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Noncognitive Variables to Predict Academic Success Among Junior Year Baccalaureate Nursing Students

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Abstract

An equitable predictor of academic success is needed as nursing education strives toward comprehensive preparation of diverse nursing students. The purpose of this study was to discover how Sedlacek's (2004a) Noncognitive Questionnaire (NCQ) and Duckworth & Quinn's (2009) Grit-S predicted baccalaureate nursing student academic performance and persistence in the junior year, when considered in conjunction with academic variables such as previous college GPAs and the SAT. Three cohorts of junior year nursing students ($N = 150$) answered the survey, and their academic records were combed for previous college GPAs and SAT scores. After the junior academic year, these variables were regressed on junior year student grade point averages and persistence in the major (dependent variables) to determine predictors of academic success among this student group. Findings indicated that previous college GPAs were the most predictive of junior year success. These results impact the practice of nursing education in several ways, and lead to suggestions for further research.

Keywords: academic success, baccalaureate nursing students, nursing education, persistence, multiple regression, logistic regression, noncognitive variables, grit

Noncognitive Variables to Predict Academic Success

Among Junior Year Baccalaureate Nursing Students

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Chapter One: Introduction

Current demographic and legislative changes in the United Sates are expected to increase healthcare needs and escalate the demand for nurses (American Association of Colleges of Nursing, [AACN] 2012c). In fact, registered nursing is predicted to be the fastest-growing occupation in the next decade (United States Bureau of Labor Statistics, 2012). The United States Bureau of Labor Statistics (2012) anticipates a 26% increase, or 1.2 million new nursing jobs before 2020, as current nurses retire and aging baby boomers require more health care. In addition, the Patient Protection and Affordable Care Act of 2010 (ACA) expanded health insurance coverage to 32 million previously uninsured citizens. This improved healthcare access also increased the demand for registered nurses (RNs) (AACN, 2012b; Auerbach, Staiger, Muench, & Buerhaus, 2013). The preparation of more nurses is critical to meet society's needs and avert this pending public health crisis (AACN, 2012b).

The nursing shortage is a public health concern because nurses are needed in sufficient numbers to protect patient outcomes (Auerbach et al., 2013; Buerhaus, Staiger, & Auerbach, 2009). For example, when there are too few Registered Nurses (RNs) in hospital settings, Buerhaus, Staiger and Auerbach (2009) found that patients wait longer for nursing care, communicate less with inter-professional providers, and lodge more complaints than when nurse-to-patient ratios are higher. Van den Heede et al. (2009) discovered that RN staffing ratios on post-operative general surgery units directly correlated with in-patient survival rates. Similarly, Aiken et al. (2014) reported that nurse's patient care increases of just one patient per nurse increased the risk of patient death by 7%. In order to protect patient outcomes, sufficient numbers of nurses are needed in both inpatient and outpatient settings to provide a spectrum of healthcare services (Aiken et al., 2014; Buerhaus et al., 2009).

The educational preparation of nurses also impacts patient care; baccalaureate- prepared nurses have been associated with better patient outcomes than associate- or diploma- prepared nurses. Decreases in adverse patient events such as bedsores, failure to rescue rates, and post-operative deep vein thromboses, as well as shorter hospital stays, were directly correlated to staffing with baccalaureate prepared nurses (Blegen, Goode, Shin Hye, Vaughn, & Spetz, 2013; Kutney-Lee & Aiken, 2013). Aiken et al. (2014) found that among 300 European hospitals, a 10% increase in bachelor- prepared nurses reduced the likelihood of patient death by 7%, and concluded that increasing the overall number of baccalaureate nurses would reduce preventable hospital deaths. Researchers agree that an increased number of nurses, and especially baccalaureate prepared nurses, is essential to patient care quality and health outcomes (AACN, 2012; Aiken, Clarke, Chung, Sloane, & Sieber, 2003; Aiken et al., 2014; Blegen et al., 2013).

In addition to the demonstrated need for better educated nurses in sufficient numbers, the workforce requires more demographic diversity in order to improve patient outcomes**.** The Health Resources and Services Administration (HRSA, 2006) systematically reviewed studies to assess racial and cultural diversity of the healthcare workforce and its impact on patient outcomes. Among 36 studies reviewed, when patients and their practitioners had race, ethnic and language similarities, health services utilization and quality was improved (HRSA, 2006). Healthcare provider diversity provided greater opportunity for patients to see practitioners who shared a cultural background and language, which enhanced "communication, comfort level, or trust in patient-practitioner relationships and thereby improve[d] partnership and decision making" (HRSA, 2006, p. 7). HRSA also found that the positive relationships between patients and their primary healthcare providers increased public trust in the healthcare system in historically underserved areas, and led to more frequent and appropriate use of health care

services, although further research was recommended to confirm this finding (HRSA, 2006). Furthermore, HRSA's systematic review found 17 separate studies of service patterns that demonstrated healthcare providers of color were more likely to work in medically underserved and poverty-stricken geographic locations, increasing access to health services for these vulnerable populations (HRSA, 2006). For instance, Bach, Pham, Schrag, Tate, and Hargraves (2004) found that 22 percent of surveyed Black Medicare recipients visited African- American physicians, who comprised only about 4.5 % of the nation's physicians. They noted that this finding was likely due to Black physicians locating their practices in communities of color, as well as Black patients seeking out African-American physicians (Bach et al., 2004). The Sullivan Commission (2004) predicted that "increasing diversity in the health care professions will improve health care access and quality for minority patients and assure a sound health care system for all of our nation's citizens" (p. 13). Several authors since Sullivan (2004) have echoed this strategy of diversifying the workforce to improve both quality and access to care in order to advance our nation's health (Aiken, 2011; Beacham, Askew, & Williams, 2009; Buerhaus et al., 2009; Dapremont, 2011; Phillips & Malone, 2014; Sutherland, Hamilton, & Goodman, 2007).

The current homogenous demographic of the White nursing workforce cannot keep pace with the needs of the nation's heterogeneous patient population (Beacham et al., 2009; Childs, Jones, Nugent, & Cook, 2004). In 2011, only sixteen percent of nurses in the U.S. were people of color, even though 39% of the nation's population was non-white (AACN, 2014; United States Census Bureau, 2014). The disparate scarcity of racial diversity among nurses contributes to inequitable health care (HRSA, Health Resources and Services Administration Bureau of Health Professions, 2006), and can be traced to historic inequalities of educational opportunities

among the health professions (Institute of Medicine, 2004). More ethnic diversity among nurses, along with more baccalaureate-prepared nurses is needed to meet the healthcare needs among an increasingly diverse patient population (AACN, 2011; Institute of Medicine [IOM], 2004, 20011; Sutherland et al., 2007). These demographic and sociopolitical elements drive nursing education programs to examine ways to meet the demand for high quality, patient-centered health care (IOM, 2011; Phillips & Malone, 2014). This study explored nonacademic student variables that may predict academic success of baccalaureate nursing students during their junior year, to increase the number and diversity of the baccalaureate nursing workforce, and ultimately improve patient care.

Context of Study

As a community health nurse-turned-educator, I am committed to increasing the educational preparation and diversity of the nursing workforce (AACN, 2014; NLN, 2016): this commitment drives my research. Though not typical of quantitative research, I disclose my position as a researcher and educator within the program of interest in this study. My particular public health lens frames my decision to conduct this research at the local level, using a pragmatic, post-positivist approach. Post-positivism is a research philosophy that acknowledges a researcher's perspective and recognizes human behavior as quantifiable yet prone to societal influences (Crossan, 2003). Because organizational context and behaviors impact student persistence (Reason, 2009), the student success and nursing research tradition of a single-institution focus is appropriate for this work and minimizes institutional variables that could confound findings. My global concern for public health and nursing is grounded in the microcosm of students I observe within my particular educational setting, and they provide the inspiration for this research.

The site of this research is a liberal arts college located in central New York State with a total enrollment over 5,000 students, and an on-campus undergraduate enrollment of about 2,700 students. The school offers bachelor's, master's, and pre-professional degrees, including 36 undergraduate majors, 27 minors, and 21 graduate programs delivered on-campus and on-line. The liberal education core provides a foundation for the undergraduate academic programs and emphasizes emerging disciplines such as cyber security and economic crime, as well as areas of high market need such as nursing and other health professions (College, 2012).

The student body of this institution is comprised of 59% women and 41% men from 45 states and 20 countries. In recent years, over 25% of enrolled undergraduates have been the first in their family to attend college, and more than 25% of the full-time undergraduates identified themselves as students of color. More than 95% of full-time undergraduate students received financial aid at this school (College, 2012). Seventy-two percent received federal loans, and 38% of students were awarded Pell Grants in 2011 (Student Financial Aid Office, 2011). The nursing majors at this institution reflect the diversity of the overall student body, and are described in Chapter Three. These baccalaureate nursing students were the focus of my research, as I expect them to be the highly educated, ethnically and socioeconomically diverse nursing workforce that will improve population health.

Baccalaureate Nursing Education

The number of baccalaureate-prepared nurse graduates more than doubled in the United States between 2002 and 2010 (Auerbach et al., 2013). Yet education programs have not kept pace with the demand for baccalaureate- educated nurses due to insufficient educational resources and academic challenges (AACN, 2011, 2012a).

Educational resource constraints. While the number of applicants to baccalaureate nursing programs increased five percent in 2011, upwards of 50,000 qualified applicants were denied admission due to insufficient number of faculty and other clinical resources (AACN, 2012c; Ellenbecker, 2010). Only 1% of all nurses have been educated at the academic doctoral level, the preferred degree of nursing professors and researchers (HRSA, 2010; Nickitas & Feeg, 2011), and enrollment trends in nursing-related PhD programs have been generally flat for the last decade (Ellenbecker, 2010; Nickitas & Feeg, 2011). Because advanced practice nurse clinicians (i.e. nurse practitioners, nurse anesthetists) earn higher incomes than nurse educators with similar academic preparation, there is little incentive for highly educated nurses to enter academia (AACN, 2012b). Furthermore, 59% of nurse educators are over the age of 50, so retirements will exacerbate the current faculty shortage in the upcoming years (Ellenbecker, 2010; HRSA, 2010). In addition to resource barriers that limit nurse education programs, academic challenges often block student progress toward entering the nursing workforce.

Nursing student admissions. Due to limited faculty resources, student admission processes for nursing majors are often selective. Nursing schools examine academic variables such as high school grade histories (Beeson & Kissling, 2001; Grossbach & Kuncel, 2011; Seldomridge & DiBartolo, 2004) and standardized test scores (e.g., SAT) to select capable students (Grossbach & Kuncel, 2011; Stuenkel, 2006). Science grades, in particular, have been statistically significantly related to nursing academic success (Lewis & Lewis, 2000; Newton, Smith, Moore, & Magnan, 2007; Wolkowitz & Kelley, 2010). Nurse educators have also recently started to examine applicant's nonacademic characteristics to promote diversity in concordance with their institution's mission, similar to practices among medical colleges (American Association of Medical Colleges, 2014). The American Association of Colleges of

Nursing (2016) has responded with holistic admission practices that consider student applicants individually, based on "experiences, attributes and academic metrics" (AACN, 2016, p. 1), though this practice is not yet widespread.

Several baccalaureate programs also rely on commercial nurse entrance examinations to help select the most qualified applicants (Alameida et al., 2011; Newton & Moore, 2009; Newton et al., 2007; Stuenkel, 2006). For instance, the Test of Essential Academic Skills (TEAS, Nursing Education Assessment Technologies Institute, 2014) assesses academic readiness for candidates to the nursing major through measures of reading comprehension, English language, mathematics and science abilities (Newton et al., 2007; Wolkowitz, 2011). The TEAS correlated with performance on a first-semester nursing exam (Wolkowitz & Kelley, 2010), grades earned in a nursing fundamentals course (Díaz, Sánchez, & Tanguma, 2012), and on first-semester nursing GPAs (Newton et al., 2007). Benefiel (2011) also found the TEAS helpful to identify academically at-risk nursing students. Yet these academic predictors of student performance have met with limited success, as up to half of baccalaureate nursing students do not complete their major (Newton & Moore, 2009; Peterson, 2009).

Nursing student persistence. Among baccalaureate nursing students accepted to nursing, academic difficulties are the most common reason students leave the nursing major (Brown & Marshall, 2008; Newton & Moore, 2009; Peterson, 2009). To better explain nursing student success, McGann and Thompson (2008) examined students' collegiate academics, and found that the number of C grades students received in pre-requisite science courses negatively correlated with performance in nursing courses, resulting in dismissal from the major. Hundreds of thousands of dollars are spent on students who do not complete nursing programs and cannot enter the nursing workforce, which in turn retards efforts to meet national healthcare service

demands (Peterson, 2009). Academic attrition rates nearing 50 % among nursing students (Newton & Moore, 2009) carry unacceptable financial and social costs for students (McGann & Thompson, 2008; Urwin et al., 2010), as well as for higher education institutions and the nursing profession (Peterson, 2009; Seldomridge & DiBartolo, 2004).

Childs et al. (2004) conducted a literature review that demonstrated that persistence rates of African American nursing students lagged behind those of their White counterparts, and identified academic isolation and socio-cultural discordance as primary factors that impacted under-represented nursing student persistence. It is crucial to retain and graduate nursing students, and especially students of color, to meet national healthcare needs (Childs et al., 2004), and several authors have advocated particular strategies to support success of under-represented students in nursing programs (Brown & Marshall, 2008; Childs et al., 2004; Dapremont, 2011; Jeffreys, 2007). The limited capacity of nursing programs, the current workforce shortage, and lack of diversity among healthcare workers point to the need to carefully assess nursing students to efficiently meet the societal need for more baccalaureate prepared nurses (Childs et al., 2004; Hopkins, 2008).

Nursing student testing practices. High stakes cognitive tests drive nursing curricula, and have been a primary means of performance prediction and assessment since the 1940s, when standardized aptitude and ability tests became widespread in nursing education (i.e. Berg, 1947; Sartain, 1946). In 1970, Lysaught's study of nursing and nursing education reported a societal undervaluing of the scientific knowledge and technical skills needed for the profession, and recommended research into more precise measures of nursing tasks and knowledge, rather than a focus on the relational caregiving practices nursing (Benner, Sutphen, Leonard, & Day, 2010; Lysaught, 1970). When a standardized licensing exam for registered nurses became nationally

accepted in 1978 (National Council of State Boards of Nursing [NCSBN], 2014), education programs emphasized test-taking even more heavily to assess performance and to prepare students for the licensing exam (Seldomridge & DiBartolo, 2004). In fact, in a survey of 1,573 nursing faculty, Oermann, Saewert, Charasika, and Yarbrough (2009) found that the nursing program's pass rate on the RN licensing examination was the most important factor in determining student assessment strategies. In Oermann et al.'s 2009 survey, evaluation of nursing student progress relied largely on tests which assessed cognitive domains, while the affective learning domains were assessed through more formative assessments such as direct observations, reflective journaling and participation in class and clinical settings (Oermann et al., 2009).

Cognitive assessments in nursing education are intended to ultimately protect the public from incompetent or poorly-educated nurse candidates (National League for Nursing [NLN], 2012; NCSBN, 2014), and are essential as a means of assessing nursing students' knowledge and critical thinking (Benner et al., 2010). Yet, the over-emphasis on cognitive knowledge and standardized exams also carries certain liabilities. High stakes cognitive testing practices may prevent otherwise qualified students, especially those from traditionally marginalized student groups, from entering the profession (NLN, 2016). Research among diverse college students has demonstrated that standardized tests are biased to disadvantage particular groups of students (AACN, 2011; Hopkins, 2008; Sacks, 2007; Solórzano, 2008; Steele, 1999). For instance, women have historically fared worse than men on standardized tests (Sacks, 2007; Sedlacek, 2004a), and students of color often do not test as well as their white peers (NLN, 2012; Alameida et al., 2011; Bowen & Rudenstine, 2003). Furthermore, standardized tests do not predict academic success particularly well as defined by grades and persistence, especially among non-

traditional college students (Lemann, 2000; Sacks, 2007; Sedlacek, 2004a). For example, Adebayo (2008) found that a college entrance exam was not predictive of academic success among 143 conditionally admitted students. Despite the need to attract baccalaureate- prepared individuals from diverse population segments to the workforce (AACN, 2011), certain groups of under-represented students are disadvantaged by high-stakes standardized assessments (NLN, 2012; Sedlacek, 2004a). Although cognitive tests are an essential part of assuring qualified students become competent RNs, an over-reliance on one type of assessment has stymied the profession's efforts to diversify its workforce and address race-based health disparities (Beacham et al., 2009; NLN, 2016; Phillips & Malone, 2014).

Alternate Predictors of Nursing Student Academic Success

An equitable, valid predictor of academic performance among diverse students could improve student persistence and nursing education efficiency (Beeson & Kissling, 2001; Peterson, 2009; Sacks, 2007). Much research has been conducted about various psychosocial, non-academic predictors of general college success, often with positive results (Allen, Robbins, & Sawyer, 2010; Kyllonen, 2012; Kyllonen, Walters, & Kaufman, 2011; Lee, Vaishnavi, Lau, Andriole, & Jeffe, 2007). Yet in nursing education, little research about these noncognitive factors was noted in the literature.

Two instruments that query non-academic (also called noncognitive) variables, the NCQ (Sedlacek, 2004a; Tracey & Sedlacek, 1984) and the Grit-S (Duckworth & Quinn, 2009), have yielded predictive results of academic success among college students in the past, and were selected for this study to survey baccalaureate nursing students. The NCQ has identified eight distinct nonacademic variables that predicted college success among a variety of student groups (Tracey & Sedlacek, 1988). For instance, the NCQ queried international students (Boyer &

Sedlacek, 1988), student athletes (Eiche, Sedlacek, & Adams-Gaston, 1997; Ting, 2009), Asian American (Fuertes, Sedlacek, & Liu, 1994; Ting, 2000), and African American students (Nasim, Roberts, Harrell, & Young, 2005; Schwartz & Washington, 2002) to discover NCVs that contributed to academic success over the past thirty years. These NCQ variables identified positive (academic) self- concept or confidence, negotiating the system/ racism, realistic (academic) self- assessment, preference for long-range goals, availability of a strong support person, leadership experience, demonstrated community service, and knowledge acquired in a field (Sedlacek, 2004a). The NCQ total score and particular noncognitive variables (NCVs) have predicted academic success, indicated by college grade point averages, persistence and graduation rates, over and above standardized tests, especially for non-traditional college students (Sedlacek, 2004a).

Grit is a more recently studied nonacademic attribute defined as a perseverance quality of successful individuals not captured by standardized cognitive tests (Duckworth, Peterson, Matthews, & Kelly, 2007; Tough, 2012). The Grit scale predicted achievement in samples as diverse as Scripps National Spelling Bee contestants and the West Point United States Military Academy cadets, as well as among diverse groups of college undergraduates (Duckworth et al., 2007; Strayhorn, 2013). A gritty individual is one who single-mindedly works toward long-term goals, despite barriers and setbacks to progress (Duckworth et al., 2007). The baccalaureate nursing student must work through several years of carefully sequenced, academically rigorous coursework. In addition, nursing students alter their lifestyles and schedules to accommodate clinical laboratory and practice experiences that include early mornings, late nights and weekends (Benner et al., 2010). Grit is essential to meet the challenging academic demands of nursing school, and was measured via Duckworth and Quinn's Grit-S (2009) in this study. The

Grit-S and the NCQ are more holistic than the traditional cognitive assessments, and together may contribute to our understanding of baccalaureate nursing student academic success.

Statement of the Problem

Theories of holistic intelligence (Gardner, 1993; Sternberg, 1999) were useful frameworks for this research. Specifically, both Sternberg (1999) and Gardner (1993) explained the need to define intelligence broadly, especially among students from diverse backgrounds. These theories of multiple types of intelligence argue that cognitive assessments alone cannot adequately measure ability and intelligence for a variety of students with different life experiences and strengths (Gardner, 1993; Sternberg, 1999). A broader assessment of cognitive and noncognitive attributes may yield better diagnostics of student strengths and challenges that could in turn impact admissions and programming decisions to enhance academic success among student nurses.

Nursing student success studies have been historically conducted within one institution (e.g., see Berg, 1947; Hayes, 1981; Lockie, Van Lanen, & McGannon, 2013; Sartain, 1946; Seldomridge & DiBartolo, 2004; Yocom & Scherubel, 1985). Similarly, much of the research on student persistence has been narrowly studied in one, or just a few institutions because institutional context matters when studying student success (Reason, 2009). Allen et al. (2010) suggested single-institution methods to assess psycho-social factors (PSFs) or NCVs[1] to identify predictors of academic performance, with consideration for particular student support services available. This local approach was important to account for the variety of institutional missions, curricula and processes (Reason, 2009). Furthermore, nursing education has not yet settled upon

[1] The terms noncognitive variables (NCVs) and psychosocial factors (PSFs) are interchangeable in this work, and refer to non-academic factors that impact student performance, depending on the cited researchers' preferred term.

stable factors that predict nursing student success across multiple settings, so research within a particular institutional context to assess a multitude of variables was appropriate for this work.

The current study utilized sequential regression for a systematic view of student factors that impacted academic success, following a tradition of regression methods in studies of student NCVs and success within one institution (e.g., see Duckworth et al., 2007; Eiche et al., 1997; Sedlacek, 2004a; Ting, 2003, 2009). Among nursing students, correlational evidence regarding predictive PSFs or NCVs is scant. To develop a broader appreciation of nursing student academic success, research should include a multitude of cognitive and noncognitive variables, analyzed through regression methods. Within the current context of nursing workforce needs and high failure and attrition rates in nursing education programs (Newton & Moore, 2009; Peterson, 2009), it is critical to explore NCVs that promote academic achievement.

The Noncognitive Questionnaire (NCQ, Sedlacek, 2004a; Tracey & Sedlacek, 1984) and the Grit-S (Duckworth & Quinn, 2009) have never assessed baccalaureate nursing students, so I target this gap in my research. The traditional, cognitive, exam-based nursing curriculum does not give a complete picture of potential future nurses, and a survey of non-academic factors could more equitably evaluate student strengths from a range of backgrounds (Beeson & Kissling, 2001; Sedlacek, 2004a). Understanding student noncognitive characteristics as well as academic measures is crucial to increase the effectiveness of nurse education programs and ultimately enhance the nursing workforce.

Purpose and Significance of this Study

The purpose of this study was to discover how specific nonacademic variables alone or in conjunction with cognitive measures correlated with these baccalaureate nursing students' academic success, defined as junior year GPA and junior year persistence. Specifically, I

examined whether student responses to an instrument that combined the Grit-S (Duckworth & Quinn, 2009) and the Noncognitive Questionnaire (NCQ, Sedlacek, 2004a) adequately predicted academic success by answering the following questions.

Research Question 1: Do specific noncognitive variables as measured by Sedlacek's NCQ (2004a) and Duckworth and Quinn's Grit-S scale (2009) predict baccalaureate nursing student academic success, as defined by junior year GPA and persistence?

Research Question 2: Do certain background variables, specifically age, gender, race, SAT scores, or previous college GPA impact baccalaureate nursing student academic success, as defined by junior year GPA and persistence?

Research Question 3: Do particular combinations of noncognitive and academic variables predict baccalaureate nursing student academic success, as defined by junior year GPA and persistence, when controlling for demographic variables (age, gender, race)?

This research is important because little research has examined noncognitive factors' effect on nursing student academic success, and cognitive assessments alone are not adequate (Lemann, 2000; Sedlacek, 2004a). The third collegiate year (junior year) is a critical time for baccalaureate nursing students, when all pre-requisite courses are finished and nursing major classes comprise their schedule. As the profession seeks to increase and diversify the nursing workforce, complementary predictors of academic success may greatly benefit nursing programs. This research contributes to our understanding of baccalaureate nursing students, and practice implications impact decision-making processes within baccalaureate nursing programs concerning the admission and progression of students.

Definitions

Academic success: Defined specifically by students' academic achievement, and measured by grade point averages (GPAs) and persistence (continued enrollment in the nursing major).

Academic variables: traditional measures to mark student progress, including previous coursework, grades, test scores, and grade point averages (GPAs).

Baccalaureate Nursing Program: A four-year academic curriculum within an accredited college or university, with a major in nursing (culminating in a Bachelor of Science [B.S.] degree).

Cognitive variables: Synonymous with academic variables, and generally measured by standardized tests or course grades, commonly considered measures of intelligence and/or academic potential.

Grade Point Average (GPA): A generally accepted measure of academic success in the U.S., calculated by a weighted average of college level course grades, measured on a 0-4 scale.

Grit: "trait -level perseverance and passion for long-term goals…[grit] entails the capacity to sustain both effort and interest in projects that take months or even longer to complete." (Duckworth & Quinn, 2009, p. 166). Grit is considered an important noncognitive variable in this study.

Grit-S: An eight-item scale to measure Grit (Duckworth & Quinn, 2009), developed from the original twelve-item Grit survey (Duckworth et al., 2007)

Junior year: The third academic year of a four-year baccalaureate degree, comprised of two semesters (fall, spring).

Junior year GPA: GPA earned during the junior year, calculated by a weighted average of fall and spring GPAs following the junior year.

Junior year persistence: Persistence through the junior year, measured by continued enrollment following the junior year.

Noncognitive questionnaire: (NCQ) is a specific survey instrument designed by Tracey and Sedlacek (1984, 1988) to identify eight specific noncognitive variables identified through confirmatory factor analysis.

Noncognitive variables: (NCVs) also referred to as *psychosocial* or *non-academic factors or characteristics,* not related to cognition or intelligence. Specific noncognitive factors in this study include *Grit* (Duckworth et al., 2007) and the eight variables identified by Tracey and Sedlacek (1984, 1988).

Non-traditional student: A college-level student whose background is not that of "White middle-class males of European descent" (Sedlacek, 2005a, p. 3). This student is more likely to experience marginalization in American colleges based on differences of gender, culture, skin color, country of origin, or sexual identification/orientation.

Nursing students: Students currently attending entry-level baccalaureate (4-year) pre-licensure nursing programs. Students of associate (2-year) pre-licensure nursing programs are included in this definition where indicated in this work.

Persistence: A generally accepted measure of academic success, measured by continued enrollment. For nursing majors at the institution studied, this requires a cumulative GPA of 2.5 or better.

Psychosocial Factors: (PSFs) a broader term than NCVs, and includes Sedlacek's NCVs (2004a) and grit (Duckworth et al., 2007), as well as other aspects of "behavioral, attitudinal, and personality constructs" (Allen et al., 2010, p. 2). In this study, NCVs and PSFs are synonymous.

Transfer student: a student who changes higher education institutions for more than one academic semester, quantified as more than 17 academic credits in this study (Peter & Cataldi, 2005).

Summary

This chapter introduced the current shortage and lack of diversity among nurses, and the negative impact these conditions have had on patient populations. Current critical challenges face nursing education, including a scarcity of faculty and other resources, as well as particular concerns for academic success and high rates of attrition among baccalaureate nursing students. Traditional cognitive predictors of academic success and supplemental noncognitive measures were reviewed next, and a gap in the research about nursing student academic success was identified. Based on holistic theories of intelligence, two measures, the Grit-S (Duckworth & Quinn, 2009) and the NCQ (Sedlacek, 2004a), were proposed to assess baccalaureate nursing students. Chapter One outlined the importance and the purpose of this study: to discover how specific noncognitive variables (NCVs) alone, or in conjunction with cognitive measures, correlate with baccalaureate nursing students' academic success, defined as junior year GPA and persistence. With mounting national nursing workforce concerns and the role that baccalaureate nursing education plays to alleviate these concerns, this research contributes to understanding how to predict the academic success of diverse baccalaureate nursing students.

Organization of the Chapters

To understand the background of this study, researches associated with predictors of academic success, rooted in the history of nursing education are discussed in the next chapter. Then literature related to the holistic intelligence theories of Sternberg (1999) and Gardner (1993) are presented, along with an in-depth discussion of studied constructs and instruments

used in this study. Previous research about academic success among baccalaureate nursing students is offered near the end of Chapter Two to point to the need for the current study. Chapter Three explains the methods of this study, beginning with the rationale and research questions. Then the research design, participants, data collection, management and analyses of this study are discussed. In Chapter Four, I present the findings from this research. Following descriptive statistics of the variables used in this study, hierarchical and logistic regression elucidate the findings about the academic success predictors among nursing students. Chapter Five interprets the results within the context of relevant literature, along with implications for nursing education practice. Finally, study strengths and limitations are shared and ideas for further research are suggested.

Chapter Two: Review of the Literature

The purpose of this study was to explore noncognitive predictors (including grit) of academic success among junior year baccalaureate nursing students. This literature review supports this inquiry, starting with a historical overview of nursing education and baccalaureate nursing student success within the context of higher education. Select theories of intelligence and learning guided the study of noncognitive factors that have been found to predict students' academic success (Gardner, 1993; Sternberg, 1999), and were applied in a particular local academic setting (Reason, 2009). This chapter also explored research utilizing the instruments for this study, namely Tracey and Sedlacek's Noncognitive Questionnaire (NCQ, 1984, 1988) and Duckworth and Quinn's Grit-S (2009). The bulk of previous research about nursing student success demonstrated that academic indicators of performance have shaped current practices in nursing education. As academic predictors account for only one aspect of student performance, this study investigated more holistic noncognitive variables that Sedlacek (2004a) and Duckworth (2009, 2013) identified, in order to predict academic success among baccalaureate nursing students.

Historic Context of Nursing Education

The current national nursing workforce shortage and the need for diversity is better understood from an examination of the history of American nursing education. This section describes the trends in nursing education and nursing student success research. Generally, as nursing education became a standardized professional academic path, student success measures also became cognitively-based and standardized.

Driven by external economic, ideological, and sociopolitical forces, the nursing vocation was initially intended exclusively for white women (O'Lynn & Tranbarger, 2007). During the

19th century, Victorian values impacted Florence Nightingale's influential writings (Nightingale, 1858, 1859) and the American Medical Association's (AMA's) first ideas of nursing. The AMA (1869) required that nursing candidates be physically strong women who met specific Victorian feminine ideals: 23 to 35 years of age, unmarried, submissive, sensitive, refined, discreet, and honest (1869; Chitty & Black, 2011). While the White male physicians of the AMA specified gender as a criterion for early nursing students, the report implicitly excluded People of Color as viable nursing candidates (AMA, 1869). The ideological context of the Victorian era drove these venerable doctors to target the Florence Nightingale protégés, possessing "high birth, excellent education, and great refinement" (AMA, 1869, p. 165). Recently emancipated slaves were not part of the AMA's nursing equation, as "Black women were not perceived as women in the same sense as women of the larger (i.e., White) society" (Perkins, 1989, p. 154). The AMA's Committee on Nursing recommended the institution of American nursing based upon specific physical and social criteria (AMA, 1869).

Early Nursing Education Programs

American hospitals financed, managed and housed early nursing schools. From the 1860s through the early 1900s, nursing students staffed hospitals exclusively, with only one or two paid supervisory staff managing their work and education. Students learned through an apprenticeship with physicians, often working long hours in substandard conditions, and managed laundry and kitchen duties in addition to patient care responsibilities (Goodnow, 1948; Hine, 1989). By 1928, there were 1,078 nurse training programs administered through hospitals (Carnegie, 1995) and their primary aim was to provide a low-cost cadre of caregivers in the hospital, rather than to educate future nurses (Goodnow, 1948; Hine, 1989).

Due to the reliance on student nurses for hospital labor, early studies of their success were undertaken in the interest of hospital economics. Student applicants were chosen on the basis of physical characteristics, rather than academic preparation or aptitude. Before 1930, most nursing schools required only an elementary education; many physicians opposed academic preparation of nurses because education was thought to "endanger the fine spirit" of these women (Goodnow, 1948, p. 264).

To be admitted to an apprentice-style nurse training school at the turn of the century, a candidate was expected to be White, well-bred and female, though a few northern schools allowed "*one* Negro [*sic*] and *one* Jewish student to be accepted each year" (Hine, 1989, p. 6). Students worked for their room and board, and lived on patient wards to enable on-call duty 24 hours a day (Berg, 1947; Goodnow, 1948). In 1930, nearly 20% of hospitals required a 70 hour work week of student nurses, although more progressive institutions set limits of 48 hours per week, excluding classroom time (Goodnow, 1948). Students were trained at the bedside by medical interns, without textbooks or examinations, and a diploma was granted when the sponsoring hospital felt the student nurse had completed their training, usually after about three years (Goodnow, 1948). It is no wonder that when queried in 1924, two hundred and fifty nurses reported the most essential characteristics for occupational success were "good health, endurance, and good feet" (Blazier, 1924, cited in Berg, 1947, p. 394).

Racial segregation of the early twentieth century necessitated a parallel but inferior nursing education system for African Americans (Hine, 1989; Young, 2005). In separate hospitals for Black Americans, most medical care was provided by family members or self-appointed nurses without any formal training (Hine, 1989). The high rate of morbidity and mortality among Black Americans caught the attention of philanthropic foundations led by John

D. Rockefeller, Andrew Carnegie and Julius Rosenwald; they provided startup monies for Black hospitals and nurse education programs which mirrored the White system in curriculum, regulations and rights of the students.

Student applicants to these segregated hospital schools were required only to be Black, female and healthy. There were no academic pre-requisites, and many had little more than rudimentary reading and math skills (Hine, 1989). Unfortunately, these hospitals and training facilities were so underfunded that few survived (Hine, 1989). In order to continue, some Black nursing education programs affiliated with historically Black universities early in the twentieth century, as in the case of Atlanta Baptist Female Seminary (Spelman College), John A. Andrew Hospital and School of Nursing (Tuskegee Institute) and the Freedmen's Hospital Nursing School (Howard University), among others (Hine, 1989).

Nursing Education Transitions to Academic Institutions

Nursing education programs for both Blacks and Whites began to partner with colleges and universities during the first part of the twentieth century. The Goldmark Report, officially titled *Nursing and Nursing Education in the United States: The Report of the Committee for the Study of Nursing Education*, reviewed 23 traditionally White hospital-based nursing programs from 1918-1922. After discovering widespread student abuses and lack of educational standards, Goldmark (1923) advised nursing education programs to affiliate with academic institutions in order to standardize and legitimize an undergraduate curriculum in nursing. The Goldmark Report prompted several nurse training programs to transition to academic institutions, including the University of Minnesota School of Nursing (Goodrich, 1936; Green, 1993),Yale University School of Nursing (Varney, 2001) and Western Reserve School of Nursing in Cleveland, Ohio (Goodnow, 1948). Yet most nurses continued training in hospital-based programs, prompting

the dean of the Yale School of Nursing to advocate for more professional nursing education in 1936, more than a decade after the Goldmark report (Goodrich, 1936).

Two years after the Goldmark Report, the Rockefeller Foundation commissioned Ethel Johns to investigate the status of Black nursing education programs. In the fashion of the Goldmark Report, Johns assessed 23 nursing programs that admitted African Americans in 11 states (Hine, 1982; Young, 2005). The Johns Report unearthed such deplorable training and working conditions for Black student nurses that it shocked the Rockefeller Foundation Trustees, who essentially buried the report (Hine, 1982). Nevertheless, the untenable conditions of all-Black teaching hospitals and the shift of predominantly White nursing programs to academic institutions prompted more African American nursing education programs to affiliate with colleges and universities (Carnegie, 1992).

Following World War II, Esther Lucille Brown's *Nursing for the Future* highlighted the shortage of nurses and lack of student applicants to current hospital-based programs (Kalisch & Kalisch, 2004). The Brown Report recommended academic preparation rather than hospital apprenticeship for nurses, including specific education in the natural and social sciences (ANA, American Nurses Association, 1948). This report coined the term "professional nurses" to refer to students who graduated from a university or medical school, and proposed a national professional accreditation process to assure standards across nursing programs (ANA, 1948, p. 737). The report was opposed by hospital administrators and physicians who preferred the traditional model of hospital-diploma programs, presumably to maintain financial and pedagogical control of nursing (Kalisch & Kalisch, 2004). The parties compromised by developing the associate degree in nursing program that grew with the community college movement during the 1950s and 1960s. This curriculum enabled students to meet basic nursing

requirements in two or three years, and shifted more nursing programs into higher education systems (Kalisch & Kalisch, 2004). In 1965, the American Nurses Association Committee on Nursing Education (1965) recommended that all professional nurse education programs move toward the baccalaureate degree, but was met with resistance from the popular associate degree in nursing programs in community colleges nationwide. The debate over the preparation of registered nurses is steeped in history and continues today (Chitty & Black, 2011; Kalisch & Kalisch, 2004).

History of Nursing Student Success Research

Research of nursing student success during the early twentieth century was conducted in the interest of hospitals that lost nearly 40% of their workforce through student attrition (Berg, 1947; Goodnow, 1948; Sartain, 1946). For example, Berg (1947) studied factors predicting academic success of students at a nurse training program affiliated with the University of Illinois. Berg (1947) administered a battery of entrance tests to nursing students *(N* = 110) in 1943-1944, and found that students who left the program due to academic failure scored statistically lower on three of the four predictor exams that measured both cognitive and noncognitive attributes (the A.C.E. Psychological Examination, the George Washington University Series of Nursing Tests, and the Preference Record and the Multiple Choice test). Berg (1947) also found that physical stature, as measured in body weight, correlated with persistence patterns. Students who were unsuccessful academically weighed less (mean weight = 121.5 pounds), than their persistent classmates (mean weight = 133 pounds), while those that left due to dissatisfaction were generally heavier (mean weight = 141 pounds) (Berg, 1947).

In the early 1930s, the first tests of intelligence (such as the Army Alpha or Binet) were not predictive of nursing student success, as measured through persistence (Berg, 1947). But as

nursing school admission and academic requirements were raised, intelligence or aptitude entrance exams became slightly better predictors (Berg, 1947; Sartain, 1946). By mid-century, nearly all nursing programs administered "psychological tests, comprehensive examinations, basic information and judgment tests [or] mechanical aptitude tests" upon admission (Goodnow, 1948, pp. 265-266).

The financial benefit to hospitals rather than success of individual students drove Sartain (1946) to survey cognitive and noncognitive traits of 81 nursing students in a single hospital-based program in Dallas, Texas in 1942. Utilizing a battery of tests produced by the "Nurse Testing Division of the Psychological Corporation" (p. 239), Sartain (1946) found that the Bernreuter Personality Inventory, which assessed psychosocial traits such as dominance, self-sufficiency, emotional stability and extraversion, did not correlate well (r = .17 - .29) with academic success as measured by student grades after six months. High school grades, an academic variable, correlated only slightly better with nursing school grades (r = .46). Sartain (1946) noted that the Potts-Bennett Tests for Nursing Aptitude correlated with nursing grades (r = .68), but the Revised Army Alpha Examination, the MacQuarrie Test for Mechanical Ability, and the Columbia Vocabulary Tests did not improve prediction of academic success. Berg (1947) and Sartain (1946) are early examples of the trend toward cognitive testing among nursing students. They also exemplify the tradition of context-specific research among populations of nursing students within single institutions (Fine, 2010; Reason, 2009).

During the 1960s, most nursing programs, regardless of degree awarded (baccalaureate, associate or diploma) set admission standards based on high school grades and/or standardized test performance to minimize attrition rates (Thurston, Finn, & Brunclik, 1963). Yet at least one-third of all admitted nursing students nationally did not graduate (Thurston et al., 1963), and

studies of nursing students were undertaken to test a variety of cognitive and noncognitive traits to predict academic performance and persistence.

For example, Michael, Haney, and Brown (1965) and Owen and Feldhusen (1970) assessed student nurses' academic aptitude and achievement. These studies found that vocabulary and math skill tests, when combined with high school GPAs were good predictors of persistence in nursing programs. Michael, Haney and Brown (1965) also administered the Minnesota Multiphasic Personality Inventory (MMPI) to nursing students but found it did not predict academic success, confirming Weisgerber's (1954) study of Loyola University student nurses (N = 168) that found the MMPI norms did not necessarily apply to nursing student populations.

Thurston et al. (1963) piloted an attitudinal questionnaire (the Luther Hospital Sentence Completion, LHSC) involving ninety sentence completion items to assess psychological and emotional readiness of students upon admission to a hospital nursing education program. Their findings included a case study example of the LHSC's ability to predict a student's academic failure; the student left due to family issues and a hearing disability (Thurston, et al., 1963). They stressed that this instrument should not dictate which candidates should be admitted, but rather spur discussion and interview topics with nursing school applicants. (Thurston et al., 1963). This qualitative, subjective approach lacked practical merit, and few other noncognitive assessments queried nursing students until the late 1970s.

In 1978, the National Council of State Boards of Nursing (NCSBN) was founded to require a standardized national licensing exam for nurses (NCSBN, 2014). Since all graduate nurses must take the National Council of Licensing Examination- Registered Nurse (NCLEX-RN) to be employed as RNs, this added a new outcome variable by which to evaluate nursing

student success. At this time, studies to predict both academic achievement and NCLEX-RN success became imperative, and measured primarily cognitive predictive factors such as previous grades and exam scores (for example, Talarczyk, 1989; Wold & Worth, 1990; Yocom & Scherubel, 1985). Although noncognitive predictors of student success were also gaining in acceptance, little research was conducted to test noncognitive or psychosocial variables among nursing students. Hayes (1981) and Dell and Valine (1990) were two exceptions.

Hayes (1981) predicted graduation among the nursing classes of 1976 (N = 134) and 1977 (N = 156) at one New England university utilizing the California Personality Inventory (CPI) and the Survey of Interpersonal Values (SIV), along with several academic indicators such as GPAs and course grades. The CPI measured fifteen underlying constructs, and the SIV yielded information about an additional six underlying traits. Hayes conducted a sequential multiple regression in which cognitive variables (GPAs and course grades) were added first, then noncognitive variables. The cognitive variables, especially second-semester GPA and course grades in Math and Psychology, predicted graduation (a measure of academic success) and accounted for 50% of the variance. The constructs of the CPI and the SIV were not significant predictors of academic success when added to the cognitive variables, though the overall CPI score accounted for 27% of the variance. Similarly, Dell and Valine (1990) assessed cognitive and noncognitive variables among baccalaureate students (N = 78) attending three small southeastern nursing programs. This study found that previous GPAs, SATs and self-esteem (assessed via three self-esteem instruments) were all predictors of success on the RN licensing exam, but that GPAs accounted for the most variance of the three predictors tested (Dell & Valine, 1990). Both Hayes (1989) and Dell and Valine (1990) entered cognitive variables into the first block of their sequential multiple regressions, on relatively small sample sizes for the

number of variables tested, which could account for the results that favored the cognitive variables (Sprinthall, 2007).

Current and Future Nursing Education

Most recently, 45% of graduate nurses who took the NCLEX-RN had earned associate degrees, while 32% were baccalaureate prepared. Twenty percent of new nurses were still educated in hospital-based diploma programs (Health Resources and Services Administration, HRSA, 2010). For the last fifty years, since the American Nurses Association first statement about nursing education (ANA, 1965), health care leaders have advocated for the four-year degree as a minimum educational requirement for professional nurses to improve patient outcomes (Blegen et al, 2013). Opposition from community colleges and some hospital administrators have prevented such a policy change nationwide in order to preserve private educational and economic benefits for particular institutions- a stance that has continued since the Brown Report era (Chitty & Black, 2011; Kalisch & Kalisch, 2004). Currently, about half of all RNs have baccalaureate degrees, since many nurses earn a bachelor's degree following their initial associate degree in nursing (Health Resources and Services Administration, 2010).

Several studies have demonstrated that higher educational levels positively impact patient outcomes (Blegen et al., 2013; Buerhaus et al., 2009; Van den Heede et al., 2009). These studies have spurred nurse educators and professional nursing organizations, including the American Association of Colleges of Nursing (AACN), the American Organization of Nurse Executives (AONE), and the National Advisory Council on Nurse Education and Practice (NACNEP) to recommend a larger proportion of baccalaureate-prepared, entry-level nurses (AACN,2012c; Auerbach et al., 2013; Benner et al., 2010; IOM, 2011; Kutney-Lee & Aiken, 2013). The

Institute of Medicine (IOM, 2011) even set a national goal to increase the percentage of baccalaureate -prepared nurses to 80% in order to meet the increasingly complex patient needs.

Students of color are more likely to earn a baccalaureate nursing degree than an associate's degree, which ultimately leads to a more diverse group of baccalaureate-prepared nurses (AACN, 2014). For instance, only 48.4% of White nurses complete nursing degrees beyond the associate degree level, while 52.5% of African American, 51.5% Hispanic, and 75.6% Asian nurses, respectively, obtain baccalaureate degrees (AACN, 2014). Therefore, predicting baccalaureate nursing student academic success impacts not only individual students; eventually student success in baccalaureate programs can also improve workforce diversity and patient outcomes.

Colleges primarily rely on cognitive assessments of achievement, aptitude, and intelligence such as standardized tests to assess nursing student academic success (Hopkins, 2008; Lemann, 2000). This approach is consistent since the advent of such tests in the early twentieth century (Goodnow, 1948; Lemann, 2000). In fact, standardized examinations continue to drive nursing curricula (NLN, 2012), culminating in the NCLEX-RN to demonstrate entry-level competency for all registered nurses (NCSBN, 2012). However, in terms of college students generally, standardized assessments disadvantage historically marginalized students such as women, racial minorities, and older students (Hopkins, 2008; Sacks, 2007; Steele, 1999). Furthermore, standardized exams do not forecast success particularly well (Lemann, 2000; Sacks, 2007; Sedlacek, 2004a), and several colleges have moved away from requiring such exams for admission (Soares, 2012).

Yet an alternate predictor of success may assist nursing programs to identify students likely to persist, as well as those who may be academically at-risk (Breckenridge, Wolf, &

Roszkowski, 2012). A fair, valid predictor of academic performance could improve nursing education efficiency by increasing student persistence and improving academic performance (Beeson & Kissling, 2001; Peterson, 2009; Sacks, 2007). One example of more equitable predictors of baccalaureate nursing student success includes the study of noncognitive or non-academic variables (Sedlacek, 2004a). "Noncognitive skills can be considered as important and sometimes more important for success" (Kyllonen, 2012, p. 84) than academic measures such as tests and grades. Systems theories of intelligence (Sternberg et al., 2000) guided this quest to identify predictive noncognitive factors among nursing students.

Theoretical Framing of Noncognitive Factors in Nursing Student Success

This section describes two holistic theories that drive this study of non-academic variables among baccalaureate nursing students. Sternberg (1999) and Gardner (1993) explained intelligence as a complex system, and broadened the definition of intelligence through assessment of diverse markers of academic potential among students (Sternberg et al., 2000).

Successful Intelligence Theory. Sternberg (1999) defined intelligence as "the ability to achieve success in life, given one's personal standards, within one's sociocultural context" (pp. 292-293). Sternberg's theory of successful intelligence asserted that capability is best defined as individual adaptation to life's circumstances, and successful people deployed various approaches to capitalize on strengths and compensate for weaknesses in order to reach personal goals within their particular environment (Sternberg, 1999, 2005).

Sternberg differentiated three distinct types of intelligence, all important in combination to achieve success (1999). The first two kinds, the experiential-creative type and contextual-practical aspects of intelligence, are not measured adequately by cognitive assessments (Sternberg, 1999). Experiential- creative intelligence is needed to solve novel problems, often

through unconventional methods. Contextual or practical intelligence is required to apply knowledge to real-life situations. People exhibiting high levels of practical intelligence more easily adapt to specific environments, and select working and living conditions that foster success (Sternberg, 1999). The last type of intelligence, the analytic or cognitive intelligence, is that which is assessed through traditional ability and achievement tests (Sedlacek, 2004a; Sternberg, 2005). Sternberg asserted that since successful intelligence is comprised of all three aspects, it should not be operationalized narrowly through standardized tests, which only captures the cognitive aspect of intelligence (Sternberg, 1999, 2005).

Theory of Multiple Intelligences. Like Sternberg (1999, 2005, 2008), Gardner (1993) believed that standardized tests only measured analytic cognitive ability, and did not assess alternative aptitudes that predicted academic capabilities (Gardner, 1993). Gardner (1993) defined intelligence simply as "the ability to solve problems or fashion products that are valued in one or more cultural or community settings" (p. 7). The theory of multiple intelligences identified at least seven different kinds of intelligence, including linguistic and logical-mathematical intelligence, which are those most often tested in school settings. More significantly, Gardner also defined spatial, musical, bodily- kinesthetic, interpersonal and intrapersonal intelligences common to all people in varying degrees, and highly valued in various occupations and communities. Gardner (2011) described how a technician, inventor, or engineer employs a combination of spatial and bodily-kinesthetic intelligence, in addition to needed theoretical knowledge and creativity to manipulate objects in specific, though not always routine, ways to achieve practical goals. Similarly, nurses demonstrate spatial and bodily kinesthetic intelligence, along with linguistic and logical-mathematical skills as they manipulate equipment and treatments in response to patient needs. Nurses also exhibit (more or less) inter- and

intrapersonal intelligence as they collaborate with other healthcare providers, families and individual patients (Clark, 2007; Denny et al, 2008). Sheahan (2015) found that applying multiple intelligence theory to learning nursing skills improved students' skill performance on objective, independent measures of those skills ($N = 90$; $p < .05$). This integration of intelligences is complex, and not well assessed by standardized tests (Gardner, 1993, 2011).

Holistic intelligence theories for nursing student success. As explained, predictors of nursing student success have concentrated primarily on cognitive attributes over the last century (Berg, 1947; Goodnow, 1948; Michael et al., 1965; Sartain, 1946; Talarczyk, 1989). Yet this pattern of cognitive assessment may have contributed to the current limited diversity within the nursing workforce (Brown & Marshall, 2008; Noone, 2008) by de facto exclusion of particular demographic groups. Sedlacek defined "non-traditional persons" as those "with cultural experiences different from those of White middle-class males of European descent; those with less power to control their lives; and those who experience discrimination in the United States" (2005a, p. 3). In short, these "non-traditional persons" comprise the cultural diversity needed in the nursing profession (AACN, 2014; HRSA, 2006), to ultimately improve the access and quality of patient care in the United States (Aiken, 2011; Phillips & Malone, 2014). Both Sternberg's and Gardner's theories support a more holistic assessment of nursing students from a variety of backgrounds to better predict aptitude and ultimate academic success.

In addition, this study relied on the premise that linking research to practice at a local level has a positive impact on policies and practices that help students succeed (McGrath, 2007; Sedlacek, 2004a). In order to cohesively link theory to practice in context, data local to the problem must be analyzed. Gardner's framework stressed context when he defined intelligence a quality "valued in one or more cultural or community settings" (1993, p.7).

Each nursing education program is situated in a distinct community setting with a characteristic culture, mission and policies, and is comprised of faculty and students with individualized strengths. Curriculum and pedagogy also differ somewhat, despite the similar desired outcomes of baccalaureate nursing programs. Studies of nursing student success have historically been conducted within one educational program (for example, Berg, 1947; Hayes, 1981; Lockie et al., 2013; Seldomridge & DiBartolo, 2004; Thurston et al., 1963; Wold & Worth, 1990; Yocom & Scherubel, 1985), and student persistence studies have also taken place at a single institution (Reason, 2009). Because stable predictors of success have not been demonstrated across educational settings, single institution research is appropriate at this stage of research. Findings from these single-institution studies have direct implications for students in these programs, and practical lessons for similar nursing programs.

Allen et al. (2010) stressed the need to use "institution-specific regression models" (p. 5) of psycho-social factors (PSFs) or NCVs to identify and assist academically vulnerable students as well as those likely to succeed. In a study of two hundred and fifty African American college students at four different institutions, Nasim et al. (2005) stressed the significance of institutional culture to shape and identify noncognitive predictors of achievement. Institution-specific models provided specific data about NCVs with practical benefits for the identified students. Individualized institutional data, when utilized to plan and implement intervention programs, can better encourage college success (Allen et al., 2010). Allen et al. (2010) also pointed out that without appropriate institutional support, simply identifying "students at high risk for academic failure" (p. 5) is pointless, and possibly harmful. Current high failure and attrition rates in baccalaureate nursing programs (Dapremont, 2011; Newton & Moore, 2009; Peterson, 2009)

point to the need to identify contributing NCVs in specific student populations, to promote precise policies and programs to enhance academic achievement (Allen et al., 2010).

Student success should be encouraged by institutional structures, programs and policies. Higher education institutions are each unique, and therefore phenomena and resulting programs to encourage success must be highly individualized within the sociopolitical and economic atmosphere of the college or university. McGrath (2007) warned against applying universal reform concepts to specific situations, since generalized policies cannot adequately apply to the wide variety of educational settings. The findings of this research should also be interpreted within institutional context for its potential influence on admission, retention and academic progression criteria, and academic programming decisions. This research was conducted at one small eastern baccalaureate college and based upon holistic theories of intelligence. The next section of this review chronicles previous research utilizing the survey instruments chosen to query baccalaureate nursing students.

Survey Instrument Review

To discover how the Noncognitive Questionnaire (Tracey & Sedlacek, 1984, 1987b) and the Grit-S (Duckworth & Quinn, 2009) have predicted college student success and to explore their potential for predicting the performance of baccalaureate nursing students, I reviewed relevant literature. I included the development and theoretical basis of the instruments and key research. I also analyzed how varying study methods and results led to mixed reviews and critiques of Sedlacek's Noncognitive Questionnaire (2004; Tracey & Sedlacek, 1984). The newer Grit-S (Duckworth & Quinn, 2009) had relatively less research to date, but showed promise as a predictive measure of academic success. Relatively few predictive studies were published about nursing student populations; those were also reviewed. The gap in current

literature directed this synthesis and pointed to areas for further research of academic predictors among student nurses.

The Noncognitive Questionnaire

Tracey and Sedlacek (1982, 1984) developed the Noncognitive Questionnaire (NCQ) to complement tests such as the SAT by measuring noncognitive attributes. The NCQ was designed to address perceived racial disparities in admission processes (Thomas, Kuncel, & Crede, 2007) and measured student characteristics not captured by standardized tests. Sedlacek (2004a) described noncognitive variables as students' personal traits involving adjustment, motivation, and perceptions. Sedlacek and colleagues demonstrated that the NCQ total score and particular noncognitive variables (NCVs) predicted academic success as defined by college grade point average (GPA), persistence and graduation better than standardized tests, especially for non-traditional students (Sedlacek, 2004a; Tracey & Sedlacek, 1984; 1987b).

Background of the NCQ. As colleges and universities began to heavily recruit students of color during the 1970s, they encountered difficulty predicting their academic success (Roessler, Lester, Butler, Rankin, & Collins, 1978; Sedlacek & Brooks, 1976; Sedlacek & Webster, 1978). Standardized test scores did not forecast academic success among non-traditional students as well as among White students (Astin, 1975; Sedlacek, 1977). For example, Astin's (1975) seminal longitudinal study of 41,000 students demonstrated that ACT and SAT test scores contributed only marginally to the prediction of college persistence of Black students. Sedlacek and Brooks (1976) conducted an extensive literature review that identified seven noncognitive characteristics that appeared to correlate with academic success for racial minorities and other under-represented groups on campus. The seven original constructs included (a) positive self-concept, defined as self-confidence and strength of character; (b)

handling racism, including a realistic appraisal of systemic discrimination, and a commitment to improve the system; (c) realistic academic self-assessment, the recognition of deficiencies and willingness to work to overcome them; (d) long-range goals preferred over short-term goals and needs, and the ability to defer gratification; (e) strong support person, defined as a family member or friend to provide assistance and advice; (f) leadership experience, such as demonstrated positive involvement in leadership role(s), within any socio-cultural context; (g) community service, defined as an experience of contributing to community organizations (Sedlacek & Brooks,1976). In a later study of 2,743 incoming freshman at one eastern university, Tracey and Sedlacek (1984) identified an eighth noncognitive construct through principle components factor analysis described as an ability to apply previous experiences to academic settings (Tracey & Sedlacek, 1984). This NCV later became known as nontraditional knowledge or "knowledge acquired in a field" (Sedlacek, 2004a, p. 7). Appendix A offers more complete descriptions and sample questionnaire items of the NCVs. Tracey and Sedlacek introduced the NCQ survey designed to measure these variables at the 1982 American Education Research Association conference (Tracey & Sedlacek, 1982), and shortly thereafter published their first study using the NCQ (Tracey & Sedlacek, 1984).

Theoretical frame of the NCQ. Sedlacek (2004a) referred to both Sternberg (1999) and Gardner (1993) to support his concern regarding the efforts toward perfecting a single cognitive assessment tool for students from diverse backgrounds. Sedlacek (2004a) described the "The Three Musketeers" problem of student assessment. In Dumas' (2007) classic novel the "all for one and one for all" credo unified the French Musketeers, but the "all for one" model did not work to assess diverse college students (Sedlacek, 2004a, p. 27). From theories of multiple kinds of intelligence (Gardner, 1993; Sternberg, 1999), Sedlacek reasoned that a single type of

cognitive test could not adequately measure academic ability for a variety of students with different life experiences. A broader assessment of a variety of cognitive and noncognitive attributes was thought to better detect student strengths and challenges. The ability to assess students fully allowed a better understanding of them, which in turn could enhance academic success by providing appropriate support. Sedlacek's goal of student assessment was "equality of results, not process" to account for a rich variety of student attributes (2004a, p. 27).

Sedlacek developed and tested the NCQ with students on a particular campus, within an institutional setting. Though the NCQ has assessed various college student groups, each study is situated within a single context, and Sedlacek (2004) explained that generalizability was not the aim of the NCQ; his approach to predicting success within a particular educational setting was consistent with Allen et al. (2010) and Reason (2009). Sedlacek and colleagues developed the Noncognitive Questionnaire (NCQ) to complement more traditional standardized admissions measures (Tracey & Sedlacek, 1984, 1987b), based on intelligence theories (Gardner, 1993; Sternberg, 1999) and his own experiences in college student affairs, to predict academic success.

Description of the NCQ. The resulting NCQ consisted of 23 individual items, and six additional items to collect demographic information. Eighteen items requested Likert-type scaling, two requested categorical information about educational goals, and three required short answers. The short answer items queried students about goals, past accomplishments, leadership and membership experiences (Sedlacek, 2004a; Tracey & Sedlacek, 1985, 1987b).

Reliability and validity of the NCQ. Tracey and Sedlacek first tested the NCQ on random samples of freshmen classes in 1979 and 1980 (N = 1,963) at a large eastern university (Tracey & Sedlacek, 1982, 1984). They analyzed the reliability, construct and predictive validity of the NCQ, and Sedlacek later defended these criteria in *Beyond the Big Test* (2004a) with a

thorough discussion of validity and reliability. The NCQ items had test-retest reliability correlations ranging from .70 to .94, with a median score of .85. The inter-rater reliability of the short answer questions regarding goals, community service, leadership and activities ranged from .88 to 1.0. The authors deemed the NCQ to have adequate test-retest and inter-rater reliability (Tracey & Sedlacek, 1982, 1984).

Construct validity requires a clear definition of the underlying attribute and how it is to be measured, as well as empirical tests to establish a logical theory regarding the differentiation of the constructs among participants (Sprinthall, 2007). To assess construct validity of the NCQ, principle component factor analysis (PCFA) was conducted on a sample of 1,963 freshmen (Tracey & Sedlacek, 1984). The PCFA on the Black student group of this sample ($N = 279$) revealed the items loaded onto seven factors previously identified through a review of the literature by Sedlacek and Brooks(1976), and the newly-identified eighth NCV, knowledge acquired in an academic field (Sedlacek, 2004a). The results of the PCFA on the larger group of White students were not presented in this study, though Tracey and Sedlacek (1984) reported that the factor analysis demonstrated "fairly similar structures for each racial group" (p. 173).

Woods and Sedlacek (1988) also assessed construct and congruent validity of the NCQ. They tested additional items to strengthen construct validity of the eight NCV variables and tested congruent validity by comparing the NCQ to Cohen, Kamarck and Mermelstein's Perceived Stress Scale (PSS, as cited in Woods & Sedlacek, 1988). The PSS measured student's stress and coping, and the perception of stressful events was expected to be related to NCVs. The sample for this work were also freshmen at the same large, eastern university in 1987 ($N = 251$). PCFA was conducted on the NCQ with additional items and the PSS, which revealed a total of fifteen factors. Many of the NCVs previously identified loaded with the new NCQ items

and/or the PSS survey items, including positive self-concept, realistic academic self-appraisal, strong support person, demonstrated community service, non-traditional knowledge. These correlations indicated adequate construct validity, though only positive self-concept, strong support person, and community service related closely to the PSS items, to additionally establish congruent validity of those NCVs (Woods & Sedlacek, 1988). Two NCVs - negotiating racism and leadership experience - did not correlate with either the new items or the PSS, indicating lack of congruent validity of these factors (Woods & Sedlacek, 1988).

To recap, the NCQ's reliability, construct, and predictive validity appeared appropriate in Tracey and Sedlacek's initial work (Tracey & Sedlacek, 1984, 1985). Woods and Sedlacek (1988) also found further evidence of congruent and construct validity of several of the eight NCVs, but validity testing has not been duplicated since 1988 (Woods & Sedlacek, 1988).

In addition to the NCQ, other noncognitive/ psychosocial factors have been investigated as potential predictors of success, both in academic and professional realms. Robbins et al. (2004) conducted a meta-analysis of educational and psychological literatures to identify personality and study skill variables that may affect students' cumulative GPA and persistence. Quantitative correlations among 109 studies between 1972 and 2002 found positive relationships between several constructs, especially academic goals, self-efficacy and college persistence. These attributes identified by Robbins et al., (2004) parallel the NCQ variables of preference for long-term goals and positive academic self-concept (Robbins et al., 2004; Sedlacek, 2004a), supporting construct validity.

However, scholars have also been critical of the NCQ's validity and reliability. Marchant (2001) argued that the questionnaire contained some confusing items, and lacked sufficient construct, face and predictive validity. For example, Marchant (2001) cited the NCQ item

pertaining to a likely cause for a student to leave college, suggesting it was misleading to award maximum points for "absolutely certain I will obtain a degree" (Marchant, 2001, para. 3), though this is an important item response to indicate a student's determination to finish college. Marchant (2001) went on to state that the construct of long range goals was consistent and appropriate in the NCQ. Sedlacek's NCQ and key (Sedlacek, 2005b) clarified how particular survey items (in combination) comprised subscales that defined each of the eight NCQ constructs to answer Marchant's concern.

King and Bowman (2006) concurred with Marchant (2001), and questioned the survey's construct and face validity, based on "psychometric weaknesses" (p. 1109). For instance, King and Bowman (2006) stated the internal consistency reliability testing was insufficient. Internal consistency reliability concerns the instrument's true score in proportion to the observed score (Sprinthall, 2007). The NCQ has only 23 items, so not all studies utilizing the NCQ reported Cronbach's alphas. One example of internal consistency testing was Sedlacek and Gaston (1992), who demonstrated an adequate mean Cronbach's alpha score of .81 among student athletes ($N = 105$), that reinforced Tracey and Sedlacek's earlier studies (1984, 1985). In addition, King and Bowman (2006) also criticized the limited accessibility of a validity study from Ting and Sedlacek (2000). In this study, Ting and Sedlacek (2000) examined the reliability and validity of a revised, expanded version of the NCQ consisting of 79 items, and though a few new constructs were identified, seven of the original eight NCVs had respectable factor loadings of .59 (realistic self-appraisal and strong support person) to .78 (knowledge acquired in a field), that supported the construct and congruent validity of the original NCQ. Community service was the only NCV not supported in the revised, 79-item NCQ (Ting & Sedlacek, 2000). King and Bowman's (2006) concerns regarding the NCQ's face validity (i.e., NCQ items did not align

with constructs they purported to measure) were difficult to refute, since face validity cannot be assessed statistically. The NCQ is over thirty years old; common phrasing has likely evolved since the initial NCQ studies to warrant these concerns. Yet Ting's 2009 study of student athletes (N = 109) demonstrated positive predictive validity to support the language used in the original NCQ and supported the face validity of the NCQ.

Thomas et al. (2007) conducted a meta-analysis of NCQ studies that concluded the NCQ narrowly operationalized constructs, and identified internal consistency and construct validity issues that interfered with the NCQ's ability to predict academic success. Thomas et al.'s study (2007) utilized direct regression, statistical methods different than Tracey and Sedlacek's recommendations (1984, 1985) to mediate the NCVs with cognitive variables. The research by Thomas et al. (2007) is addressed thoroughly later in this chapter, but their validity concerns were due to methodological differences.

Despite the critiques of Marchant (2001), King and Bowman (2006), and Thomas et al. (2007), the NCQ's reliability and validity have also garnered approval from many scholars. Pieterse (2007) and Smith (2001) reported the NCQ demonstrated satisfactory reliability, construct and predictive validity in separate instrument reviews. Both authors praised it as a "technically sound instrument" (Smith, 2001, para. 9) to assess and predict success among college students. Pieterse (2007) reviewed the reliability and validity explanations cited in *Beyond the Big Test* (Sedlacek, 2004a) and reported Sedlacek "consistently provided supporting empirical evidence" for the NCQ (Pieterse, 2007, p.181). Smith (2001) endorsed Tracey and Sedlacek's (1982, 1984) factor analytic studies (previously reported here) to support the overall design and the constructs of the NCQ. Furthermore, Smith (2001) found the studies of test-re-test and inter-rater reliability (Tracey & Sedlacek, 1982, 1984) appropriate and sufficient, and

praised the predictive validity of the NCQ demonstrated in published articles (Smith, 2001). Both Pieterse (2007) and Smith (2001) endorsed the NCQ as a reliable and valid instrument, countering the critiques of King and Bowman (2006) and Marchant (2001).

Both camps of reviewers agreed that Sedlacek's aim, to assess noncognitive as well as traditional cognitive variables, is worth further research to improve admissions processes and college climates for diverse students (King & Bowman, 2006). Despite the criticism, sufficient evidence of the questionnaire's construction exists to warrant continued use. These critical reviews set the stage for further studies involving the NCQ, and are discussed in the next section.

Review of NCQ Research

Method of literature search and organization of studies. The development of the NCQ (background, instrument description and psychometric properties) has been reviewed, and in the next section research is categorized by study methodologies to note trends in the results. After an analysis of research to date, the NCQ studies are summarized and the current gap in the research in identified.

I adapted a procedure proposed by Thomas et al. (2007) in their meta-analysis of studies employing the NCQ. Between March, 2012 and August, 2013, I explored databases including PsychINFO (1980-2012), ERIC (1980-2012), and Academic Search Premier (1980-2012) for published and unpublished works (including dissertations, research reports, etc.). I revisited these databases mid-2016 to search for new NCQ research and found none published between 2013 and 2016. I entered key words to mirror Thomas, et al's (2007): *NCQ, NCV, noncognitive questionnaire, noncognitive variables, noncognitive predictors, non-intellective variables, non-intellective predictors, and alternative predictors.* I reviewed the collected articles for citations

electronic searches may have missed, as well as Sedlacek's website featuring his published and unpublished works (Sedlacek, 2005b).

Similar to Thomas et al. (2007), my initial search yielded over three hundred sources, though I identified less than sixty research studies, reports or dissertations implementing the NCQ. I hypothesized several different relationships of the study variables, but found nearly all studies fell into two primary categories, as noted by the bold arrows in Figure 2.1.

Figure 2.1.

Potential Variable Relationships

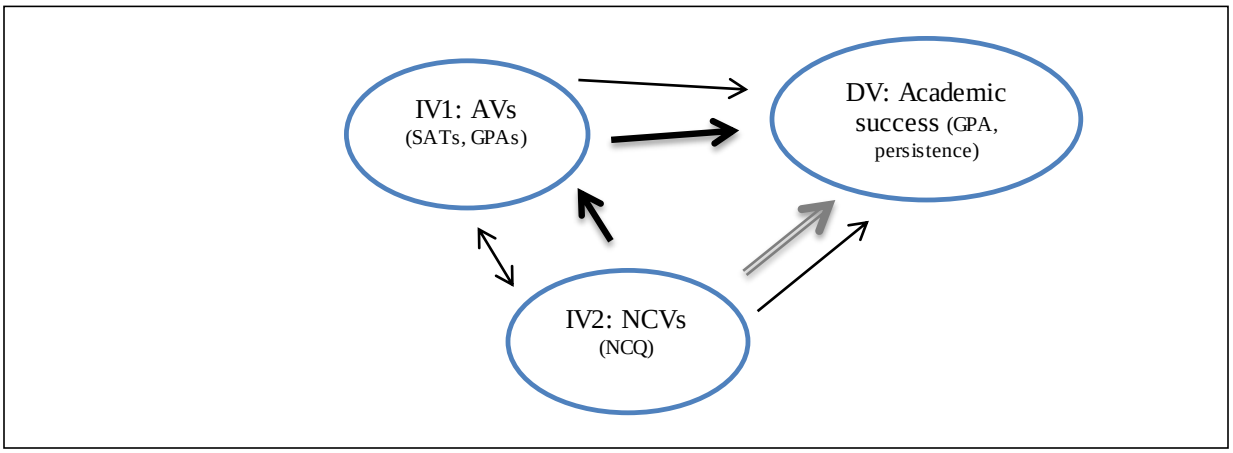


Figure 2.1. Potential predictor relationships of academic success. IV1: AVs-Academic Variables (indicated by high school GPA, SAT, class rank, etc.); IV2: NCVs-Noncognitive Variables (indicated by NCQ and subscales or other NCV measure); DV: Academic success (indicated by college GPA, persistence, graduation)

I classified over three decades of NCQ research studies by the type of statistical analysis of the data. I first reviewed research employing the original Tracey and Sedlacek (1984) approach in which the NCQ variables were mediated by academic variables (see bold black arrows in Figure 2.1). Next, I examined studies that assessed a direct relationship between the NCQ scores and the outcome variables (see double gray arrow in Figure 1). Then, I note research that utilized other statistical methods (see thinner arrows in Figure 2.1). Following the review of research, I discuss critiques of Sedlacek's work.

Indirect effect of NCVs on academic success. Tracey and Sedlacek (1982, 1984) found the NCQ predicted academic success *with or without mediation* by cognitive variables (i.e., SAT scores, GPA) in their initial studies. Most studies employing the NCQ followed a model of sequential step-wise multiple regression and/or discriminant analysis in which the NCQ variables were entered first to assess the relationship between noncognitive variables and the outcome before cognitive predictors were added (Figure 2.1). Tracey and Sedlacek (1984, 1985) and Sedlacek (2004a) recommended this procedure for investigations involving both established cognitive measures (i.e., academic variables) and less established measures such as the NCQ. On the whole, this method produced favorable results for the NCQ, predicting both grades and retention. Although the NCQ was originally designed to improve prediction of academic success among students of color, it has also been noted to have predictive validity among a wide range of under-represented college students, indicating potential usefulness in baccalaureate nursing students as well.

Sedlacek explained that predictive validity is used to "predict scores on some future criterion measure" (2004a, p. 17). Tracey and Sedlacek (1982, 1984) initially demonstrated predictive validity of the NCQ with SAT scores on three outcome criteria of academic success (first-semester GPA, third semester cumulative GPA, and persistence) among 1,529 first year college students at one university, utilizing sequential multiple regression and discriminant analysis. Tracey and Sedlacek (1982, 1984) found the standardized regression coefficients for the NCQ on third semester GPAs (β = .40 for Black students and .44 for White students) were higher than for SAT scores (β = .33 for Black students and .39 for White students), indicating that the NCQ was, indeed, a better predictor of third semester GPA for both Black and White students. When the NCQ was combined with the SAT, overall prediction of academic success

was improved (R^2 = .41 and .54, respectively), and Tracey and Sedlacek (1984) recommended the NCQ to aid admissions decisions. This research team went on to assess the NCQ's ability to predict academic success as defined by long-term persistence over eight semesters (Tracey & Sedlacek, 1985) and five- and six-year graduation rates (Tracey & Sedlacek, 1986, 1987b) through discriminant analysis. Specific variables predictive for both races included positive self-concept and realistic self-appraisal in these studies (Tracey & Sedlacek, 1982, 1984, 1985, 1987a), demonstrating good predictive and construct validity of the NCQ for this sample.

Likewise, Tracey and Sedlacek (1982, 1984) used stepwise discriminate analysis to discover the NCQ was predictive of persistence for Black, but not for White, student samples; the SAT scores did not predict persistence for either of the student groups. The NCQ's prediction of academic success was most notable among Black students in these studies, supporting the hypothesis that noncognitive variables play an important role for historically under-represented students. The NCQ's promising predictive validity led authors to suggest implications for college admissions and retention programs based on these results (Tracey & Sedlacek, 1987b).

More recently, Nasim et al. (2005) and Ting (2003) employed the NCQ to identify noncognitive predictors of academic success across various institutional cultural environments. Nasim et al (2005) surveyed two hundred and fifty Black first and second- year students enrolled at one of four colleges, two of which were historically Black institutions (HBCUs). The results demonstrated that NCVs, specifically the availability of a strong support person and handling racism, impacted the prediction of success for students of color at predominantly White institutions (PWIs), but not at HBCUs. Similarly, Ting (2003) found the NCV called handling racism became predictive of grades and retention in the seventh semester (fourth year) for first-

generation students of color at a PWI, similar to Tracey and Sedlacek's findings in a longitudinal study of Black students (1985). Despite timing of the survey administration, Nasim, et al., (2005) and Ting (2003) demonstrated the predictive value of specific NCVs identified through the NCQ, especially for students of color at PWIs.

Fuertes, Sedlacek, and Liu (1993), Fuertes et al (1994), and Ting (2000) assessed entering Asian American students at PWIs utilizing the NCQ. Across these studies, SAT scores and specific NCVs in the NCQ showed good predictive validity for this student group. The NCVs of realistic self-appraisal and community service were significant NCV predictors of GPAs and persistence for Asian American students during their first year (Fuertes et al., 1993, 1994; Ting, 2000).

In addition to assessing ethnic student groups, researchers have used the NCQ to evaluate other groups deemed non-traditional. For instance, Ancis and Sedlacek (1995) studied random samples of female undergraduate students at a large southeastern university over ten years (N = 1,930) and discovered the NCVs of community service and realistic self-appraisal were good predictors of GPAs over seven semesters for these women.

Sedlacek and Adams- Gaston (1992), as well as Eiche et al. (1997) identified student-athletes at a NCAA Division 1-A university as non-traditional student groups (N = 105 and N = 73, respectively). Both studies employed the traditional NCQ analysis, mediated by cognitive variables. They found that the NCQ correlated much better with first semester grades than SAT scores did (Sedlacek & Adams-Gaston, 1992). In 2009, Ting replicated the studies by Sedlacek and Adams-Gaston (1992) and Eiche et al. (1997), surveying 109 first-year student athletes. Similarly, the total NCQ score predicted overall GPA and persistence for these students, though only positive self-concept overlapped with the particular NCVs found by Sedlacek and Adam-

Gaston's (1992) study of this population (Ting, 2009). This research demonstrates that the NCQ is an effective academic predictor of academic success as measured by GPAs and persistence over at least two semesters, among diverse sup-groups of college students, including women and athletes.

Health professions students (more closely resembling baccalaureate nursing students) have also taken the NCQ. For instance, Bandalos and Sedlacek (1988, 1989) surveyed pharmacy students at a large eastern state university (N =55). In this sample of 75% White, 9% Black, and 16% Asian graduate students, the NCV of handling racism, along with students' pre-pharmacy college GPA predicted 35% of the variance in pharmacy school cumulative GPA, and the handling racism NCV accounted for 7% change (R^2 = .07) when all races were combined. Though limited by the small sample size, this study lends credence to the predictive ability of the NCQ, as suggested by Tracey and Sedlacek (1984, 1986, 1987a, 1987b).

Similarly, Webb et al. (1997) compared two samples of entering medical students. The first was at a PWI (N = 104), while the other was at a Historically Black University (HBCU, N = 102). In both of these samples, the NCQ was a good predictor of GPAs over four semesters, especially among Black students. However, these distinct student samples did not share any specific NCV predictors, and the Medical College Admission Test scores (MCATs, a cognitive variable) were more predictive overall than the NCVs for these students. Sedlacek (2004a, 2004b) advocated widespread use of the NCQ for medical and graduate school admissions, and supported the benefits of using the NCQ within specific institutional contexts. Based on these reviewed studies, nursing students are student group ripe to be queried with the NCQ.

The studies reviewed in this section entered the NCVs into the regression before cognitive measures, just as Tracey and Sedlacek (1982, 1984) suggested when using a newer

measure such as the NCQ with a more established measure such as standardized test scores (See Figure 2.1). The results of these studies were generally favorable, showing good predictive validity of the NCQ via an indirect regression analyses. Specific NCVs varied from study to study, even with the same student groups at the same institutions (Eiche et al., 1997; Sedlacek & Adams-Gaston, 1992; Ting, 2009), but the NCQ was predictive on the individual student level within an institutional context. Sedlacek (2004a) pointed out that the particular NCQs discovered among specific student groups should inform college policies to encourage academic success within the context and culture of the institution.

Direct effects of NCVs on academic success. The next group of studies examined the direct effects of the NCQ or its component parts directly upon the outcome variable(s) representative of academic success (indicated by double arrow, Figure 2.1). Though cognitive variables were also included in analyses, these studies assessed the NCVs' direct effects on the outcome, rather than using a regression model mediated by cognitive variables (as in the indirect studies previously discussed). Unlike the unambiguous positive connections linking NCVs to academic success reached with the indirect methods, direct regression studies demonstrated mixed results. In this section, I first reviewed NCQ research that showed good predictive validity for academic outcomes using a direct regression technique. Then, I summarized NCQ research that used similar statistical methods, but that did not find positive predictive validity of the NCVs. The results of the studies using direct methods indicated that NCVs often predicted academic success, similar to results of indirect or mediated model studies.

Direct effect studies with predictive results. Tracey and Sedlacek (1984) found the NCQ directly predicted GPA for all students (N = 1973) and persistence for Blacks (N = 279) in their initial study. Similarly, White and Sedlacek (1986) and Adebayo (2008) conducted direct

regression studies of academically at-risk students with good results. White and Sedlacek's (1986) longitudinal study of fifty-eight black freshmen discovered that while leadership experience and positive self-concept were the strongest NCV predictors for second semester GPA and persistence, handling racism and strong support person became important predictors in the third and fourth semesters. Twenty-two years after White and Sedlacek (1986), Adebayo (2008) also identified handling racism as an NCV that predicted success (first semester GPAs) for at-risk first- year students ($N = 143$) using direct regression.

The NCQ predicted incoming international students' use of the campus counseling center (Boyer & Sedlacek, 1987b) and academic success over four years (Boyer & Sedlacek, 1987a, 1988) at one large eastern university. These longitudinal studies revealed specific predictors at different points in international students' academic careers, just as White and Sedlacek (1986) noted in their study of African American students. Handling/understanding racism, knowledge acquired in a field, and long-term goals were NCVs most predictive of international students' use of the counseling center (Boyer & Sedlacek, 1987b) and persistence (Boyer & Sedlacek, 1987a, 1988) throughout the eight semesters studied. Boyer and Sedlacek (1988) also found that self-confidence and the availability of strong support person were predictors of GPA for international students all four years, while realistic academic self-appraisal was predictive of GPA only for the first year (Boyer & Sedlacek, 1988).

Noonan, Sedlacek, and Veerasamy (2005) conducted a longitudinal study of 263 community college students in health sciences programs. GPAs over four semesters were regressed on NCQ subscales, and three noncognitive constructs best predicted cumulative GPA: community service, strong support person, and leadership, though several scales contributed significantly to GPA in at least one semester (Noonan et al., 2005). For instance, positive self-

concept and realistic self-appraisal were significant predictors only in the first year, while leadership and handling racism became important later on among this sample (Noonan et al., 2005). These works demonstrated good face and predictive validity of the NCQ using direct regression methods, and established a need to study the impact of NCVs on student success throughout their academic career.

Direct effect studies without predictive results. Despite this compelling research that supported the NCQ to predict college performance (Adebayo, 2008; Boyer & Sedlacek, 1987a, 1987b, 1988; Noonan, et al., 2005; Tracey & Sedlacek, 1984; White & Sedlacek, 1986), other research did not support the NCQ as a predictor of academic success. As previously noted, Thomas et al. (2007) conducted a meta-analysis of 42 NCQ studies between 1984 and 2002, including 47 independent student samples. This analysis did not include confounding, mediating or moderating variables, despite the original study designs and intended methodologies. Because Thomas et al (2007) focused on the direct effects of the NCQ and its subscales on GPAs, credits earned and persistence, the analysis found no universal NCV predictors across the studies, and concluded that the NCQ subscale scores, as well as total NCQ scores were not valid predictors of academic success (2007). Thomas et al. (2007) did not employ the same mediated regression statistics as Sedlacek and colleagues (Tracey and Sedlacek, 1984; White and Sedlacek, 1986) originally suggested. Furthermore, the NCQ was not intended to generalize beyond a single institution, as local context and student samples differ (Sedlacek, 2004a), so it is not surprising that Thomas et al. (2007) found the NCQ did not predict GPAs, credits earned, or persistence.

Schwartz and Washington (2002) queried 229 African American first year men attending a southeastern HBCU using Sedlacek's NCQ (2004a) and the Student Adjustment to College Questionnaire (SACQ, Baker & Siryk, 1989, as cited in Schwartz & Washington, 2002).

Cognitive variables added 10% to the prediction equation of GPA, persistence, and probation status. Two SACQ variables accounted for 9% of the variance, but the NCQ variables were not significant predictors of college success (Schwartz & Washington, 2002). Like Schwartz and Washington (2002), Schauer, Osho, and Lanham (2011) directly regressed noncognitive and cognitive variables among students of color ($N = 127$) to predict graduation. They found that NCV's were not significant predictors, adding to the evidence against the NCQ's predictive validity when using direct regression methods (Schauer, et al., 2011).

In other studies, direct correlations and discriminant analysis demonstrated no NCV predictors of academic success among Hispanic freshmen ($N = 156$) (Fuertes & Sedlacek, 1994), first-year medical school students ($N = 96$) (Mavis & Doig, 1998), or physical therapy students ($N = 57$) (Guffey, Farris, Aldridge, & Thomas, 2002). I argue that variations in the application of the NCQ may have contributed to these study results. For example, Guffey et al. (2002) reported the purpose, timing, and methods of their NCQ administration differed from Sedlacek's original intent. Rather than GPAs or continued enrollment, Guffey et al. (2002) defined the outcome criteria as scores on the physical therapy licensing exam, and administered the NCQ following graduation, rather than before or during the program. As a result, age and educational attainment could have affected participant responses. Guffey et al. (2002) also acknowledged that the small sample size ($N = 57$) may have caused a statistical aberration in the results.

In summary, several researchers used direct regression methods to uncover noncognitive predictors of academic success for a wide variety of students, with mixed results. While many studies found direct predictive relationships (Adebayo, 2008; Boyer & Sedlacek, 1987a, 1987b, 1988; Noonan et al., 2005; Tracey & Sedlacek, 1984; White & Sedlacek, 1986), other studies found no little or no predictive value of the NCQ or its subscales for measures of academic

success (Fuertes & Sedlacek, 1994; Guffey et al., 2002; Mavis & Doig, 1998; Schauer et al., 2011; Schwartz & Washington, 2002; Thomas et al., 2007). Potential reasons for these diverse findings may be related to different student samples, timing of the survey administration, sample sizes, and statistical methods. Additional NCQ studies employing alternative statistical methods are reviewed next.

Alternate methods to analyze the NCQ's effect on academic success. In my search for studies utilizing Sedlacek's NCQ (2004a), I found no studies that entered cognitive variables in the first block of a sequential regression and NCV scores in the second block to mediate measures of academic success, since there is no temporal logic for that method. Tracey and Sedlacek (1987a) examined student samples of their previous studies (1984, 1985, 1987b) in a path study to compare structural models of academic success for White and Black students through a LISREL analysis. Their results reinforced the hypothesis that different racial groups on a predominantly White campus undergo different educational experiences, and therefore exhibit different predictors of academic success (Tracey & Sedlacek, 1987a). The models in this LISREL analysis indicated that the NCVs were predictive for Black students, but not for White students (Tracey & Sedlacek, 1987a). Tracey and Sedlacek (1987a) argued that their analysis confirmed the different experiences of White and Black students at one university, and explained the complex process of academic success among diverse student groups, although I found no other studies of this type.

Synthesis of the NCQ Literature

Following studies of reliability and validity, specific trends emerged across studies. First, the NCQ data analysis methods directly affected the results as well as the conclusions drawn from the work. Several studies (i.e., Adebayo, 2008; Noonan et al., 2005; White & Sedlacek,

1986) showed predictive study purpose and methods, and recommended policy and practice changes in their concluding remarks. Though tempting, the leap from prediction to explanation was not warranted by the predictive methods employed in these studies (Keith, 2006).

The second trend involved different NCV predictors depending on class year. The NCVs of self-confidence and realistic self-appraisal were often predictive of students' academic success in the first college year, while handling racism became more important in the latter years of college (Boyer & Sedlacek, 1987a; Fuertes et al., 1994; Tracey & Sedlacek, 1985; White & Sedlacek, 1986). Consistent with these findings, the multiple dimensions of identity model (Jones & McEwen, 2000) explains that student identity development is an ongoing process, influenced by environmental contexts, and one dimension (such as racial identity) may become more or less important at different times during college. The face and content validity of the NCQ makes sense, based on this developmental theory.

In the third pattern discerned, the studies in which NCQ scores were mediated by cognitive variables (the bold arrows, Figure 2.1) demonstrated more consistent predictive results than those utilizing direct effects of the NCVs only. One reason for this could be that to enter NCVs before the cognitive variables in a sequential regression accurately reflects the timing of personal development, as supported the successful intelligence theory (Sternberg, 1999). Sternberg (1999) described success as an individual's ability to capitalize on assets and mitigate challenges within one's environment, a developmental process that begins many years before college. Tracey and Sedlacek (1984, 1987b; Sedlacek, 2004a) as well as Nasim et al. (2005) and Ting (2000, 2003, 2009) advocated for NCV assessments in concordance with Sternberg's theory (1999). The second possible reason that the mediated statistical model resulted in more

predictive NCVs could be the result of step-wise hierarchical regression methods that produced the significance as a "chance effect" as claimed by Thomas, et al. (2007, p. 649).

The use of the NCQ for more than three decades speaks to its appeal to higher education in general, and its value to specific student groups in particular (Sedlacek, 2010). An extensive review of the research demonstrated that NCVs were predictive of academic success, especially when mediated by cognitive measures in a sequential multiple regression approach. Despite critiques (King & Bowman, 2006; Marchant, 2001), the NCQ has been praised as an effective, valid tool (Pieterse, 2007; Smith, 2001) to assess NCVs that encourage equitable representation of student attributes and better prediction of academic success among a variety of students. I reviewed evidence from diverse student group samples that suggested the NCQ may also be an effective tool for baccalaureate nursing majors, though it has not yet queried this student population. Based on holistic intelligence theories (Gardner, 2011; Sternberg, 2009), the NCQ's substantial contributions to research on college student success support its use to better understand baccalaureate nursing student academic success.

After reviewing Sedlacek's work and more recent studies of other psychosocial factors that may predict nursing student success, I explored grit (Duckworth, Peterson, Matthews, & Kelly, 2007) in conjunction with Sedlacek's NCVs (2004a). Using both instruments measured students' prevalence of these constructs, and demonstrated the contribution of these attributes to academic success among nursing majors. To discover how the Grit-S (Duckworth & Quinn, 2009) could predict college performance and persistence, I reviewed relevant literature starting with the development and theoretical basis of the Grit-S. A gap in current literature drives this synthesis and points to areas for further research about academic success among baccalaureate nursing students.

The Grit-S Scale

Some students demonstrate more determination than their peers to complete college and succeed in the workplace (Tough, 2012). The attitudes and related behaviors that set these dedicated individuals apart are called grit, defined as "perseverance and passion for long-term goals" (Duckworth, et al, 2007, p. 1087). Duckworth and colleagues demonstrated the Grit Scales measured the presence of this attribute and linked it to success in a variety of workplace and academic situations (Duckworth et al., 2007; Duckworth & Quinn, 2009).

Background and theoretical frame of grit. The construct of grit was developed from a history of studying characteristics of successful individuals, both in academia and business. Success in this context was defined by diverse observable and objective accomplishments, such as vocational and educational feats, rather than personal satisfaction with achievements, relationships, or general happiness (Duckworth, et al., 2007). The dependent variable measuring academic success among baccalaureate nursing students in this study met Duckworth et al.'s criteria of success (2007) based on measurable accomplishments. Duckworth et al. (2007) explained prior research about successful individuals found that persistence, hard work, and sustained interest contributed to success apart from intelligence (Duckworth et al. 2007).

Duckworth et al. (2007) differentiated grit from Barrick and Mount's (1991) conscientiousness, a construct used to predict job performance. Barrick and Mount (1991) identified conscientiousness as one of five of the big five personality dimensions in their five factor model (also called big five model, BF) that best predicted job performance in their landmark meta-analysis (Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001). Though grit may intersect with achievement dimensions of the BF construct conscientiousness, grit does not include the dependable and self-control aspects of conscientiousness. Grit stresses *long-term*

commitment: pursuing a goal over an extended time period, rather than immediate or short-term gains. The focus of gritty people is on future rewards and requires both perseverance and long-term passion for a single outcome (Duckworth et al., 2007). Poropat (2009) found BF conscientiousness was independent of intelligence, just as grit was also found to be independent of intelligence (Duckworth et al., 2007; Duckworth & Quinn, 2009). Because grit involved perseverance and a focus on future goals, I hypothesized that grit correlated with Sedlacek's construct of preference for long term goals (2004a), and this relationship was examined in the context of academic success of baccalaureate nursing students.

Review of Grit Research

Method of grit literature search. When embarking on the grit literature search, I followed a procedure similar to the NCQ search, though searched dates were more recent, as the construct was not defined by Duckworth until 2007. I explored databases including PsychINFO (2005-2013), ERIC (2005-2013), and Academic Search Complete (2005-2013) between May, 2013 and December, 2013 for published and unpublished works (including dissertations, research reports, etc.). I also searched WorldCat for pertinent publications. In both searches, I entered key words: *Grit, Grit-S, success, student success*. I reviewed the collected articles for citations that electronic searches may have missed, as well as Dr. Duckworth's webpages on the University of Pennsylvania's website featuring related published and unpublished works (Duckworth, 2013).

Unlike my quest for NCQ research, my initial search for grit research yielded less than a dozen research articles, and only a few reports were assessed as appropriate studies of success. The excluded articles studied the concept of grit in various settings, in conjunction with diverse other constructs. For instance, Silvia, Eddington, Beaty, Nusbaum, and Kwapil (2013) measured

physiological responses among forty adults completing a cognitively challenging task to better understand the biologic autonomic nervous system response of grit and coping. In contrast, Singh and Jha (2008) discovered that grit correlated positively with happiness and life satisfaction among technology-focused undergraduates in New Delhi, India (N = 254). Grit was also associated with professional satisfaction among physicians in Idaho (N = 564, Reed, Schmitz, Baker, Nukui, & Epperly, 2012). In a physical rehabilitation setting, grit was a predictor of success as defined by physical function goals among people with low back pain (N = 22, Nilakantan, Johnson, & Mackey, 2013). Though these are important contributions to the literature on grit, they did not pertain to success as defined by Duckworth et al. (2007) as academic or vocational achievements, and were therefore not included in this review.

Initial Grit- O research. Duckworth, Peterson, Matthews & Kelly (2007) presented the first six grit scale studies in a single publication in order to define and assess validity of the original Grit scale (Grit-O) among diverse independent samples. Initial studies found construct correlations with BF's conscientiousness over the other BF constructs, and found grit to be positively correlated with educational achievement among adults, retention of military cadets, GPAs among college students, and winners in the National Spelling Bee, even more closely than BF conscientiousness. These findings supported the construct and predictive validity of grit (Duckworth et al., 2007).

In the first instrument development study, Duckworth et al. (2007) queried a self-selected group of 1,545 adults (over age 25; 73% women) who completed an on-line survey accessed through a psychology website in 2004 - 2005. They were asked twenty-seven questions designed to measure perseverance in general, without specifying a particular domain (i.e. art, work, family, etc.) and also questions about current work and educational background. From

these responses, exploratory factor analysis yielded a parsimonious solution of two primary factors comprising grit: "consistency of interest" and "perseverance of effort" (Duckworth et al., 2007, p. 1090). To measure these dimensions of grit, a total of twelve survey items were retained. Analysis of the results demonstrated that grittier adults (respondents with high grit scale scores) achieved higher educational levels, even when controlling for age (Duckworth et al., 2007).

To test the construct and predictive validity of the revised twelve-item on-line grit tool, 690 respondents (over age 25; 80% women) completed the Big Five Inventory (BFI, John, Naumann, & Soto, 2008). These results demonstrated the expected relationship of grit with big five (BF) conscientiousness ($r = .77$, $p < .001$), but not the BF domains of agreeableness, openness, neuroticism, or extraversion (Duckworth, et al., 2007). Grit also incrementally predicted educational attainment better than any of the BF traits (controlling for age). Finally, the grittiest respondents were also 35% more likely to remain in their chosen career (Duckworth et al., 2007).

The third study of grit reported by Duckworth et al. (2007) surveyed 139 undergraduates attending the University of Pennsylvania, an elite university. The aim of this research was twofold: to assess the relationship between grit and cumulative GPA, and to test its relationship to cognitive ability (measured by SAT scores) in predicting GPAs. As hypothesized, higher grit scores correlated with higher cumulative GPAs. Additionally, grit was negatively associated with SAT scores ($r = -.20$, $p < .03$), suggesting that grit predicts GPAs better than SATs, and is independent of this traditional academic admissions measure (Duckworth et al., 2007).

Next, Duckworth et al. (2007) tested the original Grit Scale (Grit-O) among the entering class of 2004 West Point military academy cadets ($N = 1,218$; 16% women), and found it

predicted retention better than other institutional admissions criteria, including SAT score, class rank, leadership measures, and physical aptitude, though grit was not the best predictor of first year cumulative GPA or Military Performance Score (a composite score of military science courses and exercises). Finally, contestants for the 2005 Scripps National Spelling Bee (N = 175; 48% female; ages 7-15) took the Grit survey, along with measures of self-control and verbal intelligence. After controlling for age (older children naturally tended to progress further), grit best predicted advancement to higher rounds of competition, and was closely related to hours spent studying spelling (Duckworth et al., 2007).

Reliability and validity of the Grit-S. The Grit-O had good initial reliability and predictive validity (Duckworth et al., 2007), and reanalysis of the survey items' correlations weeded out the least predictive items among six initial studies. The remaining eight survey items formed the Short Grit Scale, or Grit-S (Duckworth & Quinn, 2009). Duckworth and Quinn (2009) found the Grit-S had internal consistency ratings of .73 to .83 (Cronbach's alphas), and confirmatory factor analysis suggested acceptable goodness of fit indices among four independent samples (Duckworth & Quinn, 2009).

Description and Development of the Grit-S. The original grit tool (Grit-O) consisted of 12 items (Duckworth et al., 2007), and was revised by Duckworth and Quinn (2009) into a more efficient eight-item Grit-S. Respondents rated themselves on a scale of 1 (*not like me at all*) to 5 (*very much like me*) on items such as "I am a hard worker" and "New ideas and projects often distract me from previous ones" (Duckworth, 2013). The instrument measures a two-factor structure consisting of long-term interest or passion, and effort perseverance despite adversity (Duckworth & Quinn, 2009; Strayhorn, 2013). Duckworth and Quinn (2009) revised the Grit-O into a shorter yet valid measure of grit, and presented several empirical studies to confirm the

brief instrument's two-factor structure (sustained interest and effort), consensual and predictive validity, as well as test-re-test reliability.

In the first study supporting the Grit-S, the Grit-O (Duckworth et al., 2007) was analyzed at the item level, and the most predictive items were retained. Then, confirmatory factor analysis confirmed the two-factor structure of grit, maintained interest and sustained effort. Using multiple goodness-of-fit indices across samples, fit statistics indicated a good fit for each of the military cadet respondent groups (N= 1, 218; N =1, 308). Fit statistics were not as good for the spelling bee finalists (N= 175) and the college undergraduates (N= 139), likely due to smaller sample sizes (Duckworth & Quinn, 2009).

In the second Grit-S study, Duckworth and Quinn (2009) confirmed the factor structure of the Grit-S and the relationships with the big five (BF) model personality traits, and further assessed the revised instrument's predictive validity. This sample consisted of 1,554 respondents (81% female; mean age= 45.64) to an on-line version of the Grit-S and the Big Five Inventory (BFI, John et al., 2008). These respondents also answered some demographic items, and questions related to their educational attainment and career changes (outcome variables). The confirmatory factor analysis (CFA) reaffirmed the two-factor structure (sustained interest and effort), and found the Grit-S goodness-of-fit indices surpassed that of the Grit-O. As with the initial Grit Scale, the Grit-S correlated more closely with BF conscientiousness than the other four personality domains of the BF model. After controlling for age and the BF dimensions, grit was a significant predictor of education level attained using logistic regression methods. Also, grit and age correlated positively, suggesting that grit increased with life experience (Duckworth & Quinn, 2009), just as the BF construct of conscientiousness increased with age (Poropat, 2009). Finally, grit was a negative predictor of lifetime career changes, even after controlling for

age and the BFI traits. In other words, grittier individuals were less likely to change careers (Duckworth & Quinn, 2009).

In the third study in Duckworth and Quinn's 2009 report, respondents to an on-line survey nominated a friend or a relative to complete a version of the Grit-S about the participant (N = 161). Responses from participants, family members and friends demonstrated good internal consistency (α = .83-.84) and appropriate consensual validity of the Grit-S. Duckworth and Quinn (2009) assessed reliability of the Grit-S and the Grit-O in their fourth study. Middle and high school students (N = 279; mean age = 13.94; 59% female) were surveyed in the fall, and again in the spring, and the Grit-S had good internal consistency (α = .82-.84) and test-retest consistency (r = .68; p < .001). Additionally, the Grit-S predicted students' GPAs one year following the survey, and was inversely related to hours of television watching.

The fifth study reported by Duckworth and Quinn (2009) returned to West Point Military Academy cadets (N = 1,248, 15% female) in June of 2005, to test the predictive validity of the Grit-S on retention through the intense summer training program. As with the previous class (see Duckworth, et al., 2007), the Grit-S predicted summer retention better than the military's "Whole Candidate Score" (Duckworth & Quinn, 2009, p. 170) which included social, physical and academic measures, and internal consistency was good (α = .77).

Finally, contestants in the 2006 Scripps National Spelling Bee participated in research published in 2009 (Duckworth & Quinn) and 2010 (Duckworth et al.). In their 2009 study, Duckworth and Quinn confirmed that among study participants (N = 190; 47% female; ages 10-15), grit correlated with big five conscientiousness better than the other BF traits, and that grittier contestants progressed further in the competition than their less-gritty peers. This result was mediated by spelling experience, assessed through both accumulated practice hours and

participation in final rounds at previous National Spelling Bee competitions (Duckworth et al., 2010).

Further studies employing the Grit-S. In 2010, Duckworth et al. assessed the type of practice that made the most difference to competitive spellers (N = 190; mean age 12.9), which differentiated it from previous studies of spelling bee participants. This group reported that studying alone, or "deliberate practice" (p. 176) was less enjoyable than either being quizzed by others or pleasure reading, yet deliberate practice was most closely related to success (defined as progression to the final rounds at the Scripps National Spelling Bee competition). As expected, experienced competitive spellers were grittier, engaged in deliberate practice more often, and were also more successful. Duckworth et al. (2010) demonstrated via path analysis how deliberate practice mediated grit's prediction of National Spelling Bee performance.

The Grit-S also predicted novice teacher effectiveness (Duckworth, Quinn, & Seligman, 2009) and retention (Robertson-Kraft & Duckworth, 2014). Duckworth et al. (2009) queried novice teachers (N = 390; 79% female) working for Teach For America (TFA), a non-profit organization that places teachers in underserved areas. The teachers were asked to complete the Grit-S, as well as measures of life satisfaction and explanatory style. Teacher effectiveness was measured through record reviews of student learning outcomes kept by TFA. Though all positive traits were predictors of student gains, grit was the most predictive of effectiveness among this sample of teachers. Similarly, Robertson-Kraft and Duckworth (2014) assessed grit among two groups of newly hired teachers (N = 154; N = 307) in socioeconomically needy districts, in two separate longitudinal studies. Rather than self-report questionnaires, raters reviewed teachers' resumes for objective signs of passion and perseverance in their college and work experiences. Outcome measures included teachers' one-year retention and student

performance. At the end of the academic year, teachers who scored higher on the Grit-S were more likely to persist, and their students showed the most academic gain as measured by scores on state and national standardized achievement tests. Interestingly, other measures at time of hire, such as college GPAs and interviewer ratings, did not predict either persistence or effectiveness (Robertson-Kraft & Duckworth, 2014).

Strayhorn (2013) surveyed 140 Black male students at predominantly White four-year colleges and universities using the Grit-S in an on-line survey. Like similar studies of college students (Duckworth et al., 2007) he discovered that grit was positively correlated with grades. Grit was also positively related to high school GPAs and ACT scores among this sample. Through a hierarchical regression, Strayhorn (2013) found "Grittier Black males earned higher grades in college than their less gritty same-race peers, even after controlling for differences in age, year in school, transfer status, engagement activities degree aspirations, and prior achievement" (Strayhorn, 2013, para. 21). This adds to the evidence in support of grit to predict achievements, as it did among undergraduates at a highly selective college (Duckworth et al., 2007), military academy cadets (Duckworth et al., 2007; Duckworth & Quinn, 2009), national spelling bee competitors (Duckworth et al., 2010; Duckworth et al., 2007; Duckworth & Quinn, 2009), and novice teachers (Duckworth et al., 2009; Robertson-Kraft & Duckworth, 2014), among other groups.

These studies have demonstrated the effectiveness of the Grit-S in correlating with success, and only one example was found in which grit did not to relate positively to achievement. That instance was noted by Duckworth et al. (2007) in their study of military academy cadets entering in 2004. Though grit was the best predictor of summer retention, it did not predict cadets' first year GPA as well as self-control (a separate dimension of big five

conscientiousness). In the study of West Point cadets in the following summer (2005), only retention was assessed (Duckworth & Quinn, 2009). The Grit-S research has shown that grit is an important variable in the field of student success.

Synthesis of the Grit Literature

The concept of grit has been so promising in its short tenure that the U.S. Department of Education, Office of Technology sponsored a report to recommend ways to measure and enhance "grit, tenacity and perseverance" in primary and secondary school systems (Shechtman, DeBarger, Dornsife, Rosier, & Yarnell, 2013, title page). These recommendations were based on the premise that grit and similar personality traits were malleable and amenable to programmatic interventions (Strayhorn, 2013; Tough, 2012). Tough (2012) explained that the personality and character strengths that determined students' academic experiences were based on brain chemistry, but also malleable. Shechtman et al. (2013) studied many of the ways character strengths were nurtured, among about fifty programs nationally in which grit and related traits were promoted, ranging from pre-school programs to alternative schools and instructional strategies. Shechtman et al. (2013) agreed with Tough (2012), and recommended data-driven, research-based practices to explicitly teach positive personality traits. For instance, Hoerr (2013) proposed teaching strategies to foster grit among students, although results from Hoerr's method have not yet been published.

Grit is a non-academic factor that is likely present in successful baccalaureate nursing students, although no research about nursing students' grit was found. A related concept, resilience, was found to be positively correlated with GPA in a study of 124 baccalaureate and graduate nursing students (Beauvais, Stewart, DeNisco, & Beauvais, 2014). Dapremont (2014) discovered that specific study strategies such as setting a daily routine and focused study time led

to academic success for Black nursing student graduates, similar to the "grittier" spelling be contestants described in Duckworth, Kirby, Tsukayama, Berstein, and Ericsson (2010, p. 174). Baccalaureate nursing, like all four-year degrees, requires years of carefully sequenced and successfully navigated coursework. The nursing curriculum is academically rigorous and lifestyle-altering, as clinical education often requires early morning, late night and weekend schedules different from most college student schedules (Chitty & Black, 2011). Furthermore, baccalaureate nursing students must synthesize new information quickly and apply it responsibly in high-stakes, unplanned clinical situations (Benner et al., 2010; Stephens, 2013). To succeed, students must be fully engaged in clinical and didactic learning settings, make sacrifices to study and meet schedules, and remain focused on reaching their career goal (Benner et al., 2010; Dapremont, 2014). Because the nursing major is especially challenging, grit may play an important role in student performance. Therefore, this student group is an appropriate one in which to assess grit.

Research about NCVs and grit among college students is limited, and particularly sparse among nursing majors. Because the nursing major is academically rigorous, these students and their faculty must discover specific NCVs that contribute to success, and then develop these beneficial traits, especially among diverse students (Brown & Marshall, 2008; Childs et al., 2004; Dapremont, 2014). As noted in the next section, many studies of nursing student success have been conducted, but few focused on NCVs, and none explored grit among nursing students. Both the NCQ (Sedlacek, 2004a) and the Grit-S (Duckworth, 2013) show promise as measurements of character traits that can be nurtured in students, especially non-traditional students to support their successful journey through college.

Predictors of Nursing Student Academic Success

Predicting baccalaureate academic success is critical in this time of nursing workforce shortage; nurse educators traditionally rely on cognitive assessments such as standardized tests to choose and advance their students (Beeson & Kissling, 2001; Benner et al., 2010; Peterson, 2009). However, standardized tests only measure one aspect of intelligence and they are not adequate to predict success, especially among traditionally under-represented college students (Sedlacek, 2004a; Sternberg, 1999). For example, African Americans traditionally score lower than their White counterparts on high-stakes standardized tests (Alameida et al., 2011; Bowen & Rudenstine, 2003), so nursing education testing practices disadvantage students who could provide diversity and enhance healthcare delivery (AACN, 2011; Sullivan, 2004, 2008). Similarly, the age of bachelor-prepared graduates in the United States is trending upward, and is now over 27 years (HRSA, 2010). Increased age has been positively correlated with academic effort and anxiety among nursing students, as well as academic performance (Beeson & Kissling, 2001; Ofori & Charlton, 2002). Furthermore, standardized tests are not a good indicator of long-term retention or GPA among college students (Sedlacek, 2004a; Soares, 2012; Solórzano, 2008). Based on nursing's demographic trends and a curricular design which relies on rigorous testing, equitable measures to complement standardized tests and predict success are needed to promote qualified diverse students in nursing, just as they are needed throughout higher education (Sacks, 2007; Sedlacek, 2004a, in press).

The next section of this review shares select literature about predictors of nursing student success. Following a description of my search methods, I will first review studies of cognitive variables influencing nursing student success, and then present studies of psychosocial variables.

Method of nursing student academic success literature search. In addition to PsychINFO (2005-2013), ERIC (2005-2013), and Academic Search Complete (2005-2013), I explored CINAHL (2000-2013) for related nursing education articles, using these key words: *baccalaureate nursing students, nursing education, noncognitive variables, psychosocial variables, grit, conscientiousness, predictors* to discover factors associated with student nurse success. Then I reviewed the reference lists of the collected articles manually for relevant citations the electronic searches may have missed.

My initial searches yielded nearly one hundred articles, but roughly twenty of these were suitable peer-reviewed empirical works. I excluded works that were editorials or expert advice articles to guide practicing nurse educators, and those that did not study measures of academic success as dependent variables. For example, three studies examined unique program initiatives to increase student applicants of color and enhance retention in nursing programs (Beacham et al., 2009; Brown & Marshall, 2008; Sutherland et al., 2007). Olson (2012) reviewed several works to explain concerns of nursing students whose primary language was not English, and suggested teaching strategies and institutional support for these students. I retained these program evaluation studies for their implications and recommendations, but they were not useful for examining predictors of success.

To better understand the perspectives of nursing students about academic success, qualitative methods provided important student insights. Though several studies have been conducted to ascertain perceptions of nursing students (i.e., Dapremont, 2011; Del Prato, 2010; Del Prato, 2013; Dyck, Oliffe, Phinney, & Garrett, 2009; Wong, Seago, Keane, & Grumbach, 2008), only those most relevant to academic success were reviewed. For instance, Dapremont (2014) interviewed 18 Black nurse graduates about factors that led to their academic success, and

found "grittier" (Duckworth, et al., 2010, p. 174) activities such as deliberate, scheduled reading and study time, utilizing peer study groups and/or note cards were important, just as they were in Duckworth et al.'s study of successful spelling bee contestants (Duckworth, et al., 2010). On the other hand, McGann and Thompson (2008) found that among 16 students that did not meet an institutional nursing major GPA threshold reported heavy workload, procrastination, and time management as reasons for their poor grade performance.

Among the included works, several of the studies involved associate degree nursing students (for example, Jeffreys, 2007; Raman, 2013; Wong et al., 2008). I incorporated this research because many concerns and predictors of student success were similar in associate and baccalaureate nursing students. In addition, I drew upon two relevant systematic literature reviews linked to persistence and academic performance in nursing programs. In the first, Childs et al. (2004) conducted a review of social and academic persistence issues among Black nursing students, concluded with useful recommendations to increase retention for students of color. I also relied on Grossbach and Kuncel (2011), who conducted a meta-analysis of predictive nursing admission measures, assessing 31 independent samples (N = 7,159).

Academic predictors of nursing student success. The dependent variable, nursing student academic success, was defined similarly across studies through measures of student persistence (retention), cumulative GPAs, graduation, and/or the National Council Licensure Examination for Registered Nurses (NCLEX-RN, National Council of State Boards of Nursing (NCSBN), 2012). The NCLEX-RN is a multiple-choice, computer adaptive, standardized exam. All nursing students, regardless of their academic preparation, must pass this exam following graduation to secure licensure as an RN. Therefore, the NCLEX-RN is commonly accepted as an ultimate outcome criterion for American nursing students as well as educational programs.

Often, NCLEX-RN predictor tests served as outcome variables, which are commercially available standardized exams "to provide graduating nurses with a method to test their knowledge … to predict success on the NCLEX-RN" (Alameida et al., 2011, p. 261). These measures of success are academic markers that defined the dependent variables in the reviewed studies.

When nurse researchers examined independent variables that predicted academic success, they focused primarily on academic and cognitive criteria. For instance, SATs were found to be predictive of NCLEX-RN success (Grossbach & Kuncel, 2011; Stuenkel, 2006). Hopkins (2008) also found SATs to be predictive of first- semester grades in Nursing Fundamentals, an initial course for 383 first-year nursing students attending an associate degree nursing program in the southeast.

Grade point averages (GPAs) and grades in selected pre-nursing and nursing courses have also been correlated with nursing student academic success. For example, Alameida et al. (2011) examined cumulative college GPAs among 589 nursing students at a large urban university. Pearson correlations and chi-square calculations discovered that GPAs were predictive of success on a commercially available nurse readiness predictor examination (a continuous variable) and the NCLEX-RN (a dichotomous variable) for this group (Alameida et al., 2011); Seldomridge and DiBartolo (2004) reviewed academic records of 186 nursing graduates, conducted logistic regressions of college GPAs on the NCLEX-RN and also found positive correlations. Likewise, post-secondary grades prior to starting nursing classes predicted nursing academic success, defined by nursing course grades or semester GPAs (Hopkins, 2008; Lewis & Lewis, 2000; McGann & Thompson, 2008; Peterson, 2009; Raman, 2013). Early academic grades, as well as specific nursing course grades predicted students' readiness for the

NCLEX-RN exam, measured either by NCLEX-RN predictor tests or passing scores on the licensing examination (Alameida et al., 2011; Beeson & Kissling, 2001; Fortier, 2010; Grossbach & Kuncel, 2011; Jeffreys, 2007; Seldomridge & DiBartolo, 2004; Stuenkel, 2006; Waterhouse & Beeman, 2003). ACT and SAT test scores, like commercially available RN readiness predictor exam scores are all large-scale standardized tests, and both were positively correlated with NCLEX-RN success (Alameida et al., 2011; Grossbach & Kuncel, 2011; Stuenkel, 2006). The literature is replete with evidence that academic variables predict success among nursing majors.

Recall that the early studies of cognitive and noncognitive variables among nursing students (Michael et al., 1965; Sartain, 1946) entered the cognitive before the noncognitive variables in multiple regression equations. The order of variable entry could explain the cognitive variables' greater variance in the prediction equation (i.e. the "chance effect" argument of Thomas, et al., 2007, p. 649), and the continued preference for indicators such as prior GPAs, and entrance tests over noncognitive variables in nursing student success studies. The early research on nursing student academic success has influenced current research trends. Sedlacek's method of considering NCVs first in the regression equation, based on theory and logic (Sedlacek, 2004a), is a valid alternative to the traditional cognitive-based approach for research about nursing student academic success.

Noncognitive predictors of nursing student success. All of the cognitive variables assessed in nursing programs, including course grades, are measured either in whole or in part by standardized, multiple-choice exams, often administered via computers, as it is thought that practice on this type of exam will increase performance on the NCLEX-RN (National League for Nursing [NLN], 2012). Yet these cognitive standardized assessments may not be a fair measure

of nursing students' abilities. For students suffering from test anxiety, this type of repeated multiple-choice testing may actually increase anxiety and decrease performance (Cassady & Johnson, 2002). Steele (1999) found that when Black students felt they were perceived as having limited cognitive ability, their performance on standardized cognitive tests was impaired (though Blacks and Whites tested equally well when Black students understood that the tests did not measure intellectual ability). Furthermore, students who were older age and female, which include the majority of nursing students (Bureau of Labor Statistics, 2011) were shown to suffer more performance anxiety that impacted their test-taking ability (Alameida et al., 2011; Waltman, 1997). The above- mentioned student groups are often disadvantaged by traditional cognitive exams.

Little research has evaluated more holistic aspects of nursing students to assess aptitude or ability, although a few recent exceptions to the cognitive focus have been noted. Johnson, Johnson, Kim, and McKee (2009) developed and evaluated ten categories of cognitive and noncognitive variables through the Personal Background Preparation Survey (PBPS) among two samples of new nursing students (N_1 = 187, N_2 = 188) in Texas. The PBPS development process mirrored Tracey and Selacek's (1984, 1987), and many of the "risk categories" on the PBPS are similar to the NCQ scale scores (Sedlacek, 2004a), including self-concept, support, leadership, discrimination, community service, and long-range goals (Johnson et al., 2009). However, unlike Sedlacek's work, the PBPS was developed as an instrument to identify factors that signaled academic difficulty rather than potential strengths. The PBPS was developed to improve retention of under-represented racial groups in nursing. Its aim was to identify risk factors leading to student attrition in order to intervene early and avoid "adverse academic status events" (AASE, Johnson et al., 2009, p. 606). Logistic regressions established that one standard

deviation above the PBPS average score increased a student's chance of an AASE by about 150%, and strategies could be implemented early to improve the academic performance of identified at-risk students (Johnson et al., 2009).

College student participation in class and on campus improves learning and retention (Tinto, 1993), but little evidence exists about nursing student engagement. Popkess and McDaniel (2011) compared baccalaureate nursing students' responses (N = 1000) from the National Survey of Student Engagement (NSSE, Kuh, 2002), to other health professions majors (N = 1000) and education majors (N = 1000), to compare levels of engagement. They discovered that while nursing students felt more academically challenged, they were also less engaged in learning activities (i.e., class discussions, presentations, and group projects) than their peers majoring in education or other health professions, especially among first-year respondents. This may partially explain academic challenges and persistence concerns facing nursing majors. The authors concluded with active and collaborative teaching strategies to increase student engagement, to encourage success among nursing majors (Popkess & McDaniel, 2011).

Peterson (2009) and Ofori and Charlton (2002) examined the noncognitive attribute of self-efficacy, or the belief in ones' ability to succeed (Peterson, 2009), but did not find it a predictor of academic success. Peterson (2009) did find that prior scholastic performance was closely correlated with success among 66 baccalaureate nursing students, while Ofori and Charlton (2002) did not. In fact, Ofori and Charlton's path study of 315 British nursing students found that age was more predictive of academic success than academic locus of control, self-efficacy, coping, or previous academic performance. Older students (M = 26; SD = 8) demonstrated more support-seeking behavior, which mediated academic success (Ofori & Charlton, 2002).

No research utilizing the NCQ (Sedlacek, 2004a) or the Grit-S (Duckworth & Quinn, 2009) to predict nursing student success was found in this review of literature. However, Beeman and Waterhouse (2003) found that nursing students who reported long hours of studying basic content were more likely to succeed on the licensing examination, which parallels the findings of Duckworth et al. (2010) in their study of successful spelling bee competitors. Likewise, Dapremont (2014) interviewed Black nurse graduates (N = 18) who reported that "deliberate practice" strategies, similar to those reported by Duckworth et al. (2010, p. 178) led to their success. These disparate groups studied by Beeman and Waterhouse (2003) and Dapremont (2014) reported academic behaviors that point to an underlying construct similar to grit among these successful students, although grit has not been directly measured in baccalaureate nursing students. From this review, it is clear that academic success studies among this group generally feature academic variables, and scant information about the influence of noncognitive variables was found in the literature. A clear gap in the literature on nursing students exists about the noncognitive or psychosocial factors that influence academic success among this student group.

Discussion and Summary

This chapter first reviewed relevant literature about nursing education history, and then introduced select theories of intelligence and learning (Gardner, 1993; Sternberg, 1999), to guide this study of non-academic factors that may influence student success. This chapter also explored previous research utilizing the instruments proposed for this study, Sedlacek's NCQ (Tracey & Sedlacek, 1984, 1988; Sedlacek, 2004a) and Duckworth and Quinn's Grit-S (2009; Duckworth, 2013). I demonstrated that the bulk of the literature about nursing student success examines cognitive and academic variables. In this study, I explored the noncognitive variables

described by Sedlacek (2004a) and Duckworth and Quinn (2009) among baccalaureate nursing students to address a gap in the literature. The NCQ and Grit-S together explored skills, attitudes and potential not captured on standardized tests, and provided valuable information to guide nursing education programs. There was scant research about psychosocial factors and their potential relationships to nursing students' academic success, and cognitive assessments alone are not adequate (Lemann, 2000; Sedlacek, 2004a). Therefore, it is appropriate to survey baccalaureate nursing students utilizing the NCQ and the Grit-S.

If nursing students could come to college with a crystal ball that would reveal their unique talents and troubles that would impact their academic success in college, nursing faculty cold devise strategies to capitalize on the strengths, and minimize risks to improve each student's chance for college success. But students do not come to college with a crystal ball, and nurse educators strive to equitably choose and promote diverse students who will become successful nurses, and are supported by national (i.e., AACN, 2011, 2012a; NLN, 2012) and corporate initiatives (i.e., Johnson & Johnson Services, 2012) to address the nursing shortage and enhance workforce diversity.

Sedlacek's NCQ (2004a) revealed noncognitive factors that impact academic success among many under-represented student groups. Duckworth and Quinn's Grit-S (2009) has also shown promise as a predictor of success identified by observable achievements such as academic performance. As the profession seeks to increase and diversify the nursing workforce, schools of nursing must find alternate predictors of academic success. Wiser, more balanced assessments of nursing students will ultimately address the shortages of nurses and diversity to meet an important public health imperative. Chapter Three describes the methods of this study to better

understand noncognitive and cognitive variables that impact baccalaureate nursing student success in their junior year.

Chapter Three: Methods

The purpose of this study was to investigate how certain noncognitive factors predicted baccalaureate nursing students' academic success, defined as junior year GPA and persistence. In this exploratory correlational study, I explained relationships among variables through descriptive and multivariate statistical analysis. Specifically, regression analyses determined whether an instrument that combined the Grit-S (Duckworth & Quinn, 2009) and the Noncognitive Questionnaire (NCQ, Sedlacek, 2004a) predicted academic success by answering the following questions.

Research Question 1: Do specific noncognitive variables as measured by Sedlacek's NCQ (2004a) and Duckworth and Quinn's Grit-S scale (2009) predict baccalaureate nursing student academic success, as defined by junior year GPA and persistence?

Research Question 2: Do certain background variables, specifically age, gender, race, SAT scores, or previous college GPA impact baccalaureate nursing student academic success, as defined by junior year GPA and persistence?

Research Question 3: Do particular combinations of noncognitive and academic variables predict baccalaureate nursing student academic success, as defined by junior year GPA and persistence, when controlling for demographic variables (age, gender, race)?

Study Design

I conducted a post-facto correlational study (Sprinthall, 2007) spanning two semesters among three consecutive cohorts of junior level nursing majors (graduating classes of 2014, 2015 and 2016) at one small liberal arts institution. The first cohort was initially examined as a pilot study, and the survey instrument and analysis was enriched by the pilot experience and findings. At the time of the survey, participants also consented to allow the investigator access to

academic records to collect demographic data and independent variables such as SATs and GPAs. At the conclusion of the 2012-2013 (Cohort 1), 2013-2014 (Cohort 2), and 2014-2015 (Cohort 3) academic years, academic success was assessed via participants' GPA and persistence (dependent variables) during their junior year.

Research Setting

As described in Chapter One, I am a researcher and educator in the program of interest in this study, a pre-licensure baccalaureate nursing program in New York State. My particular public health lens, combined with the tradition of single-institution nursing education research allows this research to be both personally meaningful and of interest to nurse educators generally. Though I did not work directly with this group of students, their long-term success impacts not only their own future, but also the nursing profession and the public's health.

This nursing education program is located within a college setting that enrolls approximately 2,700 on-campus students. The school offers a variety of liberal arts and pre-professional bachelors' degrees, available on-campus and on-line (College, 2012). The nursing major commences in the third collegiate year (junior year) following general education and pre-requisite coursework, and entails four semesters of full-time nursing study in a variety of class, laboratory, and clinical settings.

The students at this institution were primarily women (59%); most were New York State residents, although students were from 45 states and 20 countries. Thirty-seven percent of all students, including some nursing majors, did not persist to the junior year (College, 2016) and were not the included in the targeted junior-year-population of this study. Over one-quarter of students identified themselves as students of color, and one-quarter were the first in their families

to attend college. Over 95% of full-time undergraduate students at this college received some form of financial aid (College, 2012).

The college's Office of Institutional Research reported that 32% of 2013 nursing students identified as students of color, though only 16% were men. Like the general student body, over 95% of nursing majors received financial aid, and approximately 83% were awarded federal loans. For 24% of nursing students, neither parent graduated from college (B. Gray, personal communication, November 17, 2014).

Participants

Rationale for participant selection. Junior level nursing students are at a critical point in their education and were the focus of this research for several reasons. First, these students had just successfully navigated the science and social science pre-requisite classes for the nursing major, with at least the 2.5 minimum GPA required to allow progression into the nursing major at this liberal arts college (Faculty, 2010). Second, the junior year immerses the student in nursing classes, skills laboratories and clinical experiences, and it is often the first time that they encounter patients in a health care setting as pre-professionals. In other words, this is when the idea of becoming a nurse begins to turn into a reality as students are introduced to the nursing profession.

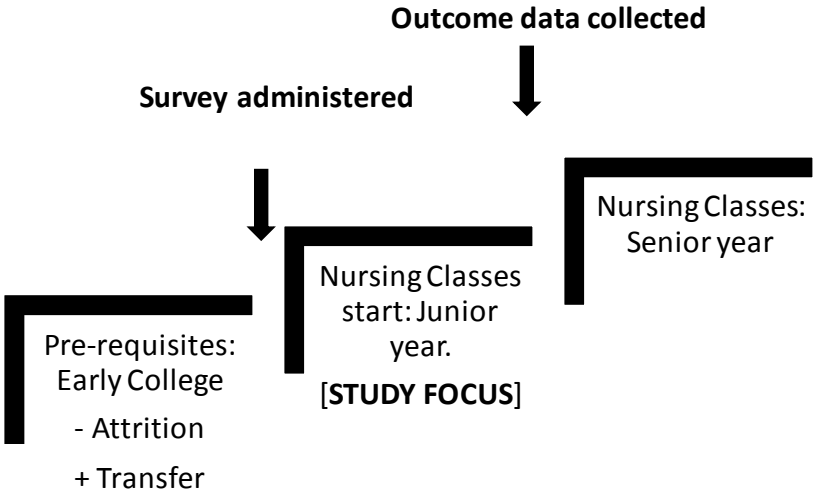
The third reason to study these students was because nursing students could be defined as a "non-traditional" college student group by Sedlacek, as they were not typically White males of European descent, and potentially experienced discrimination due to gender and/or race (Sedlacek, 2005a, p. 3). At this institution and nationally, nursing student populations were comprised of a relatively higher proportion of women and people of color, as well as older aged students than the general U.S. college population (Health Resources and Services

Administration, 2010). Nursing students must participate in specialized educational activities that often separate them from typical college populations such as varying schedules, off-campus clinical experiences and a challenging, cognitive test-based curriculum to prepare for the national licensing examination (National League for Nursing [NLN], 2012). To succeed in this environment, students must demonstrate determination and perseverance, which also begged further exploration of nursing students' grit (Duckworth & Quinn, 2009). The junior year nursing students were targeted for this research that assessed NCVs (Sedlacek, 2004a) and grit (Duckworth & Quinn, 2009).

Finally, in that these nursing students were beginning a very challenging part of their education, they were similar to first year college students, though they had successfully completed rigorous pre-requisite courses. The junior year is an educational juncture when the nursing curriculum becomes more rigorous, and estimates upwards of 30% of nursing students fail to persist at this time (Jeffreys, 2007; Thurston et al., 1963), especially among racially under-represented students (Childs et al., 2004). The attrition rate at this college among nursing majors during the junior year was estimated at 20 to 30% (C. Love-Williams, personal communication, 2016). The junior year of a baccalaureate nursing education is a critical time, and was chosen as the temporal focus of this study (Figure 3.1). Prediction of outcomes at this time is beneficial to maximize student academic success, and little research at this educational stage was noted in the literature.

Figure 3.1

Graphic of Study Timing and Targeted Population



Participant pool. The participant pool used in this study were junior baccalaureate nursing students at one central New York college, enrolled in the third of a four year, on-campus program to earn a bachelor's of science degree, and who anticipated taking the NCLEX-RN licensing exam upon graduation. Table 3.1 is a snapshot of nursing students' demographics at this institution in 2013 (Brownell, 2013).

Table 3.1

Racial/ Ethnic Origin among All Nursing Majors at Study Site, 2013

	African American		Native American		Asian/ Pacific Islander		Hispanic		Multi-cultural/ Other		White/ Non-Hispanic		Total	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Female	22	13.3	2	1.2	3	1.8	10	6.0	6		97	58.4	140	84.4
Male	7	4.2	0	0	0	0	0	0	3	1.8	16	9.6	26	15.6
Total	29	17.5	2	1.2	3	1.8	10	6.0	9	5.4	113	68	166	100

Notes: Adapted from Brownell, C. (2013). *2013 Annual report for associate and baccalaureate nursing education programs* (unpublished report). Submitted to The University of the State of New York, State Education Department, Office of the Professions, and Division of Professional Education Program Review.

Though most nursing majors at this college identified as White females, similar to nursing students' predominant demographic nation-wide, this program was more racially diverse than the current nursing workforce or the college in general. In 2013, the nursing workforce was comprised of only 19% people of color (AACN, 2014), compared to 37 % of the nation's population (United States Census Bureau, 2014). In comparison, Table 3.1 demonstrates that in 2013, 32% of the students in this program were people of color (Brownell, 2013), approaching the national distribution of race and ethnicity. Less than 10% percent of nurses nationally were men at the time of this study (HRSA, 2010), compared to 15.6% men enrolled in this nursing program in 2013 (Brownell, 2013). Though not reflective of the 49% men in the U.S., (United States Census Bureau, 2014), it is slowly changing from the negligible historical representation of men in the nursing workforce (Chitty & Black, 2011). The pool of potential participants included fifty-three 2012 juniors, fifty-two 2013 juniors, and fifty-five 2014 juniors.

Participant sample. The purposive samples were drawn from these three successive classes of junior year baccalaureate nursing students (entering cohorts of 2012, 2013, and 2014).

Of these potential participants, 50 (94%) 2012 junior (Cohort 1), 47 (90%) 2013 junior (Cohort 2), and 53 (96%) 2014 junior nursing students (Cohort 3) consented to the survey and allowed access to their academic records to retrieve data such as demographic data, SAT scores, and GPAs. The total sample size from all three cohorts totaled 150 participants, a participation rate of 94%. Since less than ten percent of each class did not consent to be participants in this research, the sample of study participants was similar to the general class demographics, and was comprised of 29% students of color and 16% men (see Table 3.3).

Sixty-four of these students (42.7% of sample) had taken at least one semester, operationally defined as 17 or more credits at a different post-secondary institution prior to transferring to the studied nursing program. Of the 64 students who transferred to the studied institution, 36 students had previously attended two-year schools and 28 attended four-year schools. All participants were at least 18 years old, in their junior year of baccalaureate studies, and enrolled in nursing classes. All nursing students had mastered pre-requisite courses, and had achieved a minimum GPA of 2.5/4.0. Conversely, students who were not nursing majors, not attending this college, or who did not consent in writing were excluded from this study.

As an incentive, names of all consented participants who indicated interest were entered into a random drawing for $20 gift cards to the campus bookstore. There was at least a 1 in 10 chance of winning the gift card among each of the classes, and participants were given the opportunity to opt in to the incentive. I explained that the incentive was a minor token of appreciation, to avoid misconceptions of payment or coercion. Though I was an educator at this institution at the time of the study, I had minimal involvement in this on-campus program, and I did not teach these students prior to survey administration, which minimized my positional influence upon their participation. Yet, I acknowledge the possibility of my faculty status at the

institution as a potential factor in participant willingness to contribute to this research. I emphasized the voluntary nature of study participation, and survey distribution was explicitly distinct from any specific course content.

Description and Comparisons of Sample: Cohorts One, Two and Three

Demographic variables were assessed among successive samples of junior-level nursing majors (entering cohorts of 2012, 2013, and 2014). The cohorts of nursing students were compared to detect potential differences that could impede the feasibility of combining the groups. Finding no differences (based on alpha parameters of $p < .05$), Cohorts one (1, surveyed in 2012), two (2, surveyed in 2013) and three (3, surveyed in 2014) were pooled to avoid problems of small sample size in the regression analyses.

Age. Ages of the respondents in Cohort 1 ranged from 19-44 years of age, and most (56%) of students reported an age of 19 or 20 years old. The mean age of this class was 22.5 years, with a standard deviation of 5.4 years. Similarly, most Cohort 2 respondents were aged 24 years old or younger, and 44.7% were 21 or 22 years old. The mean age of Cohort 2 was 22.3 years ($SD = 5.04$). In Cohort 3, respondents ranged in age from 19-46 years of age, though as in previous years, the majority of students (83%) were 24 years or younger, and 45.7% of the students were19-20 years old (see Table 3.2). Nine students (17%) were 25 or older. Although the pilot survey (Cohort 1) was administered five months earlier in the curriculum than Cohorts 2 and 3, participant ages were not affected by the time of year the survey was administered. Next, *t*-tests, chi-square and ANOVA compared the means of the three cohorts.

Comparisons of age distribution. First, *t*-tests were conducted to compare the mean ages of the three cohorts, to detect significant differences that could preclude combining the cohorts. There was no significant difference between the Cohort 1 participants ($M = 22.5$, $SD = 5.40$) and

the Cohort 2 participants (M = 22.26, SD = 5.04; t (95) = .231, p = .82). Then, Cohort 2 was compared to Cohort 3 (M = 22.19, SD = 4.48; t (98) = .07, p = .95 two-tailed), and Cohort 1 (M = 22.5, SD = 5.40) to Cohort 3 (M = 22.19, SD = 4.48; t (101) = .317, p = .75). No differences in cohort ages were found using t-tests.

To further assure that Cohorts 1, 2, and 3 were similar in age, a two-by-three chi-square test was conducted on the dichotomous age variable, and no assumptions were violated (all cells had frequencies over 5). The chi-square test indicated that Cohorts 1, 2, and 3 were not significantly different in terms of age (χ^2 = .55, df = 2, N = 150, p = .76; Table 3.2). To confirm previous tests of cohort sample similarities, a between-groups analysis of variance (ANOVA) was conducted to assess the groups' differences for the age variable. The Levene's test of the homogeneity of variances demonstrated no significant variances, validating the assumption of equal variances across groups. The one-way ANOVA established the means were the same (not significantly different, $p < .05$) among participants in Cohorts 1, 2, or 3 in terms of age, F (2, 147) = .055, p = .95. The ANOVA further confirmed that the three junior year cohorts were demographically homogenous. In summary, the combined sample of three cohorts was predominantly of college age, with an overall mean age of 22.3 (SD = 5.0). The t-tests, chi-square and ANOVA demonstrated similarities among the three cohorts in regards to mean age, which allowed the three cohorts of participants to be combined into one sample.

Gender. As noted in Table 3.2, the percentage of men in the three cohorts were comparable, and reflected a normal fluctuation in enrollment numbers, ranging from 11.3 % to 19%. This was similar to the general population of 2014 baccalaureate nursing students nationally, in which 15% of the students were men (NLN, 2015).

Comparisons of gender distribution. To confirm that the cohorts were similar with regards to gender representation, a two-by three chi-square statistic was conducted after checking and meeting assumptions (each cell had $N > 5$). The chi-square indicated that Cohorts 1, 2, and 3 were not significantly different in terms of gender ($\chi^2 = 1.36$, $df = 2$, $N = 150$, $p = .51$). The noted similarity of these samples' gender variable distribution further supported the combination of these cohorts of participants for further analyses.

Race. Table 3.2 shows the reported race of the participants by study cohort, and clear similarities were noted. All three cohorts were predominately White (71.3% overall). The students of color represented various races, and made up 28% to 30% of students in each cohort studied.

Comparisons of race distribution. To assess whether Cohorts 1,2, and 3 varied by racial distribution, a two-by-three chi-square test for independence was conducted after meeting assumptions, and identified no significant differences in White and students of color proportions between the cohorts ($\chi^2 = .09$, $df = 2$, $N = 150$, $p = .95$). Small numbers of each race precluded analysis by specific race, so Black, Hispanic, Asian, Multiracial and Other categories were combined to make the students of color grouping. The three cohorts as noted in Table 3.2, were clearly similar for the dichotomous race variable, as well as the age and gender variables, and could be combined to answer the research questions.

Table 3.2

Descriptive Statistics of Demographics across Three Cohorts

	Cohort 1 (2012 Juniors)		Cohort 2 (2013 Juniors)		Cohort 3 (2014 Juniors)		Total Sample			
	N	%	*N*	%	*N*	%	*N*	%	χ^2	*p*
Age										
19-24	41	82	41	87.3	44	82.9	126	83.9		
25+	9	18	6	12.6	9	17.1	24	16.1		
Mean	22.5 (*SD* = 5.4)		22.3 (*SD* = 5.0)		22.2 (*SD* = 4.5)		22.3 (*SD* = 5.0)			
Total	50		47		53		150	100	.55	.76
Gender										
Male	9	18	9	19	6	11.3	24	16		
Female	41	82	38	81	47	88.7	126	84		
Total	50		47		53		150	100	1.36	.51
Race										
White	36	72.0	34	72.3	37	69.8	107	71.3		
Students of Color	14	28.0	13	27.7	16	30.2	43	28.7		
Black	12	24.0	9	19.1	9	17	30	20		
Hispanic	1	2.0	0	0	1	1.9	2	1.3		
Asian	0	0	0	0	3	5.7	3	2		
Multirace	1	2.0	4	8.5	2	3.8	7	4.7		
Other	0	0	0	0	1	1.9	1	.7		
Total	50	100	47	100	53	100	150	100	.094	.95

Summary of participant demographics. Each cohort of nursing students was described in terms of age, gender and race, then compared to assess demographic variables that could influence the dependent variables. Chi-square and *t*-tests confirmed that Cohort 1 ($N = 50$), Cohort 2 ($N = 47$), and Cohort 3 ($N = 53$) were similar in terms of age, gender, and race distribution. As no differences were detected, the cohorts were combined to form one participant group for further analyses ($N = 150$; see Table 3.3).

Table 3.3

Summary Description of Combined Study Sample

	Age		Gender		Race		Total
	19-24	25+	Male	Female	White	Students of Color	
N	126	24	24	126	107	43	150
% of Total	84	16	16	84	71	29	100

Data Collection

Pilot study. The initial pilot study survey was distributed to Cohort 1 in the spring of 2012, and outcome data were collected after the fall semester of 2012. This pilot survey included only Sedlacek's NCQ. Due to the small sample size ($N = 50$) and correlations among variables, differences noted were marginal. The pilot study demonstrated the need for a larger sample size and a longer interval prior to measuring outcomes.

Study revisions based on pilot. Following the pilot study, I decided to recruit participants from two more successive classes of juniors to combine with the pilot sample, and allow two semesters prior to assessing outcome variables. The dependent variables data were collected from academic records following Cohort 1's spring semester of their junior year to be consistent with the plan for subsequent cohorts. These decisions improved the statistical power and practical significance of the study by increasing the sample size ($N = 150$ total) and lengthening the measurement interval of outcomes to match the academic year (fall and spring semesters of the junior year).

The Short Grit Scale (Grit-S, Duckworth & Quinn, 2009) was added to the second and third rounds of surveys (Cohort 2 and Cohort 3), because construct face validity aligned it with the NCQ construct of long term goals. As described in Chapter Two, research has shown grit to

predict different measures of success (Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014; Strayhorn, 2013), and it added a potential predictor variable of academic success among baccalaureate nursing students in this work. In summary, the pilot study informed design decisions, and this research was strengthened by a two-semester time interval between survey administration and outcome data collection. Additionally, the Grit -S was added to the NCQ survey of Cohorts 2 and 3 to enhance the predictor data gathered.

Table 3.4

Data Collection Schedule

	*Cohort 1: 2012Jrs (*N* = 50)	Cohort 2: 2013Jrs (*N* = 47)	Cohort 3: 2014Jrs (*N* = 53)
Questionnaires administered	April, 2012	Nov, 2013	Oct, 2014
Academic records reviewed	July, 2013	July, 2014	July, 2015

Note. *Pilot study; survey distributed five months earlier than subsequent cohorts; did not include Grit-S

Questionnaire. Similar to the pilot study, participants of Cohorts 2 and 3 consented to participate, and Nursing Student Surveys (Appendix B) were distributed in the falls of 2013 and 2014 before or after regularly scheduled nursing classes, with the explicit written permission of the faculty involved (see Appendices C2, C3). I explained the purpose and participant involvement expected for the study, and I provided time for questions about my research. I obtained written consent from students willing to participate, and provided my contact information as well as that of the approving Institutional Review Boards (please see Appendix D, Informed Consent).

Academic records. The Informed Consent (Appendix D) also requested permission to collect background academic data (SAT scores, college GPAs and course grades) as well as outcome criteria (dependent variables included enrollment status and junior year GPAs) from

participants' academic records following the spring semesters of 2013, 2014, and 2015. I also requested and was granted written permission to access this secondary data from academic records by the Chair of the Nursing Department (see Appendix C1), and this process was approved by the college's Institutional Review Board. Outcome variables were collected at the conclusion of the students' second nursing semester (i.e., end of junior year for traditional four-year students) as per Table 3.4, for inclusion in Cohort 1, Cohort 2, and Cohort 3, respectively.

Instruments. I surveyed nursing students in the fall of 2013 (Cohort 2) and 2014 (Cohort 3) with a questionnaire I named the "Nursing Student Survey." It was comprised of two complete and tested instruments, the Noncognitive Questionnaire (NCQ, Sedlacek, 2004a) and the Short Grit Scale (Grit-S, Duckworth & Quinn, 2009). In addition to these instruments, the survey included six questions about academic and demographic background variables, such as age, gender, race, and previous college experience. (see Appendix B for the *Nursing Student Survey*).

The NCQ. The NCQ (Tracey & Sedlacek, 1984) consisted of 18 Likert-scale questions, and respondents rated themselves on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*) on items ranging from "I am sometimes looked up to by others" to "I want a chance to prove myself academically" (Sedlacek, 2004a). The NCQ also included three open-ended items regarding goals, accomplishments, group membership and leadership. In various combinations, these 22 items indicated eight underlying factors or noncognitive variables (NCVs). Tracey and Sedlacek (1984, 1987b) found acceptable construct validity of the NCQ, with eight distinct factors defined through exploratory factor analysis (N =1,977), loading from .31 (self-confidence) to .90 (long term goals). The NCQ's early trials demonstrated two-week test-retest reliability on closed-choice items ranged from .70 to .94, with a median of .85 (Tracey & Sedlacek, 1984).

The authors also assessed the NCQ's inter-rater reliability of the short answer questions regarding goals, community service, leadership and activities, which ranged from .83 to .98 in initial studies (Tracey & Sedlacek, 1984). With the revision of the NCQ to the current form, the inter-rater reliability of these items improved to .88 to 1.0 (Tracey & Sedlacek, 1984; Sedlacek, 2004a).

Short-answer items description. On the Nursing Student Survey (Appendix B), the NCQ short answer items were numbered as follows: Section 2, question 2 (Item 2.2); Section 2, question 4 (Item 2.4), and section 3, question 19 (Item 3.19). Item 2.2 stated: "Please list three goals you have for yourself right now," and requested three responses. Each response was coded by separate criteria as part of two different NCQ scale scores (long range goals and knowledge acquired in a field), as dictated by Sedlacek's coding key (2004a, 2005b). Item 2.4 asked participants to "Please list three things that you are proud of having done," and was included in the academic self-concept NCV scale. Item 3.19 asked participants to "list offices held and/or groups you belonged to in high school, college or in your community," and had spaces to record four (4) responses. Each response to Item 3.19 was distinctly coded three times for inclusion in three different NCQ scale scores, representing the NCVs of leadership, community service, and knowledge acquired in a field, per Sedlacek's coding key (2004a, 2005b). The entire Nursing Student Survey with the coding key is found in Appendix B.

Inter-rater reliability established. My experience with the pilot study guided my decisions in the treatment of the NCQ's open-ended questions for Cohorts 2 and 3. I developed a coding manual for the open-ended items based on Sedlacek's coding key and pilot study data (Cohort 1, 2012). I trained an experienced researcher regarding Sedlacek's coding instructions, and chose ten surveys (20%) at random from Cohort 1 ($N = 50$). I asked the second rater to code

the open-ended items described above, and his answer codes were compared to mine. Initial inter-rater reliability was .89 overall. Item coding disagreement was then discussed and resolved to achieve 100% agreement. The item-coding manual was edited to include the examples of answers that were more difficult to code in Cohort 1 to facilitate consistency during the subsequent data analyses of Cohorts 2 and 3.

For Cohort 2, twenty of the 47 surveys (43%) were coded by both coders, and inter-rater reliability calculated to .99. Likewise, inter-rater reliability was over .99 when nearly half of the surveys of Cohort 3 (N = 26 of 53) were rated. The few discrepancies noted were discussed and resolved to achieve 100% agreement, and inter-rater reliability was established for the short-answer items of the NCQ.

The Grit-S. The original grit tool (Grit-O) consisted of 12 items (Duckworth et al., 2007), and was revised by Duckworth and Quinn (2009) into an efficient eight-item closed-response Short Grit Scale (Grit-S). Respondents rated themselves on a scale of 1 (*not like me at all*) to 5 (*very much like me*) on items such as "I am a hard worker" and "New ideas and projects often distract me from previous ones" (Duckworth, 2013). The instrument measured a two-factor structure of grit consisting of long-term interest or passion, and perseverance despite adversity (Duckworth & Quinn, 2009; Strayhorn, 2013). Duckworth and Quinn (2009) found the Grit-S had internal consistency ratings of .73 to .83 (Cronbach's alphas), and confirmatory factor analysis suggested acceptable goodness of fit indices among four independent samples (Duckworth & Quinn, 2009). For instance, predictive validity was demonstrated by positive correlations with educational attainment and negative associations with career changes among adults (Duckworth & Quinn, 2009). Among middle and high school students, the Grit-S demonstrated internal consistency and test-retest consistency over two semesters. Additionally,

the Grit-S predicted students' GPAs one year following the survey, and was inversely related to hours of television watching (Duckworth & Quinn, 2009). Strayhorn (2013) also demonstrated acceptable internal consistency (Cronbach's alpha = .87) of the Grit-S. The Grit-S incrementally predicted course grades among Black male college students (Strayhorn, 2013). The Grit-S was deemed to have adequate construct and predictive validity among a variety of participant groups over its short tenure and does not contain any open-ended items, simplifying survey administration and data coding (Duckworth & Quinn, 2009). The Grit-S was administered to the 2013 juniors (Cohort 2) and the 2014 juniors (Cohort 3) as part of the Nursing Student Survey in the fall of 2013 and 2014, following review of the pilot study (Cohort 1) findings.

Rationale for selected instruments. I chose the NCQ and the Grit-S instruments carefully, following a literature review of nonacademic variables and academic success. Both instruments have a notable history of querying college students, though neither was ever distributed among baccalaureate nursing majors. Furthermore, the NCQ included several potential NCVs that reasonably could impact nursing student success, as demonstrated by research on similar student groups. For instance, Noonan et al. (2005) found that among 263 health science majors earning associate's degrees, three NCVs stood out as positive predictors of success. Although baccalaureate nursing students may be developmentally and educationally more mature than Noonan et al.'s (2005) sample, other allied health students also showed good predictive validity of the NCQ. For example, pharmacy (N = 263, Bandalos & Sedlacek, 1989) and medical (N = 206, Webb et al., 1997) graduate student groups both demonstrated the predictive merit of the NCQ, in conjunction with academic predictors similar to this study. Note that in these studies, the NCQ was administered upon admission to the programs, which differs

from the timing of this survey administration, though the junior year is the beginning of the upper division nursing major classes in this four-year program.

Similarly, the Grit-S predicted academic success in previous studies. The Grit-S predicted course grades among Black male college students, even when controlling for potentially confounding academic and demographic variables (Strayhorn, 2013). The Grit-S also correlated with persistence among military cadets, and GPAs among college undergraduates (Duckworth et al., 2007). To date, there has been no Grit-S research involving allied health students, though it has been associated with self-reported satisfaction among practicing physicians in Idaho (Reed et al., 2012). Based on this literature, these survey instruments appeared appropriate to query this student sample.

Variables

Dependent variables. The outcome (dependent) variables in this research included the participants' junior year grade point average (GPA), as well as their continued enrollment in the nursing major. The junior year was the time frame studied because it was the first year of major nursing classes, and it allowed for the inclusion of students who transferred into the college at any time prior to the start of the junior year. Both dependent variables were gathered from academic records following the academic years of 2012-2013, 2013-2014, and 2014-2015 (for each cohort respectively). Note that the literature also identified the NCLEX-RN exam as a measure of success following graduation (Grossbach & Kuncel, 2011; Stuenkel, 2006), but this study focused on academic success in the junior year only.

Junior year GPAs were measured on a traditional 0-4 point scale, where 0.0 = F, and 4.0 = A. Junior year GPAs were calculated by adding grade points earned per credit, and dividing by number of credits from fall and spring semesters during the third (junior) academic year. This

method of basing GPAs on the junior- level academic year uniformly compared students who transferred into the program prior to the junior year with those who began college at the study site.

Persistence in the nursing major was measured through continued enrollment, as evidenced in students' academic records. Continued enrollment in the nursing major was assessed following the spring semester of the junior year for each participant, and was a dichotomous categorical variable (1 = not enrolled; 2 = enrolled in nursing major). Twenty-one of the 150 participants continued enrollment according to an individualized plan, as they failed one nursing class, and could not proceed until a C+ (77%) was achieved, and these were categorized as 2, still enrolled. Since the bulk of students who did not persist in nursing left due to their inability to meet academic retention and progression criteria in previous studies (Ofori & Charlton, 2002; Peterson, 2009), it was likely that students who changed majors or left the college altogether in this study did so for academic reasons also, though reasons for attrition were not part of this study.

Independent variables. The independent variables were grouped into three categories: Noncognitive variables, academic variables, and demographic variables, similar to groupings noted in previous works (Duckworth & Quinn, 2009; Schmitt et al., 2009; Sedlacek, 2004a; Strayhorn, 2013; Ting, 2009; Tracey & Sedlacek, 1984).

Noncognitive variables (NCVs). The independent variables of primary interest in this study were gathered through the Nursing Student Survey (Appendix B) that combined the Grit-S and the NCQ (following the pilot study). This tool measured students' self-reported grit (Duckworth et al., 2007), as well as the eight noncognitive variables (NCVs) defined by Sedlacek (2004a) and Tracey and Sedlacek (1984). Sedlacek's NCVs (2004a) are described

more fully in Appendix A. These variables include positive self-concept, realistic academic self-assessment, preference for long-range goals, handling racism, availability of a strong support person, positive leadership experience, demonstrated community service, and knowledge acquired in a field (Sedlacek, 2004a). Each of these constructs was measured by scale scores, made up of combinations of survey items as prescribed by Sedlacek (2004a, 2005b).

Academic variables. I included academic variables, including prior college GPAs and SAT scores, consistent with research in this field (i.e., Alameida, et al., 2011; Hopkins, 2008; Grossbach & Kuncel, 2011). Prior college GPAs were measured at the conclusion of students' fourth post-secondary semester for students following a typical institutional progression, at the conclusion of the pre-requisite courses to the nursing curriculum, and range from 0.0 (F) to 4.0 (A). Study participants who did not complete at least one semester at the studied institution prior to the junior year nursing courses were not included in this calculation, so $N = 132$ of 150 participants for this variable. No credits earned outside of the studied institution were included in the prior college GPA calculation to maintain consistency of measurement.

The SATs were required for nursing students, but optional for other majors and transfer students, so several SAT scores were not available for this study ($N = 98$ of 150 participant records included SATs). Where available, SAT scores were submitted with the students' college applications, and included three sections, critical reading, writing, and mathematics. Each section's scores ranged from 200 to 800 (CollegeBoard, 2015), and the highest section scores were combined for the final SAT score across test dates, consistent with the admission practices at the studied institution (CollegeBoard, 2012). Prior college GPAs and SAT scores were collected from students' academic records following written consent as previously described.

These academic variables were chosen based on prior research about baccalaureate nursing students that demonstrated early college GPAs correlated closely with cumulative GPAs (Díaz et al., 2012; Peterson, 2009) and predicted NCLEX-RN success (Alameida et al., 2011; Beeson & Kissling, 2001). SAT scores correlated with persistence (Hopkins, 2008) as well as NCLEX-RN success (Grossbach & Kuncel, 2011) in the literature.

Demographic variables. Respondents reported their demographic information on the Nursing Student Survey. I verified participants' self-reported demographic data on the survey instrument with the students' academic records. In case of a discrepancy about demographic variables, I deferred to the self-reported data on the survey as it most accurately reflected students' current self-identification status. If demographic variables were not reported on the survey instrument, they were gleaned from academic records. Each participant's information was considered individually in order to obtain the most current and accurate data.

Data Management

I obtained student names or college identification numbers (participant choice) from surveys, and I used this identifying information to research students' demographics, grades, colleges attended, previous coursework, and SAT scores. This identifying information was confidential; it was not shared with other investigators and unique study code numbers were immediately assigned to each participant. The assigned codes were utilized to organize and analyze all the data collected. All survey and secondary source data were then entered into IBM SPSS (Versions 20-23) with no accompanying participant names or other identifying data.

The original key of participant names and code numbers was recorded on a written log that was manually locked in a secure location area separate from the data, consents and surveys, and destroyed following data collection. All data were entered onto an IBM-SPSS spreadsheet

with assigned study code numbers. The data was kept on a password- protected computer, and backed up onto a hard disc drive, with no data available via the web or cloud for security purposes. I was the only investigator to access respondents' raw data. Aggregate study data were shared with my dissertation chair only, and files were emailed via a password-protected email system. In these ways, participant confidentiality was maintained throughout the collection, analyses, and reporting phases of this research.

Data Analyses

Statistical analyses were conducted in several phases, utilizing IBM SPSS (v.20-23) software. Following the description and comparison of the student participants (previously reported in Chapter Three), descriptive statistics were conducted on all the dependent and independent variables relevant to this study (see Phase I, Table 3.5). In the second phase, I used Pearson correlations of survey scale scores to analyze relationships and potential multicollinearity issues among the independent variables (see Phase II, Table 3.5). I conducted the third phase of data analysis after I collected and assessed the dependent variables. For example, I collected outcome data for Cohort 1 following the spring semester of 2013, including junior year GPAs (0-4, a continuous variable), and current enrollment data (a dichotomous variable). Data from Cohorts 2 and 3 were obtained in the same manner, and the cohorts were combined following a descriptive analysis that demonstrated similarity between the groups. Then the research questions guided the statistical analysis of the combined sample, and each question was answered according to the outlined phases (see Phase III, Table 3.5).

Table 3.5

Schematic Outline of Data Analyses

Phase I: Descriptive analysis of all variables used in research questions

Phase II: Pearson Correlations of variables, multi-collinearity assessment

Phase III: To answer Research Questions:

Research Question 1	**Research Question 2**	**Research Question 3**
1.1 DV = JFSGPA IV = NCQ var. (Cohort 1,2,3) IV = grit (Cohort 2,3)	2.1 DV = JFSGPA IV = age, gender, race, previous college GPA, SATs	3.1 DV = JFSGPA IV = NCQ var., grit, age, gender, race, previous college GPA, SATs
1.2 DV = nursing major IV = NCQ var. (Cohort 1,2,3) IV = grit (Cohort 2,3)	2.2 DV = nursing major IV = age, gender, race, previous college GPA, SATs	3.2 DV = nursing major IV = NCQ var., grit, age, gender, race, previous college GPA, SATs

Notes. DV = dependent variable; IV = independent variable; JFSGPA = junior year grade point average; nursing major = continued enrollment in the nursing major; previous college GPA = GPA earned prior to starting the nursing major classes; NCQ variables = Includes 8 noncognitive variables as defined by Sedlacek (2004a); race = dichotomous race (2 categories, White and Students of Color, due to small numbers); SATs = SAT test scores, a standardized admissions test.

Research Question 1. Do specific noncognitive variables as measured by Sedlacek's NCQ (2004a) and Duckworth and Quinn's Grit-S scale (2009) predict baccalaureate nursing student academic success, as defined by junior year GPA and persistence?

Null Hypothesis 1. NCVs will not significantly contribute to baccalaureate nursing student academic success, as measured by junior year GPA and junior year persistence.

Hypothesis 1.1. NCVs will significantly contribute to baccalaureate nursing student academic success, as measured by junior year GPA.

Hypothesis 1.2. NCVs will significantly contribute to baccalaureate nursing student academic success, as measured by junior year persistence (continued enrollment in the nursing major following junior year).

To test hypotheses 1.1 and 1.2, descriptive statistics including means, standard deviations and *t*-tests were conducted on each of the NCVs, including grit. Next, correlation coefficients were compared among the NCVs to assess relationships and multicollinearity among NCVs. To test Hypothesis 1.1, a simultaneous multiple regression was conducted to discover each NCV's effect on the dependent variable, junior year GPA (a measure of academic success), following each cohort's junior year. In this method, all the variables were entered into the equation simultaneously "to determine the extent of the influence of one or more variables" (Keith, 2006, p. 76). The simultaneous multiple regression started with clear designations of variables:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 \ldots + b_9 X_9 + e$$

Where Y represents the criterion variable, junior year GPAs after the spring semester. The X variables are the independent variables, the NCVs, measured by scale scores, and are as follows: X_1 = grit; X_2= positive (academic) self-concept; X_3= realistic self-appraisal; X_4 = negotiating the system/ racism; X_5 = preference for long-term goals; X_6 = strong support person available; X_7 = leadership experience; X_8 = demonstrated community service; X_9 = knowledge acquired in a field. The residual is represented by e, and follows a normal distribution. Once these variables were identified, they were entered into the multiple regression equation. Multiple regression coefficients (b_1, b_2, b_3…) were tested to determine which NCV(s) significantly predicted Y (Sprinthall, 2007).

To test Hypothesis 1.2, a logistic regression was conducted to discover each NCV's effect on the second dependent variable, continued enrollment in the nursing major following

junior year, a dichotomous measure of academic success. Logistic regression is appropriate for a dichotomous dependent variable when regressed by continuous predictor variables such as NCVs (Keith, 2006), and can determine the differences in NCVs among students who persist in nursing and those who do not. The logistic regression is expressed in terms of probability (log odds). The model used to predict the log odds was

$$\text{Logit}(p_1) = \log[p_1/(1-p_1)] = a_1+b_1X_1 + b_2X_2 + b_3X_3 \ldots + b_9 X_9$$

Where p_1 is the probability of Y being equal to 1. Y is the dependent variable of predicted continued enrollment after the spring semester, with 1 corresponding to continued enrollment and 0 indicating not enrolled. Also, a_1 is a constant; b_1 is the unstandardized regression coefficient; and X_1 is a continuous variable, a NCV scale score. The variances were assessed to determine which NCVs significantly contributed to the logistical equation to predict persistence.

Research Question 2. Do certain background variables, specifically age, gender, race, SAT scores, or previous college GPAs impact junior year baccalaureate nursing student academic success, as defined by junior year GPA and junior year persistence?

Null Hypothesis 2. Student age, gender and race, SAT scores, or previous college GPA will not significantly impact baccalaureate nursing student academic success, as measured by junior year GPA and junior year persistence.

Hypothesis 2.1. Student age, gender, race, SAT scores, or previous college GPAs will significantly impact baccalaureate nursing student academic success, as measured by junior year GPA.

Hypothesis 2.2. Student age, gender, race, SAT scores, or previous college GPAs will significantly impact baccalaureate nursing student academic success, as measured by junior year persistence (continued enrollment in the nursing major following junior year).

To address Question 2 regarding background demographic and academic predictors of student success as measured after the spring semesters of the junior academic years in 2013, 2014, and 2015, a process similar to that of the first question was followed. Following standard descriptive statistics, correlation coefficients assessed relationships among the independent variables for multicollinearity. To test Hypothesis 2.1, a simultaneous multiple regression was conducted to discover how each demographic and academic variable affected cumulative junior year GPA. In this method, all the variables were entered into the equation simultaneously. The equation was:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + e$$

Where Y = cumulative junior year GPAs. The X variables are the demographic and academic variables: X_1 represents age (at time of survey); X_2 represents gender; X_3 represents race; X_4 represents SAT scores; X_5 represents previous college GPAs. The residual is denoted by e, and follows a normal distribution. Multiple R is then assessed for significance (*p* value of the F test).

To test Hypothesis 2.2, a binary logistic regression was be conducted to discover each demographic and academic variable's effect on the second dependent variable, persistence (measured by continued enrollment, a dichotomous measure of academic success). The logistic regression was expressed in terms of the probability (log odds). The model used to predict the log odds was:

$$\text{Logit } (p_1) = \log [p_1/(1-p_1)] = a_1 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5$$

Where p_1 is the probability of Y being equal to 1. Y is the dependent variable of predicted continued enrollment after the spring semesters, with 1 corresponding to continued enrollment and 0 indicating not enrolled; a_1 is a constant; b_1, b_2, b_3, b_4, and b_5 are the unstandardized

regression coefficients. X_1, X_2, X_3, X_4, and X_5 represent the predictor variables of age, gender, race, SAT scores, and previous college GPAs, respectively.

Research Question 3. Do particular combinations of noncognitive and academic variables predict baccalaureate nursing student academic success as measured by junior year GPA and junior year persistence, when controlling for demographic variables?

Null Hypothesis. No combinations of NCVs and academic variables predict baccalaureate nursing student success, when controlling for demographic variables.

Hypothesis 3.1. A specific combination of NCVs and academic variables predict baccalaureate nursing student success, measured by junior year GPAs, after controlling for demographic variables.

Hypothesis 3.2. A specific combination of NCVs and academic variables predict baccalaureate nursing student success, measured by continued enrollment in the nursing major following junior year, after controlling for demographic variables.

As with previous questions, general descriptive statistics and bivariate correlations were assessed. Given no concerns with these preliminary statistics, I tested Hypothesis 3.1 by conducting a sequential (hierarchical) linear regression on junior year GPAs. In hierarchical regression, independent variables were entered into the equation based on temporal precedence, logic, and prior research (Keith, 2006). To test Hypothesis 3.1, demographic variables were entered in the first step (or block), to control for these variables. The second block includes noncognitive scale scores (NVCs and grit), and then academic predictor variables (SAT scores, previous college GPAs) in the third step, as recommended by Tracey and Sedlacek (1984) in their original NCV research.

Model A: $Y = B_0 + B_1 X_1 + e$

Model B: $Y = B_0 + B_1 X_1 + B_2 X_2 + e$

Model C: $Y = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + e$

Where Y represented cumulative GPA, B_0 was a constant, and e indicated the normally distributed residual. X_1 represented one or more demographic variables. X_2 represented one or more NCVs, and X_3 represented one or more academic variables. Several combinations of variables were run, but the block order of entered variables were consistently background variables, followed by NCVs, and then academic variables last, consistent with Sedlacek and colleagues' methodology based on temporal progression (2004; Ting, 2003, 2009; Tracey & Sedlacek, 1984). In each regression, the change at each step (R^2) was assessed for significance to find the most parsimonious model accounting for the change in cumulative GPA. This method was statistically conservative, and minimized the potential for Type I errors (Strayhorn, 2013).

To test Hypothesis 3.2, a sequential binary logistic regression was conducted on the dichotomous outcome variable, enrollment status, to discover variables of interest (noncognitive or academic) that may explain nursing students' continued enrollment status when controlling for background variables. Sequential logistic regression develops models to predict a categorical outcome by combining predictor variables based on the same reasoning as the sequential linear regression noted earlier. The models for the logistic regressions were

Model A: $\text{Logit}(p_1) = \log[p_1/(1-p_1)] = a_1 + b_1X_1$

Model B: $\text{Logit}(p_1) = \log[p_1/(1-p_1)] = a_1 + b_1X_1 + (b_2 X_2 + b_3X_3 + b_4X_4)$

Model C: $\text{Logit}(p_1) = \log[p_1/(1-p_1)] = a_1 + b_1X_1 + (b_2 X_2 + b_3X_3 + b_4X_4) + (b_5X_5 + b_6X_6)$

Where p_1 was the probability of Y_1 being equal to 1, and Y_1 was the dependent variable of continued enrollment (1 = continued enrollment; 0 = discontinued enrollment). Also, a_1 was a

constant, b_1 was the unstandardized regression coefficient, and X_1 was a demographic variable, such as gender, age, or race. Several iterations of Model A were run to test the probability of demographic variables influencing the outcome variable, continued enrollment.

In Model B, X_2, X_3, and X_4 represented independent continuous variables, the NCVs, including grit. These predictor variables were combined based on the results of the simultaneous regression to determine the probability of different NCVs influencing the outcome variable, continued enrollment, while controlling for demographic variables (X_1).

Finally, in Model C, X_5 and X_6 were academic variables, independent continuous variables. X_5 represented previous college-level GPAs, while X_6 represented SAT scores. Model C tested the probability of different academic variables influencing the outcome variable, continued enrollment, while controlling for demographic variables (X_1) and the NCVs (X_2, X_3, and X_4). Furthermore, this testing identified the statistically significant regression coefficients of the predictor variables, which predicted academic success as measured by the dichotomous enrollment variable. In this sequential binary logistic regression, the focus of the findings was to determine whether a certain variable significantly improved the model's prediction of the outcome when the variables were entered into the model by a theoretical, logical order (Sawtelle, Brewe, & Kramer, 2011). Likelihood ratio tests were conducted to compare the models, to determine the difference that the added variables made to the observed outcome, continued enrollment. The difference between Model A and Model B was the NCVs; the difference between Model B and Model C was the academic variables. The formulas to compare the models were:

$$X^2 = -2\text{loglikelihood}_{(\text{Model A})} - (-2\text{loglikelihood}_{(\text{Model B})})$$

$$X^2 = -2\text{loglikelihood}_{(\text{Model B})} - (-2\text{loglikelihood}_{(\text{Model C})})$$

Log likelihood tested the fit of each model using a likelihood ratio; the higher the ratio, the better the fit of the model. The models were repeated with various demographic variables, NCV combinations, and academic variables to determine which NCVs and/or academic variables impacted baccalaureate nursing students. I analyzed several variable relationships through regression techniques, examining direct relationships of NCVs and grit on measures of academic success in the fashion of Guffey et al. (2002), Schauer et al. (2011), and Schwartz and Washington (2002). These findings are reported in Chapter Four.

Summary

This section outlined the rationale, purpose and specific research questions that guided this study, as well as the means to answer the research questions. I described the research design, and participant and cohort characteristics, combined for further analyses. Next, I explained the data collection process, including the variables studied and the component parts of the Nursing Student Survey. Then, plans were presented for managing and analyzing the data. I described the multiple and logistic regressions and statistical methods that were used to answer each of the research questions. The current dearth of noncognitive studies about nursing majors drives this research towards a better understanding of these students and important implications for improving their success.

Chapter Four: Findings

This research explored how specific nonacademic variables alone or in conjunction with cognitive measures correlated with baccalaureate nursing students' academic success (defined as junior year GPA and persistence). I studied junior-level nursing students, using the Nursing Student Survey, a combination of two survey instruments (Duckworth and Quinn's Grit-S, 2009, and Sedlacek's Noncognitive Questionnaire /NCQ, 2004a) to answer the research questions in order to better understand nursing student success.

This chapter answered the research questions through distinct phases of statistical analyses. The student participants were described in Chapter Three and the cohorts were combined into one sample for analyses. In the first phase of analysis, junior year GPA and continued enrollment in the nursing major (the dependent variables) are described, followed by descriptions of the independent variables from the Nursing Student Survey and academic records. In the next phase of analysis, Pearson product moment correlations explored relationships among the independent academic and noncognitive variables. In the final phase of data analysis, the research questions were answered through multiple and logistic regressions to discover factors that predicted success of nursing students, as defined by the dependent variables, junior year GPA (two semesters), and continued enrollment in the nursing major following the junior year. Type-1 error parameters were set at $p < .05$ throughout this work to identify significant relationships among the variables (Sprinthall, 2007).

Phase 1: Descriptive Analyses of All Variables used in Research Questions

Dependent variable: Junior year grade point averages. Once the cohorts were combined, junior year grade point averages (GPAs), a dependent variable in this study, were calculated by a weighted average of the grades earned in the fall and spring semesters of the third

collegiate year (Table 4.1). Junior year GPAs were measured on a 0-4 scale, where 0.0 = F, and 4.0 = A. The junior year GPAs ranged from 2.49 to 3.93, with a mean of 3.16 (*SD* = .28). Of the total respondents (*N* = 150), only students still enrolled in nursing classes at the end of the junior year (*N* = 121) had GPAs for this dependent variable (although all 150 participants were considered for the continued enrollment in the nursing major dependent variable). The participants who did not take nursing classes throughout their junior year (*N* = 29) were not included in this dependent variable. These students left the nursing major after the fall semester of their junior year, and their earned mean GPA in their last semester as a nursing major were 2.25 (*SD* = .49), with a median of 2.31. Most (69%) of these GPA values fell below the retention threshold of 2.5 set by the nursing department policy (Faculty, 2010). Nine students (31%) left the nursing major yet earned above a 2.5 GPA. They may have been unsuccessful in two nursing classes (i.e., earned less than 77% overall in 2 nursing classes, but maintained a 2.5+ GPA), and therefore did not meet the criteria to progress in the major (Faculty, 2010), or they may have left voluntarily. That data was not available.

To better understand the junior year GPA variable, two age categories were created (18-21/ 22+) to offset the few participants over 22 years old. Similarly, the dichotomous race (White/ Students of Color [SOC]) variable was used in this research to compensate for the relatively small number of students who identified as races other than White. No differences in junior year GPA based on age or race was found by independent-samples *t*-tests. As noted in Table 4.1, the nursing students who were women earned significantly higher grades in their junior year (*M* = .3.19, *SD* = .27) than men in this study (*M* = 3.10, *SD* = .29; *t* (119) = -2.21; *p* = .03, two -tailed). The effect size was calculated using Cohen's *d* to determine if this was a

meaningful difference between women and men, and found to be a medium effect size (d = -.53; Cohen, 1988; Sprinthall, 2007).

Table 4.1

Differences of Means of Junior Year GPA by Participant Demographic Variables (N = 121)

		N	Mean GPA	*t-test*	*df*	*Sig* (*p*)	Effect (*d*)
Total		121	3.16 (*SD* = .28)				
Age	Under 22	81	3.15 (*SD* = .25)	.53	119	.69	.10
	22 years +	40	3.18 (*SD* = .32)				
Gender	Male	21	3.10 (*SD* = .29)	-2.21	119	.03*	-.53
	Female	100	3.19 (*SD* = .27)				
Race	Students of Color	35	3.12 (*SD* = .30)	1.07	119	.29	.21
	White	86	3.18 (*SD* = .27)				

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Dependent variable: Continued enrollment in nursing major. The second dependent variable, persistence in the nursing major, was measured through continued enrollment, as noted in students' academic records following the junior year. The students who persisted were those who continued in the nursing major through the end of the junior year, and continued enrollment in the nursing major was a dichotomous categorical variable (1 = not enrolled in nursing major; 2 = enrolled in nursing major), and therefore a chi-square for independence was conducted to detect differences by demographic variables (Table 4.2).

Students in this study who changed majors or left the college altogether probably left for academic reasons, as in previous studies (Ofori & Charlton, 2002; Peterson, 2009). As reported, the last known semester GPAs for 69% of participants who did not continue enrollment were below the retention policy of this nursing department (< 2.5/4.0). Also, only one course grade below C+ (77%) was allowed if the minimum GPA was maintained. When a student earned less than a C+ (77% course average) in a course, they were required to repeat the course and continue in the nursing major on a modified schedule. If a grade less than C+ (77%) was earned in a

second class, the student was dismissed from the nursing major. The participants who did not continue in the nursing major did not maintain the minimum GPA, earned two grades less than C+ (77%), or chose to change majors despite satisfactory academic performance (Faculty, 2010, 2012).

Eighty percent of nursing students (N = 120) overall continued the enrollment in the nursing program following the junior year (Table 4.2). Eighty-seven percent of students twenty-two years old and older continued their enrollment in nursing, while only 77% of students under 22 continued, suggesting that age was positively related to academic success in this study, as in Ofori and Charlton (2002). However the chi-square was not significant for the dichotomous age variable, χ^2 = (1, N = 150) = 1.78, p = .18, so continued enrollment following the junior year was the same regardless of age. Similarly, persistence rates appeared similar between genders (79% vs. 80%) and races (81% vs. 79%); chi-square tests confirmed there were no persistence differences based on these demographics (Table 4.2). In summary, chi-square comparisons of demographic groups' continued enrollment in the nursing major demonstrated no differences based on age, gender or race.

Table 4.2

Frequency, Percentage, Chi-Square of Continued Enrollment by Participant Demographic Variables

		N	Enrolled *N* (%)	Not Enrolled *N* (%)	χ^2	*p*	Effect Size
Total		150	120 (80)	30 (20)			
Age	< 22 years	105	81 (77)	24 (23)	1.78	.18	.12
	22 years +	45	39 (87)	6 (13)			
Gender	Male	24	19 (79)	5 (21)	.01	.91	.01
	Female	126	101 (80)	25 (20)			
Race	Students of Color	43	35 (81)	8 (19)	.07	.79	.02
	White	107	85 (79)	22 (21)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Independent Noncognitive Variables. Next, each of the independent variables as measured by the Nursing Student Survey were assessed, starting with the noncognitive scale scores. The first variable assessed was grit (Duckworth et al., 2007) among the last two cohorts (N = 100), following the pilot study. The Grit-S was scored as per Duckworth and Quinn (2009), and scores were within the ranges found in previous Grit-S studies (Duckworth & Quinn, 2007; Strayhorn, 2013). Then the NCVs as defined by Tracey and Sedlacek (1984) on the NCQ were explored among the total participant sample (N = 150). The NCQ variable scale scores were determined by Sedlacek's NCQ scoring instructions (2004a), with combinations of two to six items from the NCQ per scale score. Some NCQ items were used for multiple scale scores, so multicollinearity was suspected although this had not been reported in previous studies. NCV scale scores were within ranges of previous samples surveyed by the NCQ and reported by Sedlacek (2004a). Table 4.3 displays the basic descriptive statistics of these independent variables, followed by a closer look at each variable.

Table 4.3

Descriptive Statistics of Noncognitive Variables (including Grit)

	N	Minimum	Maximum	Mean	*SD*
Grit	100	2.00	5.00	3.89	.49
Self- Concept/Confidence	150	12.33	58.67	20.28	3.95
Realistic Self-Appraisal	150	6.00	38.00	10.87	2.85
Understands Racism & systemic bias	150	14.00	23.00	18.35	2.16
Prefers Long Range Goals	150	4.33	13.00	9.62	1.57
Availability of Strong Support Person	150	9.00	15.00	13.71	1.47
Successful Leadership Experience	150	4.00	49.25	9.36	3.65
Demonstrated Community Service	150	1.00	7.25	5.07	1.26
Knowledge Acquired in a Field	150	1.67	5.75	3.89	.85

Grit. Each item on the Grit- S was scored on a Likert-type scale of 1-5, and the total mean grit scores were calculated by adding the item scores and dividing by 8, the number of

items on the grit scale, as directed by Duckworth and Quinn (2009). In this study (N = 100), the grit scores ranged from 2.0 to 5.0, and the total mean of the grit scores was 3.89 (SD = .49; see Table 4.4). In this sample, independent samples t-test showed no difference in grit between male and female participants, but did show a significant difference between students 22 years and older and younger students t (98) = -2.39, p = .02, with a medium effect size (d = -.52; Cohen, 1988). Older students reported more grit than students under 22 years old. The independent samples t-test also showed a difference between students of color and White students, t (98) = 3.43, p = .001, with a large effect size (d = .76; Cohen, 1988). Students of color reported more grit than White students.

Table 4.4

Differences of Means of Grit Scale Score by Demographic Variables

		N (%)	Mean (*SD*)	*t*-test (*df* = 98)	*Sig.* (*p*)	Effect Size(*d*)
Total		100	3.89 (.49)			
Age	Under 22	70 (70)	3.81 (.48)	-2.39*	.02	-.52
	22 years +	30 (30)	4.07 (.48)			
Gender	Male	15 (15)	3.77 (.70)	-1.06	.29	-.30
	Female	85 (85)	3.91 (.45)			
Race	Students of Color	29 (29)	4.14 (.48)	3.43**	.001	.76
	White	71 (71)	3.79 (.46)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Positive self-concept, or self-confidence. All three cohorts (N = 150) were surveyed regarding the NCVs, including positive self-concept, defined as independence and self-confidence by Sedlacek (2004a). The independent samples t-tests showed older students scored significantly higher on positive self -concept than students younger than 22 years t (148) = -2.70, p = .01, with a medium effect size (d = -.48; Cohen, 1988). The independent samples t-tests showed no difference in positive self-concept between male and female participants, but did

show a significant difference between students of color and White students, t (148) = 2.09, p = .04, with a small to medium effect size (d = .38; Cohen, 1988). Students of color reported more positive self-concept than White students (Table 4.5).

Table 4.5

Differences of Means of Positive Self-concept Scale Score by Demographic Variables

		N (%)	Mean (*SD*)	*t*-test (*df* =148)	*Sig.* (*p*)	Effect (*d*)
Total		150	20.3 (3.9)			
Age	Under 22 years	105 (70)	19.72 (2.27)	-2.70*	.01*	-.48
	22 years +	45 (30)	21. 58 (6.17)			
Gender	Male	24 (16)	21.63 (8.32)	1.84^{+}	.07	.41
	Female	126 (84)	20.02 (2.33)			
Race	Students of Color	43 (29)	21.33 (6.30)	2.09*	.04*	.38
	White	107 (71)	19.85 (2.36)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Realistic academic self-assessment. This construct measured the ability to self-identify specific strengths and weaknesses of school performance accurately, to clarify and develop academic skills (Sedlacek, 2004a). As noted in the table below (Table 4.6), there were no differences between demographic groups for this NCV in this study.

Table 4.6

Differences of Means of Realistic Academic Self-assessment Scale Score by Demographic Variables

		N (%)	Mean (*SD*)	*t*-test	*Sig.* (*p*)	Effect Size (*d*)
Total		150 (100)	10.87 (2.85)			
Age	Under 22 years	105 (70)	10.81 (3.23)	-.42	.68	-.07
	22 years +	45 (30)	11.02 (1.67)			
Gender	Male	24 (16)	11.88 (5.76)	1.90^{+}	.06	.42
	Female	126 (84)	10.68 (1.83)			
Race	Students of Color	43 (29)	11.12 (1.65)	.66	.51	.12
	White	107 (71)	10.78 (3.21)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Handling racism. Higher scores of this construct indicated an ability to successfully manage systemic discrimination, and understand systemic inequities (Sedlacek, 2011). Handling racism acknowledged inherent racial/ethnic biases, and a pro-active approach to correcting them, without becoming hostile (Sedlacek, 2004a). Independent samples *t*-tests showed no differences in handling racism between younger and older, or male and female participants, but did show a significant difference between students of color and White students, $t\ (148) = 3.89$, $p = .004$, two-tailed, with a moderate to large effect size ($d = .70$; Cohen, 1988). The nursing students of color reported more understanding and management of systemic bias than White students, as recorded in Table 4.7.

Table 4.7 *Differences of Means of Handling Racism Scale Score by Demographic Variables*

		N (%)	Mean (*SD*)	*t*-test	*Sig.* (*p*)	Effect Size (*d*)
Total		150	18.35 (2.16)			
Age	Under 22 years	105 (70)	18.30 (2.16)	-.51	.62	-.01
	22 years +	45 (30)	18.49 (2.19)			
Gender	Male	24 (16)	18.13 (2.11)	-.56	.57	-.12
	Female	126 (84)	18.40 (2.18)			
Race	Students of Color	43 (29)	19.14 (2.21)	3.89**	.004	.70
	White	107 (71)	18.04 (2.07)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Preference for long-range goals. This scale score measures one's ability to think ahead, and work for a deferred reward (Sedlacek, 2004a). No significant differences based on gender or race were noted for the preference for long range goals variable. However, older students indicated more preference for long-range goals than younger students. Students 22 years and older scored higher on this construct ($M = 10.13$, $SD = 1.83$) than younger students ($M = 9.40$. $SD = 1.40$); $t = (148) = -2.66$, $p = .01$, two-tailed, with a medium effect size ($d = -.47$, Cohen, 1988), as noted in Table 4.8.

Table 4.8

Differences of Means of Preference for Long-Range Goals Scale Score by Demographic Variables

		N (%)	Mean (*SD*)	*t*-test	*Sig.* (*p*)	Effect Size (*d*)
Total		150	9.62 (1.57)			
Age	Under 22 years	105 (70)	9.40 (1.40)	-2.66*	.01	-.47
	22 years +	45 (30)	10.13 (1.83)			
Gender	Male	24 (16)	10.14 (1.93)	1.77	.08^{+}	.39
	Female	126 (84)	9.53 (1.48)			
Race	Students of Color	43 (29)	10.02 (1.67)	1.96	.052^{+}	.35
	White	107 (71)	9.46 (1.51)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Availability of strong support person. This scale score assessed the perceived presence of a supportive individual or network while at college (Sedlacek, 2004a). There were no differences noted between younger and older, or male and female nursing students on this scale score (Table 4.9). White students (M = 13.88, SD = 1.32) reported more support than students of color (M = 13.28, SD = 1.75); t (148) = -2.29, p = .02, with a medium effect size (d = -.41).

Table 4.9

Differences of Means of Availability of Strong Support Person Scale Score by Demographic Variables

		N (%)	Mean (*SD)*	*t*-test	*Sig. (p)*	Effect Size (*d*)
Total		150	13.71 (1.47)			
Age	Under 22 years	105 (70)	13.85 (1.26)	1.84^{+}	.07	.33
	22 years +	45 (30)	13.38 (1.85)			
Gender	Male	24 (16)	13.63 (1.58)	-.30	.77	-.07
	Female	126 (84)	13.72 (1.46)			
Race	Students of Color	43 (29)	13.28 (1.75)	- 2.29*	. 02	-.41
	White	107 (71)	13.88 (1.32)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Successful leadership experience. This scale score was based on the reported involvement in group activities; both the number of reported organized activities and the role(s) within those groups was considered as per Sedlacek's instructions (2004a). There were no differences between demographic groups in leadership experience, as shown in Table 4.10.

Table 4.10

Differences of Means of Successful Leadership Experience Scale Score by Demographic Variables

		N (%)	Mean (*SD*)	*t*-test	*Sig.* (*p*)	Effect Size (*d*)
Total		150	9.36 (3.65)			
Age	Under 22 years	105 (70)	9.37 (1.61)	.05	.96	.01
	22 years +	45 (30)	9.33 (6.25)			
Gender	Male	24 (16)	8.63 (1.62)	-1.08	.28	-.24
	Female	126 (84)	9.50 (3.91)			
Race	Students of Color	43 (29)	8.84 (1.58)	-1.10	.27	-.20
	White	107 (71)	9.57 (4.19)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Demonstrated community service. This construct measured the reported participation in larger community events and volunteer efforts (Sedlacek, 2004a). Nursing students who were women ($M = 5.19$, $SD = 1.21$); t (148) = -2.61, $p = .01$, and White ($M = 5.24$, $SD = 1.19$); t (148) = -2.64, $p = .01$ demonstrated significantly more community service than men ($M = 4.47$, $SD = 1.38$) and students of color ($M = 4.65$, $SD = 1.34$), with a medium/ moderate effect sizes ($d = -.58$; $d = -.48$, respectively). There was no age - based difference on this NCV (Table 4.11).

Table 4.11

Differences of Means of Demonstrated Community Service Scale Score by Demographic Variables

		N (%)	Mean (*SD*)	*t*-test	*Sig*. (*p*)	Effect Size (*d*)
Total		150	5.07 (1.26)			
Age	Under 22 years	105 (70)	5.17 (1.28)	1.45	.15	.26
	22 years +	45 (30)	4.84 (1.21)			
Gender	Male	24 (16)	4.47 (1.38)	-2.61*	.01	-.58
	Female	126 (84)	5.19 (1.21)			
Race	Students of Color	43 (29)	4.65 (1.34)	-2.64*	.01	-.48
	White	107 (71)	5.24 (1.19)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Knowledge acquired in a field. This construct captures the understanding of an academic topic acquired through non-academic experiences such as work or extra-curricular activities (Sedlacek, 2004a), and was renamed in Sedlacek's later work as non-traditional learning (Sedlacek, 2015). This variable showed significant differences between demographic groups. Nursing students under 22 years old ($M = 4.09$, $SD = .85$) reported more non-traditional learning than older students ($M = 3.43$, $SD = .66$); t (148) = 4.68, $p = .00$. This was a large effect size ($d = .83$), though it was expected that older students would have more opportunity to acquire knowledge through non-traditional learning experiences. Women ($M = 3.97$, $SD = .83$) also reported more knowledge acquired in a field than men ($M = 3.47$, $SD = .85$); t (148) = -2.73, $p = .01$, and White students ($M = 4.04$, $SD = .83$) reported more than students of color ($M = 3.52$, $SD = .77$); t (148) = -.355, $p < .001$ (Table 4.12). These groups differed by moderately large effect sizes ($d = -.61$; $d = -.64$ respectively; Cohen, 1988).

Table 4.12

Differences of Means of Knowledge Acquired in a Field Scale Score by Demographic Variables

		N (%)	Mean (*SD*)	*t*-test	*Sig.* (*p*)	Effect Size (*d*)
Total		150				
Age	Under 22 years	105 (70)	4.09 (.85)	4.68**	.00	.83
	22 years +	45 (30)	3.43 (.66)			
Gender	Male	24 (16)	3.47 (.85)	-2.73*	.01	-.61
	Female	126 (84)	3.97 (.83)			
Race	Students of Color	43 (29)	3.52 (.77)	-3.55**	.00	-.64
	White	107 (71)	4.04 (.83)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Independent Variables: Academic. Several researchers have studied factors related to students' collegiate history that correlate with academic success in nursing (Griffiths, Bevil, O'Connor, & Wieland, 1995; Grossbach & Kuncel, 2011; Kowitlawakul, Brenkus, & Dugan, 2013; Raman, 2013; Wolkowitz & Kelley, 2010). Two of these academic variables, previous college GPAs and SAT scores, were used in this study and are described next.

Previous college GPAs. Prior institutional GPAs were measured at the conclusion of students' pre-requisite courses to the nursing curriculum at the end of their second post-secondary year, and ranged from 0.0 (F) to 4.0 (A). Only students who had attended the studied college prior to starting nursing major classes had comparable prior GPAs for this research (N = 132). Study participants who transferred from another institution were included in the previous college GPA calculation after they had completed one full semester at the studied institution. In this sample, the prior GPAs ranged from 2.32 to 3.96 accounting for a range of 1.64. The mean prior GPA was 3.14 (SD = .37), and had an approximately normal distribution. The narrow range of GPAs was expected due to the nursing department policy of at least 2.5 GPA prior to entering the nursing classes (Faculty, 2010). Independent samples t-tests were conducted; no differences in previous college GPAs were found based on age, gender or race (Table 4.13).

Table 4.13

Differences of Means of Previous College GPAs by Demographic Variables

		N (%)	Mean (*SD*)	*t*-test	*Sig.* (*p*)	Effect Size (*d*)
Total		132	3.14 (.37)			
Age	Under 22 years	94 (71)	3.16 (.37)	.59	.56	.11
	22 years +	38 (29)	3.11 (.37)			
Gender	Male	23 (17)	3.12 (.35)	-.37	.72	-.08
	Female	109 (83)	3.15 (.38)			
Race	Students of Color	37 (28)	3.06 (.32)	-1.60	.11	-.31
	White	95 (72)	3.17 (.39)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

SATs. SAT scores were required for students who declared nursing their major as entering freshmen (first year students). SAT scores were not required for general admission to this institution, or for students transferring from another institution. Therefore, only ninety-eight of 150 participant records included SAT scores, and few SAT scores for students over 22 ($N = 7$) were available. The SAT included three sections, critical reading, writing, and mathematics. Each section's scores ranged from 200 to 800 (CollegeBoard, 2015), and the highest section scores were combined for the final SAT score across test dates, consistent with the admission practices at the studied institution (CollegeBoard, 2012). Table 4.14 shows the overall SAT score mean was 1437.4 ($SD = 160.3$). According to the college's admissions office, the minimum required SAT combined score was 1000 for nursing majors at this college (KI, personal communication, July 30, 2015). Independent samples *t*-tests were conducted to compare SAT scores by age, gender and race (Table 4.14). There were no mean differences based on age or gender. However, White students ($M = 1461.36$, $SD = 153.56$) performed better than students of color ($M = 1323.53$, $SD = 145.43$) on SATs, $t(98) = -3.39$, $p < .01$. The effect size was very large ($d = -.90$), so this difference is likely meaningful (Keith, 2006).

Table 4.14

Differences of Means of SAT Scores by Demographic Variables

		N (%)	Mean (*SD*)	*t*-test	*Sig.* (*p*)	Effect Size (*d*)
Total		98	1437.45 (160.27)			
Age	Under 22 years	91	1439.01 (160.28)	.35	.73	.14
	22 years +	7	1417.14 (171.44)			
Gender	Male	13 (13)	1443.08 (192.63)	.14	.89	.04
	Female	85 (87)	1436.59 (156.06)			
Race	Students of Color	17 (17)	1323.53 (145.43)	-3.39**	.00	-.90
	White	81 (83)	1461.36 (153.56)			

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Phase II: Pearson Correlations

In the second phase of data analysis, Pearson product-moment correlations (*r)* between the independent variables explored statistical relationships between the variables, and ranged from -1.0 to +1.0. The relationships among the academic and centered noncognitive variables, including grit, are reported in Table 4.15.

Grit correlated positively with positive self-concept/ confidence ($r = .27$, $p < .01$) and preference for long-range goals ($r = .33$, $p < .01$), and negatively with the academic independent variables, SAT scores ($r = -.27$, $p < .05$), and prior college GPAs ($r = -.23$, $p < .05$). Total self-concept/confidence was also moderately correlated with long-range goals ($r = .30$, $p < .01$), and negatively with SAT scores ($r = - .21$, $p < .05$). Realistic academic self-appraisal was negatively correlated with demonstrated community service ($r = .20$, $p < .05$). Handling racism and systemic bias was correlated positively with the availability of a strong support person ($r = .17$, $p < .05$), albeit the correlations were small. Long-range goals correlated positively with demonstrated community service ($r = .17$, $p < .05$), as did the availability of a strong support person ($r = .25$, $p < .01$). Leadership experience and demonstrated community service both

correlated positively with knowledge acquired in a field ($r = .26$, $p < .01$ and $r = .44$, $p < .01$, respectively). Not surprisingly, the academic independent variables, including SAT scores ($N = 98$) and prior college GPAs ($N = 132$) were moderately positively correlated ($r = .39$, $p < 01$). None of the variables correlated over .50, so multicollinearity was not evident, and all variables were retained for further analyses.

Table 4.15

Correlations between Centered Noncognitive and Centered Academic Variables

Independent Variables		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.Grit	*r*	1	.263**	.052	.169	.326**	.064	.126	.030	.010	-.267*	-.225*
	p		.008	.609	.092	.001	.527	.210	.764	.918	.024	.032
	N	100	100	100	100	100	100	100	100	100	71	91
2.Self-confidence	*r*	.263**	1	.107	.140	.302**	-.050	.074	.120	.012	-.205*	-.099
	p	.008		.192	.087	.000	.547	.365	.143	.886	.043	.258
	N	100	150	150	150	150	150	150	150	150	98	132
3.Realsitic self-appraisal	*r*	.052	.107	1	.118	-.044	.092	-.037	-.200*	-.113	.047	.140
	p	.609	.192		.149	.595	.264	.652	.014	.169	.643	.109
	N	100	150	150	150	150	150	150	150	150	98	132
4.Handling Racism	*r*	.169	.140	.118	1	.104	.172*	.132	-.011	.007	-.191	-.014
	p	.092	.087	.149		.205	.035	.108	.892	.929	.059	.876
	N	100	150	150	150	150	150	150	150	150	98	132
5.Long-range goals	*r*	.326**	.302**	-.044	.104	1	.059	.038	.211**	.050	-.086	.029
	p	.001	.000	.595	.205		.473	.642	.010	.545	.402	.743
	N	100	150	150	150	150	150	150	150	150	98	132
6.Strong support system	*r*	.064	-.050	.092	.172*	.059	1	.159	.249**	.156	.063	.118
	p	.527	.547	.264	.035	.473		.052	.002	.056	.538	.177
	N	100	150	150	150	150	150	150	150	150	98	132
7.Leadership experience	*r*	.126	.074	-.037	.132	.038	.159	1	.138	.258**	-.138	-.044
	p	.210	.365	.652	.108	.642	.052		.092	.001	.175	.616
	N	100	150	150	150	150	150	150	150	150	98	132
8.Community service	*r*	.030	.120	-.20*	-.011	.211**	.249**	.138	1	.439**	.009	.183*
	p	.764	.143	.014	.892	.010	.002	.092		.000	.931	.036
	N	100	150	150	150	150	150	150	150	150	98	132
9.Knowledge in a Field	*r*	.010	.012	-.113	.007	.050	.156	.258**	.439**	1	.083	.164
	p	.918	.886	.169	.929	.545	.056	.001	.000		.414	.061
	N	100	150	150	150	150	150	150	150	150	98	132
10.SATs	*r*	-.267*	-.205*	.047	-.191	-.086	.063	-.138	.009	.083	1	.385**
	p	.024	.043	.643	.059	.402	.538	.175	.931	.414		.000
	N	71	98	98	98	98	98	98	98	98	98	95
11.Prior College GPAs	*r*	-.225*	-.099	.140	-.014	.029	.118	-.044	.183*	.164	.385**	1
	p	.032	.258	.109	.876	.743	.177	.616	.036	.061	.000	
	N	91	132	132	132	132	132	132	132	132	95	132

Notes. **. Correlation is significant at the .01 level (2-tailed). *. Correlation is significant at the .05 level (2-tailed).

Phase III: Multiple Regressions to answer research questions

Research Question 1. Do specific noncognitive variables as measured by Sedlacek's NCQ (2004a) and Duckworth and Quinn's Grit-S scale (2009) predict baccalaureate nursing student academic success, as defined by junior year GPA and junior year persistence?

Null Hypothesis 1.0. NCVs will not significantly contribute to baccalaureate nursing student academic success, as measured by junior year GPA and junior year persistence.

Hypothesis 1.1. NCVs will significantly contribute to baccalaureate nursing student academic success, as measured by junior year GPA.

To answer this question, a multiple regression was conducted on the dependent variable, cumulative junior year GPA, using all the noncognitive variables and grit, entered simultaneously into the equation. To avoid the potential collinearity of interaction variables (since some survey items contributed to more than one scale score), all the independent variables were centered on the mean (Keith, 2006). As only 82 students answered the grit questions and completed the junior year, only 82 cases were included in the initial multiple regression. The correlation matrix (Table 4.16) demonstrated no independent noncognitive variables correlated with the dependent variable of the junior year GPA. However, several of the independent variables were correlated. Notably, grit, self- confidence and preference for long-range goals were all related a moderate amount ($r < .40$; Cohen, 1988). Long-range goals also negatively correlated with realistic self-appraisal ($r = -.19$). A cluster of correlations was also evident between the last three variables in the table: leadership experience, community service, and knowledge acquired in a community setting, and were somewhat larger ($r = .44$ and .56), as noted in Table 4.16. Although not high, these correlations among the variables were higher than the correlations with the dependent variable, and raised concern about potential collinearity. Therefore, several iterations of this equation were run to find the most parsimonious model, and the most notable were reported here.

Table 4.16

Means, Standard Deviations, and Correlations for Junior Year GPA and Centered NCVs and Grit (N = 82)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1 Jr. Year GPA	3.18	.28	1	-.05	-.16	-03	.10	.12	-.02	.13	.01	.08
2 Grit	-.02	.51		1	.26**	.04	.16	.36**	.03	.03	.10	.02
3 Self-confidence	.30	4.79			1	.04	.06	.32**	-.12	.07	.11	.08
4 Realistic Self-appraisal	.22	3.54				1	.03	-.19*	.07	-.14	-.25*	-.11
5 Handling racism	.11	2.06					1	.05	.14	.18	.05	.10
6 Long-range goals	.17	1.48						1	-.05	.16	.29**	.15
7 Strong support system	-.09	1.58							1	.21*	.28**	.24*
8 Leadership experience	-.27	1.73								1	.44**	.56**
9 Community Service	-.07	1.28									1	.47**
10 Knowledge in a field	.02	.79										1

Notes. **. Correlation is significant at the .01 level ($p < 01$). *. Correlation is significant at the .05 level ($p < .05$).

The first equation included all nine independent variables, and the multiple correlation coefficient (R) was .31, and R^2 was .09, so 9% of the variance in junior year GPA can be predicted from this model. The ANOVA demonstrated F (9, 72) = .83, indicating that this combination of variables was not a significant predictor of junior year GPA. The beta weights in Table 4.17 suggested that a strong support system and academic self-confidence were marginally negative predictors ($p < .10$). In other words, these NCVs contributed the most to the equation, but higher scale scores on these NCVs predicted lower, rather than higher, grades. None of the independent variables were significant positive predictors of junior year GPA.

Table 4.17

Multiple Regression Analysis Summary for NCVs and Grit Predicting Junior Year GPA (N = 82)

Variable	*B*	*S.E.*	*β*
Grit	-.05	.07	-.08
Self-confidence	-.01	.01	-.22^{+}
Realistic self-appraisal	.00	.01	.02
Handling racism	.01	.02	.10
Long-range goals	.04	.03	.22
Strong support system	-.01	.02	-.06^{+}
Leadership experience	.02	.02	.12
Community service	-.02	.03	-.07
Knowledge in a field	.01	.05	.04
Constant	3.18	.03	

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Upon further inspection, multicollinearity was suspected in this equation despite acceptable collinearity diagnostics, including Eigenvalues near 1.0 and Condition Indexes less than 15.0 (Leech, Barret & Morgan, 2011). Regression coefficients changed signs, or "flipped" from the correlation table (Kennedy, 2002). For instance, note that the sign (+/-) changed between the correlation table (Table 4.16) and the coefficients in the regression summary (Table 4.17) for the variables of realistic self-appraisal and community service. The Research Question 1.1 regression was run a second time, this time without the independent variables of realistic self-appraisal and community service to avoid multicollinearity.

Keith (2006) recommended "10 to 20 participants per independent variable" (p. 204), but due to participant attrition, the sample size ($N = 82$) was small for the number of original variables included. An added benefit of dropping problematic variables was that with a total of seven independent variables, there were nearly 12 participants per variable, an acceptable ratio. The predictive ability of the second equation improved as the number of independent variables

decreased. For this equation, the correlation matrix (Table 4.18) demonstrated no independent noncognitive variables correlated with the dependent variable of the junior year GPA.

Table 4.18

Means, Standard Deviations, and Correlations for Junior Year GPA and Six Centered NCVs and Grit (N = 82)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1 Jr. Year GPA	3.16	.28	1.0	-.05	.10	-.02	.13	.08	.12	-.16
2 Grit	-.02	.51		1.0	.16	.03	.03	.02	.38**	.26**
3 Handling racism	.11	2.1			1.0	.14	.18	.10	.05	.06
4 Strong support person	-.09	1.6				1.0	.21*	.24	-.05	-.12
5 Leadership experience	-.27	1.73					1.0	.56	.16	.07
6 Knowledge in a field	-.02	.79						1.0	.15	.08
7 Long-range goals	.17	1.5							1.0	.32**
8 Self-confidence	.29	4.78								1.0

Notes. **. Correlation is significant at the .01 level ($p < .01$). *. Correlation is significant at the .05 level ($p < .05$). $^{+}$. Correlation marginally significant at the .10 level ($p < .10$).

The multiple correlation coefficient (R) was .3, and R^2 was .09, so 9% of the variance in junior year GPA can be predicted from the seven predictor variables in this model, similar to the first equation. The ANOVA demonstrated F (7, 74) = 1.04, indicating that this combination of variables was not a significant predictor of junior year GPA. Though no signs of multicollinearity were observed, the beta weights in Table 4.19 indicate that none of the independent variables tested (the NCVs and grit) were significant predictors of junior year GPA.

Table 4.19

Multiple Regression Summary for NCVs without Realistic Self-Appraisal and Community Service, with Grit Predicting Junior Year GPA (N = 82)

Variable	*B*	*S.E.*	*β*
Grit	-.05	.07	-.08
Handling racism	.01	.02	.11
Strong support system	-.01	.02	-.08
Leadership experience	.02	.02	.11
Knowledge in a field	.01	.05	.02
Long-range goals	.04	.02	.19
Academic self-confidence	-.01	.01	-.22^{+}
Constant	3.18	.03	

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

The most parsimonious model was found with just six independent variables. Knowledge acquired in a field was dropped as its Beta weight was the least of all the variables in the previous regression. The following tables (4.20, 4.21) demonstrate the correlations and regression coefficients. As in previous regressions, the multiple correlation coefficient (R) was .3, and R^2 was .09, so 9% of the variance in junior year GPA could be predicted from these six predictor variables, which is an improvement over the seven predictors in the last model. Yet the ANOVA demonstrated F (6, 75) = 1.23, p = .30 indicating that this combination of variables was not a significant predictor of junior year GPA. The beta weights in Table 4.21 indicated that none of the independent variables tested (the NCVs and grit) were significant predictors of junior year GPA. Hypothesis 1.1 was rejected, since no NVCs or grit predicted junior year grades.

Table 4.20

Means, Standard Deviations, and Correlations for Junior Year GPA and Five Centered NCVs and Grit (N = 82)

Variable	*M*	*SD*	1	2	3	4	5	6	7
1 Jr. Year GPA	3.18	.28	1.0	-.05	.10	-.02	.13	-.16	.12
2 Grit	-.02	.51		1.0	.16	.03	.03	.26**	.38**
3 Handling racism	.11	2.1			1.0	.14	.18	.06	.05
4 Strong support person	-.09	1.6				1.0	.21*	-.12	-.05
5 Leadership experience	-.27	1.73					1.0	.07	.16
6 Academic self-confidence	.29	4.78						1.0	.32**
7 Long-range goals	.17	1.48							1.0

Notes. **. Correlation is significant at the .01 level ($p < .01$). *. Correlation is significant at the .05 level ($p < .05$).

Table 4.21

Multiple Regression Summary for NCVs without Realistic Self-Appraisal, Community Service, and Knowledge Acquired in a Field (with Grit) Predicting Junior Year GPA (N = 82)

Variable	*B*	*S.E.*	*β*
Grit	-.05	.07	-.08
Handling racism	.01	.02	.11
Strong support system	-.01	.02	-.08
Leadership experience	.02	.02	.11
Academic self-confidence	-.01	.01	$-.22^{+}$
Long range goals	.04	.02	.20
Constant	3.18	.03	

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Next, a multiple regression was conducted to assess possible predictors of junior year GPA on the five NCVs alone (centered). Grit was excluded in this equation due to the missing data about the grit variable in order to increase the sample size ($N = 121$; 24 participants per independent variable). As noted in Table 4.22, inter-correlations appeared to be typical. Long

range goals were significantly correlated with the dependent variable in this equation, $r = .152$; $p = .049$ (Table 4.22).

Table 4.22

Means, Standard Deviations, and Correlations for Junior Year GPA and Five Centered NCVs, without Grit (N = 121)

Variable	*M*	*SD*	1	2	3	4	5	6
1 Jr. Year GPA	3.16	.28	1.0	-.07	.10	.15*	-.01	.12
2 Self-confidence	.06	4.23		1.0	.09	.30**	-.84	.07
3 Handling racism	.12	2.16			1.0	.04	.16*	.18*
4 Long-range goals	.08	1.63				1.0	-.01	.13
5 Strong support system	-.02	1.50					1.0	.22**
6 Leadership experience	-.29	1.60						1.0

Notes. **. Correlation significant .01 level ($p < .01$). *. Correlation significant .05 level ($p < .05$).

The multiple correlation coefficient (R) for this model was .24, and R^2 was .06, so 6% of the variance in junior year GPA could be predicted from the five predictor variables in this model. The ANOVA demonstrated $F(5,115) = 1.42$, $p = .22$, indicating that this combination of variables was not a significant predictor of junior year GPA. The beta weights in Table 4.23 suggest that a preference for long-range goals was a marginal positive predictor ($p < .10$). None of the independent variables were significant predictors of junior year GPA. Hypothesis 1.1 was rejected again; the five NCVs, even without grit, did not predict junior year grades.

Table 4.23

Multiple Regression Summary for Five NCVs without Grit Predicting Junior Year GPA (N = 121)

Variable	*B*	*S.E.*	*β*
Self-confidence	-.01	.01	-.14
Handling racism	.01	.01	.10
Long-range goals	.03	.02	.18^{+}
Strong support system	-.01	.02	-.05
Leadership experience	.02	.02	.10
Constant	3.16	.03	

Notes. $^{+}$ $p < .10$. * $p < .05$. ** $p < .01$

Hypothesis 1.2. NCVs will significantly contribute to baccalaureate nursing student academic success, as measured by junior year persistence (continued enrollment in the nursing major following the junior year).

A logistic regression was conducted to test whether there was a combination of grit and noncognitive variables that predicted continued enrollment in the nursing major after the junior year (a dichotomous dependent variable). Assumptions of logistic regression were met: the sample size was adequate, and cases were independent and related to the dependent variable. The regression was run twice, using both raw scale scores and centered variables entered into the first block, and no substantive differences were noted between the raw and centered variable equations. The centered variables are shown here, consistent with the previous equations (Table 4.24). As expected, one-third of the cases were missing data regarding grit ($N = 50$) because they were surveyed prior to the addition of the Grit- S to the Nursing Survey. Therefore the sample size for the logistic regression was 100.

Continued enrollment in the nursing major was predicted from this model 81% of the time, which was significantly different from chance (50/50). When grit and the five

noncognitive variables selected from the multiple regressions were assessed together, they did not predict whether or not a student continued to be enrolled in the nursing major, $\chi^2 = 6.51$, $df = 6$, $N = 100$, $p = .41$, which was not significant.

Table 4.24

Logistic Regression Predicting Continued Enrollment in Nursing Major (N = 100)

	B	*S.E.*	*Sig.* (*p*)	Odds Ratio Exp(*B*)	95% C.I. for Exp(*B*)	
					Lower	Upper
Grit	-.27	.60	.65	.76	.24	2.45
Self-concept	.005	.08	.95	1.01	.86	1.17
Handling Racism	.10	.13	.42	1.12	.87	1.42
Long-range goals	.17	.20	.37	1.19	.81	1.75
Strong support	-.10	.19	.61	.91	.63	1.31
Leadership experience	-.18	.15	.25	.84	.62	1.13
Constant	1.64	.30	.00	5.18		

Step	-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2
1	91.09	.06	.10

Notes. $^+$ $p < .10$. * $p < .05$. ** $p < .01$

Table 4.24 illustrates that none of the predictor variables were significant individually. Approximately 6- 10% (as noted from the Cox & Snell R^2 and Nagelkerke R^2) of continued enrollment in the nursing major can be predicted by these six variables, not a significant amount (see last rows of Table 4.24).

A second logistic regression was conducted to assess possible predictors of continued enrollment on the five NCVs alone (centered). Grit was excluded in this equation due to the missing data about the grit variable and the sample size increased to 150 ($N = 150$). Additionally, the variables omitted in the final multiple regression were excluded from this equation due to possible multi-collinearity, and to maintain consistency (realistic self-appraisal, community service, and knowledge acquired in a field were omitted). From the five remaining NCVs, continued enrollment in the nursing major was predicted 80% of the time, which was

significantly different from chance (50/50). When the five noncognitive variables were assessed together, they did not predict whether or not a student continued to be enrolled in the nursing major, $\chi^2 = 6.87$, $df = 5$, $N = 150$, $p = .23$, which was not significant. None of the noncognitive predictor variables was significant individually, and approximately 5-7% (as noted from the Cox & Snell and Nagelkerke R Squares) of continued enrollment in the nursing major can be predicted by these five variables, not a significant amount (Table 4.25).

Table 4.25

Logistic Regression Predicting Continued Enrollment in Nursing Major from Five NCVs, Without Grit (N = 150)

	B	*S.E.*	*Sig.* (*p*)	Odds Ratio Exp(*B*)	95% C.I. for Exp(*B*)	
					Lower	Upper
Self-concept	.01	.07	.89	1.01	.89	1.15
Handling Racism	.14	.10	.16	1.15	.95	1.41
Long-term goals	.13	.14	.36	1.14	.86	1.50
Strong support	-.08	.15	.61	.93	.68	1.25
Leadership experience	-.13	.11	.22	.88	.71	1.08
Constant	1.48	.22	.000	4.37		

Step	-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2
1	143.248	.05	.07

Notes. $^{+}$ $p < .1$. * $p < .05$. ** $p < .01$

The first research question explored whether specific noncognitive variables, as measured by Sedlacek's NCQ (2004a) and Duckworth and Quinn's Grit-S scale (2009), predicted nursing student academic success, as defined by junior year GPA and continued enrollment in the nursing major. Research Question 1 was answered by the null hypothesis, as there were no NCVs (including grit) predictive of junior year GPA or continued enrollment.

Research Question 2. Do certain variables such as age, gender, race, SAT scores, and previous college GPAs impact baccalaureate nursing student academic success, as defined by junior year GPA and persistence?

Null Hypothesis 2.0. Student age, gender, race, SAT scores, and previous college GPAs will not significantly impact baccalaureate nursing student academic success, as measured by junior year GPA and persistence.

Hypothesis 2.1. Student age, gender, race, SAT scores, and previous college GPAs will significantly impact baccalaureate nursing student academic success, as measured by junior year GPA.

A simultaneous multiple regression was conducted to discover how demographic and academic variables, including age, gender, race, SAT scores, and previous college GPAs affected junior year GPA, a measure of academic success. Assumptions were checked on the linearity and distribution of errors, and met. Table 4.26 shows the means, standard deviations and correlations of the centered variables. Due to missing academic data, especially SAT scores, 78 respondents were included in this regression ($N = 78$). Previous college GPA was moderately correlated with the dependent variable, junior year GPA ($r = .56$; Cohen, 1988), and the academic variables, SAT scores and previous college GPA, were correlated a small- to- medium amount ($r = .35$; Cohen, 1988). Gender and SAT scores also correlated with junior year GPA a small amount (both variables, $r = .20$; Cohen, 1988). No multicollinearity was observed among the independent variables.

Table 4.26

Centered Means, Standard Deviations and Correlations for Junior Year GPA and Demographic and Academic Variables (N = 78)

	Mean	*SD*	1	2	3	4	5	6
1 Jr year GPA	3.15	.261	1	-.05	.20*	-.07	.20*	.56**
2 Age (Cen)	.002	1.33		1	-.33**	-.05	.09	-.03
3 Gender (dic female)	.86	.35			1	.08	.03	.05
4 SOC (dic)	.17	.38				1	-.44**	-.23*
5 SAT score (Cen)	24.34	157.25					1	.35**
6 Prior College GPA (Cen)	.058	.35						1

Notes. **. Correlation is significant at the .01 level ($p < .01$). *. Correlation is significant at the .05 level ($p < .05$).

These variables predicted junior year GPA, $F = (5, 72) = 7.65$, $p < .001$. The model accounted for 35% of the variance, as noted by the R-squared value of .348. Of the five predictor variables in the model, only prior college GPA was a significant predictor ($p < .001$), as reported in Table 4.27. Prior college GPA contributed most to the junior year GPA performance; SAT scores and demographic variables were not predictive of junior year GPA, although being female was marginally significant in this model ($p < .10$). Hypothesis 2.1 was shown to be true, and the null hypothesis (2.0) was rejected, as this model predicted junior year GPA.

Table 4.27

Multiple Regression Summary for Demographic and Academic Variables Predicting Junior Year GPA (N = 78)

Variable	*B*	*S.E.*	*β*	*Sig. (p)*
Age	.01	.02	.03	.74
Gender (dic Female)	.13	.08	.18^{+}	.08
Race (dic SOC)	.04	.08	.05	.61
SAT score	2.53	.00	.02	.89
Prior college GPA	.42	.08	.56**	.00

Notes. **. $p < .01$. *. $p < .05$. $^{+}$. $p < .10$.

However, the flipped sign multicollinearity concern persisted in this equation (Kennedy, 2002), as noted by comparing the correlations to the coefficient values of the age and race variable scores in Tables 4.26 and 4.27. To correct this, several regressions were run, dropping problematic variables until no flipped sign effect was noted.

For example, in the next regression, the flipped variables were omitted, leaving gender and the academic variables to predict junior year GPA. When the regression was run with these three variables, the SAT score variable flipped (see Tables 4.28, 4.29), even though this combination of variables still significantly predicted junior year GPA, $F = (3,74) = 12.91$, $p < .001$. The model accounted for 34% of the variance, as noted by the R-squared value of .344. Of the three predictor variables in the model, only prior college GPA was a significant predictor ($p < .001$), as reported on Table 4.29. Prior college GPA contributed most to the junior- year GPA performance; SAT scores and demographic variables were not predictive of junior year GPA, although being female was marginally significant ($p < .10$).

Table 4.28

Centered Means, Standard Deviations and Correlations for Junior Year GPA, on Gender and Academic Variables (N = 78)

	Mean	*SD*	1	2	3	4
1 Jr Fall+Spring GPA	3.15	.261	1	.20*	.20*	.56**
2 Gender (binary female)	.86	.35		1	.03	.05
3 SAT score (Cen)	24.34	157.25			1	.35**
4 Prior College GPA (Cen)	.058	.35				1

Notes. **. Correlation is significant at the .01 level ($p < .01$). *. Correlation is significant at the .05 level ($p < .05$).

Table 4.29

Multiple Regression Summary for Gender and Academic Variables Predicting Junior Year GPA (N = 78)

Variable	*B*	*S.E.*	*β*	*Sig. (p)*
Gender (binary female)	.13	.07	.17^{+}	.07
SAT score- cent	-5.00	.00	-.003	.98
Prior college GPA- cent	.41	.08	.55**	.00

Notes. **. $p < .01$. *. $p < .05$. $^{+}$. $p < .10$

The most parsimonious model eliminated the centered SAT score, since it had flipped; just two independent variables, gender and prior GPA remained. These two variables still significantly predicted junior year GPA, $F = (2,109) = 24.92$, $p < .001$. There were no signs of multicollinearity; the Eigenvalues ranged from .09 to 1.93 and the Condition Indexes ranged from 1.0 to 4.43, with no flipped sign effect. Without the SAT variable, the sample size improved considerably to 112, and accounts for the small changes in the means and standard deviations in Table 4.30. The model accounted for 31% of the variance (R squared value of .314), and both variables were significant predictors. Women were more likely than men to earn higher junior year GPAs ($p = .046$), and higher prior GPAs also predicted higher junior year GPAs ($p = .00$), as reported in Table 4.31. To summarize, SAT scores, as well as age and race variables were not predictive of junior year GPA, and correlated more closely with one another than with the dependent variable. Prior college GPAs were consistent significant predictors of junior year GPA, and female gender was also a predictor. Hypothesis 2.1 was shown to be true, and the null hypothesis (2.0) was rejected, as this model did predict junior year GPA.

Table 4.30

Centered Means, Standard Deviations and Correlations for Junior Year GPA, on Gender and Prior College GPA (N = 112)

	Mean	*SD*	1	2	3
1 Jr Fall+Spring GPA	3.16	.28	1	.20*	.54**
2 Gender (bin Female)	.81	.39		1	.07
3 Prior College GPA (Cen)	.04	.36			1

Notes. **. Correlation is significant at the .01 level ($p < .01$). *. Correlation is significant at the .05 level ($p < .05$).

Table 4.31

Multiple Regression Summary for Gender and Prior College GPA Predicting Junior Year GPA (N = 112)

Variable	*B*	*S.E.*	*β*	*Sig. (p)*
Female (binary)	.12	.06	.16*	.046
Prior college GPA- cent	.41	.06	.53**	.00

Notes. $^{+}$ $p < .1$. * $p < .05$. ** $p < .01$

Hypothesis 2.2. Student age, gender, race, SAT score, and previous college GPA will significantly impact baccalaureate nursing student academic success, as measured by persistence following the junior year (continued enrollment in the nursing major).

To address Hypothesis 2.2, a logistic regression was computed on the dichotomous variable of continued enrollment in the nursing major after the junior year, using the background variables of age, gender, race, SAT scores, and prior college GPAs. Equation assumptions of independent observations and variables linearly related were checked and met. Data were missing in over one-third of cases (37%), so total $N = 95$. As in earlier equations, missing data involved the variables of SAT scores and prior college GPAs, which were not available for

several students[2]. When all background demographic and academic predictors were considered together, they significantly predicted whether or not a student persisted in the nursing major, as measured by continued enrollment after the junior year, $\chi^2 = 15.25$, $df = 5$, $N = 95$, $p < .01$. The model as a whole explained between 15% (Cox and Snell R^2) and 23% (Nagelkerke R^2) of the variance in continued enrollment, and correctly classified 82.1% of cases.

Table 4.32 shows prior college GPAs made unique significant contributions to the model ($p = .04$) to predict continued enrollment, and younger ages were also marginally significant ($p = .06$). The strongest predictor of continued enrollment in the nursing major was previous college GPAs, with an odds ratio of 7.2. This indicated that students with the highest prior college GPAs were seven times more likely to persist in the nursing major.

Table 4.32

Logistic Regression Predicting Continued Enrollment in the Nursing Major (N = 95)

	B	*SE*	*Sig. (p)*	Odds Ratio Exp(*B*)	95% CI for Odds Ratio Lower	Upper
Age (cent)	-.42	.22	.06+	.66	.43	1.01
Gender	.34	.78	.67	1.40	.30	6.46
SOC	.36	.74	.62	1.44	.34	6.09
SAT (cent)	.00	.00	.13	1.00	1.00	1.01
Prior College GPA	1.97	.93	.04*	7.16	1.15	44.46
Constant	1.36	.73	.06	3.88		

Step	-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2
1	79.62	.15	.23

Notes. $^+$ $p < .1$. * $p < .05$. ** $p < .01$

[2] Specifically, students who did not start their collegiate career at the studied institution did not submit their SAT scores per college admission protocol, and were not available. For students who did not complete at least one semester prior to the junior year nursing courses at the host institution, previous college GPAs were not reported to preserve consistency of data.

To achieve a more parsimonious model, two more logistic regressions were run. In the first, only the independent variables of gender (binary female) and prior college GPA were entered, since these variables were most significant in the multiple regression. This equation was significant, $\chi^2 = 10.56$, $df = 2$, $N = 132$, $p < .01$, and accounted for seven to 13% of the variance. Yet prior college GPA was the only significant variable, so this model was rejected in favor of the logistic regression including five variables.

In the second alternate logistic regression, the variables of age (centered) and prior college GPA were included, as these were most predictive in the first regression to answer this research question. Using age instead of gender was a slightly better model, $\chi^2 = 13.33$, $df = 3$, $N = 132$, $p < .01$, although age was not significant ($B = .13$, $p = .16$) and prior college GPA again stood out as the best predictor of continued enrollment ($B = 2.40$, $p < .01$). In summary, Hypothesis 2.1 and 2.2 were found to be true. Prior college GPA was a significant predictor of academic success in the nursing major, as measured by both dependent variables, junior year GPA and continued enrollment in the nursing major.

Research Question 3. Do particular combinations of noncognitive and academic variables predict baccalaureate nursing student academic success, as defined by junior year GPA and persistence, when controlling for demographic variables (age, gender, and race)?

Null Hypothesis 3.0. No combinations of NCVs and academic variables predict junior year baccalaureate nursing student success, when controlling for demographic variables.

Hypothesis 3.1. A specific combination of NCVs and academic variables predict baccalaureate nursing student success, measured by junior year GPAs, after controlling for demographic variables.

To investigate how well NCVs, grit, and academic variables predicted junior year GPAs, after controlling for demographic variables, several sequential (hierarchical) linear regressions were conducted. Demographic variables were entered in the first step (or block), and noncognitive scale scores (including the grit scale score) were included in the second block. Academic predictor variables were entered in the third step, as recommended by Tracey and Sedlacek (1984) in their original NCV research.

As in earlier regressions, assumptions of linearity, distribution of errors, and uncorrelated errors were checked and met, but missing data (prior college GPAs, SAT scores and grit) caused the sample size of this regression to drop to 51; with a total of sixteen IVs, this model was untenable. Even so, the Model Summary (Table 4.33) shows that the first block, demographic variables (age, gender, and race), predicted 3% (R^2 = .03) of the total variance in junior year GPAs, not a significant amount, F (3, 48) = .45, p = .72. When the NCVs and grit were added to the model, it accounted for an added 23% of the variance (R^2 change = .23), F (9, 39) = 1.34, p = .25, though it still did not predict junior year GPAs. When academic variables were introduced in the third block of the equation, the variables together significantly predicted junior year GPA, F (2, 37) = 10.03, p < .01, and improved the prediction by 26% over the demographic and noncognitive variables, to 52% (R^2), a large effect (Cohen, 1988).

Table 4.33

Model Summary of Sequential Regression on Junior Year GPAs (N = 51)

Block	*R*	R^2	Std. Error of the Estimate	Change Statistics				
				R^2 Change	*F* Change	*df*1	*df*2	*Sig.*(*F* Change)
1	.17	.03	.26	.03	.45	3	48	.72
2	.51	.26	.25	.23	1.34	9	39	.25
3	.72	.52	.21	.26	10.03**	2	37	.00

Notes. ** Significant at the .01 level ($p < .01$). *. Significant at the .05 level ($p < .05$). + Significant at the .10 level ($p < .10$).

1. Predictors: (Constant), race, gender, age.
2. Predictors: (Constant), race, gender, age, Total Prefers Long Range Goals, Total Availability of Strong Support Person, Total Knowledge Acquired in a Field, Total Handling Racism & Systemic Bias, Total Self Concept/Confidence, Total Mean Grit, Total Realistic Self-Appraisal, Total Successful Leadership Experience, Total Demonstrated Community Service
3.Predictors: (Constant), race, gender, age, Total Prefers Long Range Goals, Total Availability of Strong Support Person, Total Knowledge Acquired in a Field, Total Handling Racism & Systemic Bias, Total Self Concept/Confidence, Total Mean Grit, Total Realistic Self-Appraisal, Total Successful Leadership Experience, Total Demonstrated Community Service, SAT score, Prior College GPA

Assessment of the correlations and coefficients revealed potential multicollinearity issues when predictor variables flipped signs, as in previous regressions (Kennedy, 2002). Furthermore, the number of cases per variable was unacceptable. To correct this, two different combinations of variables were run, utilizing information gathered from previous equations.

In the first alternate model, the demographic variables of gender and race were omitted, leaving only age. In the second block, five NCVs were utilized altogether (knowledge acquired in a field, realistic self-appraisal, demonstrated community service were omitted due to collinearity concerns, consistent with RQ1.1). Additionally, grit and SAT scores were omitted to eliminate potential multicollinearity and to increase the sample size to 112. In the last step, only prior college GPAs were added. The Model Summary (Table 4.34) shows that the first block predicted 2% ($R^2 = .02$) of the total variance in junior year GPAs, not a significant amount, F (1, 110) = 2.15, $p = .15$. When the five NCVs were added to the model, it accounted for an added

7% of the variance (R^2 change = .07), F (5,105) = 1.64, p = .16, not predictive of junior year GPAs. When academic variables were introduced in the third block of the equation, the variables together significantly predicted junior year GPA, F (1,104) = 38.36, p < .01, and improved the prediction by 25% over the demographic and noncognitive variables, to 34% (R^2 - .34), a moderate effect (Cohen, 1988). Although this model had a more appropriate sample size for the number of variables included, it did not improve the overall prediction of continued enrollment in the nursing major from the initial model.

Table 4.34

Model Summary of Alternate Sequential Regression #1 on Junior Year GPAs (N = 112)

Block	R	R^2	Std. Error of the Estimate	Change Statistics				
				R^2 Change	F Change	$df1$	$df2$	*Sig.(F* Change)
1	.14	.02	.28	.02	2.15	1	110	.15
2	.30	.09	.28	.07	1.64	5	105	.16
3	.58	.34	.24	.25	38.86**	1	104	.00

Notes. ** Significant at the .01 level (p < .01). *. Significant at the .05 level (p < .05). + Significant at the .10 level (p < .10).

1. Predictors: (Constant), centered Age.
2. Predictors: (Constant), (cent) Age, Total Prefers Long Range Goals, Total Availability of Strong Support Person, Total Handling Racism & Systemic Bias, Total Self Concept/Confidence, Total Successful Leadership Experience
3.Predictors: (Constant), (cent) Age, Total Prefers Long Range Goals, Total Availability of Strong Support Person, Total Handling Racism & Systemic Bias, Total Self Concept/Confidence, Total Successful Leadership Experience, Prior College GPA

In the final alternate model, age and race were omitted, and gender (binary female variable) was added to the first block. The other blocks remained the same, including the five remaining NCVs in the second step (including handling racism, strong support person, leadership experience, long-range goals, and self-confidence), and prior college GPA in the third step. The sample size stayed at 112, providing ample cases per variable (Keith, 2006). This model was the most parsimonious, accounting for 36% of the variance overall (R^2 = .36), with seven variables

(Table 4.35). Gender was significant in this model, with the first block predicting 4% (R^2 = .04) of the total variance in junior year GPAs, F (1, 110) = 4.37, p = .04, a small effect (Cohen, 1988). The five NCVs in the second step added 6% (R^2 change = .06), not a significant amount, F (1, 105) = 1.39, p = .23. As in the other regressions, prior college GPA was most predictive, adding 26% to the model, F (1, 104) = 42.31, p = .00.

Table 4.35

Model Summary of Alternate Sequential Regression #2 on Junior Year GPAs (N = 112)

Block	R	R^2	Std. Error of the Estimate	Change Statistics				
				R^2 Change	F Change	$df1$	$df2$	Sig.(F Change)
1	.20	.04	.28	.04	4.37*	1	110	.04
2	.31	.10	.28	.06	1.39	5	105	.23
3	.60	.36	.23	.26	42.31**	1	104	.00

Notes. ** Significant at the .01 level (p < .01). *. Significant at the .05 level (p < .05). + Significant at the .10 level (p < .10).

1. Predictors: (Constant), binary female.
2. Predictors: (Constant), age, Total Prefers Long Range Goals, Total Availability of Strong Support Person, Total Handling Racism & Systemic Bias, Total Self Concept/Confidence, Total Successful Leadership Experience
3.Predictors: (Constant), age, Total Prefers Long Range Goals, Total Availability of Strong Support Person, Total Handling Racism & Systemic Bias, Total Self Concept/Confidence, Total Successful Leadership Experience, Prior College GPA

These regressions demonstrated the importance of previous academic performance to predict junior year academic performance among baccalaureate nursing students, and Hypothesis 3.1 was found to be true, primarily due to prior college GPAs that predicted junior year GPA.

Hypothesis 3.2. Combinations of particular NCVs and academic variables predict baccalaureate nursing student success, measured by continued enrollment, after controlling for demographic variables.

To test Hypothesis 3.2, sequential logistic regressions were conducted on the dichotomous dependent variable, continued enrollment status in the nursing major, to discover

combinations of variables of interest (noncognitive and academic) that predicted nursing students' continued enrollment status when controlling for demographic variables. The assumptions of independent observations and linearity were checked and met. Similar to previous sequential regressions, the demographic variables of age, gender and race were entered in the first block. In the second block, the five NCVs were entered; realistic self-appraisal, knowledge acquired in a field, and demonstrated community service, along with grit scale scores were excluded to decrease potential collinearity issues and increase sample size. In the last block, the academic variables, SATs and previous GPAs, were added. In this model, $N = 95$; fifty-five cases were missing, as data about SAT scores and previous college GPAs were not available for 37% of cases. When all predictors were considered together, they significantly predicted whether or not a student persisted in the nursing major, as measured by continued enrollment after the junior-level year. Table 4.36 shows $\chi^2 = 19.0$, $df = 10$, $N = 95$, $p = .04$, which was significant. Despite the large amount of missing data, the sequential logistic regression predicted between 18% (Cox and Snell R^2) and 29% (Nagelkerke R^2) of the variance in continued enrollment, and correctly classified 81% of cases. Table 4.37 also presents the odds ratios, to suggest that prior college GPA (the only significant predictor variable) improved the odds of continued enrollment over seven times, and made a unique significant contribution to the model ($p < .05$) to predict continued enrollment.

Table 4.36

Model Summary of Sequential Logistic Regression Predicting Continued Enrollment

χ^2	*df*	*Sig.* (*p*)	Cox & Snell R^2	Nagelkerke R^2	% Predicted
19.00	10	.04	.18	.29	81.1

Table 4.37

Block 3: Sequential Logistic Regression Predicting Continued Enrollment in the Nursing Major (N = 68)

	B	S.E.	*Sig.* (*p*)	Odds ratio Exp(*B*)
Age (Cent)	-.43^{+}	.24^{+}	.08	.65
Female	.28	.81	.73	1.32
Students of Color (bin)	.53	.82	.52	1.70
Handling racism	.05	.15	.71	1.06
Strong support system	-.14	.25	.56	.87
Leadership experience	-.18	.20	.39	.84
Self-confidence	-.172	.15	.25	.84
Long-range goals	.13	.24	.59	1.14
SAT	.00	.00	.23	1.00
PriorGPA	2.01*	.96*	.04	7.49
Constant	1.41	.75^{+}	.06	4.10

Notes. $^{+}$ $p < .1$. * $p < .05$. ** $p < .01$

Upon review of the third research question, Hypotheses 3.1 and 3.2 were found to be true when the academic variables, and especially prior college GPAs were added to the regression equations. Both junior year GPA and continued enrollment in the nursing major could be predicted by prior college GPAs.

Summary

This chapter reviewed the analyses of data from three classes of junior-level baccalaureate nursing students to answer the research questions. First, the dependent and independent variables from the Nursing Student Survey were described, as well as academic independent variables including SAT scores and previous college GPAs. Then the relationships among the independent variables (noncognitive and academic variables) were examined, utilizing product- moment correlations. In the final phase of data analysis, I answered each of

the research questions through simultaneous and sequential multiple and logistic regressions, to discover factors predictive of the dependent variables, cumulative GPA of the junior year and continued enrollment in the nursing major. Unexpectedly, grit and the NCVs were less predictive than prior college GPAs for this group of nursing students. In the final chapter of this study, these results are discussed, along with limitations and strengths of this work, implications for nursing education, and suggestions for further research in this field.

The Summary Table of Findings (Table 4.38) presents the key data reported in this chapter.

Table 4.38

Summary Table of Findings

Analyses	**Findings** *(p < .05)*
Cohort comparison (Chapter Three)	• Cohorts 1, 2, &3 very similar in terms of age, gender and race; Combined for further data analyses.
Participant demographics (Chapter Three)	• Sample mean is 22.3 years old, and predominantly made up of White women
Dependent Variables	
Junior Year GPAs	• No differences based on age, race • Women higher than men
Continued Enrollment after Junior Year	• No differences based on age, gender, race
Independent Variables	
Grit	• Older students showed more than younger students • Students of color (SOC) showed more than White students • No difference based on gender
Positive Self-Concept/ Confidence	• Older students showed more than younger students • SOC showed more than White students • No difference based on gender
Realistic Self-Assessment	• No differences based on age, gender, race
Handling Racism	• SOC showed more than White students • No differences based on gender, age
Preference for Long-range Goals (LRGs)	• Older students showed more than younger students • No differences based on gender, race
Availability of Strong Support Person	• White students reported more than SOC • No differences based on age, gender

Analyses	**Findings** *(p < .05)*
Successful Leadership Experience	• No differences based on demographics
Demonstrated Community Service	• Women reported more than men • White students reported more than SOC
Knowledge in a Field	• Younger students reported more than older students • Women reported more than men • White reported more than SOC
Prior College GPA	• No differences based on age, gender or race
SAT scores	• White higher than SOC
Variable Summary by Demographics	
• Age	**Younge**r students reported more than older • Knowledge acquired in a field (non-traditional knowledge) **Older** students reported more than younger • Grit • Positive self-concept/confidence • Preference for LRGs
• Gender	**Women** reported more than men • Junior year GPA • Demonstrated community service • Knowledge acquired in a field **Men** did not report more than women on any NCGs or academic variables

Analyses	**Findings** *(p < .05)*
• Race	**SOC** reported more than White students • Grit • Positive Self- Concept • Handling Racism **White** students reported more than SOC • Strong Support Person • Demonstrated community service • Knowledge acquired in a field • Higher SAT scores

Variable Correlations

- Grit correlated positively with positive self-concept/ confidence and preference for long-range goals
- Grit was negatively related to the academic independent variables, SAT scores and prior college GPAs
- Positive self-concept/confidence was also moderately correlated with long range goals
- Positive self-concept/confidence negatively correlated with SAT scores
- Realistic Self-appraisal negatively correlated with Demonstrated Community Service
- Long Range Goals was positively correlated with Demonstrated Community Service and Availability of strong support person
- Leadership Experience correlated positively with Demonstrated Community Service and Knowledge Acquired in a field
- SAT scores and prior college GPAs were also positively correlated
- Only prior college GPAs correlated with junior year GPA

Research Question 1

1. DV = JFSGPA IV= NCQ (Study 1,2,3) IV= Grit (Study 2,3)	• 1.1 Grit and NVCs were not predictive of junior year GPAs
2. DV= Nur Major IV= NCQ (Study 1,2,3) IV= Grit (Study 2,3)	• 1.2 No individual or combination of NCVs predicted enrollment following junior year

Research Question 2

1. DV= JFSGPA IV= age, gender, dich.race, previous college GPA, SATs 2. DV= NUR Major IV= age, gender, race, previous college GPA, SATs	• 2.1, 2.2 Background variables (demographic and academic variables) predicted junior year GPA and continued enrollment following junior year • 2.1 Female gender predicted junior year GPA. • 2.1 Age, race did not predict junior year GPA**.** • 2.1, 2.2:**Prior college GPA** predicted both junior year GPA and continued enrollment • 2.2: no demographic predictors predicted continued enrollment following junior year

Research Question 3

1. DV= JFSGPA IV= NCQ variables, Grit, age, gender, race, prior GPA, SATs	• 3.1 Gender (female) and prior GPA predicted junior year GPA
2. DV= Nur Major IV= NCQ variables, Grit, age, gender, race, prior GPA, SATs	• 3.1 Prior GPA predicted continued enrollment in nursing major following junior year

Chapter Five: Discussion

This research explored noncognitive variables to augment academic indicators and predict success of junior year baccalaureate nursing students. A move toward more holistic assessments of students in the context of the current nursing workforce needs (American Association of Colleges of Nursing [AACN], 2012c; 2016; Brown & Marshall, 2008; Institute of Medicine [IOM], 2011) and nursing education program challenges (Newton & Moore, 2009; Peterson, 2009) are crucial to enable more effective nurse education programs and ultimately the success of students, leading to competent baccalaureate-prepared nurses in the workforce (Benner et al., 2010).

This correlational cohort study at one small liberal arts college surveyed nursing students in the third year of a four-year baccalaureate program, using an instrument that included the Grit-S (Duckworth & Quinn, 2009) and the Noncognitive Questionnaire (Sedlacek, 2004a). The aim was to discover how these non-academic factors influenced baccalaureate nursing students' academic success, defined as GPA and persistence at the conclusion of the junior year of college (dependent variables).

This chapter analyzes the findings presented in Chapter Four, congruent with the phases of analyses. First, the sample of nursing students is discussed in relation to the larger population of nurses and nursing students. Then the discussion centers on this study's descriptive statistics on grit, noncognitive and academic variables previously found to be predictive of success (Díaz et al., 2012; Grossbach & Kuncel, 2011; Hopkins, 2008). Next, I analyze how the findings of the three research questions align with previous research studies. Following the results, implications of this study for nursing education are highlighted. This study's strengths and limitations are

reviewed and areas for further research in this field are suggested. Finally, concluding thoughts about this work and baccalaureate nursing student success are shared.

Sample Representativeness

This sample of students was amassed over three consecutive years at one baccalaureate nursing education program, from a possible pool of all junior year nursing students at this college. The high participation rate reflected the general population of nursing students at this college, though there were variations within the sample. These students had mastered pre-requisite courses before starting nursing classes, and had achieved a minimum GPA of 2.5/4.0 prior to starting the nursing major curriculum in the fall of the third collegiate year (junior year). It is important to note that this study did not examine students prior to starting the nursing curriculum in their junior year, and students who did not succeed during their first two years of college were not captured in this work. The participants in this research all met the nursing major entrance requirements, and were academically successful in their initial years of college, accounting for some restriction of range in the findings. The respondents still reported varying levels of grit and NCVs, as well as academic and nonacademic-related activities on the Nursing Student Survey.

The participants were similar to baccalaureate nursing students' predominant demographic nation-wide, as the vast majority identified as White females between nineteen and twenty-four years old. The national average age for BSN graduates was just slightly older than this sample[3] (Health Resources and Services Administration [HRSA], 2010). Men were represented in this sample on par with other nursing education programs (National League for

[3] The national average included all nurse graduates, including 22% that entered nursing as a second career, and already held at least one post-secondary degree (HRSA, 2010).

Nursing [NLN], 2015). The percentage of participants of color in this study was similar to the national pool of 2011 baccalaureate nursing graduates (AACN, 2012c).

The current nursing workforce in the United States is overwhelmingly White and female (U.S. Department of Health and Human Services, 2014). This demographic is not representative of the more diverse general US population (United States Census Bureau, 2014). This long-standing demographic disparity within the profession has recently started to change, as observed among nursing student populations. People of color and men are increasingly represented among baccalaureate nursing students nationwide (AACN, 2015; NLN, 2015).

Overall, the sample of nursing students in this study reflected the national demographics of nursing students, and the current trend among baccalaureate nursing programs toward more racial and gender diversity. Although sampling procedures prohibit statistical generalization, the sample representativeness bodes well for the conclusions that can be drawn from this work.

Variations among Participants as Reported on the Nursing Student Survey

Among the independent variables studied, some interesting differences were noted in this research. In previous research conducted in this field, direct comparisons of demographic groups on specific independent variables were rarely reported, though they possibly occurred in other studies and were just omitted from the published reports.

The analyses uncovered no age-based or racial differences in overall success as measured by junior year GPA or persistence following the junior year (the dependent variables). The results of this study were similar to the findings of Benefiel (2011) and Beeman and Waterhouse (2003), who examined demographics that could impact success on the nurse licensing examination following graduation, and found no significant relationships.

This research found that women earned higher junior year GPAs than men. Women also reported more community service and more knowledge acquired in an academic field (non-traditional knowledge) on the Nursing Student Survey than their male counterparts. Ancis and Sedlacek (1995) found that women who reported more community service earned higher GPAs over seven semesters. Similarly, this study found women demonstrated more community service and earned higher junior year GPAs than men. O'Lynn and Tranbarger (2007) chronicled the historic under-representation and marginalization of men in the nursing field, and Dyck, Oliffe, Phinney, and Garrett (2009) explored gender-based educational practices or attitudes of nursing faculty that influenced the success of male nursing majors in an ethnographic study. Yet little quantitative research has compared academic success based on gender in the nursing major, so this finding begs further inquiry.

Younger students reported higher NCV scale scores on knowledge acquired in a field (non-traditional knowledge). This finding was not reported in previous NCV studies, although recent research regarding millennial students' collaborative and participative learning styles suggest that younger people prefer to learn through non-traditional means, such as workplace or volunteer experiences (Skiba, 2005; Strange, 2004). Another explanation is that perhaps older students had more work or family responsibilities, and did not perceive (or report) their experience as opportunities to acquire knowledge non-traditionally in an academic field. This new finding could have important implications for nursing practice, and is revisited later in this chapter.

White students reported higher scale scores than students of color for the noncognitive variables of available support person, demonstrated community service, and knowledge acquired in a field. High scores on these NCVs scale may point to more resources and opportunities for

non-academic educational experiences among these students (Bowen & Rudenstine, 2003). These educational opportunities could also explain higher SAT scores among White students in this study, as reported in other student groups by Lemann (2000) and Sacks (2007).

In contrast, students of color in this research scored higher on the Grit-S, and lower on the NCQ scale score of available support person than White students, indicating they were grittier and less supported than White students. As Grit is "trait-level perseverance and passion for long term goals" (Duckworth & Quinn, 2009, p. 166), it is not surprising that students of color, who have been historically under-represented in higher education and had less resources to facilitate college entrance and success (Bowen & Rudenstine, 2003) were more internally motivated to set and work toward a long term goal such as college independently (Tough, 2012). These findings are similar to a study of Black male college students that also reported relatively high grit scale scores (Strayhorn, 2013). In a survey of nursing students, Evans (2013) noted that nursing students of color reported a greater intention to complete a baccalaureate degree than their White counterparts, a reflection of personal grit and determination, though grit was not specifically assessed among nursing students prior to this study.

Students of color in this study also reported higher levels of positive academic self-concept and ability to negotiate systemic bias or racism than White students. These variables, like grit, are assets to success for under-represented students in predominantly White colleges (PWIs). Boyer and Sedlacek (1988) also demonstrated high scale scores of handling racism and academic self- concept among international students at a mid-Atlantic university. Similarly, Tracy and Sedlacek (1987) reported handling racism and academic self- concept were important predictors of graduation among Black students, and Ting (2003) also found these variables higher among students of color than for Whites among first-generation college students. Though

the NCQ scale scores were not designed for norming or comparisons, they were within the ranges reported by Sedlacek (2004a), and predicted academic success as reported previously by students of color (Boyer & Sedlacek, 1988; Ting, 2003). This cluster of variables found across studies could have important implications for nursing education practice.

Correlations between Independent Variables

Correlations are examined in this section, starting with the academic independent variables. Among the study participants who submitted SAT scores, SATs correlated with prior college GPAs. SATs and prior college GPAs were not available for all students who started their college careers outside of the studied institution, yet this correlation of academic indicators in the first two years of college was consistent with findings among nursing students researched by Grossbach and Kuncel (2011) and Hopkins (2008). Conversely, SATs did not correlate with GPAs among other college populations (Sacks, 2007; Sedlacek & Adams-Gaston, 1992; Tracey & Sedlacek, 1986). This correlation among the academic predictor variables is an important difference between nursing student populations and other groups of college students, but should be interpreted cautiously since this study did not examine if the student group that took the SATs was representative of the entire study sample.

Next, significant relationships were examined among the noncognitive variables and several notable correlations were found. First, grit correlated positively with academic self-confidence and a preference for long-range goals. Though these relationships were not previously researched, this correlation affirmed Duckworth's definition of the grit construct as "passion and perseverance for long-term goals" (2007, p. 1087), and this study contributes to the construct validity of these variables. Positive self- concept or confidence also involves determination, especially as related to academic goals (Sedlacek, 2004a). It is interesting that

these three variables- grit, academic self-confidence, and a preference for long-range goals- were inversely correlated to participants' SAT scores in this study.

The second cluster of correlations involved the availability of a strong support person, positive leadership experience, demonstrated community service, and knowledge acquired in a field. These positive correlations have not been documented previously, and point to the presence of positive role models and mentors for young people, since these attributes were highest among the students under age 22, especially younger White students. Other variable relationships are addressed in the next section, with the results of the research questions.

Research Questions Results

The research questions were explored through multiple and logistic regressions, to discover variables predictive of academic success in the junior year of a baccalaureate nursing program. The results of this study are discussed next, as organized by the research questions, and in the context of relevant literature.

Research Question 1. Do specific noncognitive variables as measured by Sedlacek's NCQ (2004a) and Duckworth and Quinn's Grit-S scale (2009) predict baccalaureate nursing student academic success, as defined by junior year GPA and persistence?

This question was answered by the null hypothesis; neither the Grit-S nor the NCQ predicted academic success, measured by the dependent variables, junior year GPA and continued enrollment in the nursing major. The mean Grit-S score for these baccalaureate nursing students was higher than other studies by Duckworth et al. (2007), and was the same as the mean Grit-S scores of novice teachers studied by Duckworth et al. (2009). Among the respondents in this study, grit was negatively correlated with the academic independent variables, SAT scores and previous college GPAs. In the same way, this group of respondents

reported comparable NCV scale scores to those reported among a variety of student groups by Sedlacek (2004a), yet none of these variables predicted academic success for these respondents.

Although these instruments have not queried baccalaureate nursing students to date, other studies of academic success among nursing students have also found nonacademic and psycho-social variables to be less predictive than academic variables. For example, Peterson (2009) conducted a survey among baccalaureate nursing students ($N = 66$), and found that self-efficacy and self-esteem were not correlated with academic success, while prior GPAs were. Raman (2013) also found that students' demonstrated GPAs predicted success better than self-efficacy, motivation or academic self-concept ($N = 104$), similar to the results of this study.

Research Question 2. Do certain variables such as age, gender, race, SAT scores, and previous college GPAs impact baccalaureate nursing student academic success, as defined by junior year GPA and persistence?

This combination of variables predicted academic success in the junior year, measured by GPA and persistence, consistent with previous research. The demographic variables of age and race were not individually predictive of junior year success; nor was the academic predictor, SAT scores. In the most parsimonious regression model, female gender was also a predictor of junior year GPA, but not of persistence. Of the five predictor variables in the model (three demographic variables and two academic variables), only prior college GPA consistently predicted junior year GPA and persistence.

In this study early college GPAs were linked to success in the nursing major, just as Alameida et al. (2011) and Seldomridge and DiBartolo (2004) found among independent nursing student samples. It is not surprising that prior college GPA indicated an aptitude for college work, and other studies utilizing prior grades and GPAs to predict nursing curriculum success

have had similar findings. For example, Raman (2013) reported pre-nursing GPAs accounted for nearly half of the variance of academic performance among students in one associates' degree program (Raman, 2013). Benefiel (2011) and Peterson (2009) also demonstrated that course grades and GPAs in the first semesters of college closely aligned with students' grades in the initial semesters of nursing programs. More specifically, Griffiths et al. (1995), Lockie et al., 2013, and Wolkowitz and Kelley (2010) all found that grades achieved in pre-requisite science courses positively correlated with grades achieved in nursing courses. These research examples, along with the findings of this study, point to the nursing pre-requisite courses as essential for establishing foundational knowledge and skills needed for academic success in the nursing major. At the opposite end of the spectrum, McGann and Thompson (2008) found the number of C grades earned in college courses predicted students' academic failure in nursing classes. Similarly, Beeson and Kissling (2001) found lower grades (C/2.0 or below) correlated with nursing licensure test failure.

In contrast, Grossbach and Kuncel (2011) conducted a meta-analysis of 31 independent samples that documented standardized nursing entrance exams and SATs predicted nursing student success better than previous college GPAs. In another study, Stuenkel (2006) conducted a retrospective record review that found SAT scores, combined with prior college GPAs and the NLN pre-nursing aptitude test predicted nursing students' success on the licensing examination. However, Díaz et al. (2012) found SAT scores were not predictive of academic success among Latino nursing students, though prior GPAs were predictive for the female students (Diaz et al., 2012). Like Diaz et al. (2012), this study did not find SAT scores predicted academic success among the nursing major participants.

In Hypothesis 2.2 of this study, junior year persistence defined academic success, and prior college GPA was the only predictor that was individually significant. Furthermore, most nursing students who did not persist left after the fall semester of the junior year, and the timing of this attrition has implications for nursing education programs. Lewis and Lewis (2000) and Newton et al. (2007) also found that previous college GPAs predicted persistence in nursing programs. Similarly, Kowitlawakul et al. (2013) researched students seeking second baccalaureate degrees in nursing, and found that the GPAs earned during their first degree predicted persistence in nursing. Ofori and Charlton (2002), as well as Beeson and Kissling (2001) found older aged students were more successful in nursing, but this study suggested that younger aged students were more persistent in the junior year, as indicated by marginally significant findings. As in Hypothesis 2.1, prior college GPA was the only significant predictor of persistence among these study participants. Prior college GPA emerged as the most important predictor of both junior year GPA and junior year persistence.

Research Question 3. Do particular combinations of noncognitive and academic variables predict baccalaureate nursing student academic success, as defined by junior year GPA and persistence, when controlling for demographic variables?

The sequential regressions including demographic, noncognitive and academic variables predicted junior year cumulative GPA and persistence, though the models became significant only after the addition of the academic variables. This confirmed the results of previous research questions, that academic variables were better predictors of junior year GPA among these nursing students than the NCVs and grit. As discussed earlier in this chapter, academic predictors such as previous GPAs and standardized admission tests were often predictive of

success among samples of nursing students as well (e.g., Grossbach and Kuncel, 2011; Hopkins, 2008; Lewis & Lewis, 2000; Peterson, 2009; Raman, 2013; Stuenkel, 2006).

This study demonstrated that the NCQ was not a good predictor of academic success in the junior year, though previous studies had found the NCQ predicted academic success among college student participants (e.g., Bandalos & Sedlacek, 1989; Noonan, Sedlacek & Veerasamy, 2005; Schwartz & Washington, 2002; Ting, 2009), even among students with college experience (Bandalos & Sedlacek, 1989; Nasim, et al., 2005; Sedlacek, 2004b; Sedlacek & Prieto, 1990; Ting, 2003).

Similarly, the evidence in support of the Grit-S was convincing in previous studies (Duckworth & Quinn, 2009; Eskreis-Winkler, Duckworth, Shulman, & Beal, 2014; Robertson-Kraft & Duckworth, 2014; Strayhorn, 2013), but it was not predictive of junior year GPAs or persistence in this study. The Grit-S predicted success among disparate groups of students, such as those competing in a spelling bee (Duckworth et al., 2010), and Black men attending predominantly White colleges (Strayhorn, 2013). However, this study did not support the role of noncognitive variables and grit as reliable predictors of academic success among nursing students, but rather reinforced previous studies that predicted academic success from academic variables.

The lack of noncognitive predictors found in this study could have been because the Nursing Student Survey was administered to students later in their college career, who had already succeeded in at least three semesters of college. The original purpose of Sedlacek's NCQ (2004a) was to discover predictors of college success among college applicants, who were likely less mature and surely less experienced in college than the participants in this study. Yet the NCQ was also a useful predictor for older student groups such as pharmacy students

(Bandalos & Sedlacek, 1989), and candidates for graduate programs in medicine (Webb et al., 1997) and veterinary science (Sedlacek, 2004a). Likewise, the Grit-S (Duckworth & Quinn, 2009) surveyed a large variety of student groups (i.e., military cadets, college students, spelling bee contestants), and found grit to be predictive of success defined in a variety of ways (i.e., persistence, cumulative GPA, spelling accuracy). Possibly, the study participants demonstrated grit or other NCVs that contributed to their academic success in pre-requisite courses, enabling progression to their junior collegiate year.

Summary of Results. This research added to the body of knowledge about nursing student academic success. Previous college GPAs predicted junior year GPAs as well as persistence in the nursing major following the junior year. The results showed that the noncognitive variables used in this research (including grit) did not complement previous college GPAs as predictors of success in this nursing program, and the sequential multiple and logistic regressions of Research Question Three did not discern any specific combinations of variables that predicted academic success among the study participants better than prior college GPA. The NCVs and grit did not predict success in this study, a finding that aligned with other research of nonacademic variables among nursing students (Peterson, 2009; Raman, 2013).

These findings are important to the field of nursing education, for resources are limited and clarifying predictive variables can increase the efficiency of nursing programs. Recognizing predictors of success can identify students most likely to be successful, as well as those in need of academic support (Grossbach & Kuncel, 2011). The workforce requires an abundance of diverse and competent baccalaureate nurse graduates (Institute of Medicine, 2011, 2015), and a parsimonious set of predictors for academic success can move the profession toward that goal, one student at a time.

Practical Implications for Nursing Education

As explained in the introduction chapter, my passion for student success, and in particular baccalaureate nursing student success, motivated this study toward exploring ways to meet a public health need for more diverse, baccalaureate educated nurse graduates. The post-positivist approach reflected in this study resulted in pragmatic findings that point to specific implications to improve nursing education to meet this need. Specifically, attention to student characteristics, early college grades, standardized exams, and more holistic criteria for assessment in baccalaureate nursing programs are discussed next.

As noted earlier, White students reported more availability of a strong support person, and more demonstrated community service and knowledge acquired in a field than the students of color, indicating White students may have more support and opportunities to explore career options earlier in their education (Bowen & Rudenstine, 2003). This is important for nursing faculty and mentors to recognize, and intentionally provide support systems and individual learning experiences for students who start college without these opportunities. Sutherland, Hamilton, and Goodman (2007) found that frequent, regular meetings with faculty advisors were well-received, especially among nursing students of color. Similarly, peer and faculty support were key themes identified among successful black nursing students at a PWI (Dapremont, 2011). Structured faculty support and programming is imperative for all baccalaureate nursing students, and especially for nursing students of color.

This study found that GPAs during the initial semesters of college predicted academic success during the junior year for nursing majors, regardless of other demographic and non-cognitive variables. This finding points to the importance of nursing students' early college education and performance. Because others have linked grades earned in pre-requisite nursing

classes (Benefiel, 2011; Peterson, 2009), especially science classes (Griffiths et al.,1995; Lockie et al., 2013) to academic success in nursing, I recommend a close examination of courses taken and grades earned to select student nurse candidates.

Most nursing students in this study who did not persist through the junior year left following the fall semester. Academic concerns are the most common reason students leave the nursing major, so introducing strategies to support learning in the initial weeks of the junior year are crucial to retaining qualified students during this critical juncture in their baccalaureate nursing curriculum (Brown & Marshall, 2008; Peterson, 2009). McGann and Thompson (2008) reviewed one such strategy for academically at-risk nursing students, a one-credit seminar that addressed learning barriers, individualized plans for improvement, study skills, test-taking strategies, content reviews, and stress management. This class significantly improved students' GPAs in later semesters of the nursing program, and 87% of the graduates passed the licensure exam (McGann & Thompson, 2008). Similarly, Sutherland, Hamilton, and Goodman (2007) added "Seminars in Success Strategies" (p. 353) to their nursing curriculum and students improved their academic performance in nursing classes. Both faculty-led (McGann & Thompson, 2008; Smith et al., 2012) and peer-led (Dapremont, 2014) tutoring sessions were well-received among nursing students and academic performance improved. It is critical that nurse educators examine academic barriers students face in the first semester of the junior year, and provide intrusive academic supports, particularly tutoring, in these areas.

SAT scores did not predict overall junior year GPAs or persistence in this study, just as they did not predict academic success in works reviewed by Lemann (2000) and Sedlacek (2004a). The SAT previously predicted first year success in college (Sedlacek, 2004a; Zwick & Sklar, 2005), yet the prediction did not hold true into the third year of college, when the major

courses were predominant (Sedlacek, 2004a; Ting, 2003). SATs may have been predictive of this college's first-year students in the nursing major, but this study did not examine that timeframe. This study provides preliminary evidence regarding current transfer admissions practices that do not require the submission of SAT scores, as SATs were not predictive of success in this study of the junior year.

The American Association of Medical Colleges (AAMC, 2014) and the American Association of Colleges of Nursing (AACN, 2016) encourage holistic, individual reviews of student applicants, pointing to the timeliness of this study. The AACN's recent policy recommends assessment of nursing student candidates' "experiences, attributes, and academic metrics" (AACN, 2016, para. 6), and their unique fit with the institutional mission (AACN, 2016). This type of review may be especially relevant during the first semesters of college, as the students of color in this study reported higher levels of grit and academic self-confidence than their White peers. These noncognitive variables may have played an important role in these students' academic success during the initial semesters of college, and merit further consideration and research.

However, the results of this study also demonstrated the need for continued focus on students' academic histories, especially grades received in pre-requisite nursing courses, to choose students most likely to succeed in the nursing curriculum (Benefiel, 2011; Lockie et al., 2013). If not NCVs (Sedlacek, 2004a) or grit (Duckworth & Quinn, 2009), what form will a more holistic assessment of nursing student candidates take? What is predictive of junior year success in addition to academic measures? These were questions that spurred this inquiry, and remain largely unanswered. Several ideas for further research were identified to address these questions, following a review of the strengths and limitations of this study.

Strengths and Limitations of this Study

Strengths. Conducting this study within one institution made the results particularly valuable to the nursing education program at this college. Proportionately large student samples from three consecutive classes provided a robust representation of nursing students at this school, and the results of this work informed the nursing department at the research site about predictors of junior year success. Furthermore, this sample was demographically representative of baccalaureate nursing students nationally (as well as representative of this college's student population), so nurse educators in similar nursing programs interested in student success can learn from this work. The specific baccalaureate program studied is not unlike other academic nursing programs based in small, liberal arts and professional four-year colleges, and this information should prove useful to similar nursing programs.

The NCQ and the Grit-S had never surveyed a baccalaureate nursing student population, so this study addressed an important gap in the literature. Other nurse education researchers can learn from this study, and explore other factors that can aid in choosing and educating student nurses from diverse backgrounds to address the public health need for baccalaureate-prepared nurses.

Limitations. There were several limitations inherent in this study. The Nursing Student Survey scores relied on self-reported data. Although surveys are often utilized in educational research, participants' may be influenced by the knowledge that they are being evaluated. In addition, people are not always accurate reporters of their own abilities or achievements (Fowler, 2009; Shechtman et al., 2013), and self-report measures are easily "faked" (Kyllonen, 2005, p. 3). The use of established instruments in this research minimized these concerns (Fowler, 2009). Additionally, my insider status as an educator at the institution of the study participants may

have also biased responses in some way, though I had no direct teaching or advising contact with respondents prior to the survey administration.

Potential confounding variables possibly impacted student success, but were beyond the scope of this study. For example, I did not collect data regarding participants' familial financial status, or parental college history, though research has linked family socio-economic status and education to college success as chronicled in Sacks (2007). Additionally, the student-level variables assessed in this work do not address larger issues of systemic bias and educational program weaknesses that could have negatively affected student experiences, learning and academic outcomes. Other systemic factors such as the institutional climate and student support resources potentially had an important effect on student success, though these were not addressed in this study. Further research on specific curricular content, faculty behaviors, and teaching practices in nursing education could prove enlightening.

The definition of academic success by specific academic outcome measures exclusively also limited this study. This study did not consider other aspects of nursing competence, such as clinical performance or professional affect, similar to Beauvais et al. (2014) who also correlated psychosocial variables to academic success measures among nursing students. Although clinical performances, including professionalism, were inherent in course grades in this study, GPAs and persistence (dependent variables) primarily reflected competence demonstrated on summative performance assessments. Furthermore, this work assessed only measures of academic success following the junior year. Ultimate measures of nursing student success, such as graduating from the nursing major and passing the nursing licensure exam (NCLEX-RN) were not included as part of this study. Finally, I did not attempt to capture other important components of nursing care, such as empathy, communication or clinical skills. It is critical to remember that this work

studied only specific academic measurements of baccalaureate nursing student success during the junior year, and nursing competence is much more complex than was represented in this work (Benner et al., 2010).

The next limitations involved my intentional sampling from one baccalaureate nursing program during the junior year. The participant pool consisted of those students who had already been successful in the first semesters of college, and met criteria to begin nursing major classes. The timing of this study may have restricted the range of data by only surveying students who "made it" to the major classes. There were probably many nursing students who did not persist through the first years of college, and were therefore not included in this study.

Furthermore, despite the good response rate, the sample size was small in relation to the number of variables tested. The relatively small sample reduced the power of the equation, and may have limited the statistical significance of my findings. The collected data set was missing data about important independent variables, namely SAT scores and previous college GPAs among students who transferred into the nursing program. These unreported scores and GPAs would have informed the results of this study, and increased understanding of transfer nursing students (a topic for further research).

The correlational nature of these statistical methods precluded the specific causality that can be attributed to the variables of interest in this research, as with all correlational research (Sprinthall, 2007). Finally, the results of this study are not statistically generalizable to other groups of baccalaureate nursing students, due to the non-random sampling methods employed. These limitations are inherent in any local contextual study. The results nevertheless enhanced our understanding of baccalaureate nursing student success, and brought to light several areas for further research.

Future Directions for Research

This study reinforced previous research about early college GPAs, but it did not support the use of SATs to predict academic success during the junior year. More research on programmatic policies and curricula are warranted to develop a more uniform set of core pre-requisite courses for nursing student candidates that better prepare students regardless of their previous learning opportunities, and enable equitable GPA comparisons (Benner et al., 2010).

In this study, prior college GPAs emerged as the most important predictor of junior year success among students who took at least one semester at the studied institution before starting the junior year, so the need to accurately compare GPAs and set more standardized ways of comparison, even between institutions, should be examined more closely. Research on the experiences of transfer students and their educational path to baccalaureate nursing could enhance our understanding of this group of students, and eventually lead to more consistency for nursing major admission requirements.

This study did not consider standardized exams other than the SAT because the studied institution did not utilize other standardized tests. However, previous nursing research demonstrated better predictability of academic success using specialized nursing admissions exams, such as the Test of Essential Academic Skills (TEAS, Díaz et al., 2012) or the Nurse Entrance Exam (NET, Fortier, 2010; Kowitlawakul et al., 2013). Wolkowitz & Kelley (2010) reported that the TEAS science sub score was the best indicator among nursing students to predict success on an achievement exam administered in the first nursing semester. An exam tailored to nursing students may be a better predictor of junior year academic performance than the SAT, and should be considered in further research of academic predictors of nursing major success.

The research linking noncognitive variables and grit to academic performance was surprisingly not supported by this study. The NCQ (as part of the Nursing Student Survey) was administered near the beginning of the nursing major classes in the present study, which was not the original intent of the NCQ that first queried incoming first-year college students (Tracey & Sedlacek, 1984; 1987a). And even though the NCQ surveyed several other student groups at different times during college and graduate school with positive results (i.e., Bandalos & Sedlacek, 1989; Nasim, et al., 2005; Sedlacek, 2004b; Ting, 2003), other authors did not find the NCQ useful for students who were not incoming freshmen (i.e., Guffey, et al., 2002; Mavis & Doig, 1998; Webb et al., 1997). The timing of survey administration following successful completion of nursing pre-requisite courses in this study may explain why no noncognitive variables emerged as positive predictors of success.

Further research of nursing students in their first college years would capture the students who did not persist to the junior year, and provide important insight earlier in their college career. This study did not capture those students, and research on academic and nonacademic variables among persisters and non-persisters in the first two years of college could shed light on the differences between these students, and be more in-line with Sedlacek's original research (Sedlacek, 2004a). Research during the early years of college could inform our understanding of students, and lead to educational experiences to promote success.

Confounding variables among the student sample could be another reason that few predictors of academic success were found. One avenue of research should encompass a more complex student assessment system, based on academic predictors as well as other moderating noncognitive factors (i.e., socioeconomic status, study time, etc.), in order to choose the best nursing student candidates and identify potential areas of concern early in their student careers

(Grossbach & Kuncel, 2011). For instance, a path analysis, in which specific demographic variables could be mediated by specific noncognitive variables could shed more light on this area. Alternately, a larger study of nursing students enrolled across several baccalaureate programs may demonstrate better predictors of success that did not emerge in this smaller, single-institution study.

Further research surrounding grit among groups of nursing students would support or negate the results of this study, and was also identified as a topic of needed research among nursing students by Stephens (2013). In particular, grit warrants further research as a mediating factor among students, possibly earlier in their college careers. Grit is a relatively new concept, first defined in 2007 (Duckworth et al., 2007), and while this study did not find grit to be a useful predictor, it is currently a popular area of educational research (Duckworth,2013), speculation (Hoerr, 2013; Tough, 2012), and education policy (Shechtman et al., 2013). More empirical work to support the implementation of grit-promoting strategies is needed (Shechtman et al., 2013), as limited research about grit among college students exists.

The current study found that women earned higher GPAs in the junior year than their male classmates, suggesting that further research about nursing faculty behaviors toward students, especially men, is needed to understand and promote a more supportive and engaging learning environment for all students (Benner et al., 2010; Del Prato, 2013: O'Lynn & Tranbarger, 2007). Nursing students who were men have reported systemic challenges in nursing education, including faculty bias and lack of peer support (Juliff, Russell,& Bulsara, 2016; O'Lynn & Tranbarger, 2007). To explore nursing student perspectives, Dapremont (2011) and Del Prato (2013) have conducted qualitative studies that point to specific student-generated ideas to improve learning experiences and academic success. For instance, Dapremont (2011,

2014) interviewed students of color enrolled in predominantly White nursing education programs, and identified several factors that enhanced their success, such as dedicated study time, inter-racial study groups, and support from faculty. Quantitative work to further explore these successful student behaviors could inform nursing education and student support models. In another example, the associate-degree nursing students in Del Prato's work (2013) identified faculty incivility as a barrier to learning and professional growth, as they experienced lack of support, and even discrimination from nursing faculty. More research about the experiences of under-represented nursing students may further illuminate the gender differences found in this work.

As nursing education seeks to choose and advance the most qualified candidates from diverse backgrounds, this study suggests that early college performance is critical. Yet, more information about the noncognitive aspects of potential and current nursing students, research about student learning, as well as faculty behavior and teaching practices are also crucial to better understand baccalaureate nursing education processes, and identify ways to encourage a variety of students to become competent and caring nurses (Benner et al., 2010). It is hoped that nurse education researchers will look beyond this work on student-level variables, and explore more systemic concerns reported in nursing education programs, including the social environment (Benner, 2010; Del Prato, 2013) and faculty behaviors (Del Prato, Bankert, Grust, & Joseph, 2011).

Chapter Summary and Conclusion

Due to the pressing need for more baccalaureate-prepared nurses from a variety of backgrounds, this research contributed to the need for information about the best predictors of academic success in the junior year. The results of this study have important implications for

nursing education. Students' academic history predicts academic success, which is a critical consideration when selecting nursing students and supporting enrolled students. Yet incorporating a holistic admissions and review process to promote diversity and excellence continue to be important goals for nursing education (AACN, 2016).

This chapter overviewed the results of this work within the context of current nursing education literature, and suggested practical ways to apply the results of this work to improve nursing education programs. The strengths and limitations of this study's design and findings were reviewed next. Directions for future research, based on questions that remain regarding nursing student attributes and nursing success were then suggested. This study contributes to nursing education literature regarding student success in the junior year, and adds to research about assessing baccalaureate nursing students from diverse backgrounds.

Appendix A

Noncognitive Variables, Definitions, and Noncognitive Questionnaire Item Examples

NCV (NCQ construct)	Definition/ behavior	NCQ item examples (Sedlacek, 2004a; pp. 169-174)
Positive (academic)self-concept	Optimistic about academic potential and abilities; confident, determined	"when I believe strongly in something, I act on it"; "won academic award"; "my high school grades *don't* reflect what I can do"
Realistic self-appraisal	Accepts praise and criticism; reflects on behavior/ performance objectively and learns from experiences	"it should not be hard to get a B (3.0) average at this school"; "I am absolutely certain I will obtain a degree"
Negotiating the system (racism)	Is realistic, assertive yet not hostile regarding systemic injustices such as racism; demonstrates ability to cope successfully with systemic inequities	"I expect I will encounter racism at this school"; "I want a chance to prove myself academically"; " I would attend tutoring regularly if available"
Preference for Long-term goals	Sets and works toward future goals; able to delay gratification; plans ahead	"once I start something, I finish it"; "stated specific goal with future orientation"
Strong support person available	Seeks out support network or person (mentor) for guidance, & support	"my family has always wanted me to go to college"; "…I have someone who would listen to me and help me"
Leadership experience	Has held leadership role in traditional (i.e. sports team) or non-traditional (i.e. street gang) group; can take action & direct others	"I am sometimes looked up to by others"; "student council or team captain experience"
Demonstrated community service	Involved in civic or community project(s) to help others and self	"belong to group whose main purpose is community service"
Knowledge in a field	Acquires and applies academic knowledge/skills from non-traditional or out-of-classroom experiences	plan to "get to know my teachers"; "earn a 3.5 GPA" is goal.

Note. Adapted with permission from Sedlacek, W.E. (2004a). *Beyond the big test: Noncognitive Assessment in Higher Education*. San Francisco: Jossey-Bass.

Appendix B

Nursing Student Survey

Section 1

Directions: Here are a number of statements that may or may not apply to you. When responding, think of how you compare to most people --not just the people you know well, but most people in the world. There are no right or wrong answers, so just answer honestly! Please mark one response per question.

1. New ideas and projects sometimes distract me from previous ones.
   - ☐ Very much like me
   - ☐ Mostly like me
   - ☐ Somewhat like me
   - ☐ Not much like me
   - ☐ Not like me at all

2. Setbacks don't discourage me.
   - ☐ Very much like me
   - ☐ Mostly like me
   - ☐ Somewhat like me
   - ☐ Not much like me
   - ☐ Not like me at all

3. I have been obsessed with a certain idea or project for a short time but later lost interest.
   - ☐ Very much like me
   - ☐ Mostly like me
   - ☐ Somewhat like me
   - ☐ Not much like me
   - ☐ Not like me at all

4. I am a hard worker.
   - ☐ Very much like me
   - ☐ Mostly like me
   - ☐ Somewhat like me
   - ☐ Not much like me
   - ☐ Not like me at all

5. I often set a goal but later choose to pursue a different one.

   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

6. I have difficulty maintaining my focus on projects that take more than a few months to complete.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

7. I finish whatever I begin.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

8. I am diligent.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

Section 2

Directions: For each question, please circle one response, or fill in the blank as requested.

1. How much education do you expect to get during your lifetime?
   a. College, but less than a bachelor's degree
   b. B.A., B.S. or equivalent
   c. 1 or 2 years of graduate or professional study (Master's degree)
   d. Doctoral degree such as M.D., Ph.D., etc.

2. Please list three goals that you have for yourself right now:

    a.

    b.

    c.

3. About 50% of college students typically leave school before receiving a degree. If this should happen to you, what would be the most likely cause?
    a. I am absolutely certain that I will obtain a degree
    b. To accept a good job
    c. To enter military service
    d. It would cost more than my family could afford
    e. Marriage
    f. Disinterest in study
    g. Lack of academic ability
    h. Insufficient reading or study skills
    i. Other

4. Please list three things that you are proud of having done:

a.

b.

c.

Section 3

Directions: *Please check (✓) the extent to which you agree or disagree with each of the following items. When responding to the statements below, think of your feelings at present or with your expectations of how things will be.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The college should use its influence to improve social conditions in the State.					
2. It should not be very hard to get a B (3.0) average at Utica College.					
3. I get easily discouraged when I try to do something and it doesn't work.					
4. I am sometimes looked up to by others.					
5. If I run into problems concerning school, I have someone who would listen to me and help me.					
6. There is no use in doing things for people; you only find that you get it in the neck in the long run.					
7. In groups where I am comfortable, I am often looked to as leader.					

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8. I expect to have a harder time than most students at Utica College.					
9. Once I start something, I finish it.					
10. When I believe strongly in something, I act on it.					
11. I am as skilled academically as the average applicant to Utica College.					
12. I expect I will encounter racism at Utica College.					
13. People can pretty easily change me even though I thought my mind was already made up on the subject.					
14. My friends and relatives don't feel I should go to college.					
15. My family has always wanted me to go to college.					
16. If course tutoring is made available on campus at no cost, I would attend regularly.					
17. I want a chance to prove myself academically.					
18. My high school grades don't really reflect what I can do.					

19. **Please list offices held and/or groups you belonged to in high school, college, or in your community**.

1. _____

2. _____

3. _____

Section 4

Directions: *Please mark your responses on this sheet. Fill in the blank or circle the appropriate answers to all questions.*

1. To access your academic records and enter you in the gift card drawing, please share your name or Utica College ID #:_____

2. Sex/ gender is:
   - ☐ Male
   - ☐ Female

3. Age: _____ years

4. Your race/ ethnicity is:
   - **01.** Black (African-American)
   - **02.** White (not of Hispanic origin)
   - **03.** Asian or Pacific Islander
   - **04.** Hispanic (Latin American)
   - **05.** American Indian or Alaskan native
   - **06.** Multi-racial or Bi-racial
   - **07.** Other _____

5. Total number of four-year colleges (including Utica College) I have attended:_____

6. Total number of two-year colleges (community colleges) I have attended: _____

7. Since High School, I have been in college for _____ years altogether.

You are done! Thank you for participating in this study. I will enter you in a gift card drawing when you return this to me with your name or UC ID #. Thank you!
Ellen Smith, MPH, RN X3180 or esmith@utica.edu

Nursing Student Survey - KEY

SECTION 1. Grit-S Scoring:

For questions **2, 4, 7** and **8** assign the following points:

5 = Very much like me
4 = Mostly like me
3 = Somewhat like me
2 = Not much like me
1 = Not like me at all

For questions **1, 3, 5** and **6** assign the following points:

1 = Very much like me
2 = Mostly like me
3 = Somewhat like me
4 = Not much like me
5 = Not like me at all

Add up all the points and divide by 8. The maximum score on this scale is 5 (extremely gritty), and the lowest score on this scale is 1 (not at all gritty).

Grit Scale citation

Duckworth, A.L, & Quinn, P.D. (2009). Development and validation of the Short Grit Scale (Grit-S). *Journal of Personality Assessment, 91,* 166-174. http://www.sas.upenn.edu/~duckwort/images/Duckworth%20and%20Quinn.pdf
Duckworth, A.L., Peterson, C., Matthews, M.D., & Kelly, D.R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology, 9*, 1087-1101. http://www.sas.upenn.edu/~duckwort/images/Grit%20JPSP.pdfKEY

William E. Sedlacek
COUNSELING CENTER
UNIVERSITY OF MARYLAND
COLLEGE PARK, MARYLAND 20742

NON-COGNITIVE MINORITY ADMISSIONS VARIABLES/QUESTIONNAIRE ITEMS
FOR SUPPLEMENTARY ADMISSIONS QUESTIONNAIRE

Directions: Add the ITEM SCORES (in bold) to get total

1. Positive Self-Concept or Confidence Items: **2.1, 2.3A, 2.4, 3.10, 3.13, 3.18**

2. Realistic Self-Appraisal Items: **2.3B, 3.2, 3.11**

3. Understands and Deals with Racism Items: **3.1, 3.8, 3.12, 3.16, 3.17**

4. Prefers Long-Range Goals to Short-Term or Immediate Needs Items: **2.2A, 3.3, 3.9**

5. Availability of Strong Support Person Items: **3.5, 3. 14, 3.15**

6. Successful Leadership Experience Items: **3.4, 3.7, 3.19A**

7. Demonstrated Community Service Items: **3.6, 3.19B**

8. Knowledge Acquired in a Field Items: **2.2B**, **3.19C**

SCORING KEY FOR SUPPLEMENTARY ADMISSIONS QUESTIONNAIRE II
William E. Sedlacek – used with permission by Ellen Smith
Adapted for Nursing Student Survey F13

SECTION 2: NCQ SCORING

QUESTIONNAIRE SECTION. ITEM	CONCEPT (orig item #)	SCORING **points awarded** = response
2.1	1. + Self Concept (#7)	**1 = a.** **2 = b.** **3 = c.** **4 = d.** **2=** no response
2.2A	4. Preference for Long Range Goals (#8A)	Each goal is coded according to this scheme: **1 =** a vague and/or immediate, short-term goal (e.g., "to meet people," "to get a good schedule," "to gain self confidence") **2 =** a specific goal with a stated future orientation which could be accomplished during undergraduate study (e.g., "to join a sorority so I can meet more people," "to get a good schedule so I can get good grades in the fall," "to run for a student government office") **3 =** a specific goal with a stated future orientation which would occur after undergraduate study (e.g., "to get a good schedule so I can get the classes I need for graduate school;" "to become president of a Fortune 500 company")
2.2.A Find the mean for each dimension (e.g. Long Range Goals) and round to the nearest whole number.		

2.2B	8. Knowledge Acquired in a Field (#8B)	Each goal is coded according to this scheme: **1=** not at all academically or school related; vague or unclear (e.g., "to get married," "to do better," "to become a better person") **2=** school related, but not necessarily or primarily educationally oriented (e.g., "to join a fraternity," "to become student body president") **3=** directly related to education (e.g., "to get a 3.5 GPA," "to get to know my teachers")
2.2B Find the mean for each dimension (e.g. Knowledge Aquired) and round to the nearest whole number.		
2.3A	1. Self-Concept (#9) *and*	**4**= a. **2**= b.- i. **2=** no response
2.3B	2. Self-Appraisal (#9)	**4**= a. **2**= b.- i. **2=** no response
2.4	1. + Self Concept (#10)	Each accomplishment is coded according to this scheme: **1 =** at least 75% of applicants to your school could have accomplished it (e.g., "graduated from high school," "held a part-time summer job") **2=** at least 50% of applicants to your school could have accomplished it (e.g., played on an intramural sports team," "was a member of a school club") **3=** only top 25% of applicants to your school could have accomplished it (e.g., "won an academic award," "was captain of football team")
Find the mean code for this dimension (2.4; #10) and round to the nearest whole number.		

SECTION 3 NCQ SCORING

Reversed (negative) Items: For questions **1 , 2, 4, 5, 7, 9, 10, 11, 12, 15, 16, 17, 18** : assign the following points:

5 = Strongly Agree
4 = Agree
3 = Neutral
2 = Disagree
1 = Strongly Disagree

Positive Items: For questions **3, 6, 8, 13, 14** : assign the following points:

1 = Strongly Agree
2 = Agree
3 = Neutral
4 = Disagree
5 = Strongly Disagree

QUESTIONNAIRE SECTION. ITEM	CONCEPT (orig item #)	SCORING **points awarded** = response

3.19. Use to score for Leadership (6), Community Service (7) and Knowledge Acquired in a Field (8). Each dimension is given a code for A, B, and C below.

Find the mean for each dimension (e.g. Leadership) and round to the nearest whole number.

3. 19A	6. Leadership (29A)	Each response is coded according to this scheme: **1 =** ambiguous group or no clear reference to activity performed (e.g., "helped in school") **2 =** indicates membership but no formal or implied leadership role; it has to be clear that it's a functioning group and, unless the criteria are met for a score of "3" as described below, all groups should be coded as "2", even if you, as the rater, are not familiar with the group (e.g., "Fashionettes," "was part of a group that worked on community service projects through my church") **3 =** leadership was required to fulfill role in group (e.g., officer or implied initiator, organizer, or founder) or entrance into the group was dependent upon prior leadership (e.g., "organized a tutoring group for underprivileged children in my community," "student council")

Find the mean for each dimension (e.g. Leadership) and round to the nearest whole number.

3.19B	4. Community Service (29B)	Each response is coded according to this scheme: **1 =** no community service performed by group, or vague or unclear in relation to community service (e.g., "basketball team"). **2 =** some community service involved but it is not the primary purpose of the group (e.g., "Scouts") **3** = group's main purpose is community service (e.g., "Big Brothers/Big Sisters")
Find the mean for each dimension (e.g. Leadership) and round to the nearest whole number.		
3.19C	8. Knowledge Acquired in a Field (29C)	Each response is coded according to this scheme: **1=** not at all academically or school related; vague or unclear (e.g., "to get married," "to do better," "to become a better person") **2=** school related, but not necessarily or primarily educationally oriented (e.g., "to join a fraternity," "to become student body president") **3=** directly related to education (e.g., "to get a 3.5 GPA," "to get to know my teachers")
Find the mean for each dimension (e.g. Leadership) and round to the nearest whole number.		

ADDITIONAL NOTES/ INFORMATION :

ITEM new/old	DIRECTION	VARIABLE NAME (NUMBER)
3.1./11	-	Use to score for Racism (III)
3.2/ 12	-	Use to score for Realistic Self-Appraisal (II)
3.3./13	+	Use to score for Long-Range Goals (IV)
3.4/14	-	Use to score for Leadership (VI)
3.5/15	-	Use to score for Availability of Strong Support (V)
3.6/16	+	Use to score for Community Service (VII)
3.7/17	-	Use to score for Leadership (VI)

3.8/18	+		Use to score for Racism (III)
3.9/19	-		Use to score for Long-Range Goals (IV)
3.10/20	-		Use to score for Positive Self-Concept (I)
3.11/21		-	Use to score for Realistic Self-Appraisal (II)
3.12/22		-	Use to score for Racism (III)
3.13/23		+	Use to score for Positive Self Concept (I)
3.14/24		+	Use to score for Availability of Strong Support (V)
3.15/25		-	Use to score for Availability of Strong Support (V)
3.16/26		-	Use to score for Racism (III)
3.17/27		-	Use to score for Racism (III)
3.18/ 28		-	Use to score for Positive Self Concept (I)

Appendix C

Letters of permission and support from Utica College nursing faculty.

Appendix C1

UTICA COLLEGE

SCHOOL OF HEALTH PROFESSIONS AND EDUCATION

October 28, 2013

This letter supports the research proposed by Qiu Wang, PhD (Syracuse University faculty advisor) and Ellen Smith, MPH, RN (Syracuse University doctoral student and Utica College faculty member).

I endorse this research and will cooperate any way I can. Following the participants' written consent, Ellen has my permission to examine and collect academic data from student records stored in the nursing department and in Banner, our electronic database system. She has assured me that this data will not be reported in such a way as to identify any particular student by name or personal characteristics. The raw data will be kept confidential and used only for research purposes.

Sincerely,

Catherine A. Brownell PhD, RN

Chair, Associate Professor of Nursing

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WWW.UTICA.EDU

Appendix C2

UTICA COLLEGE

SCHOOL OF HEALTH PROFESSIONS AND EDUCATION

October 28, 2013

To meet her research requirements at Syracuse University, I have granted Ellen Smith permission to talk with the nursing students in my class to recruit, obtain informed consent, and administer a short survey. I understand that this will take about 20 minutes of class time. I will not consider students' participation status in any aspect of their class assessment, and will not review any survey responses.

I fully support Ellen in her doctoral work, and wish her well.

Sincerely,

Linda Culyer MS RN ANP

Linda Culyer, MS, RN, ANP

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Appendix C3

UTICA COLLEGE

SCHOOL OF HEALTH PROFESSIONS AND EDUCATION

October 28, 2013

To meet her research requirements at Syracuse University, I have granted Ellen Smith permission to talk with the nursing students in my class to recruit, obtain informed consent, and administer a short survey. I understand that this will take about 20 minutes of class time. I will not consider students' participation status in any aspect of their class assessment, and will not review any survey responses.

I fully support Ellen in her doctoral work, and wish her well.

Sincerely,

Cynthia Love-Williams, MS, RN

Cynthia Love- Williams, MS, RN

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Appendix D

Department of Higher Education
Syracuse University

Informed Consent for Nursing Student Survey

Dear Nursing Student,

I am interested in factors that contribute to the success of baccalaureate nursing students as part of my PhD research at Syracuse University. As a student nurse, your input is critical my research, so I need your help.

Please complete this survey, which has four (4) short sections. Each section will take less than five minutes to complete. Each section is very important, and asks about your opinions, feelings, and background. There are not any right or wrong answers, so be as honest as you can. Please answer all of the questions; do not skip any items. You can take as much time as you need.

In addition, please allow me access to your academic records in the nursing department and through the college's electronic student database (Banner). With Dr. Cathy Brownell's permission, I will collect information about your SAT scores, grade point averages (GPAs), colleges you attended, and previous courses you took.

I need your consent to

1. Report the data from this survey.
2. Review your academic records for your SAT scores, grade point averages (GPAs), colleges you attended, and previous courses you took.

I will guard your privacy and take steps to be sure your information is kept confidential. My study records won't be accessible to anyone but me, and I will keep them locked securely. I will assign your survey a code number, and I will keep the code log in a locked storage area (separate from your consents and surveys). I will destroy the log, consents and surveys at the completion of this study. Your coded data will be entered into an IBM-SPSS spreadsheet. This data will be kept on a password-protected laptop. I will be the only one with access to your survey and academic records. The information you provide on the survey and from your academic records will be reported for groups only, and your information will not be identifiable.

I appreciate your participation, and will offer you a chance to win one of ten $20.00 gift cards at the Utica College bookstore. If you check the box below, I will enter your name into a drawing which will take place one week from today. Your odds of winning are approximately one in ten (1:10), and you are eligible even if you decide to withdraw from this study.

The benefit of this research is that it will help people understand baccalaureate nursing students better. There are no direct benefits to you by taking part in this study. The risks to you are minimal, as there are no further surveys or procedures you need to complete. You may choose to participate or not. If you do not want to take part, you have the right to refuse without penalty, and you may withdraw from the study at any time.

I am happy to explain my research further, so please feel free to ask me questions any time at 315-792-3180 or esmith@utica.edu. If you have any questions about your rights as a research participant, or you have questions, concerns, or complaints that you wish to address to someone other than me, you may contact the Syracuse University Institutional Review Board at 315-443-3013 and the Utica College Institutional Review Board at 315- 792- 3335. Thanks so much for participating!

Please check one of the following:

- ☐ I wish to have my name (as printed below) entered in the gift card drawing.
- ☐ I do not wish to be entered into the gift card drawing.

All of my questions have been answered, I am over the age of 18 and I wish to participate in this research study. I have received a copy of this consent form.

_____
Signature of participant/ Date

_____
Printed name of participant

_____
Signature of researcher/ Date

Ellen Smith, MPH, RN
Researcher's contact information:
Ellen M. T. Smith, MPH, RN
315-792-3180
esmith@utica.edu or emsmit07@syr.edu
#243 White Hall, Utica College

Appendix E

SYRACUSE UNIVERSITY
Institutional Review Board

Office of Research Integrity and Protections 121 Bowne Hall, Syracuse, New York 13244-1200
(Phone) 315.443.3013 □ (Fax) 315.443.9889 orip@syr.edu □ www.orip.syr.edu

MEMORANDUM

TO: Qiu Wang
DATE: November 4, 2013
SUBJECT: Expedited Protocol Review - Approval of Human Participants
IRB #: 13-303
TITLE: *Non-Cognitive Factors Which Impact Nursing Student Success*
The above referenced protocol, submitted for expedited review, has been evaluated by the Institutional Review Board (IRB) for the following:
1. the rights and welfare of the individual(s) under investigation;
2. appropriate methods to secure informed consent; and
3. risks and potential benefits of the investigation.

Through the University's expedited review process, your protocol was determined to be of no more than minimal risk and has been given **expedited approval.** It is my judgment that your proposal conforms to the University's human participants research policy and its assurance to the Department of Health and Human Services, available at: http://orip.syr.edu/human-research/human-research-irb.html.
Your protocol is approved for implementation and operation from **November 1, 2013** until **October 31, 2014**. If appropriate, attached is the protocol's approved informed consent document, date-stamped with the expiration date. This document is to be used in your informed consent process. If you are using written consent, Federal regulations require that each participant indicate their willingness to participate by signing the informed consent document and be provided with a copy of the signed consent form. Regulations also require that you keep a copy of this document for a minimum of three years.
CHANGES TO APPROVED PROTOCOL: Proposed changes to this protocol during the period for which IRB approval has already been given, cannot be initiated without IRB review and approval, except when such changes are essential to eliminate apparent immediate harm to the participants. Changes in approved research initiated without IRB review and approval to eliminate apparent immediate hazards to the participant must be reported to the IRB within five days. Protocol changes are requested on an amendment application available on the IRB web site; please reference your IRB number and attach any documents that are being amended.
CONTINUATION BEYOND APPROVAL PERIOD: To continue this research project beyond **October 31, 2014**, you must submit a renewal application for review and approval. A renewal reminder will be sent to you approximately 60 days prior to the expiration date. *(If the researcher will be traveling out of the country when the protocol is due to be renewed, please renew the protocol before leaving the country.)*
UNANTICIPATED PROBLEMS INVOLVING RISKS: You must report any unanticipated problems involving risks to subjects or others within 10 working days of occurrence to the IRB at 315.443.3013 or orip@syr.edu.

SYRACUSE UNIVERSITY
Institutional Review Board

Office of Research Integrity and Protections 121 Bowne Hall, Syracuse, New York 13244-1200
(Phone) 315.443.3013 □ (Fax) 315.443.9889 orip@syr.edu □ www.orip.syr.edu

STUDY COMPLETION: Study completion is when all research activities are complete or when a study is closed to enrollment and only data analysis remains on data that have been de-identified. A Study Closure Form should be completed and submitted to the IRB for review
(Study Closure Form).

Thank you for your cooperation in our shared efforts to assure that the rights and welfare of people participating in research are protected.

[electronic signature]
Kathleen King, Ph.D.
IRB Co-Chair

Note to Faculty Advisor: This notice is only mailed to faculty. If a student is conducting this study, please forward this information to the student researcher.
DEPT: Higher Education, 604 University Ave. **STUDENT:** Ellen Smith

Appendix F

UTICA COLLEGE

OFFICE OF ACADEMIC AFFAIRS

Date: November 5, 2013

IRB#: **567**

TITLE OF RESEARCH: **Noncognitive Variables and Baccalaureate Nursing Student Success: A Sequential Regression Analysis**

Status: Modification Approved
Research Type: Exempt

Dear Ellen Smith:

This letter is to officially notify you, the Principal Investigator, that the request to modify the project listed above has been reviewed by the Institutional Review Board (IRB) for the Protection of Human Subjects. It is the IRB's opinion that the modification(s) submitted does not change the potential risks or benefits or has been sufficiently documented. Therefore, the modification(s) has been approved.

NOTE:

1. This board complies with requirements found in Title 45 Part 46 of The Code of Federal Regulations (45 CFR 46).
2. Your approval for this study does not have an expiration date and can proceed as long as necessary.
3. The IRB must be notified if any changes are made to this study's protocol before the changes are implemented; please use the *Modifications to Approved IRB Protocol Form*.

Any forms needed for IRB procedures are available online at www.utica.edu/irb. Questions should be directed to irb@utica.edu and should include the IRB# listed above. Thank you, and best wishes for successful completion of your project!

Sincerely,

Robert Halliday

Robert Halliday
Chair, Institutional Review Board

cc:
Faculty Advisor – Bruce McBride

1600 BURRSTONE ROAD • UTICA, NY 13502-4892
VOICE: 315 792 3122 • FAX: 315 792 3702
WWW.UTICA.EDU

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