses, as well as an overwhelming environment that calls for reduced funding and potential legislative reform. The healthcare administrator is charged with the responsibility of managing these intricate healthcare organizations, and therefore competency among healthcare administration program graduates is vital in this era of transition and reform. Because of this, an argument exists for strong competency among healthcare administration program graduates in today's dynamic and complex healthcare environment. For example, while the need for healthcare management professionals continues to increase due to the incessant growth and complexity of the healthcare industry, the competency of early careerist healthcare administration graduates remains problematic.

The Association of University Programs in Health Administration (AUPHA) recently reported a record enrollment of undergraduates in accredited healthcare administration programs, increasing by over 55% from academic year 2006 to 2007 (AUPHA, 2010a). Additionally, the U.S. Bureau of Labor Statistics has projected the field of healthcare services management to grow 16% from 2008 to 2018 (Bureau of

Labor Statistics, 2010). However, research suggests that many healthcare administration early careerists are not graduating from accredited healthcare administration programs with the appropriate level of competency and leadership skills required by the healthcare industry (Hartman & Crow, 2002; Helfand, Cherlin, & Bradley, 2005; Hudak, Brooke, & Finstuen, 2000; Mecklenburg, 2001; Pointer, Luke, & Brown, 1986; Schneller, 1997; White & Begun, 2006). Furthermore, in direct contrast with concerns from senior leaders in healthcare management, research indicates that early careerist healthcare administrators rate their own competencies and leadership skills quite high, particularly in the areas of interpersonal communication and emotional intelligence (Cherlin, Helfand, Elbel, Busch, & Bradley, n.d.).

Exacerbating this competency and leadership gap is the dynamic nature of the healthcare field itself. The Institute of Medicine (IOM) published its report, "Crossing the Quality Chasm," which directly addressed the continuously growing need for healthcare leaders with the proper knowledge and skills in order to ensure a safety culture that is both developed and monitored by healthcare management personnel (Kohn, Corrighan, & Donaldson, 2000). Accordingly, with the current context of the healthcare environment in continual flux, individuals are expected, and therefore required to effectively deal with relentless change within the industry. Christopher Van Gorder, 2010-2011 Chairman of the American College of Healthcare Executives further affirmed these conditions by stating, "I believe we are on the verge of major changes in healthcare delivery…" and, "Healthcare reform will bring more regulations, mandates, and unfortunately, costs" (Squazzo, 2010, p. 11). Van Gorder furthered the argument for competent healthcare administrators:

> Healthcare reform will bring new challenges, responsibilities and accountabilities. Executives will need to be skilled in change management, physician relations, labor relations, workforce and talent development, organizational development, management engineering, and patient safety and quality systems, financing, accounting, advocacy, fundraising, and many other technical areas. (Squazzo, 2010, p. 12)

Healthcare administration graduates who struggle with the knowledge and skills required in the field face several professional perils early on in their careers, which include potential economic hardship of the organization they are leading, possible unemployment, and the risk of patient safety. In an industry where individual competency levels are believed to influence future career success, it is imperative that graduates of healthcare administration programs be advantageously proficient in all necessary competencies set forth by the academic curriculum and thus the industry. To this end, some graduates of healthcare administration programs are ill-prepared for placement in such a challenging management profession with exigent competency requirements. Moreover, healthcare administration programs are not taking into consideration each student's inherent and underlying behavioral traits to assist in the forecasting of their future competency attainment, as well as future success and career progression within the field of healthcare management.

Focusing on knowledge, skills, and abilities collectively as specific competencies within various professions is not a new practice, especially within the general business management field (Shippmann et al., 2000). Likewise, the specialized field of healthcare administration has followed suit, creating several competencies and competency

assessments to ensure that future leaders have the appropriate training and expertise required to meet the challenges of today's healthcare industry (Calhoun, Davidson, Sinioris, Vincent & Griffith, 2002; Calhoun et al., 2004; Healthcare Leadership Alliance, 2010; Maurer & Grazier, 2001.; National Center for Healthcare Leadership, 2010; Robbins, Bradley & Spicer, 2001; Stefl, 2008). Additionally, several studies have also proposed both conceptual and operational definitions of competency in healthcare management (Calhoun et al., 2002, Calhoun et al., 2004, Counte & Newman, 2002; Davidson, Calhoun, Sinioris & Griffith, 2002), all focusing upon a handful of homogeneous competencies necessary for the healthcare administration practitioner to lead successfully.

To further ensure the preparation of their program graduates, healthcare administration institutions and academic credentialing bodies specific to healthcare administration have attempted to identify their own specific competencies for early careerists entering this challenging field (AUPHA, 2010b; Cherlin et al., 2006; Lockhart & Backman, 2010; Shewchuk, O'Connor & Fine, 2005; St. Louis University, 2010; Tulane University, 2010; White, Clement & Nayar, 2006). In an attempt to assist with both professional and academic competency development in healthcare administration, recent competency research in the healthcare administration field has yielded limited focus, concentrating upon student and alumni self-perceptions of competencies required of the industry (Cherlin, Hefland, Elbel, White, Clement, Nayar, 2006). Attempting to further support the healthcare administration early careerist competency initiative, researchers have surveyed tenured healthcare administration practitioners to identify competencies which they personally recommend as mandatory fundamentals required of

their management appointments to meet both the demands of the industry, as well as their organization (Hartman & Crow, 2002; Prybil, 2003).

As the 21st century progresses deeper into the growing likelihood of dynamic healthcare reform, the forecasting of early careerist healthcare administration graduate success is crucial to ensure the successful future of healthcare organizations, their employees, and especially the patients they serve. While the simple utilization of student grades, grade point average, and program exit exam scores may serve as summative evaluation instruments to assess individual academic competency, this method is not necessarily an accurate and reliable determinant of post-graduation success. Early studies have shown that the sole use of scholastic aptitude scores demonstrates no significant relationship with actual accomplishments in social leadership and other practical accomplishments in college students upon graduation (Elton & Shevel, 1969; Holland & Richards, 1965). Nuttall and Fozard (1970) further confirmed the dissociation of academic achievement and post-graduation success by relating social class with the ability of students to obtain higher academic test scores, therefore suggesting that any correlation between job success and academic performance may simply be due to artifact (McClelland, 1973). Because of this, academic competency alone should not be the sole determinant towards the prediction of future success of an individual in the field of healthcare administration.

A strong argument has long been made regarding the practice of testing for competency, otherwise cited as, "personality variables," rather than evaluating only intelligence when attempting to predict success among managerial candidates (McClelland, 1973, p. 10). Major studies provide strong evidence that successful leaders

of organizations possess similar personality traits (Judge & Bono, 2001; Judge & Bono, 2000; Judge, Ilies, Bono & Gerhardt, 2002; Scroggins, Thomas & Morris, 2009); unfortunately, the evidence examining the relationship between an individual's personality and their academic competency in healthcare administration is virtually nonexistent. The fact is, healthcare administration academic programs should continue to improve upon their curriculum and teaching methods to further enhance preferred professional competencies in their students. However, the lingering question is what relationship, if any, will individual personality type have with the mastery of competencies in healthcare administration among undergraduate healthcare administration students? Answering this question will assist academic programs to adapt their curriculum and teaching methods, as well as possibly modify future enrollment practices to increase the number of individuals that demonstrate healthcare administration leadership success upon graduation.

Statement of the Problem

This study will establish a solid framework directed toward healthcare administration competency analysis and the relationship(s) between individual personality and healthcare administration competency in order to attempt to predict the future success among healthcare administration early careerists. Most research in healthcare administration is less rigorous when compared with other leadership and management prediction models with regard to the potential influence of behavioral traits and select demographic variables. As the healthcare environment and policy regulations continue to transform the industry, it is essential for early careerists in the field of healthcare management to possess strong competencies in their craft to ensure workplace

success. Nonetheless, many healthcare administration institutions enroll record numbers of students in an attempt to meet demand and introduce future healthcare leaders into the unique field to manage complicated healthcare organizations. Ideally, identification of the significant relationships between student competency and inherent behavioral traits will further future healthcare administration graduate success. To this end, an exploratory investigation into the significant relationships between healthcare administration student personality type and competency in healthcare administration is warranted. Furthermore, analysis of specific variables and their influence upon the success of early careerist healthcare administrators will assist in the guidance of future research methods.

Variables

Research suggests that several competencies of healthcare administration early careerists have been questioned (Hartman & Crow, 2002; Hudak, Brooke, & Finstuen, 2000; Mecklenburg, 2001; Pointer, Luke, & Brown, 1986; Schneller, 1997; White & Begun, 2006). Individuals possessing certain individual personality characteristics such as conscientiousness and extraversion exhibit greater success in the general field of management (Judge, Ilies, Bono & Gerhardt, 2002; Judge & Bono, 2000; Scroggins, Thomas & Morris, 2009). Based on findings from management research, it follows that understanding the relationship among personality characteristics and important competencies within the healthcare administration profession is a first step in understanding and predicting success of future healthcare administration graduates. Examples of healthcare administration competencies include those previously mentioned by the American College of Healthcare Executives' Chairman Christopher Van Gorder

(Squazzo, 2010), as well as several other competencies such as those promulgated by both academic and professional healthcare administration associations as delineated in Appendix A. Additionally, prior research has supported the use of personality testing, in addition to cognitive ability measures, as a valid method to predict future job performance (Scroggins, Thomas & Morris, 2008). Because of this, the need to understand the relationship among personality and competency in the specialized field of healthcare administration is proposed.

A strong, growing consensus has emerged, suggesting that the five-factor model of personality (often termed the *Big Five*) can be utilized to effectively describe and classify an individual's inherent personality traits (Goldberg, 1990). Decades of factor analytic research on the structure of personality resulted in the following five traits of personality: neuroticism, extraversion, openness, agreeableness, and conscientiousness (Costa & McCrae, 1992). Table 1 lists characteristics of each personality factor. Of the several meta-analyses conducted regarding personality types and job performance (e.g., Anderson & Viswesvaran, 1998; Barrick & Mount, 1991; Hurtz & Donovan, 2000; Robertson & Kinder, 1993), Judge et al. (2002) utilized data from 222 correlations from over 70 samples and found that Costa and McCrae's five-factor personality model indicated strong support for the leader trait perspective for individuals in management positions. They further suggested that the extraversion personality type possessed the strongest positive correlation with leadership emergence, leadership effectiveness, and general management success, while neuroticism was negatively related to these latent variables (2002). In another study by Seibert and Kraimer (2001), extraversion was shown to be positively related to career success, as measured in terms of salary level,

promotions, and career satisfaction. Thus, the five-factor model has provided an impressive taxonomy for the study of management success and leadership performance in the workplace.

Table 1

NEO-FFI (Five Factor Inventory) Personality Types and Descriptive Traits

	Synonym	Antonym
NEO-FFI Personality Type		
Neuroticism	Susceptibility of psychological distress including fear, sadness anger, guilt, and disgust	Calm, even-tempered, relaxed
Extraversion	Sociable, upbeat, energetic, and optimistic	Reserved, independent, even-paced
Openness of Experience	Active imagination, attentiveness to inner feelings, independence of judgment	Conventional, conservative outlook
Agreeableness	Agreeable, altruistic, sympathetic to others	Disagreeable, antagonistic
Conscientiousness	Purposeful, strong-willed, and determined	Lazy, disorganized, unreliable

Note. From "*NEO PI-R Professional Manual*," by Costa, P. T. & McCrae, R. R. 1992. Copyright (1992) by PAR. Reprinted with permission.

Several competency-based systems have been developed over the past decade in the areas of education and professional development (Lucia & Lepsinger, 1999; Westera, 2001), while it was the work of David McClelland in the 1970s that gained the greatest

recognition for competency development with regards to personality testing (McClelland, 1973). Examples of correlation studies regarding both personality and competency have involved the measurement of academic competency through the assessment of grade point average (GPA), examination grades, and/or a final comprehensive examination or project (Chamorro-Premuzic & Furnham, 2003). To date, this specific relationship between healthcare administration competencies and personality type has yet to undergo quantitative scrutiny using correlational and descriptive analyses. Furthermore, identification of trends among specific competencies identified in a cognitive assessment (e.g., a final comprehensive exit exam) is important in order to determine significant competency variations between and within exams, and between individuals across academic semesters.

Research Questions

1. What are the descriptive characteristics of the three healthcare administration comprehensive exit exams, and has any trending or changes in competency (based on course-level questions within each exam) occurred among the three exam versions utilized in this study?
2. What are the psychometric properties of the three healthcare administration comprehensive exit exams?
3. Are there any significant relationships that exist between personality type and competency in healthcare administration early careerists? If so, to what degree does personality type influence individual competencies in healthcare administration early careerists?

4. Can successful completion of the comprehensive exit exam in healthcare administration be correctly predicted from gender, age, ethnicity, prior healthcare experience status, and the presence of a healthcare administration mentor? If so, what variables are central in the prediction of that status?

Research Hypotheses

- Null hypothesis: there are no statistically significant differences between groups of students total exam scores and competency sub-scale scores among the three comprehensive competency exit exams.
- Null hypothesis: there are no statistically significant relationships between personality type and competency in healthcare administration.

  Alternate hypotheses: based upon research from the management field, as well as the researcher's substantive knowledge in the field of healthcare administration, the following associations between competency and personality type are hypothesized to be statistically significant:

  a. H_1: the competency of managerial skill (AUPHA, 2010b) will be positively correlated with the extraversion personality type (Judge & Bono, 2000).
  b. H_2: the competency of managerial skill (AUPHA, 2010b) will be positively correlated with the conscientiousness personality type (Judge & Bono, 2000).
  c. H_3: the competency of managerial skill (AUPHA, 2010b) will be negatively correlated with the neuroticism personality type (Scroggins, Thomas, & Morris, 2009).

d. H_4: the competency of ethics (AUPHA, 2010b) will be positively correlated with the extraversion personality type (Rolfhus & Ackerman, 1999).

e. H_5: the competency of ethics (AUPHA, 2010b) will be positively correlated with the openness to experience personality type (researcher's substantive knowledge and expert review).

f. H_6: the competency of computational skills (AUPHA, 2010b) will be positively correlated with the conscientiousness personality type (researcher's substantive knowledge and expert review).

- Null hypothesis: regression results will indicate the overall model of the five predictors (gender, age, ethnicity, prior healthcare experience status, and the presence of a healthcare administration mentor predictors) are not statistically reliable in predicting the successful completion of the exit examination.
  Alternate hypothesis: only prior healthcare experience and the presence of a healthcare administration mentor will significantly predict successful completion of the exit examination.

Data Analysis

A detailed analysis of each comprehensive exit exam's descriptive statistics with regard to the mean, median, standard deviation, skewness, and kurtosis allowed for identification of trending or changes of competency results for each section of the exam (12 items per course, 16 courses total). A psychometric analysis of the items comprising each comprehensive exam is essential in verifying the level of reliability and validity of any score values acquired from individuals taking the examination. Such information is

also required to inform the process of test revision for the healthcare administration department. A bivariate correlation and regression method was used to examine the relative contribution and statistical relationship between personality type and competency for healthcare administration early careerists, and for identification of significant relationships among comprehensive demographic characteristics of the sample. Finally, a logistic regression analysis was conducted to evaluate the predictive accuracy of competency, as measured by successful exam completion in early careerist healthcare administrators. The sample consisted of students enrolled in their final semester of their senior year of an AUPHA-accredited healthcare administration program at a four-year university in central Texas. The sample included the program's senior classes of December 2009, May 2010, and December 2010.

Definition of Terms

Personality Type. The NEO-FFI is a psychometrically sound instrument that enables researchers to evaluate, interpret, and categorize the underlying qualities of an individual's psychological traits. The following dimensions are measured by the NEO-FFI (a) Neuroticism, Extraversion, (b) Openness, (c) Agreeableness, (d) Conscientiousness (Costa & McCrae, 1992; Digman & Inouye, 1990; John, 1989).

Competency in Healthcare Administration. Standardization of the vast body of knowledge necessary to ensure success of the individual is initially based on the premise of Katz's (1974) three competences of managerial skill. Thus, identifiable levels of competency may exist based on the instrument utilized to measure professional core competency. In this study, a student's competency in healthcare administration was assessed based on successfully passing the healthcare administration program's

comprehensive exit examination. Successfully passing an examination was determined by a cut-off score of 70%. Furthermore, differences between the proportions of students passing each specific competency area were assessed between the three semester exit exams.

Comprehensive Demographics. Detailed demographic information on sample participants was obtained to examine baseline data, identify possible trends, influences, and significant relationships among sample participants and competency in healthcare administration. The demographic variables used in the study included age, gender, and ethnicity. Independent or moderator variables included presence (or non-presence) of a mentor in healthcare administration and prior experience in the healthcare field.

Assumptions

Healthcare administration research has suggested that many early careerist graduates of healthcare administration programs are not fully competent in the domains of healthcare management (Hartman & Crow, 2002; Hudak, Brooke, & Finstuen, 2000; Mecklenburg, 2001; Pointer, Luke, & Brown, 1986; Schneller, 1997; White & Begun, 2006). According to Squazzo, 2010, it is vital for healthcare administrators to be competent at their craft, communicate well, and possess strong interpersonal skills in order to facilitate organizational success. One gross misconception is that a student's academic success alone serves as a sole predictor of future leadership and workplace success (McClelland, 1973). Given the poor relationship between academic success and future leadership success, student grades are not useful as a predictor of future early careerist performance after graduation.

The focus of this exploratory study is to better understand the influence of individual personality upon the several competencies identified for healthcare administration early careerists. One goal of this study was to provide foundational work for the development of a predictive model for the selection of competent future healthcare administration leaders, in relation to personality type. Based on relevant literature regarding personality characteristics (Salgado, 1997; Seibert & Kraimer, 2001; Silverthorne, 2000; Thomas, Dickson, & Bliese, 2001), the correlation among specific healthcare administration competencies are expected to be stronger for those students who score high in the extraversion and conscientiousness factors than students scoring high in the neuroticism factor of the NEO-FFI.

As with any internet-based survey instrument, this method of data collection included several assumptions. Honest answers on both the NEO-FFI personality inventory, as well as the demographic questionnaire were expected. The study and the instrument itself was introduced to each intended sample participant via email, therefore it was assumed that the individual taking the survey was the intended recipient. Due to the high level of interest in early careerist healthcare administration competency analysis, it was also expected that a high response rate would be experienced, as those survey participants would be interested in the study's overall findings, specifically the relationship(s) identified among personality type and competencies in healthcare administration. Furthermore, as a professional resource and personal development tool, each subject's individual personality inventory results was offered at the completion of the study, if elected by the subject during the online survey.

Importance of the Study and Contribution to the Field

The identification of graduates of accredited undergraduate healthcare administration programs who struggle with specific competencies required of early careerist healthcare administrators has been addressed by senior healthcare administration leaders and medical practitioners (Hartman & Crow, 2002; Hudak, Brooke, & Finstuen, 2000; Mecklenburg, 2001; Pointer, Luke, & Brown, 1986; Schneller, 1997; White & Begun, 2006). Importantly, academic success in college appears to be a poor predictor of future workplace and managerial leadership success when evaluated independently (Elton & Shevel, 1969; Holland & Richards, 1965). However, for many management fields it has long been established that inherent behavioral traits, as described by individual personality types such as conscientiousness and extraversion, serve as reliable predictors of management success (Judge & Bono, 2000; Judge, Ilies, Bono & Gerhardt, 2002; McClelland, 1973; Scroggins, Thomas & Morris, 2009).

Prior healthcare administration research attempting to predict early careerist success in the field focused upon competency identification, as well as the discrepancy between self-rated and senior leadership competency levels (Helfand, Cherlin & Bradley, 2005; White, Clement & Nayar, 2006). This discrepancy between self-evaluations and senior leadership evaluations of early careerists healthcare administration competency levels drives the continual efforts of healthcare administration educators to not only further identify and operationally define the necessary competencies required of such a dynamic field (Davidson et al., 2002), but to also establish and hone andragogical methods to teach these competencies to early careerist students (Helfand et al., 2005).

Additionally, mentoring and prior experience are central to furthering management success in young leaders (Collins & Scott, 1978; Roche, 1979).

The collective analysis of identified variables directly related to the predictive success of management personnel both inside and outside the field of healthcare administration will further identify and evaluate the relationship strength among each variable, with respect to specific competencies in healthcare administration early careerists. This knowledge will therefore establish a foundation for future research, both to enhance andragogic methodology of healthcare administration educators, and to increase understanding into the predictive characteristics of success in specific competencies of healthcare administration with regard to inherent behavioral and demographic traits. This exploratory mixed-method analysis established a framework to identify these important relationships which remain inconclusive in current literature (Calhoun et al., 2004; Cherlin et al., n.d.; Helfand et al., 2005) with respect to overall competency in healthcare administration.

CHAPTER II

LITERATURE REVIEW

Healthcare Administration Competency

The inception and use of the term competency, as well as the actual practice of competency modeling evolved from early educational psychology and behavioral differences research. Initial focus was upon inherent, individual characteristics and their relationship with potential leader-emergence or knowledge, skills and abilities of students in academia. From an educational psychology perspective, Bloom (1956; 1967) created a taxonomy of educational objectives in order to assist educators identify, prioritize, and assess educational outcomes. Bloom's work (1956) operationally defined taxonomic educational categories predictive of success and directly related them to individual behavioral observations. Furthermore, this initiative enabled educators to establish theoretical frameworks regarding curriculum development and assessment in order to enhance the educational practice among a variety of students, all with different inherent behavioral traits (Bloom, 1967). In other words, this educational psychology perspective was the first of its kind, intended to focus on both performance outcomes as well as behavior modification to ensure student success, which is a similar process used in the development of most business, management, and human resource competencies today (Shippmann et al., 2000).

While Bloom's initial model has since been revised several times to meet the continuing needs of educators (Krathwohl & Andersen, 2010), the taxonomy concept itself comes with continued discourse. Research involving graduate students in history and advanced placement history high school students show differences in critical thinking and student interpretation of historical facts, imposing that Bloom's pyramid is in fact upside-down (Wineburg & Schneider, 2010). Even today, the model is scrutinized with regard to what order each taxonomic structure is ordered within the pyramid; in this case, educators of historical concepts recommending that knowledge be placed at the top of the pyramid, suggestive that new knowledge is the key to successful learning and that all knowledge is simply facts to be gathered and analyzed (Wineburg & Schneider, 2010).

A Harvard psychologist in the 1970s, McClelland took a much different approach to the education, evaluation, and prediction of competencies. Focusing more on individual differences with regard to behavioral traits, motivation, and achievement, McClelland developed several personality tests in order to assess these individual characteristics and utilize this information to determine which patterns were most demonstrated by the high achievers (Lucia & Lepsinger, 1999). Therefore moving from Bloom's educational psychology perspective to more of a focus upon individual behavioral differences, McClelland was convinced that competencies were more about the knowledge, skills, abilities, and traits that are directly related to an individual's job or other important life outcome (McClelland, 1973). Because of this, McClelland's definition of competency separated the use of traditional intelligence and aptitude testing from important life outcomes and individual motivation, such as job success, or maintaining competency in one's field, and their direct relationship with individual

behaviors (McClelland, 1973). McClelland's work therefore focused much more upon the current behavioral traits of the individual, including patterns of thinking and feeling, and the associated positions or tasks most suitable for the individual, based on historical personality data (Lucia & Lepsinger, 1999).

Since Bloom and McClelland's research on individual competency in education and psychology, the term "competency" has continued to be well-utilized in the business management realm for over 25 years, yet a firm operational definition of the term remains to exist (Zemke, 1982). Numerous studies have focused on the human resource practicality of competency utilization in the workplace, primarily due to the continuous changes and reorganization often experienced in organizational dynamics and overall structure of work in the U.S. (Ashkenas, Ulrich, Jick & Kerr, 1995; Howard, 1995; Keidel, 1994). Furthermore, prior studies indicate that as many as 75% to 80% of surveyed companies utilized some type of competency-based employee assessment and/or employment criteria (Cook & Bernthal, 1998; Jones, 1997). Because of this, Shippman et al. (2000) initiated a formal task force to investigate the practice of competency modeling within the fields of human resources and business management. Criterion-selected subject matter experts referenced the following statements when asked to define "competency" as it relates to their field of business and management (Shippman et al., 2000, p. 706):

- The knowledge, skills, and attributes that differentiate high performers from average performers.
- It is a construct that helps define level of skill and knowledge.

- Observable, behavioral capabilities that are important for performing key responsibilities of a role or job.
- Mishmash of knowledge, skills, and abilities and job performance requirements.
- I can't.

Additional literature places continued emphasis upon the relationship of competency and individual traits and behavioral characteristics. This was especially acknowledged in Spencer, McClelland & Spencer (1994), who defined competency as a combination of personal motives, traits, and self-concepts, including attitudes and individual values. Additionally, Spencer et al. (1994) further related competency directly to content knowledge or cognitive behavioral skills. Clearly, there seems to be much more to assessment of competency than simply the possession of content-based knowledge. This is furthered by Green (1999), describing competency as a written description of measurable work habits, while also requiring the successful employment of personal and communication skills to better achieve workplace results.

There have been several competency models developed for the field of healthcare administration in an effort to fully capture the broad spectrum of knowledge, skills, and abilities required of successful practitioners in the field (Batalden et al., 1998; Calhoun et al., 2008; Calhoun et al., 2004; Maurer & Grazier, 2001; MacKinnon et al., n.d.; Robbins et al., 2001). Following in Bloom's footsteps, each model suggests an itemized taxonomy of competencies necessary to perform at an appropriate level in the field of healthcare administration. To date, healthcare administration competency models consist of mutually exclusive competency domains or taxonomic structures, independent of each other with no prerequisite required among competencies. Examples of these models

established by healthcare administration authors, associations, and other related organizations for the field of healthcare management are summarized in Appendix A (AUPHA, 2010b; American College of Healthcare Executives, 2010; American College of Medical Practice Executives, 2010; Healthcare Information and Management Systems Society, 2010).

The models included in Appendix A, along with other reputable healthcare administration competency models and assessments, illustrate the homogeneity that exists among individual competencies in healthcare administration. The Healthcare Leadership Alliance (HLA) initiated a research analysis in an attempt to identify core or common competencies existing within each organization's body of knowledge in healthcare management (Stefl, 2008). This collaboration and analysis of individual association core competencies helped to synthesize the field of healthcare administration while also creating a forum to increase communication among entities. Of the five major professional associations that participated in the study (American College of Healthcare Executives, American Organization of Nurse Executives, Healthcare Financial Management Association, Healthcare Information and Management Systems Society, and the Medical Group Management Association and its certifying body, the American College of Medical Practice Executives), analysis of their individual core competencies posited five competency areas in healthcare management: communication and relationship management, professionalism, leadership, knowledge of the healthcare system, and business skills and knowledge (Healthcare Leadership Alliance, 2010). This leadership directory, available on the Healthcare Leadership Alliance's website (www.healthcareleadershipalliance.com) remains one of the most thorough and

comprehensive analyses outlining the multiple competencies and competency assessment criteria available in the healthcare administration field today.

Challenges related to the future of healthcare administration competency assessments are multi-faceted. To begin, there is not one licensing examination or assessment available to certify or credential a healthcare administrator. Therefore, in order to demonstrate competency in the field, healthcare administration associations develop bodies of knowledge within their healthcare administration specialties, while healthcare administration undergraduate and graduate academic programs initiate their own academic competencies and assessments in healthcare management. Because of this, much ambiguity exists in current healthcare administration competency assessment terminology and methodological deployment (Calhoun et al., 2002). Furthermore, with regard to academic competency evaluation in healthcare administration students, many faculty charged with developing healthcare administration program exit examinations are not well trained in the art of measurement and the science of testing (Calhoun et al., 2002), therefore allowing questions of content validity and reliability of alternate forms to exist.

Given the previously mentioned concerns related to assessment of competency in healthcare administration, the use of an undergraduate healthcare administration program's exit examination was included in this analysis to pragmatically evaluate early careerist competency using historical data (total exam scores and competency sub-scale scores). Furthermore, descriptive and item analysis of each exit exam version (one exam per semester, three semesters total) was conducted in order to evaluate testing reliability

and competency trending to establish a basis of equivalency for this available method of assessment.

Personality and its Influences

The use of personality testing for personnel selection and as a prediction method for success in the workplace initially occurred in the U.S. Army during World War I. Researchers such as Robert Yerkes and Walter Dill Scott convinced the military that current war efforts would benefit by the use of psychological testing, therefore selecting and categorizing troops for specific military assignments based on their inherent, individual personality traits (Scroggins et al., 2008). Due to the Army's success experienced with personality testing and predictive workplace behavior during the war era, a distinctive separation began to occur between the fields of industrial psychology and the previously utilized scientific management theory, which simply focused upon contextual factors to predict workplace behavior, such as employee incentive systems (Scroggins et al., 2008). As the field of industrial psychology continued to grow rapidly and spread from its initial military use into the business field, more focus was instilled upon psychological testing and instrument validity. Because of this, several professional research entities developed, such as the *Journal of Applied Psychology*, as well as the Psychological Corporation, furthering the validity of instruments and proposed value of psychological testing, including personality testing, for purposes of predicting workplace behaviors and workplace success of key leadership personnel (Scroggins et al., 2008).

One facet of psychological testing that has demonstrated strong validity and significant prediction of workplace success for managerial and supervisory positions is cognitive ability testing (Schmidt & Hunter, 1998). In the present study, cognitive ability

testing is demonstrated by healthcare administration competency levels, measured by student performance on each section of the comprehensive exit examination. Alternatively, personality testing has produced historical controversies related to validity and subjectivity, as well as basic disagreement of the taxonomic structure of personality types. Establishment of the five factor inventory (FFI), or *Big Five*, has been developed from a myriad of personality inventories and factor analytic results and is now widely accepted by many personality researchers (Borgatta, 1964; Digman & Inouye, 1986; Judge & Bono, 2000; McCrae & John, 1992; Wiggins & Pincus, 1992). While support of the five factor inventory is still not completely universal (Block, 1995; Hogan, R., Hogan, J. & Roberts, 1996), it does offer five core factors of personality that are strongly evident across cultures and serve as broad constructs for many individual, specific inheritable traits. Further factor analysis research shows that while the actual names of each factor may vary slightly among studies, the meaning of each factor and differences identified among each construct remain negligible (John, 1990; Mount & Barrick, 1995). As previously discussed, Table 1 on page 9 summarizes the five factors and suggestive traits associated with each personality construct.

Research regarding the prediction of achievement in the workplace, specifically within the fields of business and management, has focused upon several concepts believed to influence success of the individual. Latent variables such as job performance, transformational leadership, leadership behavior, leadership effectiveness, leadership role occupancy, and career success have all been studied in order to investigate the influence, as well as predictive significance of the *Big Five* personality types upon the previously mentioned concepts (Arvey, Rotundo, Johnson, Zhang & McGue, 2006; Church &

Waclawski, 1998; Judge & Bono, 2000; Salgado, 1997; Seibert & Kraimer, 2001; Silverthorne, 2001). Within these studies, both positive and negative relationships have been established between the variable associated with workplace success and specific personality types. These relationships, or correlations, are therefore predictive of which individual personality type(s) possess an affinity for stronger success and potential leadership strength in the workplace.

The field of psychological testing in personnel selection for employment of management professionals has historically relied upon personality testing as a means to predict success in the workplace, specifically relating to those in leadership positions. Several research findings suggested that personality is directly related to career success (Blickle et al., 2007; Church & Waclawski, 1998; Seibert & Kraimer, 2001). One such study has shown that individuals in leadership positions share several similar personality traits among one another (Jackson, Peacock, & Holden, 1982). Barrick and Mount (1991) determined that conscientiousness was a significant predictor of job performance for all occupations studied. A follow-up study established a significant relationship between extraversion and job performance among managerial positions (Barrick & Mount, 1993). Further examination into the *Big Five* factors resulted in conscientiousness again serving as a significant predictor of performance motivation across the three motivational perspectives of goal-setting, expectancy, and self-efficacy (Judge et al., 2002). Judge, Higgins, Thoresen, and Barrick (1999) have solidified the significant relationship between conscientiousness and the indicators of career success (job satisfaction, income, and occupational status), while also concluding that neuroticism negatively predicted income and occupational status. Therefore, the

examination of one's inherent personality type proves necessary in the determination of a potentially successful healthcare management leader.

Because organizations continue to face more difficult and challenging business environments, Seibert and Kraimer (2001) further studied the relationships among inherent personality traits and career success, as measured by salary level, promotions, and career satisfaction. It was determined that those individuals who possessed high extraversion personality score experienced a positive relationship with salary level, promotions, and career satisfaction; neuroticism-type individuals possessed a negative relationship with regard to career satisfaction (Seibert & Kraimer, 2001). Extraversion and agreeableness was found to be directly related to transformational leadership among business leaders, with neuroticism and conscientiousness unrelated altogether (Judge & Bono, 2000). Furthermore, two separate meta-analyses revealed that while personality predicted leadership (Hogan & Kaiser, 2005), extraversion was proven to be the most consistent correlate with leadership and the leader trait perspective across various business settings and leadership criteria (Judge, Illies, Bono & Gerhardt, 2002).

While many studies have thoroughly reviewed the relationships among personality type and leadership-related variables, little research has explored the influence of personality type upon competency within the field of healthcare administration. As healthcare organizations continue to become more complex and require leaders with specific skill sets necessary to lead their organizations through these difficult and dynamic times, this study explored the relationships among the Big Five personality types and the identified competencies in healthcare administration. Furthermore, early careerists were studied in an attempt to establish a solid baseline for

future research regarding healthcare administration competency as related to personality and the intent to establish a robust predictive model for overall success in healthcare administration based on these variables.

Mentorship and Prior Healthcare Experience

The inclusion of the variables of mentorship and prior healthcare experience result directly from the healthcare administration program's expectation that both positively influence success among early careerist healthcare administrators, as well as healthcare administration students. Highly regarded by the healthcare administration program, practical experience such as prior work or volunteer experience in the healthcare field (administrative or otherwise) serves as an interview question for undergraduate and graduate program applicants in the healthcare administration program. Furthermore, the Healthcare Leadership Alliance competency model cites "Knowledge of the Healthcare Field" as a required competency for healthcare administrators (Healthcare Leadership Alliance, 2010) and it is assumed that prior work or volunteer experience further demonstrates applicability toward this healthcare administration competency. Study subjects with prior healthcare experience were descriptively analyzed with regard to the other study variables for exploratory purposes in order to determine possible significant relationships and potential underlying concepts that may exist.

Mentorship has long been shown to directly influence career progress and success, education level, salary level, and job satisfaction among business executives (Collins & Scott, 1978; Roche, 1979). Further research has linked the presence of a professional mentor to having career mobility and opportunity, recognition, satisfaction, and promotion when compared to individuals without a mentor (Fagenson, 1989).

Thought to serve the same purposes as in the business field, healthcare administration professional associations, as well as healthcare administration academic programs promote the use of a mentor for early careerists (American College of Healthcare Executives, 2010b; Texas Medical Group Management Association, 2010). In an attempt to understand the relationship(s) that may exist between the mentorship variable and other study correlates, the presence or non-presence of a healthcare administrative mentor for each survey participant was included.

CHAPTER III

RESEARCH METHODOLOGY

The field of healthcare administration is unique and distinguishable from several other healthcare professions in that no certifying or licensing examination exists for healthcare management professionals. While many healthcare administration professional associations offer certifying examinations to establish a level of competency of their member constituents, a dilemma exists in that the associations are limited to the members served by the respective professional membership of the association itself (Calhoun et al., 2002). Furthermore, these healthcare administration associations tend to focus on their specific field of healthcare administration (hospital administration, medical group practice administration, long-term care administration, and managed care administration, to name a few). To date, a lack of collaboration among the various professional healthcare management groups exists. To this end, the realization of a single healthcare administration competency examination that assesses all aspects of the professional discipline is lacking.

Several analytic approaches were used in this study to examine the competency level and predictors of success in healthcare administration students. Variables examined included competency examination score, personality type, gender, ethnicity, and age of the undergraduate student enrolled at a central Texas public university accredited by the Association of Undergraduate Programs in Healthcare Administration (AUPHA). The

variables included in this study have been identified in other studies as correlates of general academic success in university-age students. Additional criterion and predictor or moderator variables introduced into the study to further investigate significant relationships they may have with competencies of healthcare administration include a) earning a passing score on the healthcare administration program's comprehensive exit examination, b) the existence or non-existence of a professional mentor in healthcare administration, as well as c) the existence of prior healthcare experience (not restricted to only healthcare administration).

In order to draw meaningful conclusions regarding the influence of these independent variables upon competency characteristics in the undergraduate healthcare administration sample, exploratory correlates were identified, quantified, and analyzed. Data were analyzed based on sociological theories related to practical healthcare administration conditions and prior research to allow for conclusions to be drawn as to the etiology and potential predictors of competency in healthcare administration early careerists. An exploratory methodology such as the approach herein provided a baseline understanding of the demographic characteristics of the healthcare administration students matriculating through the educational program, as well as the potential relationships among personality type and individual competencies in healthcare administration. Furthermore, a descriptive analysis of the comprehensive exit exam test scores, as well as analysis of the demographic characteristics of the students successfully completing the comprehensive exit exam provided for a foundational basis for understanding competency among healthcare administration early careerists and served

as a foundation for future research. Therefore the research questions and directional hypotheses for this study are as follows:

Research Questions

1. What are the descriptive characteristics of the three healthcare administration comprehensive exit exams, and has any trending or changes in competency (course-level questions within each exam) occurred among the three exam versions utilized in this study?
2. What are the psychometric properties of the three healthcare administration comprehensive exit exams?
3. Are there any significant relationships that exist between personality type and competency in healthcare administration early careerists? If so, to what degree does personality type influence individual competencies in healthcare administration early careerists?
4. Can successful completion of the comprehensive exit exam in healthcare administration be correctly predicted from gender, age, ethnicity, prior healthcare experience status, and the presence of a healthcare administration mentor? If so, what variables are central in the prediction of that status?

Research Hypotheses

- Null hypothesis: there are no statistically significant differences between groups of students total exam scores and competency sub-scale scores among the three comprehensive competency exit exams.
- Null hypothesis: there are no statistically significant relationships between personality type and competency in healthcare administration.

Alternate hypotheses: based upon research from the management field, as well as the researcher's substantive knowledge in the field of healthcare administration, the following associations between competency and personality type are hypothesized to be statistically significant:

a. H_1: the competency of managerial skill (AUPHA, 2010b) will be positively correlated with the extraversion personality type (Judge & Bono, 2000).
b. H_2: the competency of managerial skill (AUPHA, 2010b) will be positively correlated with the conscientiousness personality type (Judge & Bono, 2000).
c. H_3: the competency of managerial skill (AUPHA, 2010b) will be negatively correlated with the neuroticism personality type (Scroggins, Thomas, & Morris, 2009).
d. H_4: the competency of ethics (AUPHA, 2010b) will be positively correlated with the extraversion personality type (Rolfhus & Ackerman, 1999).
e. H_5: the competency of ethics (AUPHA, 2010b) will be positively correlated with the openness to experience personality type (researcher's substantive knowledge and expert review).
f. H_6: the competency of computational skills (AUPHA, 2010b) will be positively correlated with the conscientiousness personality type (researcher's substantive knowledge and expert review).

- Null hypothesis: regression results will indicate the overall model of five predictors (gender, age, ethnicity, prior healthcare experience status, and the presence of a healthcare administration mentor) are not statistically reliable in predicting the successful completion of the exit examination.

  Alternate hypothesis: only prior healthcare experience and the presence of a healthcare administration mentor will significantly predict successful completion of the exit examination.

Descriptive Statistical Analysis of Comprehensive Exit Exam Scores

The three comprehensive exit examinations used in this study each included a total of 192 questions addressing 16 healthcare administration competencies. The test development and item writing methodology to create each exam included an attempt to ensure homogeneity among healthcare administration competencies assessed across exams. Each healthcare administration program faculty provided 12 items (questions) for each healthcare administration course offered, for a total of 16 undergraduate courses. All competency questions are based on both course objectives as well as program accreditation criteria (AUPHA, 2010a). Therefore, while one comprehensive exit exam possessed 192 different items from the other two versions, each exam possessed the same amount of questions from each course, or competency, offered in the program. This methodology was established in an attempt to ensure similarity among exam versions, while allowing all healthcare administration course competencies to be assessed by each exam version.

Since the exam versions possessed different items, the data from all three semesters were descriptively analyzed at an overall exam level, as well as individual

competency levels. As with any data analysis, the first step was to describe or summarize all of the data collected therefore the individual competencies for every exam were analyzed with regard to measures of central tendency, variability, and relationship (Mertler & Vannatta, 2005). These descriptive statistics provide evidence of overall trends among all three exit examinations, while also identifying trends of student performance at the individual competency level.

Comprehensive Exit Exam Psychometrics and Item-Level Analyses

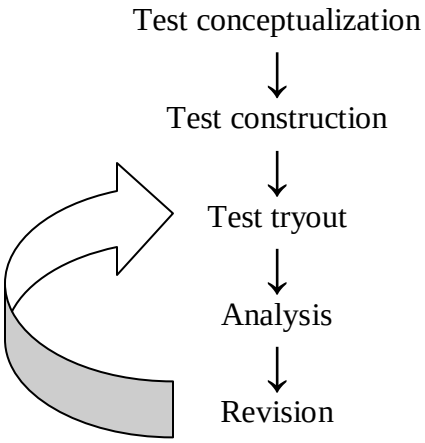
In order to evaluate competency in healthcare administration early careerists, the undergraduate healthcare administration program's comprehensive exit exam was used. This criterion-referenced achievement test is essential for all healthcare administration students to master after completing their coursework and before beginning their practical fieldwork experience (internship or residency in healthcare administration). For several reasons, including test security, the exam given to these seniors before leaving for their practical internships and residencies varied from semester to semester. The students in all three semesters utilized in this study (Fall 2009, Spring 2010, and Fall 2010) were given three different exam versions, creating a lack of specific item-level uniformity. For this reason, each individual exit exam was analyzed separately to determine the extent of potential variation.

Item-level analyses were essential to begin to understand the validity of the items related to the construct of the exam itself. Cohen and Swerdlik (1999) suggest the process of test development, shown in Figure 1. After three semesters (Fall 2009, Spring 2010, and Fall 2010), it can reasonably be concluded that the department has successfully engaged in the first three steps of the test development process, and in order to

understand each exam's characteristics and level of competency measurement in healthcare administration, reviewing exam descriptive statistics and specific psychometric analyses were necessary in order to direct future test revision processes within the department.

Figure 1

The Test Development Process



Note: from Cohen & Swerdlik, 1999.

Cohen and Swerdlik (1999) cite several psychometric analyses appropriate for analyzing criterion-referenced tests at the item-level. The item-difficulty index (*p*) was used to identify, within each of the three exam versions, what proportion of individual items were answered correctly by each subject, by semester. With the value of an item-difficulty index ranging from 0 to 1.0, Cohen and Swerdlik (1999) reference this index as a measure of those who passed the item (scored as correct) or those who failed the item (scored as incorrect). Therefore, an item with a *p*-value < 0.50 would be considered

difficult, as less than half the students got the item correct, while a *p*-value > 0.50 would be considered easy, as over half of the students got the item correct. An item with a *p*-value falling very close to the 0.50 value would typically be considered average difficulty, yielding the most variation and best differentiation in the population taking the exam. Although the item-difficulty index helps to assess each item's difficulty level, it does not provide much information regarding the item's overall usefulness in measuring the exam's construct, which is why additional, item-level psychometric analyses were necessary.

The item-discrimination index (*d*) is a second measure available to actively discriminate each item by the higher performing students and the lower performing students with regard to their overall exam score. By comparing performance on each item with the performance of the upper and lower regions of a distribution of continuous test scores (Cohen & Swerdlik, 1999), the item-discrimination index, also ranging from 0 to 1.0, distinguishes the proportion of higher performing students who scored that item correctly, from the lower performing student who scored that item correctly. The primary goal is to identify when an inverse, or negative item-discrimination index value is obtained, therefore determining which items were answered incorrectly by those performing well (top 25% scorers) on the exam, compared with those who performed poorly on the exam (lower 25%).

The upper and lower groups of scorers were determined by those falling within the upper 25% and lower 25% area distribution for each section of each comprehensive exam. In other words, each healthcare administration course tested on the exam had 12 questions, and the boundary lines to demarcate the upper and lower performing students

was based on the cumulative score of each course's 12 items. The upper and lower 25% areas of the distribution was chosen as the % to delineate the higher and lower performing students on each exam section, a standard protocol discrimination % (Allen & Yen, 1979). The underlying concept of the item-discrimination index is that those understanding the exam material least should not perform better on an individual item than those students who performed well on the overall exam (Cohen & Swerdlik, 1999). Therefore, negative *d* values were identified and summarized at the course level to further refine the test development process.

The third psychometric analysis completed at the item level was an analysis using the point-biserial correlation coefficient (r_{pbi}). This statistical index is interpreted in a very similar manner as the Pearson product-moment correlation coefficient (*r*), ranging from 0 to +1.00 for positively related items and 0 to -1.00 for negatively related items. Not to be misinterpreted with the biserial correlation coefficient (r_{bi}) which involves a one scale dichotomous (nominal) variable and one scale interval or ratio variable correlation, the point-biserial correlation coefficient assesses the degree of relationship between a one scale naturally occurring dichotomous (nominal) variable and a one scale interval or ratio variable (Brown, n.d.). In the current study, the point-biserial correlation coefficient was utilized to calculate the item-score correlation with the total test score for each competency area as an additional method of estimating item discrimination. The point-biserial correlation also provided the relative contribution of each item to explaining the total underlying variance specific to the construct of the test. The naturally occurring dichotomous nominal scale was if the student either scored each item correct or incorrect (coded as 1 or 0) and the ratio scale was the total composite score

from each 12 question section of the test (each of the 16 courses in healthcare administration have 12 items each on the exit exam), which ranged from 0 (the student failed all items) through 12 (the student passed all items). The point-biserial correlation coefficient further demonstrated the degree to which each individual item separates the better performing students from the lower performing students.

Finally, it should be noted that the healthcare administration exit exam is an assessment of competency, as employed in an educational context. Just as physicians, lawyers, and other professionals must demonstrate a specific level of knowledge, skills, or abilities with a state-level board examination or other certifying body licensing exam, so must healthcare administration early careerists who complete the undergraduate academic requirements for their degree. Additionally, while physicians, attorneys, and other professionals must demonstrate a passing score on their competency exam prior to moving on to an enhanced level of learning through application instruction, the same is true for early careerist healthcare administrators. Mastery of the competency is mandatory for the healthcare administration undergraduates to matriculate through the program and then enter their follow-on internship or residency experience. As stated by Cohen and Swerdlik (1999), successfully passing an educational criterion-referenced test is necessary prior to furthering the student learning experience in a practical learning context. Because of this, the overall purpose of the healthcare administration exit exam is not to necessarily discriminate among each semesters' upper and lower performing students, but to successfully validate their understanding of the various healthcare administration competencies by demonstrating high levels of item-difficulty indices

(proportion of correct item responses) for each section of the exam measuring a different healthcare administration competency.

The psychometric analyses allowed for detailed investigation into item-level responses to further interpret how students perform on various levels for each test, and more importantly assisted with the continued test development process within the health administration department to further the design process and continuously improve the construct and reliability of the multiple comprehensive exit exam scores. With the goal of developing and documenting a valid and reliable comprehensive exam in healthcare administration, these statistical data were combined with the knowledge and experience of the healthcare administration faculty members, thus enabling the development of test items based on statistical analyses and theory (Cohen & Swerdlik, 1999), as well as AUPHA credentialing requirements.

Bivariate Correlation and Regression

The quantitative characteristics of the data, as well as the a priori approach taken to specify an exploratory relational model based on prior general management theory and current healthcare administration knowledge made both bivariate correlation and regression analyses the preferred methodology for answering the research questions and hypotheses. For example, based on what is already known from prior research related to variables in the research problem, potential relationships are now of interest, specific to healthcare administration early careerists. Specifically, the literature documents significant determinants of personality type and success in the workplace with regard to individuals serving in general management positions. Additionally, as this study focuses solely upon the competency of students as measured by successful achievement in

academics and passing the comprehensive exit examination in healthcare administration, the literature also convincingly argues that academic achievement in college students is positively related to specific personality types.

The use of regression analysis in the current study was mainly exploratory and yielded a prediction equation for competency in healthcare administration early careerists. Bivariate correlation statistics identified from the exploratory analysis determined to be statistically significant result in a relationship among these independent variables (personality type and/or demographic characteristics) and may be used to develop a prediction equation and thus to predict the score of the criterion/dependent variable (overall competency in healthcare administration, and/or competency in a specific area of healthcare administration).

Logistic Regression

Several characteristics of logistic regression make it the preferred methodology for predicting the success of early careerist healthcare administration students, with regard to the prediction of successful completion (passing) of the comprehensive exit examination. To begin, the outcome for the prediction of successfully completing the comprehensive exit examination is binary (not passing the exam = 0, passing the exam = 1). Logistic regression also permits the prediction of a group membership outcome from variables that are continuous, discrete, dichotomous, or a mix of all three (Tabachnick & Fidell, 2007). In this case, based on what is already known about the variables related to this research study, data were utilized in the logistic regression equation in an attempt to predict an outcome from the entire set of variables, regardless of what type of data exists (nominal, ordinal, internal, or ratio).

Second, logistic regression has the ability to establish predictive functions, yet the predictor variables used in the equation are not required to be normally distributed, linearly related, or of equal variance (homoscedasticity) within each group (Tabachnick & Fidell, 2007). This is especially important in this a priori exploratory study, consisting of a survey that may produce data that do not conform to these assumptions and would otherwise threaten the robustness of any other inferential methodology.

Finally, logistic regression is cited to be especially useful when nonlinear relationships exist within the data (Tabachnick & Fidell, 2007). In other words, the dependent variable (passing or not passing of the comprehensive exit exam) response distribution may turn out to have a nonlinear relationship with one, or many of the independent variables in the study. Such nonlinearities in relationships between variables pose no problems for logistic regression analysis.

Key Terms

Bivariate correlation, regression, and logistic regression use terminology common to all statistical methods, as well as other terms more uniquely associated with these methods. The following list of terms and their meanings is provided as an aid to a common understanding of the analysis methodology used in this study, and its implications.

1. Direct logistic regression. One of three logistic regression methods, allowing each predictive variable to enter the logistic equation simultaneously when no hypotheses exist regarding the potential order of predictive variables (Tabachnick & Fidell, 2007).
2. -2 Log Likelihood (deviance). A statistical test to determine overall model fit.

3. Chi-Square test. A statistical test of independence that evaluates the relationship among two discrete variables (Tabachnick & Fidell, 2007).
4. Wald statistic. A statistical test to evaluate the statistical significance of the coefficients used in the accepted logistical regression model (Tabachnick & Fidell, 2007).
5. Multicollinearity. A problem in statistics and logistic regression when moderate to high intercorrelations among prediction variables exists, therefore including variables in the study that measure the same thing (Mertler & Vannatta, 2005).
6. Tolerance. A statistical test to measure for multicollinearity, ranging from 0 to 1 (with 0 indicating multicollinearity existing).
7. Orthogonality. The opposite of multicollinearity (Tabachnick & Fidell, 2007), therefore the perfect nonassociation of variables (Mertler & Vannatta, 2005).
8. Effect size. Assessed to determine the statistical relationship between the overall model outcome and the set of predictors chosen to be in the model itself.
9. *a* level (level of significance). The probably of making a Type I error.
10. Pearson's Correlation Coefficient (*r*). A statistical calculation to measure the association among two variables without utilizing any dependent/independent variable distinction (interval or ratio data).
11. Parsimonious solution. The capability of selecting the fewest number of independent variables necessary to ultimately provide the appropriate regression analysis.

12. Item-difficulty index (*p*). An item-level analysis that describes the proportion of test takers that scored an individual item correctly (Cohen & Swerdlik, 1999).
13. Item-discrimination index (*d*). An item-level analysis that compares the performance on an item with the upper and lower regions of the continuous overall exam scores (Cohen & Swerdlik, 1999). A percentage of 25% to establish the upper and lower regions of these overall exam scores is acceptable (Allen & Yen, 1979).

Participants

Undergraduate healthcare administration students enrolled in their final semester of an AUPHA-accredited healthcare administration program represented the population for this study. Students who were eligible to take this central Texas university's comprehensive healthcare administration exit examination were enrolled in their senior year within the following academic semesters: Fall 2009, Spring 2010, and Fall 2010. All students in the sample have completed the necessary coursework in the major of healthcare administration and were in their final semester of undergraduate study.

Table 2 provides a demographic description of the survey respondents with regard to gender, age, and ethnicity. The frequency distribution of each class, as well as the percentage of each measure is displayed. Further explanation of these variables and their presentation in the actual survey can be reviewed in Appendix B.

Table 2

Demographic Characteristics

Characteristic	Frequency	% (%)
Gender (n=55)		
Fall 2009		
Male	4	7.2
Female	18	32.7
Spring 2010		
Male	3	5.4
Female	11	20.0
Fall 2010		
Male	7	12.7
Female	12	21.8
Overall		
Male	14	25.4
Female	41	74.5
Age (n=55)		
Fall 2009		
17 – 25	19	86.4
26 – 30	2	9.1
31 – 35	1	4.5
36 – 40	0	0
> 40	0	0
Spring 2010		
17 – 25	12	85.7
26 – 30	1	7.1
31 – 35	1	7.1
36 – 40	0	0
> 40	0	0
Fall 2010		
17 – 25	17	89.5
26 – 30	1	5.3
31 – 35	0	0
36 – 40	1	5.3
> 40	0	0
Overall		
17 – 25	48	87.3
26 – 30	4	7.3
31 – 35	2	3.6
36 – 40	1	1.8
> 40	0	0
Ethnicity (n=55)		
Fall 2009		
White	13	59.1
Black or of African descent	2	9.1
Hispanic or Latino	6	27.3
Asian	1	4.5
International	0	0

Table 2-Continued

Demographic Characteristics

Characteristic	Frequency	% (%)
Spring 2010		
White	7	50.0
Black or of African descent	3	21.4
Hispanic or Latino	4	28.6
Asian	0	0
International		
Fall 2010		
White	11	57.9
Black or of African descent	0	0
Hispanic or Latino	5	26.3
Asian	2	10.5
International	1	5.2
Overall		
White	31	56.4
Black or of African descent	5	9.1
Hispanic or Latino	15	27.3
Asian	3	5.5
International	1	1.8

Table 3 provides the % of over or under representation of gender and ethnicity of the participants as compared to the AUPHA 2008 – 2009 cumulative enrollment data for accredited undergraduate healthcare administration programs in the United States. Because data for this study was acquired from an AUPHA accredited healthcare administration program in central Texas, the AUPHA 2008-2009 enrollment data was an appropriate benchmark for determining over and under representation of the demographic characteristics evaluated. While the study's total sample size was small, a comparison between the sample's demographics and the demographics from 43 AUPHA accredited healthcare administration programs yielded a relatively close match for specific demographic characteristics, except for Hispanic/Latino and Black students.

Table 3

Over and Under Representation of Demographics, AUPHA 2008 – 2009

Characteristic Survey	Average AUPHA Enrollment % (n=43 institutions)	Survey % of Present respondents (n=55)	Over or Under Representation
Gender			
Male	30.7	25.5	-5.2
Female	69.2	74.5	+5.3
Ethnicity			
White	51.0	56.4	+5.4
Black or of African descent	27.0	9.1	-17.9
Hispanic or Latino	7.0	27.3	+20.3
Asian	6.0	5.5	-0.4
American Indian, First Nations Member, or Alaskan Native	0.5	0	-0.5
International	7.5	1.8	-5.7
Hawaii or Pacific Islander	1.0	0	-1.0

While there was not a significant disproportion of gender between the survey and AUPHA enrollment data, there was a clear disparity identified in the demographics of the survey respondents, with regard to the average AUPHA enrollment numbers. Specifically, Black or of African descent students were under-represented in the survey sample by 19.7 %, while Hispanic or Latino students were over-represented in the survey sample by 22.1 %. With this central Texas University having recently received Hispanic-Serving Institution (HSI) status, it can be assumed that this achievement and service towards Hispanic or Latino degree-seeking students significantly influenced the over-representation of Hispanic or Latino/Latina students enrolled in the healthcare administration program, and thus the higher frequency of this demographic participating

in the survey sample. It is unknown what influences may have caused the 19.7 % under-representation of Black or of African descent students participating in the survey.

Procedures

As with any quantitative research design, sample size is an important consideration. A specific sampling method was used in this study to maintain important integrity among the various versions of the university's healthcare administration program's comprehensive exit examination. Additionally, because several of the variables in the study required survey responses in order to obtain accurate data (not historical data) surveying of the individual study participants was required. A convenience with this sampling method also existed by utilizing more recent semester data, as the healthcare administration program's recordkeeping of recent graduates was more current and accurate with regard to recent graduates' email, phone number, address, and last known place of employment. Additionally, with several of the comprehensive demographic survey questions focusing on healthcare administration characteristics related to early careerists, it was important to ensure that the survey was directed to only those healthcare administrative professionals that are just entering the field.

An electronic survey was administered to students who met the sample criteria. Students were invited to take the survey through an email with the survey hyperlink embedded. The electronic survey was hosted by an academic survey program call mrInterview (secure server). This university-based survey system allowed for a secure survey to be administered, while controlling for the frequency of proprietary NEO-FFI instrument issuances online. The mrInterview program also allowed for immediate data download into MS Excel for analysis prior to its upload into SPSS. The survey consisted

of a consent to participate in the survey, a consent for the researcher to access students' university academic records, followed by the two demographic questions discussed earlier and the 60 question NEO-FFI personality inventory.

Demographic Characteristics and Instrumentation

Demographic information on all survey participants was collected from the university academic records database and immediately matched with each subject's survey responses in the main MS Excel data file. The two additional demographic variables (presence of a mentor in healthcare administration and prior healthcare experience) were provided by the subject while taking the mrInterview survey (see Appendix B).

Comprehensive Demographic Characteristics. The following demographic variables were addressed by the subjects using the survey instrument and the raw data was then coded into the following data types:

- Gender – (female = 1, male = 2), nominal data set.
- Age – (1 = 17-25; 2 = 26-30; 3 = 31-35; 4 =36-40; 5 = >40), ordinal data set.
- Ethnicity – (1 = White; 2 = Hispanic or Latino; 3 = Black or of African descent; 4 = American Indian, First Nations Member, or Alaskan Native; 5 = Asian; 6 = Hawaiian or Pacific Islander; 7 = Multi-racial; 8 = Other, not included here), nominal data set.
- Prior Healthcare Experience – (1 = less than 1 year of prior healthcare experience at the time of the comprehensive exit exam; 2 = greater than 1 year of prior healthcare experience at the time of the comprehensive exit exam), nominal data set.

- Presence of a Mentor in Healthcare Administration – (1 = I currently DO have a professional mentor in the field of healthcare administration; 2 = I currently DO NOT have a professional mentor in the field of healthcare administration); nominal data set.

Healthcare Administration Competency. Access to the healthcare administration program's comprehensive exit examination data provided the data necessary to evaluate the variable of competency in healthcare administration. The comprehensive exit examination assessed academic competency, as related to the 16 academic competencies in healthcare administration. Recently, the healthcare administration program at this university revised their comprehensive exit examination and developed three new versions of the exam. These three versions contain questions related to competency in healthcare management as dictated by the program's credentialing agency, as well as the healthcare industry. With direct course objectives and literature references for each question present on each exam, the methodology for question generation for the three exams is more homogeneous than any of the program's comprehensive exit exams prior to the Fall 2009 semester. Each faculty member selected 12 questions from his or her course(s) to be present as items on the comprehensive exam. Therefore, while each of the three semester exams are different, each exam possessed 12 questions per healthcare administration course required of the major (a total of 16 healthcare administration courses, 192 questions per exam). Because of this, it was assumed that specific healthcare administration competencies were assessed accurately since each exam version was constructed with a similar, content-referenced methodology;

focusing upon domain-specific criteria in healthcare administration necessary to complete the undergraduate program and satisfy AUPHA credentialing criteria (AUPHA, 2010b).

Competency in healthcare administration was assessed by multiple methods. First, a student who passed the comprehensive exit examination successfully with a percentage of 70% or greater was assumed to have a certain level of competency in healthcare administration. Second, the students' overall scores on the comprehensive exit examinations were transformed into an ordinal variable with <69%=1, 70-79%=2, 80-89%=3, and 90-100%=4. Thirdly, the identified competency areas of healthcare administration within the comprehensive exit examination were identified, and the total number of correctly answered questions for each competency were summed with sums ranging from 0 (no questions answered correctly) to 12 (all questions answered correctly) as shown in Table 4.

Table 4

Healthcare Administration Comprehensive Exit Exam Competency Coding

Variable name	Competency item	Response categories
EXAMRSLT	Did the student pass the comprehensive exit exam?	1 = passing 0 = not passing
EXAMSCRE	What was the student's overall score on the comprehensive exit exam?	1 = < 69% 2 = 70 – 79% 3 = 80 – 89% 4 = 90 – 100%
EXAMHA3308	Number of correct responses in this course.	0 – 12
EXAMHA3309	Number of correct responses in this course.	0 – 12
EXAMHA3315	Number of correct responses in this course.	0 – 12
EXAMHA3324	Number of correct responses in this course.	0 – 12
EXAMHA3329	Number of correct responses in this course.	0 – 12
EXAMHA3340	Number of correct responses in this course.	0 – 12
EXAMHA3341	Number of correct responses in this course.	0 – 12
EXAMHA3345	Number of correct responses in this course.	0 – 12
EXAMHA3375	Number of correct responses in this course.	0 – 12
EXAMHA3376	Number of correct responses in this course.	0 – 12
EXAMHA4304	Number of correct responses in this course.	0 – 12
EXAMHA4305	Number of correct responses in this course.	0 – 12
EXAMHA4307	Number of correct responses in this course.	0 – 12
EXAMHA4315	Number of correct responses in this course.	0 – 12
EXAMHA4320	Number of correct responses in this course.	0 – 12
EXAMHA4325	Number of correct responses in this course.	0 – 12

The data sets were downloaded from the mrInterview program directly into Microsoft Excel. Further coding and organization of the data was completed within MS Excel, and

then the MS Excel data file was imported into SPSS for analysis with the other study variables.

Personality. Each survey participant was issued the Neuroticism Extraversion Openness-Five Factor Inventory (NEO-FFI) personality instrument. This instrument consists of 60 questions, focusing upon the five personality types of neuroticism, extraversion, openness, agreeableness, and conscientiousness (Costa & McCrae, 1992). Responses to the NEO-FFI inventory consist of the subjects answering questions related to each personality type on a Likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree). The responses are then scored to determine each subjects personality characteristics in relation to the five personality factors of the instrument. By calculating factor T scores from the raw data, the ordinal range of each personality type can then be established for each individual (Very Low, Low, Average, High, and Very High). The personality data were obtained in Microsoft Excel from the mrInterview program, coded within MS Excel, and then imported into SPSS for analysis with the other study variables.

A summary of the personality variable is shown in Table 5.

Table 5

Coding Individual Personality Types

Personality Type	NEO-FFI factor T score range	
	Male	Female
Neuroticism		
1 = Very Low	0 – 10	0 – 14
2 = Low	11 – 18	15 – 21
3 = Medium	19 – 26	22 – 30
4 = High	27 – 34	31 – 37
3 = Very High	35 – 42	38 – 45
Extraversion		
1 = Very Low	0 – 19	0 – 22
2 = Low	20 – 25	23 – 28
3 = Average	26 – 32	29 – 34
4 = High	33 – 38	35 – 40
5 = Very High	39 – 45	41 – 46
Openness to Experience		
1 = Very Low	0 – 18	0 – 19
2 = Low	19 – 24	20 – 24
3 = Average	25 – 30	25 – 31
4 = High	31 – 37	32 – 36
5 = Very High	38 – 44	37 – 42
Agreeableness		
1 = Very Low	0 – 20	0 – 22
2 = Low	21 – 25	23 – 28
3 = Average	26 – 31	29 – 33
4 = High	32 – 36	34 – 39
5 = Very High	37 – 42	40 – 45
Conscientiousness		
1 = Very Low	0 – 19	0 – 20
2 = Low	20 – 26	21 – 27
3 = Average	27 – 34	28 – 34
4 = High	35 – 41	35 – 41
5 = Very High	42 – 48	42 – 48

Note. From "*NEO PI-R Professional Manual*," by Costa, P. T. & McCrae, R. R. 1992. Copyright (1992) by PAR. Reprinted with permission.

Table 6 summarizes each individual variable in the study, as well as its method of measurement, instrumentation, and data type for further clarification. Additionally, a complete copy of the electronic survey instrument is shown in Appendix B.

Table 6

Summary of all Variables and Instrumentation

Variable	Measurement	Instrumentation	Type of data
Competency in Healthcare Administration	Successful completion of the comprehensive exit exam	Exit exam	Nominal
Competency in Healthcare Administration	Number of correct responses in each section (course) of the comprehensive exit exam	Exit exam	Ratio
Personality	NEO-FFI personality Inventory	mrInterview survey	Ordinal/Ratio
Gender	Participant self-reported	University records	Nominal
Age	Participant self-reported	University records	Ordinal
Ethnicity	Participant self-reported	University records	Nominal
Healthcare experience	Participant self-reported	mrInterview survey	Nominal
Mentor presence	Participant self-reported	mrInterview survey	Nominal

Data Screening

Once all data was acquired data screening becomes the first step in data analysis process. Data screening proceeded by (a) assessing the accuracy of the data collected, (b) identifying and resolving any missing data values, (c) analyzing the effects of any extreme outliers, and (d) assessing adequacy of fit among the data and the assumptions of the specific procedure (Mertler & Vannatta, 2005). To identify outliers, a preliminary regression can be run and if necessary, statistical tests such as Mahalanobis distance calculated to determine what data values to eliminate from the analysis, as well as evaluate the multicollinearity among the several predictor variables. Screening and data preparation were important in this study in order to ensure overall accuracy of the

descriptive analyses concerning statistically significant relationships among variables. Because all three study samples (three semesters) possessed the same number of items for each variable, it was assumed that basic data screening methods ensured integrity of the data prior to regression analysis. No missing data or outliers were identified and all subjects completed each survey in its entirety.

Data Analysis

Data analysis began with data screening, then calculation and review of descriptive statistics, psychometric analysis of item-level responses for each comprehensive exam version, bivariate regression, and ended with a logistic regression model to predict successful completion of the healthcare administration comprehensive exit examination, based on the predictor values and demographic characteristics obtained from the survey. Statistical Program for the Social Sciences (SPSS) was used to analyze the data.

In order to answer research question #3, bivariate correlation and regression was used to identify statistically significant relationships among personality type and healthcare administration competency variables. The parameter estimates (i.e., regression coefficients) provide information related to the amount of variance explained by the predictor/independent variable specific to the criterion/dependent variable, holding all other independent variables constant. Variables identified with a high regression coefficient explain the existence (or non-existence) of a predictive relationship, based on both the quantitative survey data, as well as the previously mentioned connections identified in the literature, therefore establishing potential causal relationships among the variables.

Additionally, binary direct logistic regression was utilized to produce a prediction equation that accurately predicted the probability of an individual to either pass or fail the comprehensive exit examination. The resulting value predicted in a logistic equation is a probability (odds ratio), measured on the scale from 0 to 1 (Mertler & Vannatta, 2005).

The results of the logistic regression analysis were subjected to three methods of interpretation. First, goodness-of-fit tests were analyzed, consisting of chi-square tests to determine if the variables included in the study are in fact significant and important predictors of the dependent variable (Mertler & Vannatta, 2005). Overall model fit indices were also analyzed, specifically the -2 Log Likelihood measure, Goodness-of-Fit measure, the Cox & Snell – R^2, and Nagelkerke – R^2 (Mertler & Vannatta, 2005). The -2 Log Likelihood measure provides an index of model fit, with a perfect model resulting in a -2 Log Likelihood value of 0 (Tabachnick & Fidell, 2007). The Goodness-of-Fit statistic is used to compare the predicted values of the sample subjects to their actual values from the overall model (Tabachnick & Fidell, 2007). Both the Cox & Snell – R^2 and Nagelkerke – R^2 tests provide different estimates for the assessed variance in the dependent variable in the model itself (Mertler & Vannatta, 2005).

Second, the classification table (also known as sensitivity and specificity analysis) output was interpreted to understand the relationship between the ability of the logistic regression model's predictive values and actual subject classification values (Mertler & Vannatta, 2005). This table presents the % correct of the observed versus predicted data, therefore providing an overall % describing the accuracy of the model in its classification of study subjects into each binary outcome (passing versus not passing the comprehensive exit examination).

Third, the output of the tolerance statistics was assessed from the summary of model variables, providing the following statistics (Mertler & Vannatta, 2005):

- B – the unstandardized regression coefficient, showing the effect of each independent variable upon the dependent variable.
- S.E. – standard error of B.
- Wald – measures significance of B, therefore showing the significance and contribution of each variable and contribution towards the entire model.
- Exp(B) – calculated odds ratio for every variable, allowing an assessment of what change in binary class outcome will result with a predictor variable increase or decrease of 1.

Summary

Descriptive statistics, item-level psychometric analyses, bivariate correlation and regression, as well as forward logistic regression were used to analyze and identify the statistically significant relationships that healthcare administration competency, personality type, and descriptive demographic characteristic variables possess in healthcare administration early careerists. Specifically, this study was intended to analyze the significant variables that enhance the predictability of success in healthcare administration, with regard to individually identified competencies. This analysis also evaluated the historical data relationships within the healthcare administration program's student population and comprehensive exit exams to identify trends and other relationships in order to provide helpful information to the program itself, as well as serve as a strong foundation for future study for the prediction of success of healthcare administrators.

CHAPTER IV

RESULTS

Chapter four provides the results of this study based on each research question and their related hypotheses. The chapter is organized according to (a) pre-analysis and data screening, (b) descriptive statistics of the survey samples for each semester, (c) item analyses and psychometric properties of the three independent comprehensive exit exams, (d) identification of relationships between personality and healthcare administration competency variables, and (e) logistic regression results to establish an initial framework for the prediction of passing the healthcare administration competency examination.

Survey Responses

The study followed a sampling methodology that solicited responses from healthcare administration students in an AUPHA accredited central Texas university who met specific study criteria. Students taking the program's comprehensive exit exam during the Fall 2009, Spring 2010, and Fall 2010 semesters were chosen as the sample for this study. Prior to these three semesters, the program's comprehensive exit exams varied in terms of competencies tested, number of items per competency present on each exam, and standardization procedures used to give the exam, resulting in difficulty in analyzing each individual competency associated with healthcare administration. Therefore, the three most recent semester's examinations were used because the methods

used to develop the items and the number of items per competency remained constant (12 items were written items per course).

The survey, which included a consent to access individual academic and demographic data, was distributed to 79 students with an overall response rate of 69.6% (n=55). The impact of this small sample and response rate is discussed in Chapter 5. Emails to potential study subjects were distributed on December 2, 2010, December 14, 2010, December 14, 2010, and January 11, 2011, identifying the researcher, purpose of the study, request for the subject to take the survey, with a secure survey link embedded within the email directing them to the survey. A copy of the email is provided in Appendix C. After the first three separate email attempts to obtain survey responses, a formal letter was mailed on December 19, 2010 to the remaining potential respondents' home of record on file with the university to request their participation in the study in the case of an inaccurate email address. This additional solicitation yielded eight additional survey respondents, as the students received the survey request letter while home for Christmas break. A copy of this formal survey request letter is shown in Appendix D. Finally, the researcher also employed the use of social media (Facebook, MySpace, as well as LinkedIn) to establish communication with potential respondents who had yet to take the survey, which resulted in three additional survey respondents.

Pre-Analysis Data Screening

Prior to performing any statistical analyses the survey data were reviewed thoroughly to examine data accuracy and identify any missing or incomplete data. Data collection was administered through the university's mrInterview survey management

server, downloaded into a Microsoft Excel worksheet for review and pre-analysis manipulation, and then imported into SPSS for statistical analysis.

Data manipulation. Several tasks were completed in MS Excel to ensure data accuracy. University records were accessed to obtain respondents' healthcare administration competency exam raw data, date of birth, gender, and ethnicity. Once the University record data were merged to each respondent's mrInterview survey data, their name was replaced with "Subject 1, Subject 2," and so on for the duration of the study. Additional, minor tasks were also completed within MS Excel to manipulate the presentation of raw data from the initial mrInterview data download, while still maintaining data integrity.

Next, several data items required coding prior to importing into SPSS for statistical analysis. These items included coding each subjects' date of birth, gender, and ethnicity to the appropriate integer code (see Appendix B). Several of the NEO-FFI items were reversed-scored, based on the proprietary instrument's scoring methodology. These items were recoded in MS Excel by utilizing "if, then" formulas. Once this was completed, items were summed across the five factors and these summed factor T scores were used to identify individual personality types on the ordinal scale.

Missing data. A frequency analysis of the raw data revealed no missing values. Furthermore, the sampling technique fielded responses from only those students that met the necessary requirements of the study and fell into the three semesters utilized for the study. Therefore, all respondents had already taken the comprehensive exit exam and their demographic information was on file with University and departmental records.

This ensured all required data was available from potential respondents upon their completion of the online survey.

Healthcare Administration Competency Exam Descriptive Statistics

The following section addresses the first research question and hypothesis of the study:

- Research Question 1: What are the descriptive characteristics of the three healthcare administration competency exit exams, and are there significant differences (i.e. practical and statistical) in competency (course-level questions within each exam) between the three exit exam versions utilized in this study?
- Directional hypothesis: There will be no significant differences in competency among the three comprehensive exit exams with regard to total exam score and competency sub-scale score.

Analyses were conducted for each semester for this research question and hypothesis. Study limitations prevent any inferential group difference analyses to be conducted until additional subjects are added to the study. Further discussion regarding the sample size limitation of this study occurs in Chapter 5.

In order to evaluate competency as early careerists in healthcare administration, the results of each respondents' exit exam were evaluated on several descriptive levels. To begin, the overall descriptive statistics for each comprehensive exit exam are shown in Table 7.

Table 7

Healthcare Administration Exit Exam Descriptive Statistics by Semester

Semester	Mean	Standard Deviation	Min	Max	Median
Fall 2009 n=22	75.3	6.51	64.5	91	74.3
Spring 2010 n=14	69.1	7.30	58.0	81	69.3
Fall 2010 n=19	76.2	4.24	68.5	83.5	76

Notes: total n=55.

Central tendency was evaluated by comparing the total mean score for each semester. Two semesters' total exam means were very close in average score (the Fall 2009 and Fall 2010 semesters) while the Spring 2010 semester's total mean fell below the "C" letter grade level (i.e., a score of 70). While variability was quite similar among exams, with the Fall 2010 semester exam possessing the lowest variance (4.24) and the Spring 2010 semester exam having the largest variance (7.30), further descriptive analysis demonstrates overall variability among exam forms. For example, while the range of total scores within each semester showed low variance, the Spring 2010 semester's minimum score fell within the "F" letter grade range and the other two semesters' minimum scores fell within the "D" letter grade range. Similar variability exists with regard to maximum and median scores for each semester.

Initial observation of the overall results by semester may suggest that either the Spring 2010 students were not as competent in the healthcare administration criterion-referenced material, or the exam that semester was more difficult. But, this conclusion

cannot immediately be made based upon the overall descriptive statistics for each semester in Table 7 above, especially because each semester's comprehensive exit exam consisted of different test items and therefore were mutually exclusive. Further item-level analysis was required to thoroughly investigate potential differences in student competency levels on each of the three exit exams.

To better understand the score distribution at the semester level, the frequency distribution of individual course mean levels on the healthcare administration exit exam by semester is shown in Table 8. These data are organized by letter grade, showing the frequency distribution and % by semester.

Table 8

Frequency Distribution of Comprehensive Exit Exam Scores by Letter Grade, by Semester

Semester	Frequency	%
Fall, 2009 (n=22)		
A	1	4.6
B	3	13.6
C	14	63.6
D	4	18.2
F	0	0
Spring, 2010 (n=14)		
A	0	0
B	1	7.1
C	6	42.9
D	4	28.6
F	3	21.4
Fall, 2010 (n=19)		
A	0	0
B	4	21.0
C	12	63.2
D	3	15.8
F	0	0

Each semester contained a different number of students with 22 students in the Fall 2009 semester, 14 students in the Spring 2010 semester, and 19 students in the Fall 2010 semester. The letter grade that occurred most frequently was a "C," for all three semesters. It can also be determined that only one "A" was achieved on the exam for this sample (Fall, 2009 semester), while three to four "D's" were consistently present across all three semesters. The Spring 2010 semester also contained three "F" scores, while the other two semesters possessed none. This explains why the Spring 2010 overall average for the exam was the lowest (69.1%). With the Fall 2009 and Fall 2010 semester grade frequency distributions looking quite similar and the Spring 2010 semester containing many grades in the lower letter grade categories, one cannot determine competency levels across the semester level based on overall exam score descriptive data alone.

Additional descriptive statistics were calculated for each section of the exam (sub-levels), which consisted of 16 courses with 12 items per course, by semester. Therefore, the range of a course's section of the exam was zero (no items scored correctly) to 12 (all items scored correctly). These data are shown in Tables 9, 10, and 11, therefore allowing for the analysis of differences in descriptive values among the individual sections of each exam, as well as among semesters.

Table 9

Healthcare Administration Competency-Level Descriptive Statistics, Fall Semester, 2009

Course Name n=22	Mean	Standard Deviation	Min	Max	Median
Healthcare Organization and Delivery	7.27	1.45	5	10	7
Ethics in the Health Professions	7.59	1.99	3	11	7.5
Healthcare Administration History, Culture, and Language	10.27	1.27	8	12	10
Supervisory Management for Healthcare Leaders	9.27	1.51	6	12	9
Human Resources in Healthcare Management	9.18	2.17	4	12	9.5
Management of Health Information Systems	8.27	1.98	4	12	8
Training and Professional Development in Healthcare	9.31	1.17	7	11	9
Employment Law in Healthcare Management	8.22	1.34	6	11	8
Principles of Accounting in Healthcare Management	10.22	1.44	7	12	10.5
Financial Management for Healthcare Managers	9.09	1.99	5	12	9
Patient Care Management and Quality Improvement in Healthcare	8.09	1.82	5	12	8
Healthcare Services Marketing	8.50	1.37	6	11	8
Essentials of Healthcare Law	9.86	1.03	8	11	10
Health Services Problem Solving and Decision Making	8.95	1.21	7	11	9
Seminar in Health Administration	10.86	0.88	9	12	11
Strategic Management	9.13	1.55	7	11	9.5

Table 10

Healthcare Administration Competency-Level Descriptive Statistics, Spring Semester, 2010

Course Name n=14	Mean	Standard Deviation	Min	Max	Median
Healthcare Organization and Delivery	8.21	1.57	6	11	8
Ethics in the Health Professions	8.42	1.82	5	11	9
Healthcare Administration History, Culture, and Language	7.85	1.23	5	9	8
Supervisory Management for Healthcare Leaders	8.14	2.03	4	11	8.5
Human Resources in Healthcare Management	8.78	1.62	7	12	9
Management of Health Information Systems	8.42	1.65	5	10	9
Training and Professional Development in Healthcare	8.00	1.41	5	10	8
Employment Law in Healthcare Management	8.35	1.21	6	10	8
Principles of Accounting in Healthcare Management	6.57	2.50	2	10	7
Financial Management for Healthcare Managers	9.14	2.41	3	12	10
Patient Care Management and Quality Improvement in Healthcare	8.14	0.94	7	10	8
Healthcare Services Marketing	8.28	1.43	5	10	9
Essentials of Healthcare Law	8.71	1.63	5	11	9
Health Services Problem Solving and Decision Making	8.64	1.73	6	12	8.5
Seminar in Health Administration	8.00	2.11	4	11	8
Strategic Management	8.78	1.52	6	11	9

Table 11

Healthcare Administration Competency-Level Descriptive Statistics, Fall Semester, 2010

Course Name n=19	Mean	Standard Deviation	Min	Max	Median
Healthcare Organization and Delivery	9.21	1.22	7	11	9
Ethics in the Health Professions	9.78	1.31	7	12	10
Healthcare Administration History, Culture, and Language	10.31	1.20	8	12	11
Supervisory Management for Healthcare Leaders	9.63	1.70	7	12	10
Human Resources in Healthcare Management	9.68	1.70	6	12	10
Management of Health Information Systems	7.84	2.50	4	12	8
Training and Professional Development in Healthcare	7.00	1.37	4	9	7
Employment Law in Healthcare Management	6.84	1.46	4	9	7
Principles of Accounting in Healthcare Management	8.26	1.28	5	10	9
Financial Management for Healthcare Managers	9.73	2.10	5	12	11
Patient Care Management and Quality Improvement in Healthcare	9.63	1.70	6	12	10
Healthcare Services Marketing	9.68	1.10	7	12	10
Essentials of Healthcare Law	9.57	1.34	7	12	9
Health Services Problem Solving and Decision Making	9.31	1.60	6	12	10
Seminar in Health Administration	10.84	0.95	8	12	11
Strategic Management	8.73	1.40	6	11	9

Analysis of the descriptive data for each semester at the course level allow for further in-depth understanding of each semesters' total mean score. Table 12 summarizes the frequency distribution of each semester's course-level (competency) mean by summed score intervals.

Table 12

Frequency Distribution for Comprehensive Exit Exam Course-Level Means, by Semester

Semester	Mean Range	Frequency (total of 16 courses)	%
Fall 2009			
n=22	6.0-6.9	0	0
	7.0-7.9	2	12.5
	8.0-8.9	5	31.2
	9.0-9.9	6	37.5
	10.0-10.9	3	18.7
Spring 2010			
n=14	6.0-6.9	1	6.2
	7.0-7.9	1	6.2
	8.0-8.9	13	81.2
	9.0-9.9	1	6.2
	10.0-10.9	0	0
Fall 2010			
n=19	6.0-6.9	1	6.2
	7.0-7.9	2	12.5
	8.0-8.9	2	12.5
	9.0-9.9	9	56.2
	10.0-10.9	2	12.5

This table allowed for immediate identification of the mean distribution scores, originating at the course level. For instance, there were two occurrences of individual course means falling within the 6.0-6.9 mean range in the Spring 2010 and Fall 2010 semesters, these occurrences represent the separate courses on the comprehensive exit

exam (Principles of Accounting in Healthcare Management for the Spring 2010 semester and Employment Law in Healthcare Management for the Fall 2010 semester). The maximum means in the frequency distribution (see Table 12) occur within the 10.0-10.9 interval for the Fall 2009 and Fall 2010 semesters, and again these occurrences represent two different courses (Principles of Accounting in Healthcare Management and Seminar in Health Administration). This non-equivalency of means by course among semester exams is consistent.

Based on the descriptive statistics for each semester's exit exam, it can be determined that there are within-exam differences at the course level. More importantly, while each exam pulls questions from 16 distinct competencies in healthcare administration (16 courses), completely different items were present on each semesters' corresponding exam. This information, as well as the possibility of further understanding the level of competency among each subject at the individual level, posits further competency investigation and detailed analysis at the item level.

Healthcare Administration Competency Exam Psychometric Properties

The following section addresses the second research question of the study:

- Research Question 2: What are the psychometric properties of the three healthcare administration exit exams?

Difficulty index (*p*). As a criterion-referenced assessment, each comprehensive exit exam consisted of different items by course and by semester, while the course syllabi objectives and AUPHA accreditation criteria dictated which healthcare administration competencies to be addressed in each course and therefore tested on the exit exam.

Because of this, each of the 16 sections of the exam consisted of 12 items directly related to the objectives of each healthcare administration course, as listed in the course syllabi.

Item level analysis allow for further investigation into these competencies, as well as item level performance in addressing each course's evaluation of healthcare administration competency. As described in Chapter 3, item difficulty (*p*) allowed for an item-level interpretation on the difficulty of each individual question and was calculated by the formula:

p = (# of subjects scoring the item correctly) / (# of subjects taking the exam)

Therefore, if all subjects score a single item correctly, *p* = 1.0, and if none of the students score an item correctly, *p* = 0. Additionally, an item that discriminates perfectly will possess a *p* value of 0.50 (Cohen & Swerdlik, 1999). By effective discrimination, the item will successfully separate the more competent students from the less competent students. However, as a criterion-referenced comprehensive exit exam, the overall goal was not to perfectly discriminate the student population, or maximize the variance of scores (Crocker & Algina, 1986). Instead, the difficulty index could be a useful tool to analyze item-level responses for other purposeful reasons, such as addressing potential instructional effectiveness on a specific concept, as well as adequacy of item specification (Crocker & Algina, 1986).

Appendix E lists all difficulty indices (*p* values) to the item level for each healthcare administration course offered in the program (12 questions per course, 16 courses). In order to further interpret these *p* values, a summary table was drawn from Appendix E. Table 13 displays the frequency of items within each exam section (by course) that are lower than a 0.50 *p* value. This identification of low *p* values will allow

for further test development analysis with regard to effectiveness of instruction, or possible item specification issues (Crocker & Algina, 1986).

Table 13

Frequency of Difficulty Indices < 0.50 by Comprehensive Exam Course, by Semester

Course Name	Difficulty Indices (p) < 0.50		
	Fall 2009 n=22	Spring 2010 n=14	Fall 2010 n=19
Healthcare Organization and Delivery	3	4	2
Ethics in the Health Professions	1	2	0
Healthcare Administration History, Culture, and Language	0	1	0
Supervisory Management for Healthcare Leaders	0	1	1
Human Resources in Healthcare Management	0	3	1
Management of Health Information Systems	2	1	3
Training and Professional Development in Healthcare	2	2	4
Employment Law in Healthcare Management	1	2	3
Principles of Accounting in Healthcare Management	0	4	4
Financial Management for Healthcare Managers	1	1	1
Patient Care Management and Quality Improvement in Healthcare	1	2	3
Healthcare Services Marketing	1	3	2
Essentials of Healthcare Law	1	1	1
Health Services Problem Solving and Decision Making	2	1	2
Seminar in Health Administration	1	2	0
Strategic Management	2	1	2

Review of Table 13 results in several sections of the comprehensive exam (courses) possessing difficulty indices below the 0.50 value. Because of reasons previously discussed above and in Crocker and Algina (1986), review of those exam sections (courses) containing items with *p* values falling below 0.50 at frequencies of three to four (for each individual section of the comprehensive exam) are to be reviewed and restructured, or the item is to be replaced altogether. Overall, the Spring 2010 semester has the highest frequency of 31 exam items with $p < 0.5$, followed by the Fall 2010 semester (29 items), and the Fall 2009 semester possessing the fewest (18 items). With the Spring 2010 and Fall 2010 exams having such high frequencies of low *p* value items, further analysis and possible item stem or foil restructuring are recommended for these two semester exit exams and their individual courses. Because every section of each semester's comprehensive exit exam possesses different *p* values at the item level (as shown in Appendix E) and there are varying frequencies of *p* values falling below 0.50 in Table 13 above, this demonstrates further variability among each comprehensive exit exam, suggesting non-equivalent items across the exam sections, therefore non-parallel examinations.

Discrimination index (*d*). Psychometric analysis continued at the item level, as discussed in Chapter 3, with calculation of the discrimination index (*d*) value, shown in Appendix E by semester, by course, and listed to the right of the *p* values. The discrimination index was calculated by the following formula:

$$d = p_u - p_l,$$

- where p_u = proportion of the upper 25% who answered the item correctly;
- p_l = proportion of the lower 25% who answered the item incorrectly

This analysis demonstrates the degree of relationship between the dichotomous variable (nominal scale) of scoring the item correctly for both the higher performing students on a section of each comprehensive exit exam (top 25% of students for the specific course's 12 questions) and the lower performing students for that same section (lower 25% of students for the course's 12 questions). Therefore, this proportion shows the degree to which each individual item separates the better performing students from the lower performing students, by each section of each comprehensive exit exam. As a result, the higher the *d* index value, the greater number of higher exam scorers answered the item correctly.

Cohen and Swerdlik (1999) define an effectively discriminating item as one that most of the high scorers answer correctly and the low scorers answer incorrectly. In theory, this allows for effective discrimination at the item level among more competent students and less competent students. Additionally, a negative *d* index value identifies an extremely poor exam item, resulting in the lower scoring group answering the item correctly and the better performing students answering the item incorrectly. This instance, termed a "nightmare" by Cohen and Swerdlik (1999) could be a result of several issues, including the possibility of a confusing or poorly worded item stem and/or item distracters.

As a criterion-referenced comprehensive exam in healthcare administration, it is expected that the students have already mastered the content on the exam and are able to successfully demonstrate their knowledge of each course (overall competency) by performing well on all sections on the exam, for both upper and lower performing groups. This verification of overall knowledge in each criterion-referenced section of the exam

(course level) is necessary to ensure the students are prepared to exit the academia setting and enter their practical fieldwork experiences with a strong level of competency in healthcare administration. For this reason, low discrimination indices are expected to occur, with the lower scoring group answering several items correctly, as did the upper scoring group. A negative *d* value does not discriminate among the high and low scorers and therefore these items should be reworded or removed from the exams. In order to assess item level performance with regard to discriminatory properties on all three comprehensive exit exams, Table 14 shows all courses, by semester, and the frequency of negative *d* values within that section of the exam.

Table 14

Frequency of Negative Discrimination Indices by Comprehensive Exit Exam Course, by Semester

Course Name	Frequency of Negative Discrimination Indices (*d*)			
	Fall 2009	Spring 2010	Fall 2010	Total
Healthcare Organization and Delivery	0	3	0	3
Ethics in the Health Professions	0	1	0	1
Healthcare Administration History, Culture, and Language	0	0	0	0
Supervisory Management for Healthcare Leaders	0	1	0	1
Human Resources in Healthcare Management	0	0	0	0
Management of Health Information Systems	0	0	1	1
Training and Professional Development in Healthcare	0	0	1	1
Employment Law in Healthcare Management	0	1	0	1
Principles of Accounting in Healthcare Management	0	0	0	0
Financial Management for Healthcare Managers	0	0	0	0
Patient Care Management and Quality Improvement in Healthcare	0	2	0	2
Healthcare Services Marketing	0	0	1	1
Essentials of Healthcare Law	0	0	0	0
Health Services Problem Solving and Decision Making	1	1	0	2
Seminar in Health Administration	0	1	0	1
Strategic Management	0	2	1	3

The results in Table 14 show a total of 17 items across all three semester's comprehensive exit exams with negative discrimination values, therefore requiring immediate item revision. The Fall 2009 exam had the most favorable results, showing only one item with a negative discrimination index. The Fall 2010 semester, with four total negative discrimination items had the second largest frequency of items with negative discrimination indices. The Spring 2010 semester required comprehensive item analysis to address the 12 items with negative discrimination indices. As part of the test development process, the revision or omission of these items is essential in order to effectively evaluate competency of early careerist healthcare administrators, therefore approaching a more reliable and valid method of competency evaluation.

Two courses with the highest frequency of items with negative *d* values, Healthcare Organization and Delivery and Strategic Management, should be reviewed and the method of item generation for these two courses be further investigated. These discrimination index results effectively document the variability among exam versions, as reported by the students' overall responses to individual items and their inclusion into either the upper or lower 25% groups, per each section of the exam. Furthermore, because of the variance in the discrimination indices themselves, as presented in Appendix E, and the differing frequencies of negative discrimination indices across each semesters' exam, the null hypothesis is supported and variation among exams exists.

Point-biserial correlation coefficient (r_{pbi}). As an additional method to evaluate discrimination within each exam at the item level, point-biserial correlation coefficients (r_{pbi}) were calculated using the formula below:

$$r_{pbi} = M_p - M_q / S_t (\sqrt{pq})$$

- Where M_p = the whole-section mean (12 questions) for students answering the item correctly, M_q = the whole-section mean (same 12 questions) for students answering the item incorrectly;
- S_t = standard deviation for the same 12 question section;
- p = proportion of students answering correctly;
- q = proportion of students answering incorrectly.

The point-biserial correlation allows for further understanding of individual items and how they separate the better performing students on each section of the exam with the lower performing students in that same section of the exam. These item-total correlations are an estimate of item level discrimination, or how each individual item discriminates among test takers or students, as associated with the total score (i.e., sum score) for each 12 question section of the exam. Therefore, the higher the r_{pbi} correlation, the better the item is at discriminating the subjects.

A comprehensive list of all r_{pbi} results for each individual item, by semester are listed in Appendix F, with all significant correlation levels (0.01 or 0.05) identified. Crocker and Algina (1986, p. 325) demonstrate items exhibiting acceptable point-biserial correlation indices with values within a specific range. Additionally, Shrock and Coscarelli (2007) and Schmeiser and Welch (2006) further support effectively discriminating point-biserial correlation indices at the +0.30 to +0.75 range. Additionally, a coefficient that is > 0.30 is acceptable for items because, while general, it is technically correct. To assist with analysis of Appendix F, a summary is provided in Table 15, identifying the % of each section's items not meeting the 0.3 to 0.6 r_{pbi} range, established by a combination of the references above.

Table 15

Summary Table of Point-Biserial (r_{pbi}) Correlation Coefficients Not Meeting the 0.3-0.6 Range

Course Name	% of Items Not Meeting the 0.3 - 0.6 r_{pbi} Range		
	Fall 2009 n=22	Spring 2010 n=14	Fall 2010 n=19
Healthcare Organization and Delivery	66%	66%	66%
Ethics in the Health Professions	41%	75%	50%
Healthcare Administration History, Culture, and Language	50%	75%	75%
Supervisory Management for Healthcare Leaders	75%	50%	75%
Human Resources in Healthcare Management	33%	66%	66%
Management of Health Information Systems	41%	41%	66%
Training and Professional Development in Healthcare	66%	50%	50%
Employment Law in Healthcare Management	58%	75%	50%
Principles of Accounting in Healthcare Management	58%	16%	66%
Financial Management for Healthcare Managers	58%	58%	50%
Patient Care Management and Quality Improvement in Healthcare	33%	66%	50%
Healthcare Services Marketing	75%	66%	66%
Essentials of Healthcare Law	58%	50%	41%
Health Services Problem Solving and Decision Making	66%	75%	50%
Seminar in Health Administration	75%	41%	100%
Strategic Management	50%	75%	50%

The % of r_{pbi} correlations not achieving a value within the 0.3 to 0.6 range describe courses, or sections of each semesters' exit exam, that require further item review as they are not effectively explaining a significant portion of the construct, within each respective section of the exam. Results in Table 15 show every course having at least one semester exam possessing at least 50% of r_{pbi} correlations not meeting the established 0.30 to 0.60 criteria. Percentages range from 33% to 75% across the total exam items, suggesting further test development with regard to point-biserial correlation results. These poorly discriminating items should be addressed before further test constructs are analyzed to ensure an accurate factor analysis which is to be conducted later in the test development process, beyond the scope of this study. However, as discussed in Chapter 3, this statistical analysis tool does not replace the theoretical and practical reasons for item construction and overall test design as it relates to competencies required by the field of healthcare administration, and should be interpreted carefully. For this reason, the point-biserial correlation serves as a tool to identify poorly discriminating items with regard to the total score for each exam section, while also further identifying the variance of items across semesters, demonstrating the non-equivalency at the course level, as well as at the item level, among each comprehensive exit exam.

Personality Types

The following section addresses the data on personality type and its influence upon successful performance on the comprehensive exit exam. The third research question and related hypotheses of the study are as follows:

- Research Question 3: Are there any significant relationships that exist among personality type and competency in healthcare administration early careerists? If so, to what degree does personality type influence competencies in healthcare administration early careerists?
- Null hypothesis: there are no statistically significant relationships between personality type and competency in healthcare administration.

  Alternate hypotheses: based upon research from the management field, as well as the researcher's substantive knowledge in the field of healthcare administration, the following associations between competency and personality type are hypothesized to be statistically significant:

  a. H_1: the competency of managerial skill (AUPHA, 2010b) will be positively correlated with the extraversion personality type (Judge & Bono, 2000).
  b. H_2: the competency of managerial skill (AUPHA, 2010b) will be positively correlated with the conscientiousness personality type (Judge & Bono, 2000).
  c. H_3: the competency of managerial skill (AUPHA, 2010b) will be negatively correlated with the neuroticism personality type (Scroggins, Thomas, & Morris, 2009).
  d. H_4: the competency of ethics (AUPHA, 2010b) will be positively correlated with the extraversion personality type (Rolfhus & Ackerman, 1999).

e. H_5: the competency of ethics (AUPHA, 2010b) will be positively correlated with the openness to experience personality type (researcher's substantive knowledge and expert review).

f. H_6: the competency of computational skills (AUPHA, 2010b) will be positively correlated with the conscientiousness personality type (researcher's substantive knowledge and expert review).

The concept of identifying the potential relationship(s) among personality types and competencies in healthcare administration remains exploratory in nature and this study's analysis focuses on a preliminary analysis for the current sample in order to establish baseline relationship identification and provide suggestions future research. Implications of sample size limitations are discussed further in Chapter 5.

Based on the subjects' responses from the NEO-FFI personality inventory survey, the overall factor T score was calculated and then classified into one of the five categories as suggested by the authors of the NEO-FFI (very low, low, average, high, and very high). Each personality dimension (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) received a score, even if that individual possessed no personality traits for a respective dimension. The frequency distributions and percentages from the online mrInterview survey are presented in Table 16, separated by male and female respondents, and then combined.

Table 16

NEO-FFI Personality Instrument Results

NEO-FFI T Score Category	Male n=14 Frequency	%	Female n=41 Frequency	%	Total n=55 Frequency	%
Neuroticism						
Very High	0	0	1	2.4	1	1.8
High	0	0	0	0	0	0
Average	3	21.4	10	24.3	13	23.6
Low	7	50.0	11	26.8	18	32.7
Very Low	4	28.5	19	46.3	23	41.8
Extraversion						
Very High	2	14.2	3	7.3	5	9.1
High	3	21.4	15	36.5	18	32.7
Average	7	50.0	16	39.0	23	41.8
Low	2	14.2	6	14.6	8	14.5
Very Low	0	0	1	2.4	1	1.8
Openness						
Very High	3	21.4	3	7.3	6	10.9
High	3	21.4	10	24.3	13	23.6
Average	5	35.7	17	41.4	21	38.1
Low	1	7.1	6	14.6	7	12.7
Very Low	2	14.2	5	12.1	7	12.7
Agreeableness						
Very High	4	28.5	8	19.5	12	21.8
High	4	28.5	15	36.5	19	34.5
Average	4	28.5	14	34.1	18	32.7
Low	2	14.2	4	9.7	6	10.0
Very Low	0	0	0	0	0	0
Conscientiousness						
Very High	2	14.2	12	29.2	14	25.4
High	5	35.7	20	48.7	25	45.4
Average	4	28.5	9	21.9	13	23.6
Low	3	21.4	0	0	3	5.4
Very Low	0	0	0	0	0	0

Review of Table 16 shows that males and females scored very low or low in the overall Neuroticism category, with just one female scoring in the very high category. The majority of males and females fell within the average category for the Extraversion, Openness to Experience, and Agreeableness personality types. Furthermore, most of the

males and females fell within the high category for the Conscientiousness personality type. While limited in sample size, these personality similarities between male and female subjects may suggest a common personality type characteristic, or underlying behavioral trait, that is common among healthcare administration students. For this study, while limited in overall statistical significance, the results may possibly suggest that the healthcare administration program attracts students that possess average to very high levels of Conscientiousness and Agreeableness, average to high levels of Extraversion and Openness, and low levels of Neuroticism. With only 14 males participating in the study and an overall sample size of 55, inferential statements cannot be made without further research.

Pearson Correlation Coefficient (*r*). Appendix G provides the Pearson correlation coefficient (*r*) for each semester, by healthcare administration course (exam section). The correlation analysis proceeded by analyzing the relationship among each student's composite score in each section of the healthcare administration exam (individual score from every 12 questions per course) with their individual personality inventory results. The NEO-FFI results, as presented in Table 16, were treated as categorical variables, with each student receiving a Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C) score of one to five (ranging from very low presence N, E, O, A, and C characteristics to very high presence of N, E, O, A, and C characteristics). Therefore, each student received a one through five rating for each personality type (very low through very high), assessing the strength of that personality characteristic based on their responses to the NEO-FFI personality inventory survey.

Review of Appendix G reveals several medium correlations greater than 0.35. Cohen, (1988) defined a medium correlation coefficient also as a medium effect size for behavioral research within a range of $r = 0.24$ to 0.36. As a result, all correlations in Appendix G at or above the 0.35 value are identified in bold, and level of significance at the 0.05, 0.01, and 0.001 levels are identified. A handful of significant findings were identified at the 0.05 significance level. With the study's limitations further discussed in Chapter 5, these correlation results are presented as an initial investigation into the relationship of personality type and healthcare administration competency, and caution should be taken not to infer the results without further research and an increased sample size. While all courses in healthcare administration for this study show at least one correlation coefficient that is greater than the 0.35 value, the statistical significance of these relationships is not supported. Therefore, the exploratory nature of this study serves to identify initial relationships that may pose grounds for future research and analysis.

Strong correlation results that are similar by course, across all three semesters demonstrate the highest possibility of a potential relationship existing among that course's objectives and related competencies and correlating personality type. This situation occurred only once in the study, as shown in Appendix G. The Healthcare Services Marketing course results possessed correlations for each of the three semesters that all fell below a -0.35 *r* value for the Agreeableness personality type (a negative relationship). Therefore, those subjects scoring the lowest in the Healthcare Services Marketing course possessed a high degree of the Agreeableness personality characteristic, and those that scored high in the same course had a low degree of the

Agreeableness personality characteristic. Furthermore, the Fall 2009 semester revealed a negative relationship between the marketing course and Extraversion (-0.369) and the Fall 2010 semester had a negative relationship between the marketing course and the Conscientiousness (-0.518, $p<0.05$) characteristic, suggesting further investigation into this competency and the identified negative relationships with common personality types.

The Seminar in Health Administration course discusses trends and problems in health administration and management, and how these issues affect the personnel of health systems (Texas State University-San Marcos, 2011). This course's correlation results with personality type resulted in two statistically significant results, yet both were exactly inversed. The Fall 2009 semester had a -0.511 ($p<0.05$) correlation with Agreeableness, while the Fall 2010 semester had a 0.511 ($p<0.05$), also with Agreeableness. Additionally, the Human Resources in Healthcare Management Course directly addresses personnel management in health administration, focusing on job requirements, job descriptions, sources of labor supply, and other related human resource competencies (Texas State University-San Marcos, 2011). This course also revealed two inverse personality correlations (Fall 2009 semester, 0.393 and Fall 2010 semester, -0.382, both nonsignificant) for the Conscientiousness personality characteristic. With both courses focusing on the human resources competency as it applies to healthcare administration, these related inversed findings suggest that there may be some type of further relationship to be evaluated among the healthcare administration human resources competency and both the Agreeableness and Conscientiousness personality types.

The Strategic Management course serves as the health administration program's capstone course, consisting of thorough reviews of several competencies including

accounting, finance, marketing, and information systems (Texas State University-San Marcos, 2011). Correlation results for this course show a negative relationship with the Conscientiousness personality type for two semesters (Spring 2010 = -0.357 and Fall 2010 = -0.447). This across-semester similarity may suggest an area for future research with increased sample size, as the Conscientiousness individual is typically associated with being strong-willed, highly determined, and typically succeeding in the academic environment (Costa & McCrae, 1992), which is not suggested by the results of this study.

Regarding the research questions and related hypotheses for this part of the study, the following healthcare administration competencies, as established by AUPHA accreditation criteria for undergraduate healthcare administration programs (AUPHA, 2010b), were assessed by their most similar corresponding undergraduate courses in the healthcare administration program. While a perfect association may not exist between the AUPHA competency criteria (see Appendix A) and the undergraduate program's individual courses in health administration (Texas State University-San Marcos, 2011), it can be determined that each undergraduate healthcare administration course addresses several AUPHA competencies, often with AUPHA competency criteria overlapping between undergraduate courses (Texas State University, 2011). Because of this, those courses with a more direct association to a single AUPHA competency were chosen to be independently studied. Table 17 shows the AUPHA competencies and the identified courses in healthcare administration to address research question three and its related hypotheses.

Table 17

Selected AUPHA Healthcare Administration Competencies and Corresponding Courses in the Health Administration Undergraduate Program

AUPHA Undergraduate Program Healthcare Administration Competency	Corresponding Bachelor of Health Administration Course(s)
Managerial Skill (AUPHA, 2010b) Healthcare	Supervisory Management for Managers (Texas State University-San Marcos, 2011)
	Health Services Problem Solving and Decision Making (Texas State University-San Marcos, 2011)
Managerial Ethics (AUPHA, 2010b)	Ethics in the Health Professions (Texas State University-San Marcos, 2011)
Computational Skills (AUPHA, 2010b)	Principles of Accounting for Healthcare Managers (Texas State University-San Marcos, 2011)
	Financial Management for Healthcare Managers (Texas State University-San Marcos, 2011)

Review of the correlations among personality types and two courses: Supervisory Management for Healthcare Managers and Health Services Problem Solving and Decision Making show no statistically significant relationships of personality and success in these courses across all three comprehensive exit exams. Furthermore, there are only two occurrences of correlations above 0.35 for the Supervisory Management course (Openness in the Fall 2009 semester and Neuroticism in the Fall 2010 semester). Both correlations are nonsignificant and inferences are not drawn from these associations until further research supports similar findings. There were no statistically significant

correlation coefficients for either the extraversion and conscientiousness personality types, therefore not supporting alternative hypotheses #1 and #2. The 0.369 neuroticism correlational value also does not support alternative hypothesis #3, therefore describing a sample of students with a slightly increased level of the neuroticism personality characteristic that actually performed well on the comprehensive exit exam.

The AUPHA competency of Managerial Ethics was assessed by student performance on the Ethics in the Health Professions course section of the comprehensive exit exam. Analysis of the results in Appendix G show no across-semester correlations above the 0.35 level, and only two individual correlations above the 0.35 level in the study. Extraversion correlated with the ethics course exam items at a value of 0.390 (nonsignificant) in the Spring 2010 semester. This result does support the fourth alternative hypothesis of the research question. Additionally, the Openness personality type yielded a -0.536 ($p<0.05$) correlation with the ethics competency, also occurring in the Spring 2010 semester. Because it was found to possess a negative relationship, the openness characteristic finding does not support the fifth research hypothesis (a significant, positive openness value was hypothesized to occur). These results, while one at significant level, still must be researched further to establish any inference regarding personality characteristics and the ethics competency in healthcare administration.

The sixth alternative hypothesis involves computational skills, defined as mathematics and quantification in the AUPHA competency criteria (Appendix G). Therefore, the Principles of Accounting in Healthcare Management and Financial Management for Healthcare Managers courses were chosen to evaluate the AUPHA computational skills competency. Both courses possess highly quantitative objectives

and involve several financial problems and case studies (Texas State University, 2011). Similar to the other two AUPHA competencies tested by the research question, the computational skills competency does not possess significant across-semester personality characteristic findings. Only one correlation coefficient above 0.35 resulted for the Principles of Accounting in Healthcare Management (Extraversion at 0.513, nonsignificant). Additionally, the Financial Management for Healthcare Managers course's only coefficient above 0.35 was for the Openness personality characteristic (-0.636, $p<0.05$). All other coefficients were less than the 0.35 value, therefore the sixth alternative hypothesis for this research question was not supported (no significant relationships exist with the conscientiousness personality type).

Overall, the Agreeableness personality type had the most correlation coefficients at or above the 0.35 value, with Neuroticism having the fewest identified relationships at or above 0.35. Furthermore, the Seminar in Health Administration (previously discussed) also possessed the highest correlation coefficient ($r = 0.615$, $p<0.05$) for the Extraversion personality type for the Spring, 2010 semester. The results in this section, as well as the results in Appendix G provide an initial analysis into the relationship among inherent behavioral traits and competencies in health administration.

Prediction of Successful Completion of the Healthcare Administration Exit Exam

The following section addresses the fourth research question and related hypotheses of the study:

- Research Question 4: Do the variables gender, age, ethnicity, personality, prior healthcare experience status, and the presence of a healthcare administration mentor reliably predict successful completion of the comprehensive exit exam in healthcare

administration? If so, what variables are most influential in the prediction of that status?

- Null hypothesis: regression results will indicate the overall model of these five predictors (gender, age, ethnicity, prior healthcare experience status, and the presence of a healthcare administration mentor predictors) are not statistically reliable in predicting the successful completion of the exit examination.
- Alternate hypothesis: only prior healthcare experience and the presence of a healthcare administration mentor will significantly predict successful completion of the exit examination.

As reviewed earlier in the study, several explanatory variables were posited to have strong influence upon the success of both students, as well as early careerist management professionals. Furthering the healthcare administration research field's attempt to understand what specific variables are available to accurately predict successful competency in healthcare administration, this study used logistic regression to identify the predictive capability of several covariates upon the response outcome of either successfully passing (scoring 70% or higher), or not successfully passing (scoring less than 70%) the comprehensive exit exam in healthcare administration. As a result, three separate analyses were conducted to establish an initial framework and grounds for future research regarding the potential relationships among the predictor variables and the dichotomous outcome.

Demographic predictors. The following demographic variables were entered into the initial logistic regression model to assess their covariance with the dependent variable. These variables and their level of measurement are listed below:

- Ethnicity (nominal): White, African American, Hispanic/Latino, Asian, and International/Other
- Gender (nominal, dichotomous): Male and Female
- Age (ratio): continuous scale

Prior to entering these independent variables into the model, a cross tabulation analysis was conducted in order to further understand the relationship among the variables. Results are displayed in Table 18.

Table 18

Initial Cross Tabulation of Ethnicity Covariates

Ethnicity Category		Comprehensive Exam Outcome *Pass*	*Fail*	Total
White	Count	25	6	31
	Expected Count	23.1	7.9	31.0
African American	Count	3	1	4
	Expected Count	3.0	1.0	4.0
Asian	Count	3	0	3
	Expected Count	2.2	0.8	3.0
International	Count	1	0	1
	Expected Count	0.7	0.3	1.0
Hispanic/Latino	Count	9	7	16
	Expected Count	11.9	4.1	16.0
Total	Count	41	14	55
	Expected Count	41.0	14.0	55.0

Expected values for each comprehensive exit exam outcome category need to be greater than or equal to 5.0 (Garson, 2010). Those demographic variables not meeting this expected count in the above contingency table analysis (African American, Asian, and International students) were collapsed into the following demographic category: Other. This collapsing of select predictor variables with low expected count values in either the Pass or Fail contingency table cells now resulted in three ethnicity categories to be analyzed, as shown in Table 19.

Table 19

Cross Tabulation of Ethnicity Covariates after Collapsing Procedure

Ethnicity Category		Comprehensive Exam Outcome *Pass*	*Fail*	Total
White	Count	25	6	31
	Expected Count	23.1	7.9	31.0
Other	Count	7	1	8
	Expected Count	6.0	2.0	8.0
Hispanic/Latino	Count	9	7	16
	Expected Count	11.9	4.1	16.0
Total	Count	41	14	55
	Expected Count	41.0	14.0	55.0

Further review of Table 19 shows that the count and expected count for the Other ethnicity category under the Fail column continues to fall below the 5.0 standard. This occurrence is an effect of the study's small sample size and few students of the minority ethnicities falling under the "failed" category. While the collapsing procedure did not totally eliminate all expected counts less than 5.0, it did minimize three of the previous problematic counts down to one expected count less than 5.0 (Other). Furthermore, while the Hispanic/Latino expected count falls very close to 5.0 (4.1), further collapsing was decided against in order to ensure an adequate level of detailed analysis of the demographic predictor variable by the use of the collapsed demographic categories listed in Table 19.

A second cross tabulation analysis was completed with the gender variable. Table 20 shows the cross tabulation of the gender predictor, which illustrates that only one expected value (males who failed, expected count 3.6) fell below the n of 5 standard.

Table 20

Initial Cross Tabulation of Gender Covariates

Gender		Comprehensive Exam		Total
		Pass	Fail	
Female	Count	29	12	41
	Expected Count	30.6	10.4	41.0
Male	Count	12	2	14
	Expected Count	10.4	3.6	14.0
Total	Count	41	14	55
	Expected Count	41.0	14.0	55.0

Due to the small number of male subjects who participated in the study, as well as the gender predictor variable existing as a dichotomous variable, further collapsing was not possible.

Binary logistic regression was conducted using these demographic predictor variables, along with age to determine the predictive capabilities of the three demographic variables upon the dependent variable (passing or not passing the comprehensive exit exam in healthcare administration). The ethnicity and gender predictor variables were entered as categorical variables, while the age variable was entered as a continuous variable. Because ethnicity had three categories, it was dummy coded with the Hispanic/Latino group serving as the reference group. Therefore, there are two coefficients related to ethnicity. The first compares Whites to Hispanics/Latinos

and the second compares Other to Hispanic/Latino. The initial model results for these explanatory variables are displayed in Table 21.

Table 21

Logistic Regression Model 1: Prediction of Successful Completion of the Comprehensive Exit Exam Using Demographic Explanatory Variables

Predictor Variable	B	S.E.	Wald	df	p	Exp(B)	95% C.I. for Exp(B)	
							Lower	Upper
Ethnicity			3.562	2	0.168			
Ethnicity(1)	-1.210	0.726	2.781	1	0.095	3.355	0.809	13.912
Ethnicity(2)	-1.626	1.193	1.857	1	0.173	5.081	0.490	52.651
Gender(1)	-0.490	0.906	0.292	1	0.589	0.613	0.104	3.618
Age	0.092	0.134	0.471	1	0.492	1.097	0.843	1.427
Constant	-1.518	3.534	0.184	1	0.668	0.219		

Notes: the dependent variable reference category is not passing the comprehensive exit exam (NOPASS). The predictor variable is passing the comprehensive exam (PASS). Measure of effect size: Cox & Snell R Square = 0.091; Nagelkerke R Square = 0.134.

Initial review of Table 21 suggests that the covariate Ethnicity(2), or the "Other" demographic type, has much better odds for passing the comprehensive exit exam (5.081 times the odds than the Hispanic group). When an odds ratio approaches or equals 1.0, this corresponds to an independent variable that does not affect the dependent variable in a significant manner, otherwise not increasing or decreasing the response event odds of occurring or not occurring significantly (no effect for odds ratios). Specifically, results indicate that the Other demographic category is 5.081 times more likely to pass the exit exam when compared to the Hispanic demographic group. In this study, this finding is most likely a consequence of the small number of students within the "Other" demographic category (a total of eight), and only one of those students failing the comprehensive exit exam.

To further interpret these results, the model fit test results for this first logistic regression model are listed in Table 22 below.

Table 22

Logistic Regression Model 1: Overall Model Fit Tests

Method	Chi-Square	df	Significance
Hosmer and Lemeshow Test	4.861	6	0.562
Omnibus Tests of Model Coefficients	5.235	4	0.264

Regression results indicated the overall model fit of the three predictors (ethnicity, gender, and age) was questionable, based upon two tests for model significance. The Hosmer and Lemeshow's goodness of fit test Chi-Square, which is the result of observed and expected frequencies based on decile analysis of predicted probabilities, showed nonsignificance (0.562), therefore indicating that the model prediction is not significantly different from the observed values. Failure to reject the null hypothesis of model to data fit results, thus a well-fitting model is presumed to exist. However, this test is sensitive to both sampling adequacy as well as expected values < 5.0 (Garson, 2010), which is the case for both the gender (male) and ethnicity (other) predictor variables. Furthermore, the Hosmer and Lemeshow's goodness of fit test is also biased toward nonsignificance (thus implying a well-fitting model) when collapsing of predictor variables occurs, which is the case for the logistic regression method above (Garson, 2010). Because of this, the Omnibus Tests of Model Coefficients was utilized, also resulting in a non-significant Chi-Square value of 5.235 (sig. = 0.264). This model fit statistic analyzes the capability

of all predictor variables in the model to jointly predict the dependent variable outcome (Garson, 2010). As shown in Table 23 above, because the resulting Chi-Square of 5.235 was determined at a nonsignificant level, at least one of the predictor variables is not significantly related to the response variable for the first logistic regression model.

In order to address the nonsignificant model fit statistics mentioned above, the SPSS logistic regression output was further analyzed and predictor variables that demonstrated no association with the response variable were investigated. The ExpB (odds) ratio in Table 21 above is the natural log base (e), to the exponent (B), where B is the parameter estimate (Garson, 2010). It can be determined that the Age independent variable has an ExpB value of 1.097, which is very close to the value of 1.0. When an odds ratio approaches or equals 1.0, this corresponds to an independent variable that does not affect the dependent variable in a significant manner, otherwise not increasing or decreasing the response event odds of occurring or not occurring significantly (no effect for odds ratios). In other words, the variable of Age has no statistically significant influence upon the outcome of the healthcare administration students' exit exam results for this study's sample. Because of this, another logistic regression analysis was conducted, without the entering of the Age predictor variable entered into the model. Model results for this second logistic regression are listed in Table 23.

Table 23

Logistic Regression Model 2: Prediction of Successful Completion of the Comprehensive Exit Exam Using Demographic Explanatory Variables (without Age)

Predictor Variable	B	S.E.	Wald	df	p	Exp(B)	95% C.I. for Exp(B)	
							Lower	*Upper*
Ethnicity			3.239	2	0.198			
Ethnicity(1)	1.064	0.691	2.367	1	0.124	2.898	0.747	11.236
Ethnicity(2)	1.634	1.188	1.892	1	0.169	5.123	0.500	52.546
Gender	-0.704	0.865	0.662	1	0.416	0.495	0.091	2.696
Constant	0.873	0.924	0.892	1	0.345	2.394		

Notes: the dependent variable reference category is not passing the comprehensive exit exam (NOPASS). The predictor variable is passing the comprehensive exam (PASS). Measure of effect size: Cox & Snell R Square = 0.082; Nagelkerke R Square = 0.121.

Model fit statistics for the second logistic regression are displayed in Table 24.

Table 24

Logistic Regression Model 2: Overall Model Fit Tests

Method	Chi-Square	df	Significance
Hosmer and Lemeshow Test	1.395	3	0.707
Omnibus Tests of Model Coefficients	4.700	3	0.195

Results for the second logistic regression model (without the Age variable) indicate an overall model fit similar to those of model one (with the Age variable). While Table 24 shows the Hosmer and Lemeshow Test with a nonsignificant Chi-Square result (0.707), suggesting a good model fit, the Omnibus Tests of Model Coefficients also demonstrates a nonsignificant (0.195) Chi-Square value (4.700). Uninfluenced by the collapsing technique utilized with the ethnicity variable, the Omnibus Tests of Model

Coefficients suggests the low capability of the two predictor variables (ethnicity and gender) to predict the dependent variable of passing the comprehensive exit exam. These model fit statistics are most likely due to the study's small sample size and the logistic regression results in Table 23 are to be interpreted with caution. Exploratory in nature, these nonsignificant results are analyzed below to assist in the initial investigation towards predictors of success in early careerist healthcare administrators.

Initial analysis of the odds ratio (ExpB) demonstrates several insights into the predictive ability of selected demographic characteristics of individuals for either passing or not passing the comprehensive exit exam. For instance, the Ethnicity(1) predictive variable (Whites) suggests that the odds of passing the exit exam increase 2.898 times when compared to the Hispanic demographic category (non-significant). In this study, this is most likely due to the abnormally distributed sample size consisting of 56.4% white students (the majority with regards to ethnicity). Additionally, the odds of students within the Other demographic covariate (African American, Asian, and International students) passing the exam are 1.892 times greater than the odds of Hispanics passing the exam. While the Other demographic category only represents 15% of the study's sample (eight students), only one of these eight students did not pass the comprehensive exit exam. Because of this, the odds of passing the exam are greater for the Other demographic category, as fewer individuals in this category failed the exam, when compared to those that failed from the White and Hispanic/Latino categories. Furthermore, the results in Table 23 above also show that the odds of passing the exam are decreased by a factor of 0.495 for female subjects. This is primarily because the female subjects comprise 75% of the study's subjects, and a total 14 of the 41 females in

the study failed the comprehensive exit exam. Due to their demographic majority, as well as having a much higher failure rate than the males in the study, the odds of not passing the exit exam are increased for this gender.

Further analysis of the SPSS logistic regression output for model two, specifically with regards to significance level, also suggest a strong dissociation between both ethnicity and gender and their predictive influence upon the outcome of the comprehensive exit exam. None of the variables that entered the second model displayed an odds ratio (ExpB) confidence interval (C.I.) of significant value (95%). This was determined by the results showing that all C.I. ranges at 95% included the value of 1.0, therefore indicating that a change in an independent variable is not associated with a change in the odds of the dependent variable (Garson, 2010). This finding further supports the underlying trend of the logistic regression analysis, as well as the alternate hypothesis that neither ethnicity or gender are considered useful predictors of the outcome of the healthcare administration comprehensive exit exam (passing or failing) for this model. Furthermore, with all significance values for each predictor variable entering the model at a value > 0.05, this disallows the ExpB (odds) ratios to be effectively interpreted without the possibility of committing a Type I statistical error. Because of this, the summary of this first logistic regression model from Table 23 must be interpreted with caution. The implications of these nonsignificant findings and their effect upon the overall study are addressed further in Chapter Five.

Mentorship and healthcare experience predictors. The following independent variables were entered into a third logistic regression model to assess their covariance

with the dependent variable. These variables and their level of measurement are listed below:

- Healthcare administration mentor (nominal, dichotomous): present or not present
- Healthcare experience (nominal, dichotomous): > one year experience or < one year of experience

Prior to entering these independent variables into the model, a cross tabulation analysis was conducted in order to further understand the relationship among the variables. The cross tabulation results for the Healthcare Experience predictor variable are displayed in Table 25.

Table 25

Cross Tabulation of Healthcare Experience Predictor Variable

Healthcare Experience Status		Comprehensive Exam *Pass*	*Fail*	Total
Less than 1 year	Count	26	11	37
	Expected Count	27.6	9.4	37.0
Greater than 1 year	Count	15	3	18
	Expected Count	13.4	4.6	18.0
Total	Count	41	14	55
	Expected Count	41.0	14.0	55.0

The cross tabulation results for the Mentor Presence variable are displayed in Table 26.

Table 26

Cross Tabulation of Mentor Status Predictor Variable

Mentor Status		Comprehensive Exam		Total
		Pass	*Fail*	
Mentor Present	Count	12	4	16
	Expected Count	11.9	4.1	16.0
Mentor Not Present	Count	29	10	39
	Expected Count	29.1	9.9	39.0
Total	Count	41	14	55
	Expected Count	41.0	14.0	55.0

There are two instances of an expected count falling below the 5.0 value (healthcare experience greater than one year – fail; mentor present – fail). Because both independent variables are dichotomous, a collapsing technique is not possible and dummy coding is not necessary. Therefore, the third logistic regression was run for the study and the SPSS output is show in Table 27.

Table 27

Logistic Regression Model 3: Prediction of Successful Completion of the Comprehensive Exit Exam Using Healthcare Experience and Mentor Presence Explanatory Variables

Predictor Variable	B	S.E.	Wald	df	p	Exp(B)	95% C.I. for Exp(B)	
							Lower	*Upper*
Healthcare Experience(1)	-0.750	0.729	1.059	1	0.303	0.472	0.113	1.971
Mentor Presence(1)	-0.013	0.692	0.000	1	0.985	0.987	0.254	3.835
Constant	1.614	0.674	5.738	1	0.017	5.022		

Notes: the dependent variable reference category is not passing the comprehensive exit exam (NOPASS). The predictor variable is passing the comprehensive exam (PASS). Measure of effect size: Cox & Snell R Square = 0.021; Nagelkerke R Square = 0.030.

The model fit statistics for the third logistic regression model are displayed in Table 28.

Table 28

Logistic Regression Model 3: Overall Model Fit Tests

Method	Chi-Square	df	Significance
Hosmer and Lemeshow Test	2.485	2	0.289
Omnibus Tests of Model Coefficients	1.147	2	0.564

Again, beginning with the odds ratio (ExpB) data, two interesting findings occur. For those subjects with less than one year of healthcare experience at the time they took the comprehensive exit exam, labeled Healthcare Experience(1), their odds for passing the exam are decreased nonsignificantly (ExpB value of 0.472). Furthermore, for those subjects that possessed a mentor in the field of healthcare administration at the time they took the comprehensive exit exam, the odds ratio was a value of 0.987 (nonsignificant). Because this value is extremely close to ExpB equaling 1.0, this explanatory variable does not significantly affect the dependent variable of passing the exit exam. Therefore, in this study, the presence of a mentor (or lack thereof) is not an influence upon the outcome of the comprehensive exit exam in healthcare administration. These odds ratios for Healthcare Experience and Mentor Presence should be interpreted with caution, as they are of nonsignificant value and therefore are reported in order to identify potential relationships that posit the inquiry for future research.

Further analysis of the SPSS logistic regression output for model three, specifically with regards to significance level, also suggest a strong dissociation between

both healthcare experience and mentorship, in terms of their predictive influence upon the outcome of the comprehensive exit exam. Neither of the variables entered the third logistic regression model with an odds ratio (ExpB) confidence interval (C.I.) of significant value (95%). This was determined by the results showing that all C.I. ranges at 95% included the value of 1.0, therefore indicating that a change in an independent variable is not associated with a change in the odds of the dependent variable (Garson, 2010). Furthermore, with all significance values for each predictor variable entering the model at a value > 0.05, this disallows the ExpB (odds) ratios to be effectively interpreted without the possibility of committing a type I statistical error. The implications of these nonsignificant findings and their effect upon the overall study are addressed further in Chapter Five.

Personality predictors. The following personality variables were entered into a fourth logistic regression model to assess their covariance with the outcome variable of either passing or not passing the healthcare administration comprehensive exam. These variables and their level of measurement are listed below:

- Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness (ratio): continuous scale

The raw data or sum scores for each personality type was used in this analysis, otherwise known as the factor T scores (Costa & McCrae, 1992). These scores were calculated by using the item-level composite scores from the NEO-FFI inventory instrument itself. Typically, this continuous data is then converted into nominal data sets, with values ranging from one to five (very low, low, average, high, and very high personality characteristic) as utilized in earlier analyses. Based upon preliminary logistic regression

analysis results, it was decided to utilize the raw NEO-FFI instrument data, primarily due to optimization and interpretation of the results. Because the NEO-FFI raw data are continuous, no categorical cross tabulation analyses or dummy coding were necessary.

The results of the fourth logistic regression model, investigating the personality prediction variables' influence upon passing the exit exam are listed in Table 29.

Table 29

Logistic Regression Model 4: Prediction of Successful Completion of the Comprehensive Exit Exam Using NEO-FFI Personality Inventory (raw scores)

Predictor Variable	B	S.E.	Wald	df	p	Exp(B)	95% C.I. for Exp(B)	
							Lower	*Upper*
Neuroticism	0.042	0.055	0.597	1	0.440	1.043	0.937	1.162
Extraversion	-0.005	0.074	0.004	1	0.949	0.995	0.860	1.151
Openness	0.057	0.052	1.221	1	0.269	1.059	0.057	1.172
Agreeableness	0.008	0.071	0.012	1	0.912	1.008	0.878	1.157
Conscientiousness	0.009	0.060	0.021	1	0.885	1.009	0.896	1.135
Constant	-1.627	3.976	0.167	1	0.682	0.197		

Notes: the dependent variable reference category is not passing the comprehensive exit exam (NOPASS). The predictor variable is passing the comprehensive exam (PASS). Measure of effect size: Cox & Snell R Square = 0.031; Nagelkerke R Square = 0.046.

The model fit statistics for the fourth logistic regression model are listed in Table 30.

Table 30

Logistic Regression Model 4: Overall Model Fit Tests

Method	Chi-Square	df	Significance
Hosmer and Lemeshow Test	12.928	7	0.074
Omnibus Tests of Model Coefficients	1.127	5	0.885

These results suggest that there is no relationship among the latent personality variables in the prediction of the exam outcome variable. Model fit statistics show a lack of model fit, with the Omnibus Tests of Model Coefficients level of significance > 0.05. All odds ratios (ExpB) in Table 29 demonstrate that the explanatory variables do not significantly affect the dependent variable (ExpB values for each predictor variable are all very close to 1.0). Because of these results, none of the Big Five personality types are influential variables upon the outcome of the comprehensive exit exam. The implications of sample size and interpretation of these results are discussed further in Chapter 5.

Summary

The results for this research are established at a nonsignificant level. This may or may not be due to sample size and the number and nature of variables examined. Given the exploratory focus of this study, all interpretations of effect size are to be made with caution and no inferential claims are forwarded at this time. Several nonsignificant relationships identified will be used by this researcher to guide future research into areas currently unexplored in the field of healthcare management.

CHAPTER V

DISCUSSION AND CONCLUSIONS

The last chapter discusses the implications of the findings from this investigation, into (a) the roles that alternate forms play in the assessment of competency of early careerist healthcare administrators, (b) how personality type influences success upon individual healthcare administration competencies and (c) how specific predictor variables can be used to determine success on the comprehensive exit exam in healthcare administration. This section also identifies specific areas of healthcare administration competencies and related questions to improve upon the understanding of the success of early careerists. The findings in this study are a result of an exploratory methodology conducted in an attempt to pioneer the understanding of healthcare administration competency assessment and the influences of inherent behavioral traits and other variables upon success in the professional field of healthcare administration. Ongoing investigation into these areas is required to inform and improve upon the current body of knowledge that pertains to the influences of successful early careerist healthcare administrators.

Prior attempts to determine factors of success for early careerist healthcare administrators focus solely upon post-graduation self-assessment surveys and alumni qualitative comments. Therefore, this study provides an initial examination of selected components of the examination, the development process and the current state of the

exam's utility. Importantly, the field of healthcare administration lacks an overall certifying body or licensing examination to demonstrate proficiency of the various competencies required of healthcare administrators. This circumstance does not allow for effective quantitative analysis in order to predict the variables most influential towards competency, especially at the sub-competency level.

Increasingly, there is a movement toward ensuring the development of effective and competent healthcare administrators as the healthcare industry continues to incur the changes related to healthcare reform and delivery of services. This initiative was furthered by the Chairman of the American College of Healthcare Executive's recent comments, outlining the upcoming major changes in the healthcare system and necessary competencies required of healthcare administrators to manage these complex organizations (Squazzo, 2010). To this end, the present study focused on assessing the influence of several predictor variables upon successful completion of a comprehensive examination in healthcare administration, as well as further investigation into the exam itself to determine psychometric properties and individual exam characteristics.

Review of the Research Study

The purpose of this study was to utilize several quantitative methodologies to investigate the competencies of an undergraduate healthcare administration program, how assessment of these competencies varied among academic semesters, as well as the identification and level of influence specific independent variables had upon the demonstration of success in healthcare administration competencies. The researcher's current knowledge and related literature supporting the characteristics of personality type, mentorship status, and prior workforce experience also informed the exploratory design

of the study. Data were obtained from selected academic semesters and evaluated using the healthcare administration department's most recent, and potentially similar comprehensive exit exams assessing AUPHA accreditation competencies in healthcare management.

The primary goals of the study were:

- Conduct descriptive and psychometric statistical analyses on the three alternative forms of the healthcare administration comprehensive exit exam to determine if equivalency exists among alternate forms.
- Identify, at an initial investigative level, the potential relationship(s) that exist among individual personality type and specific competencies (courses) in healthcare administration, as measured by scores on a comprehensive exit exam.
- Assess several predictor variables (including comprehensive demographics) and their influence upon successful completion of the comprehensive exit exam in healthcare administration.

Analysis of alternative forms. To assess the degree of equivalency among the three alternative exam forms used in the study, statistical evaluation occurred at many levels. Descriptive analyses were conducted at the comparative level. Distinct differences among and within (course level) each of the three semester comprehensive exit exams were identified. It was determined that nonequivalent alternate forms exist based on measures of central tendency and variability among the three samples (semesters). This finding was further verified by psychometric investigation into each of the three comprehensive exit exams, therefore analyzing each exam at the item level.

Difficulty indices were prepared for each item present on all three alternate forms. These findings demonstrated both items with very high proportion correct of difficulty indices (very easy items) as well as items with very low proportion correct of difficulty indices (very difficult items). It was determined that the comprehensive exit exam serves as an instrument to reaffirm the competency of students matriculating through the program, therefore all difficulty indices falling below the 0.50 cutoff were identified for further analysis. Additionally, the exams were not parallel in terms of the discrimination indices.

Item discrimination was assessed by calculating both discrimination indices, as well as point-biserial correlations for each item within each semester's exam. Results further supported previous findings, suggesting nonequivalent forms based upon the item level analyses. Several negative discrimination indices were identified within each semester's exam. For these items, the lower performing students on the exam scored these individual items correct, while the higher performing students scored these individual items incorrectly. The total number of negative discrimination indices varied by semester. The point-biserial correlations also supported variances among exams, describing several items within each semester that potentially do not discriminate effectively with regard to that section of the exam (course's) total score.

In summary, the descriptive and psychometric findings among, as well as within each comprehensive exit exam demonstrate a lack of equivalency among these three alternative forms. Assessment of competency for the entire sample (n=55) was not uniform and therefore each version of the exam consisted of items of different difficulty and discrimination levels. These nonequivalent forms therefore demonstrate a low

reliability of alternate forms, each developed with various ranges of difficulty and discrimination levels (Anastasi & Urbina, 1997). With no standardized healthcare administration competency assessment available, the research study's methodology continued assessment of competency using the three different versions of the comprehensive exit exam, with the varying descriptive and psychometric findings taken into consideration as a limitation of the study.

Influence of personality type. Based on supporting literature from the field of general business management, the degree of relationship between personality type and competency in healthcare administration was investigated. All subjects' NEO-FFI personality inventory results were subjected to a correlation analysis with their composite scores (competency sub-scores) for each section of the comprehensive exit exam in order to explore the possible relationships of this research theory.

Pearson Product-Moment Correlation Coefficients were evaluated by deriving a bivariate correlation matrix and identifying those correlations with an established effect size of predetermined level. Due to the alternate forms varying in equivalency, correlation results across semesters for a single course (or competency) within the exam and a specific personality characteristic provides insight into future investigations between the two variables. This instance only occurred once in the study. The Healthcare Services Marketing course was found to inversely relate to the Agreeableness personality type for all three semesters.

To address the research question involving alternative hypotheses predicting the positive relationship of specific healthcare administration competencies with individual personality characteristics, several individual sections of each exit exam (course level)

were evaluated. For instance, the Supervisory Management for Healthcare Managers course and the Health Services Problem Solving and Decision Making courses were used to assess the AUPHA competency of Managerial Skill. The course, Ethics in the Health Professions was used to measure the AUPHA competency of Managerial Ethics. Additionally, Principles of Accounting for Healthcare Managers and Financial Management for Healthcare Managers courses were examined to assess the AUPHA competency of Computational Skills. Of the six alternative hypotheses related to the overall research question regarding personality and competency in healthcare administration, the fourth alternative hypothesis was supported, but only by a single semester correlation (not across all three semesters). Extraversion positively correlated with the Ethics competency above the 0.35 cutoff value, potentially positing a need for future research into this relationship.

The correlation results between performance on the individual sections of the comprehensive exit exam and the personality variables are to be interpreted with caution. The small sample size for the study resulted in several insignificant correlations. Furthermore, the implication of low statistical power does not allow inferential conclusions to be drawn from the findings at this point in the research. This correlational investigation was inspired by business literature relating personality type and success in the workplace, as discussed in Chapter 1 and 2. Serving as an initial, exploratory investigation into the findings of relationship between the two variables, further research is required to obtain statistically significant results that possess more robust statistical power.

Prediction of competency in healthcare administration. The third goal of the study was to utilize all of the variables discussed thus far in developing a prediction model for determining which variables practically and statistically influence success on the healthcare administration comprehensive exit examination. A logistic regression was used to evaluate the following predictor (independent) variables upon the response (binary) variable of either passing or not passing the comprehensive exit exam:

- Demographics: ethnicity, gender, age.
- Presence of a healthcare administration mentor.
- Prior healthcare experience.
- Personality type.

Regarding demographic predictors, age was immediately removed from the logistic regression model, as its effect size was found to not influence success (or lack of success) on the exit exam. This omission of the age predictor therefore supported the fourth research question's alternative hypothesis. Other findings from the logistic regression model using ethnicity and gender as predictor variables are to be interpreted with caution, as their results are affected by sample size.

A second logistic regression model entered both Healthcare Experience and Mentor Presence, with odds ratios demonstrating that having less than one year of healthcare employment or volunteerism at the time of the comprehensive exit exam decreased the odds of passing the exam. Mentor Presence was determined to not influence the outcome of the comprehensive exit exam.

The final logistic regression model entered all five personality variables, therefore analyzing the influence of personality type on successful completion of the

comprehensive exit exam. Findings from this model demonstrate no influence of personality type upon the dependent variable.

All results for predicting success on the exit exam were found to be nonsignificant. While results were interpreted, no inferential claims are made at this point until further investigation occurs with increased sample size. The established models, methodology, and technique have been established to further investigation into predicting the success of healthcare administration early careerists. The researcher's post hoc analysis of the study's statistical power is discussed in the following section.

Limitations of the Study

This study has several limitations. Perhaps the most important limitation is the size of the sample. To this end, no inferential claims are made from the findings reported herein; rather the goal of this exploratory study was to pioneer an area of research, with regard to the early careerist healthcare administration population. The following sections summarize the identified limitations of the study and their effects upon the findings.

Sample size. Due to limited sample size (total n=55 subjects), the power of the statistical tests to correctly reject a false null hypothesis for correlation analysis was acceptable but marginal (Fraenkel & Wallen, p. 102). The coefficients reported were statistically nonsignificant. For the logistic regression analyses, the limited sample size (total n=55 subjects) likely influenced the power of the statistical tests to correctly reject a false null hypothesis. Because of this, the probability of obtaining the observed effect in the population from the various statistical analyses of the sample when the null hypothesis is true will be greater than the assigned significance criterion (0.05).

Effect sizes throughout the study are to be interpreted with caution. For findings of specific value, the probability of them occurring in the actual population by chance alone is high. The results of this exploratory study are intended to direct future research based on the findings within, and only when the sample size is increased will results of significant value allow for inference upon the healthcare administration early careerist population.

Demographic characteristics. The study used a sample from three separate healthcare administration senior cohorts at a single central Texas university. To evaluate the overall sample's demographic characteristics to the population of early careerist students, the AUPHA 2008-2009 undergraduate enrollment data was utilized. Two significant disparities were present: a higher % of Hispanic/Latino early careerists; and, the lower % of African American early careerists in the study sample.

Non-parallel, alternate forms. The three comprehensive exit exams, while containing similar amounts of questions per course (or competency) in the healthcare administration program, were found to be non-equivalent in terms of total descriptive findings, as well as item level analyses (difficulty and discrimination indices). Therefore, issuing criterion-referenced exams that are not parallel decreases the validity evidence (and any statements made on behalf of congruency among students) of the overall exam outcome. Implications for future research related to the three alternate forms of the comprehensive exit exam, as well as the psychometric analyses completed in this study are discussed below.

Implications for Future Research

The current study establishes a baseline framework for future research on (a) the process of test development in healthcare administration programs and (b) the relationship between demographic and personality characteristics and competency in the field of healthcare administration. Furthermore, the psychometric findings and methods of calculation for each comprehensive exit exam serve as models for future test development processes with regard to test reliability and test validity. Future research should focus on the following areas.

Increase sample size. The study should be replicated across several AUPHA-accredited undergraduate healthcare administration programs. An increased sample size will address several of the limitations previously mentioned. Furthermore, a sample more homogeneous to the AUPHA accredited institutions will more accurately reflect occurrences in the true early careerist population. It should be noted, since no single exam exists, replication of the study across multiple university programs will require extensive comprehensive exit exam analysis to obtain equivalency across all program exams and competencies assessed therein.

Test reliability and establishment of equivalent forms. A primary reason why competency of healthcare administrators cannot be evaluated accurately, including early careerists, is because no standard licensing exam or certifying body exists. Because of this, several university programs, as well as professional associations, rely on internally developed exit or credentialing exams to demonstrate proficiency in specific healthcare administration competencies. Furthermore, the content validity for each of these exams varies based on the competencies addressed, as well as overall purpose of the exam.

Using the test development process outlined by Cohen and Swerdlik (1999) and Crocker and Algina (1986), as well as quantitative item analysis tools to investigate equivalency of alternate forms as discussed in Anastasi and Urbina (1997), exam forms can be revised (at the item level) to possess similar difficulty and discrimination results, therefore establishing optimal reliability among forms. Since most students from the healthcare administration program for the current study usually only take the exam once, the single test administration method of assessing reliability among several versions of exams is recommended (Crocker & Algina, 1986), with an overall goal of establishing internal consistency across each alternate form (Crocker & Algina, 1986). This can be done by calculating difficulty index composite scores for each section (or competency tested) within each exam, therefore assessing the level of difficulty for each section across multiple forms (Cohen & Swerdlik, 1999). Similar reliability assessments can be completed for discrimination indices (Cohen & Swerdlik, 1999).

Once all psychometric indices are available, an item pool is recommended (Cohen & Swerdlik, 1999) from which individual items are to be interchanged based on their difficulty and discrimination index values. Additionally, the content validity of each exam may also be simultaneously measured by ensuring that the material covered by the exam is proportionally similar to material covered in the educational course (Cohen & Swerdlik, 1999). The overall goal being to obtain parallel or equivalent forms based on the balancing of items pulled from the item pool onto each comprehensive exam alternate form.

Based on the psychometric analysis results for each exam, the items not meeting specific criteria can then be either revised or omitted from the exam altogether (Cohen &

Swerdlik, 1999). Revision may entail rewording a single distracter of a specific item, to rewording the entire item stem (Cohen & Swerdlik, 1999). Item level revision will allow for those items not meeting specific psychometric properties to be addressed. For the current study, this would primarily include those items with a low difficulty index value, or a negative discriminatory value. Once completed, the newly revised forms can then be entered back into the test development process for new students taking the comprehensive exit exam. Furthermore, this continuous process (test tryout, analysis, revision, back to test tryout, etc.) will eventually allow for cross-validation to occur, establishing reliability from a new sample of test subjects with which psychometric findings for each sample can be compared (Cohen & Swerdlik, 1999). When alternate forms of the healthcare administration comprehensive exit exam exist with equivalent reliability, only then can assessment be conducted across multiple semesters accurately.

Factor analysis and continued item refinement. In addition to furthering the premise of establishing equivalent forms, construct validation is then required in order to assess each exam form and the extent to which it measures specific theoretical constructs, or competencies, in healthcare administration. Cohen and Swerdlik (1999, p. 197) further defines a construct as, "…unobservable, presupposed traits that a test developer may invoke to describe test behavior or criterion performance." In other words, each form should be evaluated to determine if it is measuring what it is intended to measure (Cohen & Swerdlik, 1999), in this case specific healthcare administration competencies. If the test serves as a valid method of evaluating the constructs (competencies) related to healthcare administration, those individuals that pass the exam will behave as predicted, therefore possessing a specific level of knowledge in healthcare administration necessary

for them to matriculate from the classroom learning environment to the practical fieldwork experience. The intended goal is to establish multiple equivalent forms that assess the same competencies in healthcare administration, as well as similar levels of assessment for each individual competency evaluated. Due to the current study's sample size limitation, the validity estimates are not possible because the low statistical power disallows inferential analyses (Crocker & Algina, 1986).

Future research will include ongoing assessment of construct validity as the study's sample size continues to grow and the students continue to take the comprehensive exit exam each semester. Throughout this process, both convergent and discriminant evidence may be assessed to support the construct validity of and within each form (Cohen & Swerdlik, 1999). Therefore, as the test development and item refinement process continues, each form may eventually converge upon each other, establishing a defined set of theoretical (latent) constructs (competencies) in healthcare administration. While the recognition of these underlying concepts within each exam form is necessary to further the goal of equivalent forms, these identified constructs may also be used as discriminant evidence to support exam validity by identifying those constructs within the exam that should not correlate with the identified competencies in healthcare administration that the exam is intended to measure.

In order to obtain both convergent and discriminant evidence, an identification of constructs present within each comprehensive exit examination is required. Factor analysis is an appropriate method of identifying these latent constructs, therefore evaluating the interrelationships of behavioral data (Anastasi & Urbina, 1997). The factors, or common traits identified within each exam can then be assessed among exams

to establish content validity and increased equivalency (Anastasi & Urbina, 1997). Each factor is identified and the weight, or loading of each factor assesses the contribution of that underlying concept towards the overall test. Cohen & Swerdlik (1999) describe the factor analysis procedure as highly complex and recommend a computer program to assist with construct identification, while it is still up to the researcher to appropriately recognize and name each underlying concept identified within each exam. As an ongoing task, the assessment and refinement of each comprehensive exit exam to improve upon criterion-related validity will allow for the healthcare administration program to effectively judge how well the exam instrument can be used to assess each student's ability on the criterion-referenced measure (Cohen & Swerdlik, 1999), in this case competency in healthcare administration.

Conclusion

This important research established a baseline framework for identifying the initial relationships between healthcare administration competency and individual personality characteristics. Furthermore, an investigation into the alternate forms using psychometric analysis established a method for the healthcare administration department to successfully equate multiple exams with regard to test reliability. This study serves as the groundwork for future investigations of early careerist healthcare administration competencies and the prediction of success for these individuals. Despite several significant limitations, the exploratory nature of the study, supported by the literature, outlines several findings that have the potential to guide future research in the field of healthcare administration.

APPENDIX A

EXAMPLES OF HEALTHCARE ADMINISTRATION ORGANIZATION COMPETENCIES

Healthcare Administration Organization	Competency
American College of Healthcare Executives (ACHE)	Governance and Organizational structure knowledge Human resources knowledge Financial knowledge Health care technology and information management knowledge Quality and performance improvement knowledge Laws and regulations Professionalism and ethical knowledge Health care knowledge Management knowledge Business knowledge
American College of Medical Practice Executives (ACMPE)	Professionalism Leadership Communication skills Organizational and analytical skills Technical/professional knowledge and skills Financial management Human resources management Planning and marketing Information management Risk management Governance and organizational dynamics Business and clinical operations Professional responsibility

Healthcare Information and Management Systems Society (HIMSS)	General Healthcare environment Technology environment Systems Analysis Design Selection, implementation, support, and maintenance Testing and evaluation Data integrity Security/privacy
Association of University Programs in Health Administration (AUPHA)	Communication (written and oral) Computational skills (mathematics and quantification) Critical thinking Societal and cultural context Theories of management Business Law Organizational behavior Organizational design Strategic management Functional areas of management Accounting Computer literacy Financial management Human resources management Operations analysis Management information systems Strategic planning Marketing Research methods Statistics Managerial skills Leadership Interpersonal skills Managerial ethics Professional development Cultural competence Motivation for continued learning Health services management

	Epidemiology
	Public health
	Health promotion
	Disease prevention
	Structure and function of health organizations, professions, and delivery systems
	Bioethics
	Health finance
	Health law
	Health economics
	Health policy
Quality/performance	improvement

APPENDIX B

Survey Instrument

SCREEN 1

Welcome to the Healthcare Administration Competency Research Survey! This research study is being conducted to investigate the potential relationship(s) between early careerist healthcare administration competency and personality type.

Researcher: Cristian Lieneck
Assistant Professor
School of Health Administration
Texas State University-San Marcos
clieneck@txstate.edu

You have been chosen to participate in this study because of your inclusion into one of the following BHA comprehensive exit examination semesters: Fall 2009, Spring 2010, and Fall 2010. There is no compensation for participating in this survey. Your participation is voluntary and you may withdraw from the study at any time without prejudice or jeopardy to your standing with the University.

The survey consists of a standardized personality inventory (NEO-FFI), where you will be asked to mark each item on a scale from STRONGLY DISAGREE through STRONGLY AGREE. An example of a question from this personality instrument is as follows:

"I laugh easily."

Additionally, two questions related to early careerists in healthcare administration will be presented and you will be asked to select the most appropriate answer. The entire survey is estimated to take 10-15 minutes to complete.

Personality will be assessed in the following manner: NEO-FFI personality inventory.

In addition to this survey, your individual competency in healthcare administration will

be assessed in the following manner: individual performance on the BHA comprehensive exit examination.

Statement of Confidentiality: all individual-specific data obtained from this study will remain confidential. Once all data is appropriately matched, subject names will be substituted with "Subject #1, Subject #2, etc". Your individual personality characteristics, as well as academic and demographic data will not be disclosed and will remain properly secured throughout the duration of the study in Professor Lieneck's office at Texas State University-San Marcos. There is minimal risk associated with this study, as outlined below, along with the control method to minimize such risk to protect your privacy and confidentiality:

Potential Risk: Confidentiality of participant names, demographic, academic, and personality information.
Control Method to Minimize Risk: Participant name is required in order to correctly match the survey results with individual academic and demographic data. Once this data is matched, all participant names will then be changed to anonymous subject numbers (example: Subject #1, Subject #2, etc) and remain as such for the remainder of the study.

Potential Risk: Breech of electronic data.
Control Method to Minimize Risk: The survey data will primarily be in electronic form, and will remain password-protected on Professor Lieneck's office computer, located in his locked and secured office in the Health Professions Building. No other individuals share, or have access to this computer. The data will be purged upon completion of the research.

Potential Risk: Breech of paperwork data.
Control Method to Minimize Risk: If any non-electronic (paper) documents exist, they will be stored in a locked file cabinet, also secured within Professor Lieneck's office located in the Health Professions Building. This data will be shredded upon completion of the research.

IRB approval number: 2010B7811

Questions about the research, research participants' rights, and/or research-related injuries to participants should be directed to the IRB chair, Dr. Jon Lasser (512-245-3413 – lasser@txstate.edu), or to Ms. Becky Northcut, Compliance Specialist (512-245-2102).

Please check the appropriate box below to continue:
I fully understand this consent form and its contents and agree to participate in this survey, as well as permit access to my Healthcare Administration course grades and demographic information on file with the University Registrar's office. I understand that participation in this study is optional and that my individual confidentiality will be upheld.

- o I consent to this survey (click to continue).

- I do not consent to this survey (click to end survey).

SCREEN 2

Please enter your FIRST and LAST name.

SCREEN 3
Please enter a good phone number to be contacted at only if there are data collection issues.

SCREEN 4

The personality inventory consists of 6 pages, 10 items per page. Please take your time to answer each question as honestly as possible.

Please check the box below and click "next" to begin the personality inventory.

- Begin personality inventory.

SCREEN 5: NEO-FFI items 1 – 10
SCREEN 6: NEO-FFI items 11-20
SCREEN 7: NEO-FFI items 21-30
SCREEN 8: NEO-FFI items 31-40
SCREEN 9: NEO-FFI items 41-50
SCREEN 10: NEO-FFI items 51-60

SCREEN 11

Please select the option below that best summarizes your prior work/volunteer experience in the healthcare field at the time you took the BHA comprehensive exit examination (not necessarily healthcare administration experience):

- Less than one year of experience in the healthcare field.

- Greater than one year of experience in the healthcare field.

SCREEN 12

A professional mentor is defined as an individual that serves as either a formal or informal resource to you as an early careerist healthcare administrator. Typically, the mentorship role includes frequent meetings or regular conversations to discuss current management objectives, trends in the general healthcare field, or even overall career progress.

Please select the option below that best describes your possible professional relationship with an official or unofficial mentor in the field of healthcare administration:

- o I currently DO have a professional mentor in the field of healthcare administration.

- o I currently DO NOT have a professional mentor in the field of healthcare administration.

SCREEN 13

You have reached the end of the survey.

If you would like to obtain the results of your personality inventory (individual personality type), please check the appropriate box below and they will be emailed to you upon completion of the research.

- o Yes, I would like my individual personality inventory type results emailed to me upon completion of the study.

- o No, I would not like my personality inventory results emailed to me.

SCREEN 14

End of survey.

APPENDIX C

Email Survey Request

- emails sent to the potential survey subjects on the following dates:
  December 2, 2010
  December 7, 2010
  December 14, 2010
  January 11, 2011

Greetings Healthcare Administration students and alumni,

My name is Cristian Lieneck, and I am conducting my doctoral research at Texas State University, focusing on the relationship(s) between individual personality type and specific competencies in the field of Healthcare Administration.

Below is a link to my survey, which will ask you to complete an online personality instrument, answer two additional questions related to healthcare administration education, and also provide consent for the academic resources to be accessed. Although there is no compensation for participating in this study, you do have the option at the end of the survey to elect to receive your individual personality instrument results, which will provide you with exceptional personal development information as utilized by several professional Healthcare Administration associations such as the American College of Healthcare Executives (ACHE).

As described in the consent form in the survey itself, your strict confidentiality will be upheld throughout the survey and destroyed upon completion of the study. I would greatly appreciate your time by taking this 15 minute survey.

Please click the link below to begin. Thank you, Cristian Lieneck

<secure survey hyperlink listed here>

APPENDIX D

Formal Letter Request

December 20, 2010

TO: <student first name, last name>
<last email address on file>
<home of record address>
<home of record city, state>
<home of record zip code>

From: Cristian Lieneck
PhD student, Texas State University-San Marcos
cell: (512) 940-8634
clieneck@txstate.edu

RE: Healthcare Administration student/alumni survey

First name,

To begin, I hope that your winter holiday is off to a great start. I have sent this letter to your last known home of record address on file with the university in an attempt to have you participate in my online doctoral research survey. To this point, several email attempts to your email address listed above have either been returned to me as undeliverable, or I have received no response.

While you are home this holiday, I respectfully request that you take 15 minutes of your day to complete the online survey for my research, which consists of a personality instrument and two additional questions related to healthcare administration education.

Below is a link to my survey, which will ask you to complete an online personality instrument, answer two additional questions related to healthcare administration education, and also provide consent for the academic resources to be accessed. Although there is no compensation for participating in this study, you do have the option at the end of the survey to elect to receive your individual personality instrument results, which will provide you with exceptional personal development information as utilized by several professional Healthcare Administration associations such as the American College of Healthcare Executives (ACHE).

As described in the consent form in the survey itself, your strict confidentiality will be upheld throughout the survey and destroyed upon completion of the study. I would greatly appreciate your time by taking this 15 minute survey.

Please click the link below to begin. Thank you, Cristian Lieneck

<secure survey hyperlink listed here>

APPENDIX E

Item-Level Difficulty and Discrimination Indices for Each Healthcare Administration Exit Exam

Course Name	Item Number	Difficulty Index (*p*)			Discrimination Index (*d*)		
		Fall 2009	Spring 2010	Fall 2010	Fall 2009	Spring 2010	Fall 2010
		n=22	n=14	n=19	n=22	n=14	n=19
Healthcare Organization and Delivery							
	1	0.09	1.00	0.89	0.16	0.00	0.40
	2	0.95	0.92	0.94	0.00	-0.25	0.00
	3	0.09	0.50	0.89	0.16	0.25	0.20
	4	0.50	0.92	0.05	0.50	-0.25	0.00
	5	0.72	0.42	1.00	0.83	0.75	0.00
	6	0.86	0.28	1.00	0.16	0.50	0.00
	7	0.54	0.35	0.52	0.66	-0.75	0.80
	8	0.95	1.00	0.73	0.00	0.00	0.40
	9	0.77	0.78	0.89	0.33	0.50	0.20
	10	0.50	0.28	0.94	0.50	1.00	0.20
	11	0.41	0.78	0.36	0.33	0.25	0.80
	12	0.86	0.92	0.94	0.00	0.25	0.00
Ethics in the Health Professions							
	1	0.63	0.71	0.94	0.66	0.75	0.20
	2	0.04	0.57	0.89	0.00	1.00	0.00
	3	0.59	1.00	0.84	0.83	0.00	0.60
	4	0.68	0.92	0.63	0.66	0.25	0.60
	5	0.81	0.78	0.84	0.50	0.75	0.40
	6	0.54	1.00	0.94	0.33	0.00	0.20
	7	0.63	0.42	0.84	0.66	0.25	0.20
	8	0.95	0.50	0.73	0.16	0.75	0.40
	9	0.68	0.78	0.63	0.16	0.50	0.40
	10	0.54	0.35	0.73	0.16	-0.50	0.20
	11	0.63	0.78	0.94	0.50	0.00	0.00
	12	0.81	0.57	0.78	0.16	0.50	0.00
Healthcare Administration History, Culture, and Language							
	1	0.59	0.07	0.57	0.83	0.25	0.60
	2	0.77	0.57	0.94	0.33	0.25	0.20
	3	1.00	0.78	0.57	0.00	0.50	0.80

4	0.72	0.42	1.00	0.50	0.00	0.00
5	1.00	0.50	0.63	0.00	0.25	0.80
6	0.77	0.85	1.00	0.50	0.25	0.00
7	0.81	0.78	1.00	0.33	0.50	0.00
8	1.00	0.50	1.00	0.00	0.00	0.00
9	0.59	0.85	1.00	0.66	0.25	0.00
10	1.00	0.78	0.78	0.00	0.25	0.40
11	1.00	0.92	1.00	0.00	0.25	0.00
12	1.00	0.78	0.78	0.00	0.00	0.00
Supervisory Management for Healthcare Leaders						
1	1.00	0.28	0.36	0.00	0.50	0.60
2	0.72	0.71	0.89	0.33	0.50	0.20
3	0.95	1.00	0.89	0.16	0.00	0.00
4	0.81	0.64	1.00	0.16	0.00	0.00
5	0.81	0.57	0.73	0.16	0.75	0.60
6	0.41	0.71	0.89	0.66	0.25	0.20
7	0.50	0.71	0.57	0.83	0.50	0.80
8	0.68	0.64	0.94	0.16	0.50	0.20
9	0.77	0.92	1.00	0.66	-0.25	0.00
10	1.00	0.78	0.73	0.00	0.50	0.60
11	1.00	0.50	1.00	0.00	0.75	0.00
12	0.59	0.64	0.57	0.50	0.50	0.80
Human Resources in Healthcare Management						
1	0.68	0.57	0.89	0.50	1.00	0.40
2	0.86	0.85	0.68	0.50	0.25	0.60
3	0.59	1.00	0.89	0.83	0.00	0.00
4	0.77	0.92	1.00	0.33	0.00	0.00
5	0.72	0.28	0.63	0.50	0.75	0.60
6	0.63	0.85	0.89	0.83	0.00	0.40
7	0.95	1.00	0.47	0.16	0.00	0.60
8	0.95	0.78	0.89	0.16	0.25	0.40
9	0.95	0.35	0.73	0.00	0.75	0.80
10	0.68	1.00	1.00	0.50	0.00	0.00
11	0.54	0.28	0.84	0.33	0.50	0.20
12	0.81	0.85	0.73	0.33	0.25	0.00
Management of Health Information Systems						
1	0.54	0.71	0.31	0.66	0.50	0.80
2	0.31	0.64	0.63	0.50	0.75	0.80
3	1.00	0.92	0.89	0.00	0.00	0.40
4	0.81	0.14	0.42	0.33	0.00	0.40
5	0.59	0.42	0.57	0.83	0.50	1.00
6	1.00	0.92	0.63	0.00	0.25	0.60
7	0.95	1.00	0.73	0.16	0.00	0.40
8	0.18	0.78	0.47	0.16	0.50	0.80
9	0.86	0.50	0.52	0.33	0.00	1.00
10	0.72	0.85	0.84	0.50	0.50	0.00
11	0.63	0.64	0.84	0.66	0.75	-0.20
12	0.63	0.85	0.94	0.50	0.00	0.20
Training and Professional						

Development in Healthcare						
1	0.86	0.57	0.94	0.00	0.00	-0.20
2	0.91	0.57	0.15	0.16	0.50	0.00
3	0.91	1.00	0.63	0.16	0.00	0.40
4	0.95	0.21	0.21	0.16	0.25	0.40
5	0.81	0.85	1.00	0.33	0.25	0.00
6	0.45	0.50	0.52	0.33	0.50	0.60
7	0.41	0.71	1.00	0.00	0.50	0.00
8	0.77	1.00	0.52	0.50	0.00	0.40
9	0.86	0.21	0.68	0.33	0.25	1.00
10	0.91	0.85	0.94	0.16	0.50	0.20
11	0.95	0.92	0.15	0.16	0.00	0.40
12	0.95	0.57	0.21	0.50	0.50	0.20
Employment Law in Healthcare Management						
1	1.00	1.00	0.89	0.00	0.00	0.20
2	0.04	0.50	1.00	0.16	-0.50	0.00
3	0.91	0.78	0.05	0.16	0.50	0.20
4	0.68	0.28	0.00	0.16	0.75	0.00
5	0.54	0.64	0.78	0.66	0.50	0.40
6	0.72	0.92	0.63	0.00	0.25	0.60
7	1.00	0.85	0.57	0.00	0.25	0.60
8	0.81	0.64	0.52	0.50	0.25	0.60
9	0.63	1.00	0.52	0.50	0.00	0.60
10	0.50	0.28	0.84	0.33	0.50	0.00
11	0.59	0.92	0.63	0.50	0.25	0.20
12	0.77	0.50	0.36	0.16	0.00	0.20
Principles of Accounting in Healthcare Management						
1	0.91	0.14	0.84	0.33	0.25	0.20
2	0.91	0.50	0.94	0.33	0.75	0.00
3	0.95	0.64	0.78	0.16	0.50	0.40
4	0.95	0.64	0.89	0.16	0.75	0.40
5	1.00	0.07	1.00	0.00	0.25	0.00
6	0.63	0.85	0.26	0.66	0.50	0.40
7	0.72	0.85	1.00	0.33	0.25	0.00
8	0.72	0.71	0.47	0.50	0.50	0.40
9	0.91	0.78	0.73	0.16	0.50	0.00
10	0.77	0.50	0.42	0.50	0.50	0.20
11	0.95	0.42	0.52	0.00	0.25	0.60
12	0.77	0.42	0.36	0.16	0.75	0.20
Financial Management for Healthcare Managers						
1	0.72	0.71	0.68	0.50	0.50	1.00
2	0.45	0.78	0.42	0.33	0.50	1.00
3	0.59	0.78	0.73	1.00	0.75	0.60
4	0.91	0.85	0.94	0.16	0.50	0.20
5	0.81	0.92	0.89	0.66	0.00	0.20
6	1.00	0.85	1.00	0.00	0.25	0.00
7	0.86	0.92	0.89	0.16	0.25	0.00
8	0.54	0.71	0.94	1.00	0.25	0.20
9	0.86	0.57	0.89	0.16	0.50	0.40
10	0.95	0.71	1.00	0.16	0.75	0.00

11	0.63	0.85	0.57	0.66	0.50	0.60
12	0.72	0.42	0.73	0.00	0.50	0.60
Patient Care Management and Quality Improvement in Healthcare						
1	0.45	0.78	0.78	0.66	0.50	0.00
2	0.13	0.42	0.94	0.50	0.00	0.20
3	0.36	0.64	0.89	0.33	0.50	0.20
4	0.68	1.00	0.78	0.50	0.00	0.40
5	0.86	0.85	0.57	0.33	-0.25	0.40
6	0.77	0.92	1.00	0.16	0.25	0.00
7	0.81	0.71	0.68	0.33	0.00	0.60
8	0.81	0.07	0.84	0.50	-0.25	0.40
9	0.91	0.85	0.78	0.00	0.25	0.40
10	0.91	0.50	1.00	0.16	0.75	0.00
11	0.77	0.78	0.47	0.33	0.25	1.00
12	0.59	0.57	0.84	0.50	0.25	0.40
Healthcare Services Marketing						
1	1.00	0.35	0.89	0.00	0.50	0.20
2	0.95	1.00	1.00	0.16	0.00	0.00
3	0.72	0.78	0.94	0.50	0.50	0.20
4	0.72	1.00	0.73	0.33	0.00	-0.40
5	0.86	1.00	1.00	0.00	0.00	0.00
6	0.63	0.57	0.42	0.50	0.50	0.40
7	0.36	0.78	0.78	0.00	0.00	0.40
8	0.63	0.57	0.89	0.33	0.75	0.40
9	0.81	0.35	0.84	0.50	0.25	0.20
10	0.00	0.85	0.47	0.00	0.25	0.40
11	0.81	0.92	0.68	0.50	0.00	0.40
12	0.95	0.07	1.00	0.16	0.25	0.00
Essentials of Healthcare Law						
1	0.86	0.57	0.94	0.33	0.75	0.20
2	0.31	0.50	0.36	0.16	1.00	0.20
3	0.77	0.57	0.84	0.33	0.00	0.60
4	0.81	0.78	0.84	0.16	0.25	0.60
5	0.77	0.78	0.94	0.33	0.00	0.20
6	0.59	0.85	1.00	0.66	0.25	0.00
7	0.81	1.00	0.84	0.16	0.00	0.20
8	0.95	1.00	0.84	0.16	0.00	0.20
9	1.00	0.85	0.94	0.00	0.25	0.00
10	1.00	0.71	0.63	0.00	0.50	0.40
11	1.00	0.64	0.57	0.00	0.50	0.20
12	0.95	0.42	0.78	0.16	0.00	0.20
Health Services Problem Solving and Decision Making						
1	1.00	0.57	0.78	0.00	0.00	0.20
2	1.00	1.00	1.00	0.00	0.00	0.00
3	0.86	0.50	0.63	0.16	1.00	0.60
4	1.00	1.00	0.47	0.00	0.00	1.00
5	0.86	1.00	0.68	0.16	0.00	0.80
6	0.59	0.71	0.94	0.66	0.50	0.20
7	0.27	0.35	0.84	0.50	1.00	0.20
8	0.63	0.50	1.00	0.16	0.50	0.00

9	0.31	0.78	0.89	0.33	-0.25	0.40
10	0.91	0.50	0.26	0.16	1.00	0.00
11	0.59	0.92	1.00	0.83	0.25	0.00
12	0.91	0.78	0.78	-0.16	0.00	0.40
Seminar in Health Administration						
1	0.95	0.71	1.00	0.16	0.25	0.00
2	0.86	0.42	0.94	0.33	-0.25	0.20
3	0.95	0.57	0.94	0.00	0.50	0.20
4	0.95	0.64	0.94	0.00	0.50	0.20
5	1.00	0.64	0.94	0.00	0.25	0.20
6	1.00	0.35	0.94	0.00	0.75	0.20
7	1.00	0.71	0.89	0.00	0.75	0.40
8	0.45	0.78	0.68	0.66	0.50	0.40
9	1.00	0.78	0.94	0.00	0.50	0.00
10	0.72	1.00	0.68	0.83	0.00	0.20
11	0.95	0.78	0.94	0.16	0.75	0.20
12	1.00	0.57	0.94	0.00	0.25	0.00
Strategic Management						
1	0.95	0.78	0.52	0.16	0.50	0.60
2	0.77	0.71	0.84	0.16	-0.25	-0.20
3	1.00	1.00	0.68	0.00	0.00	0.60
4	0.81	0.78	0.94	0.50	0.25	0.00
5	0.86	0.78	0.89	0.33	-0.25	0.20
6	0.72	0.92	0.89	0.33	0.25	0.40
7	0.45	0.78	0.42	0.66	0.75	0.60
8	0.72	0.50	0.31	0.50	0.75	0.40
9	1.00	0.35	0.63	0.00	0.25	0.60
10	1.00	1.00	0.68	0.00	0.00	0.00
11	0.31	0.57	0.94	0.83	0.75	0.20
12	0.50	0.57	0.94	0.33	0.50	0.00

APPENDIX F

Point-Biserial Correlation Coefficients by Semester

Course Item Number	Point-Biserial Coefficient (r_{pbi}) Fall 2009 n=22	Spring 2010 n=14	Fall 2010 n=19
Healthcare Organization and Delivery			
1	0.273	a	**0.491***
2	0.042	-0.326	0.042
3	0.273	0.141	**0.347**
4	**0.384**	-0.143	-0.042
5	0.693**	**0.543***	a
6	0.170	**0.535***	a
7	**0.432***	0.679**	0.608**
8	0.042	a	**0.305**
9	**0.410**	**0.532**	0.204
10	**0.320**	0.743**	**0.436**
11	0.296	0.188	0.687**
12	-0.017	**0.404**	0.042
Ethics in the Health Professions			
1	**0.569****	0.693**	**0.329**
2	0.046	0.866**	0.078
3	0.680**	a	0.605**
4	**0.508***	**0.540***	**0.471***
5	**0.567***	0.819*	**0.492***
6	**0.324**	a	**0.329**
7	**0.472***	**0.363**	**0.380**
8	0.178	**0.568***	0.182
9	**0.308**	0.621*	**0.471***
10	0.183	-0.520	-0.005
11	**0.375**	-0.071	-0.039
12	0.083	0.211	0.117
Healthcare Administration History, Culture, and Language			
1	**0.551****	0.267	**0.684****
2	**0.379**	**0.382**	0.265
3	a	**0.377**	**0.412**
4	**0.460***	0.104	a

5	a	0.241	0.671**
6	**0.465***	0.295	a
7	**0.480***	0.671**	a
8	a	0.000	a
9	**0.477***	**0.467**	a
10	a	0.084	**0.359**
11	a	0.200	a
12	a	-0.063	0.249
Supervisory Management for Healthcare Leaders			
1	a	**0.357**	0.695**
2	**0.319**	**0.369**	0.234
3	0.187	a	0.027
4	0.246	0.283	a
5	0.166	**0.579***	**0.371**
6	**0.533***	0.127	0.234
7	0.613**	0.611*	0.709**
8	0.257	**0.435**	**0.373**
9	0.612**	-0.121	a
10	a	**0.394**	**0.587****
11	a	0.656*	a
12	**0.402**	**0.435**	0.645**
Human Resources in Healthcare Management			
1	**0.564****	0.803**	**0.349**
2	**0.470***	0.205	0.623**
3	0.681**	a	0.245
4	**0.353**	**0.316**	a
5	**0.437***	**0.490**	**0.447**
6	0.687**	0.074	**0.556***
7	**0.532***	a	0.181
8	0.224	**0.373**	0.660**
9	-0.084	0.673**	0.680**
10	**0.380**	a	a
11	**0.379**	**0.490**	**0.353**
12	**0.484***	0.205	0.175
Management of Health Information Systems			
1	**0.506***	**0.469**	0.695**
2	**0.459***	**0.576***	**0.578****
3	a	-0.100	**0.542***
4	0.249	-0.110	**0.537***
5	0.643**	**0.493**	0.733*
6	a	**0.598***	**0.354**
7	**0.482***	a	0.158
8	0.177	**0.469**	0.711**
9	**0.535***	0.269	0.761**
10	**0.403**	**0.495**	0.091
11	**0.644****	**0.388**	-0.028
12	**0.448***	0.238	0.178
Training and Professional Development in Healthcare			

1	-0.121	0.106	**-0.352**
2	0.226	**0.424**	0.000
3	0.226	a	**0.326**
4	0.252	**0.383**	**0.386**
5	0.234	**0.300**	a
6	**0.305**	**0.524**	**0.552***
7	0.011	**0.464**	a
8	**0.530***	a	0.236
9	**0.458***	0.128	0.677**
10	0.226	**0.599***	**0.529***
11	0.252	0.000	**0.432**
12	**0.517***	0.212	0.290
Employment Law in Healthcare Management			
1	a	a	0.203
2	0.295	-0.549*	a
3	0.296	0.605*	**0.357**
4	0.118	0.617*	a
5	**0.436***	0.609*	**0.396**
6	0.106	0.085	**0.528***
7	a	0.299	**0.355**
8	**0.441***	**0.354**	**0.413**
9	**0.419**	a	**0.487***
10	**0.450***	**0.482**	0.155
11	**0.356**	**0.321**	0.298
12	0.177	0.061	0.085
Principles of Accounting in Healthcare Management			
1	0.611**	0.242	**0.322**
2	0.611**	**0.533***	0.050
3	0.190	**0.547***	**0.522***
4	0.190	**0.424**	0.209
5	a	**0.394**	a
6	**0.590****	0.605*	0.161
7	**0.315**	**0.435**	a
8	**0.315**	**0.478**	**0.475***
9	0.275	**0.412**	-0.065
10	**0.395**	**0.474**	0.162
11	0.035	**0.453**	0.621**
12	**0.395**	**0.573***	**0.363**
Financial Management for Healthcare Managers			
1	**0.551****	**0.515**	0.797**
2	**0.378**	0.706**	**0.578****
3	0.749**	0.781**	0.740**
4	**0.339**	0.727**	**0.545****
5	**0.565****	0.136	**0.375**
6	a	**0.464**	a
7	**0.358**	0.256	0.040
8	0.604**	**0.447**	**0.430**
9	0.154	0.239	**0.542***
10	0.122	**0.583***	a
11	0.616**	0.640*	0.671**

12	0.081	**0.319**	**0.507***
Patient Care Management and Quality Improvement in Healthcare			
1	**0.415**	**0.462**	0.196
2	0.649**	-0.135	0.090
3	**0.439***	**0.442**	-0.076
4	**0.418**	a	**0.430**
5	**0.318**	-0.159	**0.388**
6	0.210	**0.347**	a
7	**0.355**	0.099	**0.531***
8	**0.487***	-0.347	**0.512***
9	0.016	0.287	**0.585****
10	0.105	**0.469**	a
11	**0.393**	0.272	0.782**
12	**0.458***	0.293	**0.425**
Healthcare Services Marketing			
1	a	0.277	0.059
2	0.244	a	a
3	0.609**	**0.359**	**0.587****
4	**0.457***	a	-0.175
5	-0.049	a	a
6	**0.353**	**0.595***	**0.447**
7	0.141	0.233	0.208
8	0.212	0.700**	0.695**
9	0.616**	**0.384**	0.141
10	a	**0.379**	**0.473***
11	**0.528***	0.057	**0.431**
12	0.244	0.143	a
Essentials of Healthcare Law			
1	**0.469***	**0.575***	**0.464***
2	0.188	0.724**	0.245
3	**0.355**	0.118	**0.412**
4	0.169	**0.567***	**0.412**
5	0.141	0.016	**0.464***
6	**0.527***	**0.444**	a
7	0.169	a	**0.412**
8	**0.401**	a	**0.412**
9	a	**0.314**	0.104
10	a	**0.387**	**0.421**
11	a	**0.526**	0.295
12	**0.401**	-0.118	0.031
Health Services Problem Solving and Decision Making			
1	a	0.160	0.188
2	a	a	a
3	0.096	0.726**	**0.505***
4	a	a	0.823**
5	0.208	a	**0.501***
6	**0.436***	**0.526**	**0.502***
7	**0.454***	0.783**	**0.458***
8	0.290	**0.384**	a
9	**0.355**	-0.319	**0.400**

10	**0.388**	0.811**	0.109
11	0.670**	**0.438**	a
12	-0.279	0.097	**0.353**
Seminar in Health Administration			
1	**0.468***	**0.388**	a
2	**0.395**	-0.355	0.213
3	0.217	**0.567***	0.718**
4	-0.034	**0.366**	0.213
5	a	**0.439**	0.718**
6	a	**0.366**	0.213
7	a	0.699**	0.677**
8	**0.459***	**0.599***	0.128
9	a	**0.599***	-0.040
10	0.727**	a	0.128
11	0.217	0.684**	0.718**
12	a	0.213	-0.040
Strategic Management			
1	**0.307**	**0.515**	**0.356**
2	0.263	-0.307	0.022
3	a	a	0.448
4	**0.509***	0.160	-0.045
5	**0.472***	-0.076	**0.435**
6	**0.392**	**0.525**	**0.435**
7	**0.520***	0.752**	**0.475***
8	**0.392**	0.728**	**0.461***
9	a	0.108	**0.570***
10	a	a	-0.130
11	0.711**	0.658*	0.299
12	0.090	**0.364**	-0.045

a = Correlation cannot be computed because one of the variables is a constant.
**. Correlation is significant at the 0.01 level.
*. Correlation is significant at the 0.05 level.
Bold items represent an effect size range from 0.30 to 0.60.

APPENDIX G

Healthcare Administration Competency and NEO-FFI Bivariate Correlation Results by Semester

Item	NEO-FFI Pearson Correlation (*r*)				
	N	E	O	A	C
Comprehensive Exam Total Score					
Fall 2009	0.046	-0.122	-0.102	**-0.374**	0.289
Spring 2010	0.062	0.285	-0272	0.089	-0.067
Fall 2010	**0.501***	-0.354	0.159	-0.164	**-0.536***
Healthcare Organization and Delivery					
Fall 2009	0.154	-0.113	-0.006	-0.244	0.069
Spring 2010	0.100	-0.090	-0.269	-0.093	0.169
Fall 2010	0.257	0.039	0.071	-0.330	-0.120
Ethics in the Health Professions					
Fall 2009	-0.218	0.004	0.128	0.033	-0.010
Spring 2010	0.172	**0.390**	**-0.536***	0.111	0.087
Fall 2010	-0.079	-0.037	0.036	-0.164	-0.003
Healthcare Administration History, Culture, and Language					
Fall 2009	0.124	-0.004	-0.213	**-0.363**	-0.004
Spring 2010	0.278	0.104	0.336	0.157	-0.119
Fall 2010	-0.290	0.085	0.202	**-0.401**	0.288
Supervisory Management for Healthcare Leaders					
Fall 2009	0.040	-0.109	**-0.353**	-0.197	0.204
Spring 2010	-0.216	-0.309	-0.236	-0.200	-0.157
Fall 2010	**0.369**	-0.130	-0.083	0.343	-0.082
Human Resources in Healthcare Management					
Fall 2009	-0.160	-0.091	-0.191	-0.243	**0.393**
Spring 2010	0.198	0.149	-0.307	-0.041	-0.278
Fall 2010	0.330	-0.240	0.252	-0.044	**-0.382**

Management of Health Information Systems					
Fall 2009	-0.116	0.024	-0.004	-0.151	**0.501***
Spring 2010	0.075	-0.112	0.006	-0.222	-0.073
Fall 2010	-0.068	-0.289	0.283	**-0.350**	**-0.357**
Training and Professional Development in Healthcare					
Fall 2009	0.325	**-0.445***	-0.039	-0.205	-0.012
Spring 2010	**0.475**	0.071	-0.280	0.000	-0.066
Fall 2010	0.000	0.133	-0.196	0.226	0.000
Employment Law in Healthcare Management					
Fall 2009	-0.143	-0.175	-0.142	-0.227	**0.512***
Spring 2010	0.163	-0.223	**-0.364**	-0.104	-0.197
Fall 2010	0.283	-0.035	-0.221	-0.132	-0.144
Principles of Accounting in Healthcare Management					
Fall 2009	-0.312	-0.052	0.112	0.245	0.040
Spring 2010	0.027	**0.513**	0.181	0.231	-0.064
Fall 2010	-0.054	-0.012	-0.046	-0.346	-0.040
Financial Management for Healthcare Managers					
Fall 2009	.0221	0.177	0.006	-0.105	0.174
Spring 2010	0.136	0.278	**-0.636***	0.185	0.215
Fall 2010	0.210	-0.021	0.220	0.123	-0.299
Patient Care Management and Quality Improvement in Healthcare					
Fall 2009	0.136	0.252	-0.138	-0.055	-0.154
Spring 2010	0.043	-0.030	-0.159	**-0.353**	-0.140
Fall 2010	0.338	-0.094	-0.162	-0.167	-0.215
Healthcare Services Marketing					
Fall 2009	0.118	**-0.369**	0.016	**-0.400**	0.115
Spring 2010	0.124	0.238	-0.301	**-0.375**	0.009
Fall 2010	0.267	-0.258	0.226	**-0.404**	**-0.518***
Essentials of Healthcare Law					
Fall 2009	0.048	-0.203	0.110	**-0.385**	0.281
Spring 2010	0.126	0.340	-0.017	0.149	-0.065
Fall 2010	0.004	-0.026	-0.096	0.279	-0.062
Health Services Problem Solving and Decision Making					
Fall 2009	0.192	-0.190	-0.005	**-0.501***	-0.122
Spring 2010	**-0.446**	0.156	-0.125	-0.254	0.192
Fall 2010	0.246	-0.164	0.012	0.086	0.122
Seminar in Health Administration					
Fall 2009	0.202	-0.057	**-0.416**	**-0.511***	-0.027
Spring 2010	-0.273	**0.615***	-0.031	0.337	0.221
Fall 2010	**0.432**	-0.244	-0.010	**0.511***	**-0.379**

Strategic Management					
Fall 2009	-0.074	-0.139	0.068	-0.238	0.218
Spring 2010	0.022	0.028	0.320	0.143	**-0.357**
Fall 2010	**0.465***	**-0.508***	0.074	0.007	**-0.447**

*statistical significance at the 0.05 level
**statistical significance at the 0.01 level
***statistical significance at the 0.001 level
Bold items demonstrate correlation with an effect size of 0.35 or greater

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