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# Relationship of Undergraduate Nursing Students' Emotional Intelligence and other Factors to ATI-NCLEX-RN Comprehensive Predictor Examination Performance

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# RELATIONSHIP OF UNDERGRADUATE NURSING STUDENTS' EMOTIONAL INTELLIGENCE AND OTHER FACTORS TO ATI-NCLEX-RN COMPREHENSIVE PREDICTOR EXAMINATION PERFORMANCE

by

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Dedication

To my beloved parents James and Margaret Spellings, in your memory. This is for you.
This achievement would not have possible without your love.

To my husband, Tony Jimenez, my beautiful children, Robert James, Lawrence Anthony,
and Cynthia Lilly
My dear cousins Donna Ballard and Stephan Wolanczyk
And my loving mother-in-law Lydia Jimenez
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Abstract

RELATIONSHIP OF UNDERGRADUATE NURSING STUDENTS' EMOTIONAL INTELLIGENCE AND OTHER FACTORS TO ATI-NCLEX-RN COMPREHENSIVE PREDICTOR EXAMINATION PERFORMANCE

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Nursing schools prepare nursing students to provide competent and safe nursing care and to pass NCLEX-RN for professional licensure. The ATI-NCLEX-RN Comprehensive Predictor Examination from Assessment Technologies Institute (ATI) has been used to predict the likelihood of passing NCLEX-RN on the first attempt. Emotional intelligence (EI), critical thinking (CT), and resilience contribute to academic performance and may influence test performance. The purpose of this study was to determine significant predictors of ATI-NCLEX-RN Comprehensive Predictor Examination test performance among the variables of EI, CT, and resilience among undergraduate senior nursing students. This dissertation explores the association between EI, CT, resilience and other demographic factors to nursing students' test scores on the proctored ATI-NCLEX-RN Comprehensive Predictor Examination.

Chapter 1, "Overview of the Dissertation Research Focus" describes my program of research and manuscript topics.

Chapter 2, "Emotional Intelligence and Undergraduate Nursing Students: A Concept Analysis" provided a conceptual analysis of emotional intelligence in the context of undergraduate nursing students.

Chapter 3, "Emotional Intelligence and Undergraduate Nursing Student Academic Performance: An Integrative Review" reviewed existing literature on EI and academic performance expressed as standardized test performance, nursing course or program achievement, and student grade point average (GPA). Recommendations regarding the inclusion of EI content in nursing curricula based on current evidence was discussed.

Chapter 4, "Relationship of Undergraduate Nursing Students' Emotional Intelligence and other Factors to ATI-NCLEX-RN Comprehensive Predictor Examination Performance" described my primary research study. An exploratory, cross-sectional, predictive correlational design was used to study the relationships between EI, CT, and resilience to test performance on the ATI-NCLEX-RN Comprehensive Predictor Examination. Quantitative data was collected from a demographic survey, the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) Version 2 (V2), the Connor-Davidson Moral Resilience Scale (CD-RISC), the California Critical Thinking Skills (CCTST), and the scores on the ATI-NCLEX-RN Comprehensive Predictor Examination among a cohort of senior level undergraduate baccalaureate nursing students. The data was analyzed using Pearson *r* correlations and multiple linear regression analyses to determine correlational and predictive relationships between these variables. There was a statistically significant association between demographics, EI, CT and resilience collectively to predict ATI-NCLEX-RN Comprehensive Predictor Examination scores.

# Chapter 1: Overview of the Dissertation Research Focus

## Background

The increasing complexity of an ever-changing health care environment requires the preparation of a nursing workforce capable of providing safe and compassionate care of the highest caliber to patients, families, and communities (National Council of State Boards of Nursing [NCSBN], 2019). Rising patient acuities, health care reform initiatives, worldwide health crises, and a looming nursing shortage pose unprecedented challenges to health care systems across the nation (American Association of Colleges of Nursing [AACN], 2019). Schools of nursing are charged with cultivating a high level of knowledge and technical, critical thinking, and interpersonal skills among their students. Upon graduation, students must pass NCLEX-RN to gain entry into professional practice. Standardized readiness tests such as the ATI-NCLEX-RN Comprehensive Predictor Examination provided by Assessment Technologies Institute (ATI) are used by schools of nursing to prepare students to pass NCLEX-RN on the first attempt (Assessment Technologies Institute [ATI], 2019). Nurse educators strive to find factors that contribute to test success that can be developed within curriculums to prepare students to pass NCLEX-RN and become successful nurses who thrive in their profession.

## The Association of Emotional Intelligence, Critical Thinking, and Resilience with ATI-NCLEX-RN Comprehensive Predictor Examination Performance

Emerging evidence suggests that personal attributes of emotional intelligence (EI), critical thinking (CT), and resilience may have significant relationships with student success as reflected in clinical and academic achievement (Christianson, 2020; Cleary et al., 2018; Fernandez et al., 2012; Shanta & Gargiulo, 2014). Discovery of how these abilities influence indicators of academic proficiency, such as standardized achievement tests, will inform

curricular designs that maximize student performance during nursing school and beyond graduation.

**Introduction of Manuscripts**

The second chapter, *Emotional Intelligence and Undergraduate Nursing Students: A Concept Analysis* enhances conceptual understanding of emotional intelligence through exploration of its many definitions and perspectives through presentations of a model case, borderline case, related case, and contrary case. Concept clarification promotes concise measurement in studies that build a strong evidence-base to guide nursing practice. The third chapter, *Emotional Intelligence and Undergraduate Nursing Student Performance: An Integrative Literature Review* provides a review, critique, and synthesis of literature related to emotional intelligence and its relationship to academic performance as reflected in standardized test performance, nursing course or program achievement, and student grade point average (GPA). The fourth chapter, *Relationship of Undergraduate Nursing Students' Emotional Intelligence and other Factors to ATI-NCLEX-RN Comprehensive Predictor Examination Performance,* describes the primary research study that sought to determine significant predictors of ATI-NCLEX-RN Comprehensive Predictor Examination test performance among the variables of EI, CT, resilience, and demographic factors among undergraduate senior nursing students. This exploratory, cross-sectional, predictive correlational study was used to examine one cohort of baccalaureate nursing students. Correlational and multiple linear regression analyses were completed and findings indicated that there was a statistically significant association between demographics, EI, CT, and resilience collectively that predicted ATI-NCLEX-RN Comprehensive Predictor Examination test scores. These findings support evidence

of other studies that have reported positive correlation and predictive relationships between EI, CT, resilience, and academic factors in this population of students.

Chapter 2: Emotional Intelligence and Undergraduate Nursing Students A Concept Analysis

**Abstract**

Understanding and managing emotions is a fundamental nursing skill. Nurses must possess emotional intelligence to facilitate effective communication with patients, families, and within the health care team. They must be adept at perceiving, understanding, using, and managing emotions within themselves and with others. Nurse educators facilitate skill development in students to prepare them for the rigors of a complex health care environment. There is a lack of consistency in how this concept is described throughout nursing literature due to multiple conceptual models and definitions. The Walker and Avant process of concept analysis was used to analyze the concept of emotional intelligence in the context of undergraduate nursing students. The intent is to bring clarity to this concept to advance nursing knowledge as it relates to undergraduate nursing education.

**KEY WORDS**: emotional intelligence, undergraduate nursing students, baccalaureate nursing students, prelicensure nursing students, emotional intelligence and nursing education, emotional competence

## Emotional Intelligence and Undergraduate Nursing Students: A Concept Analysis

Emotional intelligence has emerged as a concept of intense fascination among scholars across disciplines due to its potential to influence educational and professional success. It has engendered much research in several fields including psychology, business, social work, education, and medicine. Throughout the last twenty years, it has gained prominence as a topic of interest in professional nursing practice and nursing education (Bulmer-Smith et al., 2009). As emotional intelligence is considered a vital component in nursing and in other fields of health care delivery, this phenomenon merits closer examination to determine its role in the provision of competent, high quality nursing care (Bulmer-Smith et al., 2009; Shanta & Gargiulo, 2014). Various definitions have evolved that describe emotional intelligence. To promote effective communication and enhance understanding, it is important to come to a general agreement about what a concept means and to clarify it in the context and purpose of what is being studied (Cronin et al., 2010). Expanding understanding of emotional intelligence will provide greater perspective on how it is manifested in nursing practice and how it is cultivated among nursing students.

The purpose of this analysis is to elucidate the concept of emotional intelligence as it relates to undergraduate nursing students by utilizing the Walker and Avant eight-step method. Conceptual clarification in this context will allow for rigorous evaluation of this term's significance in nursing education. This process contributes to the creation of an operational definition that has practical use in future research endeavors. Concepts are linked with knowledge development, and it is imperative to clarify concepts when embarking upon studies that will build on a scientific body of knowledge (Cronin et al., 2010). Development of operational definitions for concepts through careful analysis facilitates communication among

researchers and other stakeholders, and promotes a greater understanding of a concept (Walker & Avant, 2019).

**Background**

The concept of emotional intelligence has been described in a variety of ways in numerous professional fields. The foundational definition given by psychologists Salovey and Mayer who proposed this concept in 1990 was that it was a distinct intelligence, apart from general cognitive intelligence, involving the "ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (p.189). It has been expressed as a form of intelligence that denotes the ability to perceive emotions in one's self and in others, regulate emotions, and effectively cope with emotional situations (Dganit & Grinberg, 2018). Salovey and Mayer determined that emotional intelligence was a specific type of intelligence based on earlier research findings in the areas of emotion, intelligence, cognition, and psychotherapy that pointed to the importance of recognizing and managing one's emotions (Mayer et al., 2016).

In 1995 journalist and psychologist, Daniel Goleman, published the best-selling book *Emotional Intelligence*. This work ushered this concept outside of the world of academia and brought it into the public spotlight. Consequently, research in the areas of psychology, education, business, and health care has grown significantly (Codier et al., 2010). Other psychologists such as Reuven Bar-On and Konstantino Petrides have also developed models and definitions of emotional intelligence that have guided research among different disciplinary fields (Bar-On, 2005; Bulmer-Smith et al., 2009; Gorgens-Ekermans & Brand, 2012; Petrides & Furnham, 2001).

There has been a primary focus on how emotional intelligence influences professional

success and emotional wellness. In the business world, studies have shown positive correlations between measured emotional intelligence and outcomes including employee performance in the workplace, effective leadership, job retention and satisfaction, conflict resolution, stress management, burnout prevention, and personal well-being (Bulmer-Smith et al., 2009; Codier et al., 2010; Mayer et al., 2008). In professional nursing practice, studies have shown similar findings with positive correlations found between emotional intelligence and job performance among nursing staff and nursing leadership, nurse retention, work satisfaction, clinical competence, stress management, and professional achievement (Codier et al., 2010; Sharon & Grinberg, 2018). In nursing education, studies have emerged exploring the association of emotional intelligence to factors such as academic achievement, clinical performance, and personal traits among both graduate and undergraduate nursing students (Beauvais et al., 2011; Benington et al., 2020; Codier & Odell, 2014).

Emotion is a feeling recognized as being fundamental to nursing practice. Nurses must possess emotional intelligence, as it is key to providing holistic care (Bulmer-Smith et al., 2009; Christianson, 2020; Shanta & Gargiulo, 2014). The underlying assumption is that understanding, detecting, and conveying emotion is essential to nursing, a profession that requires sensitivity in relationships (Bellack et al., 2001; Bulmer-Smith et al., 2009; Reeves, 2005). Nurses work within chaotic and heavily charged emotional environments and experience a whirlwind of emotions internally and externally that affect communication with colleagues, patients, and families (Bulmer-Smith et al., 2009). Nurses must be able to recognize and understand their own emotions through self-awareness in their interpersonal interactions. A degree of emotional competence is also necessary to grasp the nuances of emotions expressed by others to facilitate ethical and sound decision-making (Bulmer-Smith et al., 2009). The ability to use and manage

emotions to collaborate with other members of the health care team and to communicate effectively with patients and families is critical to promoting positive patient outcomes (Shanta & Connolly, 2013). Additionally, emotional intelligence has been reported to be foundational to caring and empathy, traits that underlie therapeutic relationships and are the core of nursing (Benner, 2001; Eriksson, 2018; Goleman, 1995; Karlsson & Pennbrant, 2020; Mayer & Cobb, 2004; Shanta & Gargiulo, 2014).

Emotional intelligence is a necessary quality for nurses to possess, and the abilities encompassed in this concept are developed during nursing school. There is strong support to promote emotional intelligence development in nursing curriculums (Bulmer-Smith et al., 2009). The National Council of State Boards of Nursing (NCSBN) stipulates that nursing knowledge illuminates the means by which to engage in relationships with others and the environment (2019). The American Association of Colleges of Nursing (AACN), an entity that accredits nursing schools, asserts in the Essentials of Baccalaureate Education for Professional Nursing Practice, that generalist nursing graduates practice from a caring and holistic framework. Emphasis is placed on preparing future nurses to "demonstrate leadership and communication skills to effectively implement patient safety and quality improvement initiatives within the context of the interprofessional team" (2018, p.14).

It is becoming clear that emotional intelligence is key to the preparation of future nurses. There is a lack of direction in the literature as to how nursing education can develop this ability in students (Shanta & Gargiulo, 2014). Research suggests that to be prepared for professional practice, students must understand the emotional nature of nursing. They require emotional skills to provide competent care and must achieve emotional intelligence competencies to effectively

navigate stressful working environments and improve self-care (Bulmer-Smith et al., 2009). Further research is needed to expand the knowledge base on the role emotional intelligence plays in student success and to develop teaching strategies that develop this ability and trait. Due to the multiple descriptions and models that exist and a lack of a consistent conceptual understanding (Bulmer-Smith et al., 2009), a concept analysis will aid in clarification of what emotional intelligence means as applied to the population of undergraduate nursing students.

## Concept Analysis

Concept analysis is an important tool for deconstructing a term to enhance understanding and support development of a sound definition that enables more apt measurement of the concept (Walker & Avant, 2019). Precise concept measurement allows researchers to explore many possibilities related to the concept and strengthens the evidence base that guides nursing practice. The Walker and Avant eight step procedure was used in this concept analysis of emotional intelligence in undergraduate nursing students. The first step in the process involves the selection of the concept. Secondly, the purposes or aims of the analysis are determined. Identification of as many uses of the concept as can be discovered is the third step. The fourth step includes determination of the concept's defining attributes. A model case is identified in the fifth step. The sixth step entails the identification of borderline, related, contrary, invented, and illegitimate cases. The identification of antecedents and consequences follows in the seventh step. Lastly, the eighth step includes the definition of empirical referents (Walker & Avant, 2019).

## Concept Definitions and Uses

### *Definitions*

Identification of all uses of a concept facilitates a deeper understanding of its meaning (Cronin et al., 2010). Lack of clarity inhibits conceptual use and analysis is appropriate for

concepts used in nursing. Emotional intelligence has been defined several ways since it emerged as a concept in the early nineties. First, each word will be examined, followed by definitions of the noun phrase "emotional intelligence". According to Merriam-Webster (n.d.), the term "emotional" is an adjective defined as "of or relating to emotion", "dominated by or prone to emotion", "appealing to or arousing emotion", and "markedly aroused or agitated in feeling or sensibilities". It comes from the word "emotion", defined as "a conscious mental reaction (such as anger or fear) subjectively experienced as a strong feeling usually directed toward a specific object and typically accompanied by physiological and behavioral changes in the body".

Salovey and Mayer (1990) described emotion as an organized response that crosses the boundaries of physiological, cognitive, motivational and experiential systems that arise in response to an internal or external event that one can react to in a positive or negative manner. According to the American Psychological Association (APA), emotions are complex reaction patterns related to behavioral and physiological responses to events of personal significance (APA, 2007; Bulmer-Smith et al., 2009). Synonyms for emotional include, "ardent, blazing, burning, charged, demonstrative, fervent, fervid, feverish, fiery, flaming, glowing, hot-blooded, impassioned, incandescent, intense, passional, passionate, perfervid, red-hot, religious, super-heated, torrid, vehement, warm, warm-blooded"(Merriam-Webster, n.d.). This word is derived from the middle-French word emouvoir, to stir up, and the old French term esmovoir, which comes from the Latin word, emovere, meaning to "move or displace from" (Merriam-Webster, n.d.).

The term intelligence is defined by Merriam-Webster (n.d.) as "the ability to learn or understand or to deal with new or trying situations, "as the skilled use of reason", and as "the ability to apply knowledge to manipulate one's environment or to think abstractly as measured

by objective criteria". Pythagoras described intelligence as "winds" and Descartes defined it as the ability to judge true from false (Laertius, 1925; Salovey & Mayer, 1990). Intelligence includes behaviors related to information processing, experiential learning, thought and reasoning patterns, and adaptation to environments (APA, 2007; Bulmer-Smith et al., 2009). Synonyms include "brains(s), brainpower, gray matter, headpiece, intellect, intellectuality, mentality, reason, sense, smarts". The online etymology dictionary (n.d) states that this word was taken from Middle English and Middle French from the Latin word "intelligentia" or "intellegentia" meaning "understanding, knowledge, power of discerning; art, skill, taste".

The concept of "emotional intelligence" was first introduced in the field of psychology. Three major theoretical frameworks have guided research; however, they define, conceptualize, operationalize, and measure this concept differently (Codier & Odell, 2014). The conceptual models of Mayer and Salovey, Bar-On, and Goleman contain the same domains of self awareness, self-management, social awareness, and social/relationship management, and all propose that emotional intelligence can be learned (Kooker et al., 2007). The settings in which the concept of emotional intelligence was developed and the means by which it is measured in terms of instruments vary among the models (Codier et al., 2010).

Mayer and Salovey (1997) posited that emotional intelligence is an ability that increases with age, and it can predict how processing of emotions contributes to life success (Mayer & Salovey, 1993; Mayer et al., 2004). Mayer and Salovey (1997) defined emotional intelligence as the "ability to perceive, appraise, and express emotion, access and process emotional information, generate feelings, understand emotional knowledge and regulate emotions for emotional and intellectual growth (p.10). They created the four-branch abilities model within the academic research setting. This model consists of 1) identifying emotions in one's self and

others, 2) using emotions to reason, 3) understanding emotions, and 4) managing one's own emotions and managing emotional situations with others (Codier & Odell, 2014; Mayer et al., 2008).

Psychologist Reuven Bar-On conceptualized emotional intelligence as a set of personality traits that can predict social and emotional adaptation. He created his emotional-social intelligence model (ESI) in the setting of community health and based it on the premise this concept is a function of personality attributes (Bar-On, 2005; Codier et al., 2010). He stated that emotional-social intelligence is both learnable and teachable. Bar-On (2005) defined emotional intelligence as a "cross-section of interrelated emotional and social competencies, skills and facilitators that determine how effectively we understand and express ourselves, understand others, relate with them and cope with daily demands "(p. 3). There are five key competencies associated with this model. They include 1) interpersonal skills, 2) intrapersonal skills, 3) adaptability, 4) stress management, and 5) general mood (Bar-On, 2005; Bulmer-Smith et al., 2009).

Psychologist Daniel Goleman described emotional intelligence as a blend of both traits and abilities that are reflected in his mixed model of emotional intelligence. This model is widely used in organizational settings. Goleman (1995) defined emotional intelligence as "the capacity for recognizing our own feelings and those of others, for monitoring ourselves, and for managing emotions in ourselves and in our relationships" (p. 317.). He proposed it was an ability that can be improved. Goleman's mixed model framework includes five key components. They include 1) self-awareness, 2) self-regulation, 3) motivation, 4) empathy, and 5) social skills (Bulmer-Smith et al., 2009; Codier et al., 2010; Goleman, 1995; Harvard Business Review, 2017). The three aforementioned models have influenced the study of emotional intelligence in terms of

applicability to certain aspects of various disciplines. Uses of emotional intelligence beyond the realm of nursing are explained below.

### *Non-Nursing Uses*

**Business**. In the world of business, the emotional behaviors of managers as determined by levels of emotional intelligence have been associated with having a direct effect on employees' perceptions of organizational climate (Momeni, 2009). In business literature, positive correlational relationships have been identified between emotional intelligence and dynamic leadership styles, employee development, satisfying personal life experiences, and professional success in the workplace (Abraham, 2006; Goleman, 2005; Harvard Business Review, 2017).

**Social Work**. The relationship and interaction between the social worker and the service user is a key aspect in the discipline of social work (Ingram, 2013; Lishman, 1994). Social workers often encounter clients in highly emotional situations and must be able to respond therapeutically to service users. Emotions are recognized as a two-way process requiring the engagement of social workers in the emotional context of the user while simultaneously recognizing the impact the process has on themselves and on their practice (Ingram, 2013).

**Education**. Social and emotional learning programs (SEL) have been used by schools worldwide to teach children emotional intelligence skills at the elementary through high school levels. These include competency in self-awareness, self-management, social awareness, relationships skills, and responsible decision-making (Lawlor, 2016; Zins et al., 2004). Many school districts in the U.S. have made SEL a curriculum requirement (Goleman, 2005).

**Medicine**. Strong interpersonal skills, empathy, ability to manage high stress situations, and enhancing well-being, all components of emotional intelligence, are recognized as essential

to the capacity of functioning as a physician (Naeem et al., 2014; Shapiro et al., 2004). The Accreditation Council for Graduate Medical Education (ACGME) states key competencies of graduate medical students are attaining proficiency in interpersonal relationships and communication skills (ACGME, n.d.). Emotional intelligence is thought to underpin many of the skills that contribute to these competencies (Arora et al., 2010).

**Defining Attributes of Emotional Intelligence in Undergraduate Nursing Students**

The exploration of as many possible meanings of a concept open the path to establishing the attributes that mark its presence. Defining attributes differentiate the concept of study from other surrounding concepts, and should immediately call the concept to mind (Walker & Avant, 2019). Attributes of emotional intelligence include: self-awareness, self-management, social-awareness, and social-management.

**Self-awareness**. The ability to recognize, know, and understand one's own emotions and motivations reflects the capacity to be self-aware. This includes knowing one's own strengths, weaknesses, drives, values, and goals, feelings, and thoughts (Codier et al., 2010; Goleman, 2005; Harvard Business Review, 2017; Mayer et al., 2016; Raghubir, 2018). People with a high level of self-awareness have self-confidence, seek constructive criticism, and exhibit a self deprecating sense of humor (Harvard Business Review, 2017; Strickland, 2000).

**Self-management**. The ability to control or redirect in a constructive manner emotions and impulses that may be disruptive in order to achieve a desired outcome reflect self management. It is the capacity to self-regulate and think through something first before taking an action based on feelings and emotions, and to express emotions accurately in a desired manner. Hallmarks include trustworthiness, integrity, and comfort with change (Codier et al., 2010; Harvard Business Review, 2017; Mayer et al., 2016; Raghubir, 2018).

**Social-awareness**. The ability to perceive the emotions of other people through vocal cues, facial expressions, behaviors, and language indicates social-awareness. It includes empathy and the consideration of others' feelings when making decisions (Codier et al., 2010; Mayer et al., 2016; Raghubir, 2018; Strickland, 2000).

**Social-management**. The ability to manage others' emotions and direct relationships effectively to achieve a particular outcome reflects social-management. This involves using the emotions of one's self and others to clearly communicate and motivate others to achieve a desired goal. Individuals with strong skills in this area are effective in persuasion, leading change, networking, and team building (Codier et al., 2010; Goleman, 2005; Harvard Business Review, 2017; Mayer et al., 2016; Raghubir, 2018; Strickland, 2000).

## Model Case

A model case provides an example of how a concept is used and presents all of the defining attributes of the identified concept (Walker & Avant, 2019). A junior level nursing student is taking care of a new young mother in the post-partum unit. The mother's infant was born prematurely at 35 weeks gestation the day prior and is in the neonatal intensive care unit (NICU) receiving treatment for respiratory distress and suspected sepsis. The mother is called to come to the NICU. Her baby's condition has deteriorated and the NICU team is running a code.

The nursing student takes the new mother to the NICU in a wheelchair. Once they arrive, they find the baby has died, and the NICU nurse takes the baby and places him in his mother's arms. The mother is silent as she holds her baby, and then suddenly she begins to sob loudly and screams, "God why have you taken my precious boy?" The staff has fallen silent, downcast, and teary-eyed. The nursing student stands calmly by her patient. She is not sure exactly how to react. She remembers how her own mother lost her baby sister five years before to SIDS, and

how it broke everyone's heart. She could not remember a sadder time in her life. She wanted to burst out into tears, but she remained calm, and spoke to the mother who was crying inconsolably. She calmly and gently told her "Ma'am, I am here. May I call someone for you? Let me take your phone so you can hold your baby close". The nursing student gently repositioned the pillow the baby was on in the mother's lap and made sure she was as comfortable as she could be under the circumstances. She asked her nursing instructor to bring her some Kleenex and a cup of water for the mother. The student stayed by the mother's side for several moments, her hand on the mother's shoulder until the mother calmed. The mother then asked the student to call her husband and best friend to come, which the student did. The student then assured her patient that she would be there for anything she needed, and the student, with tears in her eyes and compassion in her voice, calmly conveyed to the mother that she was there for her, and would do all she could to support her through these devastating moments. The nursing student then wheeled the mother back to her room where she waited for family members to arrive. Throughout the shift, the nursing student anticipated and tended to her patient's needs. She reached out to her preceptor nurse and nursing instructor throughout the day for guidance to ensure she was handling the situation appropriately. She then debriefed with her nursing instructor and reflected on the experience in private after clinical post-conference.

The nursing student demonstrated self-awareness, recognizing her own sad experiences with death, and then controlled her intense emotions to be present for her patient. At the end of her shift, she engaged in self-reflection and sought guidance from her instructor. She also demonstrated self-management by providing nursing care in a professional and compassionate manner despite the sadness and trepidation she experienced as a witness to this devastating event. She recognized instantly that this mother was in great emotional pain and demonstrated

empathy, showing social-awareness. The nursing student anticipated the mother's physical and emotional needs, and worked diligently to meet them using the resources of her preceptor nurse and instructor, displaying social-management.

**Borderline Case**

Walker and Avant (2019) state that borderline cases present most of the defining conceptual attributes, but not all of them. By showing how this case differs from one containing all of the defining attributes, this clarifies thought processes related to the defining attributes. A first year nursing student completing his medical-surgical rotation is doing discharge teaching at 9 am with a sixty-year old man who had a stent placement, and his adult daughter who lives out of town. The discharge was to be completed by noon, but as of 5 pm, the physician has not written the order yet. The student nurse has been checking on the patient and his daughter throughout the day, and sees their impatience growing. Having self-awareness, he feels tension, as he knows what it is like to wait, but he ignores the daughter's attempts to speak to him. At 5:00 pm, the student checks on the patient and the daughter is extremely frustrated and barks at the student, "We've been waiting here all day, and I need to get my dad settled in. I'm catching a plane in the morning, and need to make sure he has all he needs. There's so much to do and I can't believe the doctor has not come by yet-what's wrong with you people? What does it take to get you to understand we need to leave? We got to go NOW!" The nursing student feels for the daughter and the patient, demonstrating social-awareness. He knows this is an exasperating situation. However, he also feels attacked and sternly says, "This is not my fault ma'am! You need to calm down and be patient! I'll ask the nurse about it right now, but you need to understand we are doing the best we can!" He is struggling with self-management. He abruptly leaves the room to find his preceptor nurse. He realizes that this was not a good way to handle

this situation, and speaks to both his preceptor nurse and nursing instructor for guidance. He was not able to fully engage in social-management, as he did not manage the daughter's emotions in a professional and therapeutic manner. However, he did speak to his instructor, and then he apologized to the daughter, and worked diligently to meet this family's needs until they were discharged, taking a strong step in improving his social-management skills**.**

**Related Case**

Related cases contain concepts related to the concept of interest, but do not present all of the defining attributes. They are similar and connected to the concept of study, but clearly differ from this concept upon closer examination (Walker & Avant, 2019). Two nursing students are working on care plans in the pediatric oncology unit. One asks the other, "Can you please help me with this care plan for a child with acute myeloid leukemia? I feel so lost, like I'm drowning, and I don't know how to go about this." The other student feels lost too, and understands her colleague's desperation. She feels a deep sense of empathy, but feels like there is nothing she can do. She tells her classmate, "I can't help you. I can barely figure these care plans out for myself. I'm so sorry. You need to ask someone else". She then runs away, and avoids this student for the rest of the clinical rotation. This student stops at empathy, and finds herself unable to talk to the classmate, or work with her to find solutions that could help the both of them. Although she recognizes emotions, she is not able to follow through to self-management and social management, critical components of emotional intelligence.

**Contrary Case**

Contrary cases provide clear examples of what is "not the concept" (Walker & Avant, 2019). A senior nursing student is caring for a homeless patient in the emergency department. A car rolled over the patient's legs, as he was asleep in a cardboard box in an alley. The patient was

inebriated, and was diagnosed with a fractured femur, dehydration, and multiple sores all over his body. The nursing student was present when this patient was admitted, and he felt nauseous smelling the patient's strong body odor. The nursing student has never known anyone who was homeless, and he always felt uncomfortable around people who he thought of as alcoholics and drug addicts. He was reminded of his own father, who also struggles with alcoholism, with whom he is estranged. He feels disgust for this patient, and avoids going into this patient's treatment room at all costs. He only checks on this patient when the preceptor nurse asks him to. While checking the patient's IV as instructed, the patient tells the nursing student he is worried about his dog who was left with a bystander when he was picked up in the ambulance after the accident. The patient then lowers his eyes, and with a worried frown and shaking voice tells the nursing student, "My dog is all I have in this world, and I wish I could find out if he is all right". The student responds that the dog is probably fine and that he should use the call bell to call his assigned nurse to answer any questions he has. The IV is slightly puffy and the patient says it "kind of hurts". Without acknowledging these concerns, the nursing student then quickly leaves the room without mentioning anything to his preceptor nurse. He felt he could not get out of that room fast enough and just wanted to sit at the nurse's station to fill out his care plan assignment due the next day.

In this case, the student failed to become aware of his own feelings and biases about the patient, and did not regulate them to enable him to provide safe, competent, and dignified care to his patient, showing a lack of self-awareness and self-management. He also did not notice the cues the patient was demonstrating that showed he was in need of compassion, empathy, and understanding, showing a lack of social-awareness. Consequently, the student did not respond in a therapeutically competent manner. He also fell short of managing his patient's emotions, or

conferring with the health care team to allay the patient's fears about his dog. In his state of discomfort with this patient, he failed to communicate with his preceptor nurse the condition of the IV site or the patient's report of pain, which should have been a top priority, indicating a lack of ability in social-management.

**Antecedents**

Antecedents must be in place for a concept to occur and cannot be a defining attribute (Cronin et al., 2010; Walker & Avant, 2019). The antecedents of emotional intelligence include cognitive ability, motivation, and empathy. The assumption is emotional intelligence is a type of intelligence with its own distinctive features apart from other intelligences. It is considered a member of the class of broad intelligences focused on "hot" processing that includes management of what matters most to people including their sense of social acceptance, identity coherence, and emotional well-being. Cold broad intelligences include those that deal with verbal-propositional intelligence, math, and visual-spatial type of abilities (Mayer et al., 2016). Emotional intelligence necessitates the cognitive ability to accurately reason about emotions and to use them to enhance cognitive processes, therefore, a basic level of cognitive ability must be present to facilitate the processes of emotional intelligence (Mayer et al., 2008).

Motivation involves having the drive to achieve something for the sake of achievement. It is possessing a passion for something, having energy to accomplish a goal, and maintaining optimism in failure (Goleman, 1995; Harvard Business Review, 2017). Motivation must be present to behave in a certain way and directs decisions and actions using skills of emotional intelligence. Empathy is the ability to consider the feelings of others. According to Merriam Webster (n.d.), it is defined as the ability to understand, be aware of, be sensitive to, and vicariously experience another's feelings and thoughts, either past or present without having

those feelings, thoughts, or experiences fully communicated objectively and in an explicit manner (Merriam-Webster, n.d.). An individual must be able to draw on what they know of their own emotions, and bridge the gap to understanding what someone else is experiencing by placing themselves "in another person's shoes", and responding accordingly. Emotional intelligence relies on a measure of empathy to drive effective interpersonal communication and emotional management in social situations.

**Consequences**

Consequences are outcomes that happen as a result of the concept (Cronin et al., 2010). They can lead to the discovery of ideas, relationships, or variables that may have had little consideration and open the door to new research directions (Walker & Avant, 2019). The consequences of emotional intelligence among undergraduate nursing students are enhanced critical thinking skills, resilience, and enhanced clinical communication skills. Critical thinking is a priority skill that nurse educators hone in their students to prepare them for complex clinical decision-making that will be required of them as professional nurses (AACN, 2008; Giddens & Gloeckner, 2005; Kaddoura et al., 2017; Romeo, 2013). A primary component across emotional intelligence models is the capacity to recognize and use emotions to reason and problem-solve (Harvard Business Review, 2017; Mayer et al., 1999). Emotional intelligence enhances cognitive activities (Mayer et al., 1999), thereby influencing processes that rely on cognitive acuity, such as academic performance.

Resilience is another consequence to emotional intelligence. The degree to which one is self-aware and able to regulate internal emotions, a key component of emotional intelligence, affects how one is able to withstand stressful environments and situations and continue to function in a desired capacity. Undergraduate nursing students who recognize, give attention to, and regulate emotion well have an increased ability to withstand, cope and rebound from

stressors (Bulmer-Smith et al., 2009; Montes-Berges & Augusto, 2007). Resilience has been defined as the "ability to adjust to diversity, maintain equilibrium, retain some control over the environment, and move in a positive direction" (Cleary et al., 2018; Pines et al., 2014, p.86). Nursing is conducted in highly stressful environments. Resilience is crucial in enabling nurses to cope with workplace stress (Cooper et al., 2020; Hart et al., 2014). Students face numerous stressors in nursing school, ranging from maintaining a work-life balance, performing well academically, and managing emotional stressors in clinical environments. Building resilience in the future nursing workforce enhances personal well-being and affects issues such as job satisfaction, nurse burnout, and retention (Cooper et al., 2020).

Enhanced clinical communication is a third consequence of emotional intelligence (Kong et al., 2016). There is heavy emphasis among models and descriptions of emotional intelligence on interpersonal communication skills. Clinical communication entails the ability of health care providers to listen and respond effectively and clearly transmit information to patients and families (Kong et al., 2016; Laidlaw et al., 2014). Undergraduate nursing students refine their skills of talking to patients, families, and other members of the health care team during their clinical rotations. Health care providers highly skilled at communication are able to facilitate quality care experiences that lead to improved patient outcomes (NCSBN, 2019; Puppe & Neal, 2014).

**Empirical Referents**

Empirical referents are categories of phenomena that by their existence demonstrate that the concept has occurred. They are not tools that measure concepts; rather they are the means by which to recognize or measure defining characteristics or conceptual attributes (Walker & Avant, 2019). They may be identical to the attributes, and in this case, the attributes of self-awareness,

self-management, social-awareness, and social-management, reflect the empirical referents (Mayer et al., 2016). Hallmarks of individual expressions of emotional intelligence include self confidence, adaptability, coping, optimism, and sensitivity (Goleman, 2005; Harvard Business Review, 2017). Social management skills are evident in how one is able to motivate others to achieve a goal and to bring about the calm during the storms in challenging situations. Refined communication skills that enable individuals to build meaningful relationships and build successful teams also demonstrate the presence of emotional intelligence (Kong et al., 2016).

Several tools have been developed to measure the concept of emotional intelligence. They include the Mayer-Salovey-Caruso Emotional Intelligence Scale (MSCEIT) that was created based on the Four-Branch Ability Model by Mayer and Salovey (1997) and the Emotional Quotient Inventory (EQ-i) developed by Bar-On based on his trait model (Bar-On, 2005; Mayer et al., 2008). The Trait Emotional Intelligence Questionnaire-Short Form (TEIQue SF) developed by Petrides and Furnham (2006) and the Emotional and Social Competency Inventory (ESCI) by Goleman (Harvard Business Review, 2017) are also commonly used.

**Implications for Nursing Research and Practice**

Nurse educators are challenged to find new and innovative teaching methodologies to develop key competencies in nursing students that will equip them to manage the overwhelming challenges they will face in professional nursing practice. Discovery of the traits and abilities that enhance core skill sets in the areas of critical thinking, communication, and stress management will inform curricular designs that adequately prepare nursing students to deliver quality care in highly stressful conditions. As emotional intelligence plays a role in each of these skills, it warrants further research to explore how it affects personal and professional growth in undergraduate nursing students, and to determine interventions that will build and fortify

emotional skill-sets. Such interventions can then be incorporated into curricula, utilized, and then examined to determine best practices in didactic and clinical settings (Bulmer-Smith et al., 2009). A foundational step is to analyze the concept of emotional intelligence in the context of undergraduate nursing education to clarify its meaning and discover its uses. Identification of conceptual attributes will bolster consistency and rigor among studies and will foster sound comparison of research findings that can then be translated into clinical education and practice.

## Conclusion

Emotional intelligence is crucial for nurses in the provision of high-quality patient care. Nursing students must develop this ability to its fullest to become the well-prepared nursing workforce that will be needed to solve the multitude of complex problems affecting health care across the nation and the globe. Nursing education must rise to the challenge by pursuing studies that shed light on the impact of emotional intelligence on key nursing skills. Clarity of the concept of emotional intelligence will inform studies that meet the rigor needed to advance the body of knowledge that will enable nurses to deliver emotionally competent care.

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Chapter 3: Emotional Intelligence and Undergraduate Nursing Student Academic Performance: An Integrative Literature Review


## Abstract

The role of emotional intelligence (EI) in academic performance of undergraduate nursing students has recently been explored for its potential to influence academic achievement and future success in professional nursing practice. Little is known about the relationship between EI and academic outcomes of undergraduate nursing students. The purpose of this article is to review research related to EI and academic performance as measured by standardized test performance, nursing course or program achievement, and grade point average (GPA). Recommendations regarding the inclusion of EI content in nursing curricula based on current evidence is discussed.

**Methodology:** An integrative literature review was conducted through searches of online nursing and psychology databases: CINAHL, Medline, PubMed, PsycInfo, PsycArticles, PsycBooks, and Psychology and Behavioral Sciences. To enhance rigor of literature selection and analysis, guidelines from Torraco (2005) were used. Limits were set for research articles, commentaries, and dissertations published between 1990 and 2021 using search terms of emotional intelligence and nursing students and academic performance, emotional intelligence and nursing students and academic achievement, emotional intelligence and nursing students and grade point average, emotional intelligence and nursing students and standardized tests, and emotional intelligence, nursing students, and NCLEX-RN. Thirty articles were selected for inclusion in this review.

**Results:** Findings are inconsistent; however, there is much evidence to suggest there is an association of EI to academic performance.

**Conclusions**: Emotional intelligence attributes are fundamental to nursing practice. This concept merits further studies to identify how it contributes to academic success during nursing school.

## Emotional Intelligence and Undergraduate Nursing Student Academic Performance: An Integrative Literature Review

Emotional intelligence (EI) has recently emerged as a topic of fascination in professional nursing practice and nursing education. This concept has been described as a distinct type of intelligence that concerns the "ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought" (Mayer et al., 2008, p.511). Emotional intelligence became popular in academic circles when psychologists Salovey and Mayer (1990) in their seminal article proposed it as a type of social intelligence that was key to success in life. It became wildly popular in the public arena with the publication of psychologist Ronald Goleman's bestselling book, *Emotional Intelligence*, in which he asserted that EI was vital to effective organizational leadership and work performance (Goleman, 1995). Ever since, it has enthralled scholars across disciplines and many studies have been done to expand understanding of the nature of EI and its role in professional success. A growing body of research has shown correlations with positive job performance and organizational outcomes (Goleman, 2005; Faguy, 2012; MacCann et al., 2019).

The concept of EI has captured the attention of nurse leaders, researchers and educators as the attributes of emotional intelligence are foundational to nursing practice (Benson, 2010; Bulmer-Smith et al., 2009). The abilities to be sensitive to the feelings of one's self and others, have emotional self-control, motivate one's self and others, and manage the emotions of one's self and others, reflect key aspects of EI, which have been shown to promote emotional, intellectual, and professional growth (Bar-On, 2006; Benson et al., 2010; Ciarrochi et al., 2000; Mayer et al., 2001). Nurses must be highly skilled in these abilities to provide competent nursing care (Benson et al., 2010; Bulmer-Smith et al., 2009). They are thrust on a regular basis into

emotionally charged situations in which they must be able to regulate their own emotions, provide therapeutic support to patients and families, and work harmoniously with members of the interdisciplinary health care team to achieve goals. Nurses use, consider, and analyze emotional information in clinical decision-making that directly impacts the quality of patient care (Akerjordet & Severinsson, 2007; Benson et al., 2010; Bulmer-Smith et al., 2009). Research has shown positive associations between emotional intelligence and nursing practice in in the areas of leadership, clinical nursing at the bedside, and coping with nursing stressors (Adams & Iseler, 2014; Benson et al., 2010; Codier et al., 2009; Lucas et al., 2008; Montes-Berges & Augusto, 2007; Shanta & Gargiulo, 2014).

The National Council of State Boards of Nursing (NCSBN) that licenses new nurse graduates for entry into practice, deem skills encompassed in EI as essential to have to provide basic competent nursing care. Knowledge related to these skills are evaluated on the NCLEX-RN examination (National Council of State Boards of Nursing [NCSBN], 2018). Questions regarding psychosocial integrity address assessment of a patient's verbal and nonverbal cues and test-takers must show aptitude for creating therapeutic environments. The expectation is that licensed nurses can provide care that "promotes, and supports the emotional, mental, and social well-being of the client experiencing stressful events, as well as clients with acute or chronic mental illness" (NCSBN, 2018, p. 27). To create a nursing workforce adept at caring for the emotional needs of patients, families, and communities, schools of nursing must create curriculums that nurture and develop EI capacity among students (Bulmer-Smith et al., 2009; Foster et al., 2015).

One area garnering much interest is the relationship of EI to academic performance. In addition to developing nurses who can provide the highest caliber of patient care in extremely

complex health care environments, nursing programs must also prepare students to pass NCLEX-RN to obtain professional licensure (NCSBN, 2018). Nursing schools aim to increase retention and decrease attrition to graduate more students and promote growth of the nursing workforce (Benington et al., 2020; Marvos & Hale, 2015; Rode & Brown, 2019). Traditionally, nursing schools have used student measures of cognitive abilities such as course grades and standardized examination scores to determine student program admission and progression (Codier & Odell, 2014; Sharon & Grinberg, 2018). Grade point averages are commonly used to predict student success by academic entities (Jones-Schenk & Harper, 2014). A strong relationship between EI and aspects of academic success, such as clinical competence and GPA have been demonstrated in some studies (Beauvais et al., 2014; Fernandez et al., 2012; Rankin, 2013; Rode & Brown, 2019). A looming nursing shortage places pressure on nursing programs to contribute sufficient numbers of well-qualified individuals to the nursing workforce (American Association of Colleges of Nursing [AACN], 2020). Nurse educators are tasked with finding elements that support and predict student success, and current literature suggests that EI holds promise of being a crucial component of academic success (Beauvais et al., 2014; Benington et al., 2020; Cheshire et al., 2015; Codier & Odell, 2014; Snowden et al., 2018).

Emotional intelligence has been strongly associated with academic achievement in the field of education (MacCann et al., 2020). Mayer et al. (2001) theorized that EI enhances cognitive abilities through the capacity to use reasoning by way of using emotions to problem-solve. It has been acknowledged that EI is intrinsically connected to academic performance, but the nature of this relationship remains unclear (Shanta & Gargiulo, 2014). Emotional intelligence research is still in its infancy in nursing education. Discovery of the mechanism of how EI

contributes to academic learning in the context of nursing will inform nursing school curricular designs that support EI development.

**Purpose**

This integrative review was conducted to review, critique, and synthesize the evidence on EI and its relationship to undergraduate nursing student academic performance. This analysis was guided by an effort to examine the nature of the association between EI and academic performance as measured by standardized test performance, nursing course or program achievement, and grade point average (GPA). Recommendations regarding the inclusion of EI content in nursing curricula based on current evidence and the direction of future research is discussed.

**Theoretical Perspectives and Instruments**

The ability model proposed by Mayer and Salovey (1997) guided this literature review. They described emotional intelligence as the ability to employ a sophisticated level of information processing regarding one's own emotions and the emotions of others, and to use this information as a guide to one's thinking and behavior (Mayer et al., 2008). They developed the four-branch model that included the abilities to a) perceive emotions in one's self and others, b) use emotions to facilitate thought, c) understand emotions including emotional language and emotional signals, and d) manage emotions in one's self and others in order to achieve specific goals (Mayer & Salovey, 1997; Mayer et al., 2008). This model is appropriate to guide a review of studies exploring EI and its role in nursing student academic performance. It supports the premise that emotional abilities are necessary for effective nursing practice and should be developed during undergraduate nursing education (Foster et al., 2015; Shanta & Connolly, 2013; Shanta & Gargiulo, 2014; Bulmer-Smith et al., 2009). The abilities model posits that

emotional abilities are learnable, that they increase with age and experience, and that they can predict how emotional processing contributes to success (Foster et al., 2015; Mayer & Salovey, 1993; 1997; Mayer et al., 2004; Bulmer-Smith et al., 2009). The ability-based model is considered to be the most conceptually and empirically valid among other models (Foster et al., 2015; Matthews et al., 2002; MacCann et al., 2020; Mayer et al., 2008; Roberts et al., 2010).

Multiple theoretical models of the construct of emotional intelligence have guided studies that were included in this review. It is therefore imperative to become acquainted with the most prominent frameworks found in the literature. The lack of consensus on consistent definitions and models of EI has led to some controversy and confusion, and has made it difficult to compare study findings (Bulmer-Smith, 2009; Foster et al., 2015). However, the literature reveals that instruments used to examine the construct through the perspectives of ability and trait models have demonstrated validity and reliability and this should be considered when evaluating study findings (Bar-On, 2006; Goleman, 1998; Mayer et al., 2008; Petrides & Furnham, 2004; Schutte et al., 1998).

Two distinct schools of thought have generated several definitions and models that share some similarities, but have distinguishable features (Nightingale et al., 2018). One conceptual model, ability EI, maintains that EI is a mental ability involving a sophisticated level of information processing that facilitates reasoning and problem solving in the domain of emotion (Gorgens-Ekermans & Brand, 2012; Mayer et al., 2008). It is measured using maximum-performance testing in which abilities are assessed (Petrides & Furnham, 2001). The other model, trait EI, posits EI reflects emotional self-efficacy and is comprised of various competencies and personality traits. Trait EI is measured using self-report testing (Bar-On, 1997, 2000; Goleman, 1998; Petrides & Furnham, 2001). An individual's perceptions of their

emotional environment, behavioral tendencies and emotional self-efficacy conceptualize trait EI (Petrides et al., 2016; Petrides & Furnham, 2001; Thomas et al., 2017). One of the tools used to measure trait EI is the Trait Emotional Intelligence Questionnaire (TEIQue) by Petrides and Furnham (2004) that uses self-report. The emphasis in trait EI theory is that EI is based in the domain of personality in contrast to ability EI that is grounded in being a type of intelligence (Petrides & Furnham, 2001).

Three major conceptual models have emerged guided by the premises of either ability or trait EI: Mayer and Salovey (1997), Goleman (1995), and Bar-On (2006). Mayer and Salovey (1997) used a deductive approach to create the hierarchical four-branch ability model of emotional intelligence. Emotional intelligence in this context is defined as the "ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought" (Mayer et al., 2008; p.507). Mayer et al. (2016) classify it as a broad intelligence within the Cattell-Horn-Carrol intelligence model (McGrew, 2009) concerned with hot information processing, meaning that it reflects management of social acceptance, identity coherence, and emotional well-being. This classification is distinct from other broad intelligences associated with cool information processing concerned with impersonal knowledge related to verbal-propositional intelligence, math abilities, and visual-spatial intelligence (Mayer et al., 2016). This is the kind of intelligence traditionally associated with cognitive abilities measured by IQ tests. Although initially these theorists asserted that EI was a type of social intelligence, the model has evolved. Currently, EI is not considered part of the social intelligence category of hot intelligences but is theorized to occupy its own distinct domain (Mayer & Salovey, 1993; Mayer et al., 2016). It is operationalized by Mayer and Salovey (2016) using the reliable and valid instrument, the Mayer, Salovey, and Caruso Emotional Intelligence Test

(MSCEIT). This test yields an overall, total, or global EI score, four branch scores that reflect the ability model components: a) perceiving emotions, b) using emotions, c) understanding emotions, and d) managing emotions, and two EI area scores including experiential EI and strategic EI groupings that encompass the four branches. Other measurement tools rooted in Salovey and Mayer's theoretical model (1990) include the Trait Meta-Mood Scale (TMMS-24) (Salovey et al., 1995) and the tools developed by Shutte et al. (1998). They include the Shutte's Self-Report Emotional Intelligence Test (SSEIT), the Shutte Self-Report Inventory (SSRI), the Assessing Emotions Scale (AES), and the Emotional Intelligence Scale (EIS) also known as the Schutte Emotional Intelligence Scale (SEIS).

Goleman (1995) proposed inductively that emotional intelligence is a combination of emotional skills and competencies that bolster managerial performance and can be assessed by multi-raters (Bar-On, 2006; Boyatzis et al., 2001; Boyatzis, 2006; Spielberger, 2004). He defined EI as "the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships…" (Goleman, 1998, p. 317; Bulmer-Smith et al., 2009). This model proposes there are four dimensions of EI including self-awareness, social awareness, self-management, and relationship-management (Goleman, 1995; Spielberger, 2004). It is described as a mixed model of emotional intelligence and as a performance based model (Foster et al., 2015; Mayer et al., 2008; Spielberger, 2004). This model includes five emotional and personal competencies. Personal competencies include: a) self-awareness, b) self-regulation and c) motivation, and social competencies include: d) empathy and e) social skills. Another level of this model includes a list of about twenty competencies categorized under the four EI dimensions (Spielberger et al., 2004). For example, the competencies of flexibility and initiative are located within the self-management dimension.

The five emotional competencies depend on an individual's trait EI, but these skills are learnable and can be developed to promote workplace effectiveness and augment professional behaviors (Goleman, 1995; Foster et al., 2015; Spielberger, 2004). Goleman views emotional intelligence as being distinct from cognitive intelligence and asserts that it complements academic intelligence, a construct measured by academic performance (Goleman, 1998; Bulmer-Smith et al., 2009). One of the instruments associated with measurement of this construct is the Emotional Competence Inventory (ECI) developed by Boyatzis and Goleman. Using this tool, people who know a particular person can answer questions about that person's social and emotional competence (Spielberger, 2004).

Bar-On (2006) also proposed a competency-based model using an inductive approach. It is comprised of five dimensions that include fifteen corresponding competencies. They include the following dimensions along with their corresponding competencies: 1) intrapersonal (self-regard, emotional self-awareness, assertiveness, independence, and self-actualization), 2) interpersonal (empathy, social responsibility), 3) stress management (stress tolerance and impulse control), 4) adaptability (flexibility, reality testing, and problem solving), and 5) general mood (optimism and happiness) (Bar-On, 2006; Spielberger, 2004). This model is described as a competency-based model of emotional-social intelligence (Spielberger, 2004). Bar-On described his model as a "cross-section of interrelated emotional and social competencies, skills, and facilitators that impact intelligent behavior…in other words how we understand and express ourselves, understand others and relate with them, and cope with daily demands" (p. 14). According to Bar-On (2006), this construct can be measured by self-report. He asserted that EI could be developed over time and can be improved through training. One of the measurement tools used to measure EI from this theoretical perspective is the Emotion Quotient Inventory

(EQ-i) (Bar-On, 2006). This model is based on Bar-On's view that EI is "an array of noncognitive capabilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and pressures" (Bar-On, 1997, p.14; Petrides & Furnham, 2001).

Psychologists Petrides and Furnham (2001) espoused the framework of trait EI and described it as being a "constellation of traits and self-perceived abilities" (p. 425) assessed through questionnaires with a foundation in the domain of personality. This is in contrast to the ability-based model in which the theoretical basis lies in the domain of cognition. They theorize that trait EI occupies the lowest levels of personality hierarchies (Petrides & Furnham, 2001; Petrides et al., 2007). They developed a tool increasingly used in studies to assess trait EI called the TEIQue questionnaire that addresses 15 facets of trait EI. Facets include adaptability, assertiveness, emotion appraisal (of self and others), emotion expression, emotion management (others), emotion regulation, impulsiveness (low), relationship skills, self-esteem, self-motivation, social competence, stress management, trait empathy, trait happiness, and trait optimism (Petrides & Furnham, 2001). Instruments grounded in both ability EI and trait EI frameworks were used to measure EI in the studies included in this review.

**Methods**

To explore the existing evidence of the relationships between emotional intelligence and academic performance of undergraduate nursing students, an integrative literature review was conducted following the guidelines recommended by Torraco (2005). The integrative review method was selected due to EI being an emerging topic in nursing education that would benefit from updated perspectives based on evidence that both support and contradict associations between EI and academic performance. This concept has been studied in other disciplines, and

researchers are tasked with comparing studies in and outside of nursing. It is appropriate to use integrative reviews when research spans different fields and when contradictory evidence is reported (Torraco, 2005). Online nursing and psychology databases that were searched included CINAHL, Medline, PubMed, and PsychInfo. The steps used to complete this review included 1) selecting the type of review article to be written, such as a new topic or mature topic, and demonstrating the need for writing an integrative review on the selected topic, 2) organizing information around a coherent theoretical or conceptual model, 3) presenting the methods used for searching and selecting the literature to be examined including key words and databases used, 4) discussing the criteria used for keeping and discarding articles for the review, and 5) using a table or evidence matrix to organize articles by concepts or study findings with the purpose of discovering and comparing patterns.

**Inclusion and Exclusion Criteria**

To find relevant literature, search limits were set for research journals and dissertations published between 1990 and 2021 to include all possible articles related to emotional intelligence, nursing students and academic performance. The following search words and combinations were used: *emotional intelligence and nursing students and academic performance, emotional intelligence and nursing students and academic achievement, emotional intelligence and nursing students and grade point average, emotional intelligence and nursing students and standardized tests and emotional intelligence and nursing students and NCLEX-RN.* There were no limitations to articles based on geographic locations, culture, or research designs. Excluded articles included those not published in English, articles about nursing education topics not related to emotional intelligence in combination with academic performance or achievement, articles related to graduate nursing students, articles related to students of other health care

professions such as medicine or dentistry, and studies based on other populations of students such as non-nursing undergraduates or secondary school students. Informational articles describing interventions that promote emotional intelligence or academic performance were also excluded.

Articles for inclusion were limited to empirical research related to measuring relationships of emotional intelligence to academic performance in the context of standardized test performance, factors directly affecting academic performance, such as nursing course or program completion, and student GPA. Also included were commentaries on specific studies included in this review, pertinent systematic, integrative, and narrative reviews, and one dissertation.

**Results**

Fifty-seven articles were initially identified and then sorted according to the subsequent topics associated with student academic performance or achievement: a) performance on standardized readiness tests or NCLEX-RN, b) academic achievement as evidenced by successful completion of nursing courses or a nursing program, and d) academic achievement as evidenced by student GPA during or at completion of a nursing program, at either the baccalaureate or associate's degree level. Twenty articles were identified from the list derived from the search terms previously discussed, and reference lists related to those articles yielded ten more articles. The final inclusion count for this review was thirty articles. Removal of the thirty-seven articles from the original list was done after determining they did not meet inclusion criteria. Articles that addressed EI in addition to non-academic topics, or academic topics other than standardized tests, nursing course or program completion, and GPA, were excluded, as well

as articles pertaining to non-nursing students, pre-nursing students or graduate nursing students. One-hundred percent of the selected articles were published after the year 2010.

Sixteen articles reported findings of relationships between EI and nursing student GPA. Six articles reported on EI and topics of course and program achievement. Of these, one article examined the association of EI scores to an academic performance ratio of courses passed and self-reported dropout tendency. Three articles addressed nursing student retention, and one examined EI related to passing nurses courses on the first attempt. One article dealt with academic procrastination, a factor that directly impacts academic achievement. One article reported on both nursing student GPA and the relationship of EI to course scores and course specific standardized test scores. This article was included in the discussion of both standardized tests and GPA. Two articles explored EI and standardized tests. Two articles were commentaries on articles included in this review. Four were literature reviews that met the criteria as outlined by LoBiondo-Wood and Haber (2018) and Moher et al. (2009).

Among the twenty-four non-literature review studies or commentary articles, all were quantitative designs (100%). Twenty-one (70%) were descriptive studies and three (30%) were experimental or quasi-experimental studies. Thirteen (43.33 %) were international studies with the majority based in Australia. Two studies addressed ADN level nursing students, thirteen studies addressed BSN level nursing students, three studies discussed pre-registration level undergraduate nursing students, one discussed junior college level non-BSN students, and five described their sample as undergraduate nursing students enrolled in a university setting. To assess EI, eight studies used the MSCEIT, five studies used the TEIQue, four studies used the SSEIT, two studies used the EQi, two studies used the AES, one study used the ESI, one study used the EIS, and one study used the TMMS-24.

The literature reviews selected for this review included two integrative reviews, one systematic review, and one narrative review. The systematic review included articles related to nursing and academic performance as well as information about medical and dental students. It included discussion about results from the nursing student articles that were also included in this review. The narrative review examined articles regarding EI and affective events on nursing students and included information about academic performance. It also included articles from this review. One integrative review examined EI and resilience as a combination of variables that affect academic performance, and the other integrative review examined the combination of EI and critical thinking (CT) and the effect of this combination of variables on academic performance. This integrative review focused on articles related to the association of EI to academic performance. This review was needed as no reviews were found to date in the literature that addressed the relationship of EI to academic performance described in terms of standardized test performance, course or program achievement, and nursing student GPA.

The results presented in this review were based on three major concepts related to emotional intelligence and undergraduate nursing student academic performance: a) the relationship of EI to standardized tests b) the relationship of EI to nursing course or program achievement, and c) the relationship of EI to GPA. There is a discussion for each concept, and the details regarding the aims, samples, study designs, EI concept measurement tools, results and recommendations, are detailed on Table 1 (see Appendix A). This table was organized by the concepts outlined above.

**Emotional Intelligence and Standardized Test Performance**

The NCSBN assesses skills that relate to interpersonal interactions on NCLEX-RN, and as EI constitutes the ability to recognize and manage emotions of one's self and others, it merits

exploration as a factor contributing to NCLEX-RN achievement (Rode & Brown, 2019). Only two studies were found that examined the variables of EI and standardized test performance outcomes. Rode and Brown (2019) explored relationships between EI scores and nursing student performance on the Kaplan Nursing Assessment Test (NAT), which is a standardized readiness test, and passing NCLEX-RN. From their sample of 53 senior level undergraduate nursing students, they looked at scores on the MSCEIT V2.0 and compared them to scores on the NAT and passage of NCLEX-RN. They found that global EI scores were significantly associated with NAT scores and passing NCLEX-RN. The *understanding emotions branch* significantly predicted NAT performance, and the *perceiving emotions* and *understanding* emotions branches significantly predicted NCLEX-RN achievement (Rode & Brown, 2019). Strickland et al. (2017) addressed EI and GPA, but also explored correlations between EI as measured on the MSCEIT, and student scores on the HESI standardized end-of-semester specialty examinations of nursing fundamentals and pathophysiology. No significant correlations were found between EI and subject test scores.

A study done by Opsahl et al. (2018) looked at the effects of a comprehensive program to improve NCLEX-RN pass rates that included a component of EI education. This education was incorporated into the first year of the program by emotional quotient intelligence certified advisors. During their senior year, students received other academic supports such as a twelve-week online personalized coaching with an MSN prepared nurses and NCLEX-RN support tools provided by Assessment Technologies Institute (ATI). The NCLEX-RN pass rates were compared among groups who graduated before and after the implementation of this program, and there was a significant improvement in pass rates after the program's implementation. No tools were used to assess EI, and it is unclear how EI factored into the NCLEX-RN outcomes. The

sample sizes used in each study were small, and the sample in Rode and Brown's pilot study (n=53) was homogenous with 96% female and 87% White. Details regarding demographics (n=69) were not reported in the articles by Opsahl et al. (2018) or Strickland et al. (2017). The findings of these few studies suggest EI may positively affect standardized test performance.

**Emotional Intelligence and Nursing Course or Program Achievement**

Nursing student retention and attrition are problems that constitute a global challenge (Benington et al., 2020; Jones-Schenk & Harper, 2014; Marvos & Hale, 2015; Snowden et al., 2018). Attrition leads to fewer new nurse graduates entering a work force already imperiled by an anticipated nursing shortage (AACN, 2020). Nursing programs must identify ways to help students remain in their programs, meet criteria and graduate. They must also prepare them to pass NCLEX-RN the first time (Jones-Schenk & Harper, 2014). Studies that have looked at the association between EI and intent to stay in school, completion of a course or program, and intent to drop out, have been few with inconsistent findings.

**Positive associations between EI and retention, course or program completion, or intent to drop out.** Marvos and Hale (2015) examined anticipated retention in a nursing program and in the nursing profession. They found that anticipated retention had a positive correlation with total EI scores, strategic EI scores, and the *understanding emotions* branch of EI Nursing students who remained in a nursing program demonstrated significantly higher levels of EI (Jones-Schenk & Harper, 2014). Snowden et al. (2018) found that students, who scored higher on trait EI (TEIQue tool) at a baseline assessment, were more likely to complete a three-year nursing program than students who had lower EI scores. Rankin (2013) explored the predictive relationship between EI, GPA, clinical performance, and retention. This researcher found that EI predicted nursing program progression. In a study that explored the association of EI and self-

efficacy to academic procrastination, a phenomena in which students postpone academic activities (Solomon & Rothblum, 1984), researchers found that EI and self-efficacy had a negative association with academic procrastination, and that self-efficacy mediated the relationship between EI and academic procrastination (Guo et al., 2019). Roso-Bas et al. (2016) evaluated students' expressed intent to drop out, and found that higher levels of EI in the areas of *emotional clarity and repair* were related to lower levels of pessimism. Pessimism was found to be positively correlated with dropout tendency. Dropout tendency was negatively correlated with academic performance, which was expressed as a ratio between academic subjects passed and registered during a past academic year. Stenhouse et al. (2016) examined the relationship of EI to GPA, but also looked at the impact of previous caring experience, EI and social connection to EI scores in a cohort of first-year nursing and midwifery students in Scotland. Social connection as assessed by the TEIQue was statistically different between students who remained in their programs versus those who withdrew from their programs. Those who withdrew had lower scores on the TEIQue.

**No associations between EI and retention, course or program completion, or intent to drop out.** Benington et al. (2020) attempted to determine if there were differences in EI levels among ADN students who passed nursing courses on their first attempt compared to students who were unsuccessful. The SSEIT tool was used. Study findings indicated that there were no significant differences in number of course failures and EI, and no significant difference in EI between nursing students who were successful in passing nursing courses the first time versus those who failed courses on their first attempts. Snowden et al. (2018) assessed undergraduate pre-registration nursing and midwifery students' EI with both a trait (TEIQue) and ability (SEIS) tool. No significant relationship was found between ability EI and completion of a three-year

nursing program. In the study by Roso-Bas et al. (2016) on third year undergraduate nursing students, that utilized the TMMS-24 tool, there was a lack of statistically significant results to predict academic performance. These mixed findings may be attributable to the fact that different tools were used and different populations were assessed.

## Emotional Intelligence and Grade Point Average

Student grade point average is widely used among institutions of higher learning to assess student aptitude and capability of succeeding in academic programs (Jones-Schenk & Harper, 2014). In addition to possessing technical competency and critical thinking skills, nurses must be able to manage emotions of patients, caregivers, and other health team professionals to ensure the most optimal outcomes for patients (Cheshire et al., 2015; Codier et al., 2010; Faguy, 2012). Although many factors contribute to academic success, evidence points toward EI being an element that can affect academic performance (Bulmer-Smith et al., 2009; Foster et al., 2015). The following studies focus on the relationship between EI and academic performance expressed as GPA.

**Positive associations between EI and GPA.** Several studies have shown significant associations between EI and nursing student GPA (AkbarilLakeh et al., 2018; Beauvais et al., 2014; Codier & Odell, 2014; Fernandez et al., 2012; Foster et al., 2017; Nosek, 2015; Rankin, 2013; Shanta & Gargiulo, 2014; Sharon & Grinberg, 2018). The tools used to measure EI in these studies included the MSCEIT (Beauvais et al., 2014; Codier & Odell, 2014; Nosek, 2015; Shanta & Gargiulo, 2014), which was used in all of the U.S. studies, the TEIQue (Fernandez et al., 2012), the ESI (AkbarilLakeh et al., 2018), the AES (Foster et al., 2017; Rankin, 2013), and the SSRI (Sharon & Grinberg, 2018). These studies were based in the U.S., Iran, Israel, the UK, and Australia. Self-reported GPA in the studies by Beauvais et al. (2014), Nosek (2015), and

Shanta and Gargiulo (2014) were used to assess academic performance. School records were used to access GPA in the remaining studies (AkbarilLakeh et al., 2018; Codier & Odell, 2014; Fernandez et al., 2012; Foster et al., 2017; Rankin, 2013; Sharon & Grinberg, 2018). The populations studied included BSN students (Beauvais et al., 2014; Codier & Odell, 2014; Fernandez et al., 2012; Noesk, 2015; Shanta & Gargiulo, 2014; Sharon & Grinberg, 2018), undergraduate students enrolled in a university program (AkbarikLakeh et al., 2018; Rankin, 2013), and students enrolled in a pre-registration nursing program (Foster, 2017).

Some researchers examined the relationship between EI and GPA during the first, second, and senior year of nursing school. In their sample of 72 students, Codier and Odell, 2014 found total EI scores and experiential area subscores as measured on the MSCEIT during the first year of nursing school, correlated significantly with pre-nursing school admission GPA. Sharon and Grinberg (2018) found significant correlations between total EI scores as measured on the SSRI and annual GPA of first year and second year nursing students in their sample of 110 participants. Emotional intelligence levels in year two were improved over year one. A sample of fifty senior nursing students in the study by AkbariLakeh et al. (2018) were assessed with the ESI tool and those scores were found to have a significant positive relationship to student GPAs earned during the final two semesters of school.

Three other studies explored the relationship of EI to GPA and other variables. Fernandez et al. (2012) examined the association between trait EI as measured on the TEIQue, learning strategies, and GPA. They found statistically significant correlations between EI scores, CT scores, help seeking, and peer learning strategies, and they found EI to be a significant predictor of academic achievement. Nosek (2015) explored the relationship of overall or total EI scores and EI branch scores with demographic factors and self-reported GPA among their sample of 71

BSN students. Nosek found that a higher GPA and being of Asian ethnicity was significantly associated with higher scores on most of the EI branches measured on the MSCEIT. Beauvais explored the relationship of EI and GPA and psychological empowerment, resilience, and spiritual well-being among graduate and undergraduate students. In this study's sample of 73 undergraduates, EI branch 1 scores, *perceiving emotions*, was significantly correlated to self-reported GPAs. Overall EI and other EI branches were not associated with GPA.

Many of the studies that explored EI associations with GPA had cross-sectional designs. Three studies had longitudinal designs. Foster et al. (2017) used a repeated measures design that followed a sample of 111 pre-registration students at four time points from the beginning until the end of their nursing program and examined the association of EI scores to GPA. They found that one EI subscale score on the AES, *managing own emotions*, was related to higher GPA in that for every one point increase in weighted academic mark (WAM), this EI score increased by .10 on average on the subscale. Shanta and Gargiulo (2014) found in their quasi-experimental between-groups comparison study of BSN students that self-estimated GPA was the only significant predictor of EI as measured on the MSCEIT. Rankin (2013) examined the predictive relationship between EI and outcomes of student clinical practice performance, retention, and academic performance expressed as the mean score for all program assignments completed during the first year from a sample of 178 students. A significant predictive relationship was found between EI and clinical practice performance, retention, and academic performance.

**No associations between EI and GPA.** Some studies have shown no statistically significant relationships between EI and academic performance as demonstrated in nursing student GPA (Beauvais et al., 2014; Cheshire et al., 2015; Eyong & Rathee, 2017; Por et al., 2011; Radford, 2010; Stenhouse et al., 2016; Strickland et al., 2017; Suliman, 2010). Instruments

used in these studies included the MSCEIT (Beauvais et al., 2014; Cheshire et al., 2015; Strickland), the TEIQue (Eyong & Rathee, 2017; Radford, 2010; Stenhouse et al., 2016), the EQ-i (Suliman, 2010), and the SEIS (Por et al., 2011). All of these studies assessed EI through school records on student GPA except for Suliman (2010) and Beauvais et al. (2014), who collected GPA data through student self-report. Countries represented in these studies included the U.S.A., Scotland, the U.K. and Saudi Arabia. All studies listed here explored the population of BSN or other undergraduate university or pre-registration students except for Eyong and Rathee (2017) whose population consisted of ADN nursing students.

The influence of EI on GPA was examined along with other variables in some of these studies. Suliman (2010) found no significant relationship between EI, learning abilities or styles, and academic success (GPA). Eyong and Rathee (2017) found no statistical correlational relationship in predicting GPA based on EI and authentic leadership. Stenhouse et al. (2016) explored the influence of previous caring experience, EI and social connection on academic performance. EI was not associated with academic performance (GPA). The relationship of EI to stress, coping, well-being and professional performance (GPA), was examined by Por et al. (2011) who found that EI was positively correlated to well-being, problem-focused coping, and perceived nursing competency. Emotional intelligence was negatively related to perceived stress. No statistically significant relationship between EI and GPA was found. Beauvais et al. (2014) explored the relationship between EI, psychological empowerment, resilience, spiritual well-being, and academic success (GPA) and found that overall EI was not associated with GPA, however EI branch one, *perceiving emotions*, was significantly related to GPA. Cheshire et al. (2015), Strickland et al. (2017), and Radford (2010) found no significant associations between EI and nursing student GPA.

## Discussion and Implications for Practice

The recommendations from this review emphasized three areas including emotional intelligence and standardized test performance, EI and nursing course program achievement as indicated by program dropout, retention, and satisfactory course or program completion, and EI and nursing student GPA. Implications for nursing education are based on findings among these three categories of studies related to EI and academic performance.

### Emotional Intelligence and Standardized Test Performance

Findings from the studies done by Rode and Brown (2019) and Opsahl et al. (2018) suggested an association between facets of EI and standardized test performance. These studies support the notion that EI is a skill worth teaching and developing in students in undergraduate nursing programs to enhance student performance on tests such as NCLEX-RN readiness predictor tests and NCLEX-RN. Studies using larger samples that examine multi-faceted approaches to improving test performance, such as the incorporation of specific EI content in curriculums, were recommended in both studies. It is important to determine predictors of student success on NCLEX-RN to include curricular activities that help students pass the first time and accelerate their entry into professional practice (Opsahl et al., 2018; Rode and Brown, 2019; Strickland et al., 2017). Studies are needed to examine the role of specific EI components, such as the use of emotions and the regulation of emotions, to problem-solve and manage stress. Investigation of EI along with factors known to affect test performance, such as test anxiety (Cleary et al., 2018; Lewis et al., 2017) and critical thinking skills (Christianson, 2020), will provide insight to nurse educators to design focused learning activities that incorporate EI skills with critical thinking development and stress management.

**Emotional Intelligence and Nursing Course or Program Achievement**

Academic achievement depends on student capability of passing required courses and graduating from nursing programs in a timely manner. Efforts to maximize student retention and decrease rates of attrition and dropout are at the forefront of implementing successful nursing programs. The Bureau of Labor Statistics' Employment Projections for 2019-2029 reported registered nursing is one of the top occupations expected to increase growth through 2029. The RN workforce is anticipated to grow from 3 million (as of 2019), to 3.3 million in 2029. A shortage of RNs is projected to spread throughout the U.S. between 2016 and 2030 with the greatest impact on the southern and western parts of the country (AACN, 2018; Zhang et al., 2018). Attrition and dropout rates were reported to be serious problems challenging ADN programs in the U.S. with a rate of 47% (Benington et al., 2020; Harris et al., 2014) and in Spain and other European states (Roso-Bas et al., 2016). Consequently, there is a need to identify factors that increase retention among nurses and nursing students.

Measured EI has been found to correlate positively with job retention among clinical staff nurses and overall clinical performance (Codier et al., 2009; Marvos & Hale, 2015) but there is minimal research into the relationship EI has on retention of nursing students. The six studies discussed in this review pertaining to EI and course or program completion, dropout and retention likelihood, revealed mixed findings. Both ability and trait EI instruments were used in studies from the U.S., Spain, Scotland, and China. Differences in methodological approaches, test variability, cultural differences, and variance among content offerings and content sequence among nursing programs that included pre-registration, ADN and BSN populations, could have all contributed to inconsistent findings. It is important for nurse educators to consider strengths and limitations of these studies when designing curriculums to support retention. Research that

delves into known factors that affect retention and attrition, such as students working full-time, not having social support systems, or being a non-traditional student (Benington et al., 2020; Harris, 2014) along with EI, will inform curricular designs that consider these factors to help students use their EI skills to overcome these challenges.

**Emotional Intelligence and Grade Point Average**

Student grade point average is considered the most important criteria for nursing school admissions and serves as the primary gauge for academic success throughout nursing school (Codier & Odell, 2014). As GPA is considered a major indicator of academic success, it is important to find elements that can be taught in curriculums to help students improve their grades. The evidence is growing showing an association between EI and GPA, although study findings to date are inconsistent. Studies that did not find associations between EI and GPA may underscore the theory that EI is measuring an intelligence other than traditional cognitive intelligence (Cheshire et al., 2015). Even if EI is not directly affecting GPA, it may be moderating other factors that do directly affect GPA (Eyong & Rathee, 2017).

Many studies in this review were comprised of cross-sectional designs, used convenience sampling of specific populations of nursing students at one academic site, and samples were mostly homogenous with a majority of female subjects, White or Caucasian ethnicities, and students younger than thirty years, limiting generalizability to larger and more diverse populations. Lack of consistent use of EI measurement tools throughout studies creates a challenge to evaluating findings for specific guidance to curriculum activities that support EI development. It is clear that there is much more work to do, but the literature demonstrates a solid start to growing the body of knowledge related to EI and academic performance.

One recurrent theme among the studies was the need to assess what EI content exists already in curriculums, and to explicitly incorporate EI-based material along with EI competencies built into program outcomes (Benson et al., 2010; Cheshire et al., 2015; Eyong & Rathee, 2017; Por et al., 2011). Many researchers have called for implementation of EI skill-building activities throughout a nursing program, and have indicated a need to then do studies to evaluate effectiveness (AkbarilLakeh et al., 2018; Beauvais et al., 2014; Codier & Odell, 2014; Fernandez et al., 2012; Sharon & Grinberg, 2018; Suliman, 2010). Variables that have been explored in conjunction with EI and have shown some association with academic performance include critical thinking, resilience, coping with stress, leadership, and empathy and compassionate care (Christianson, 2020; Cleary et al., 2018; Eyong & Rathee, 2017; Gratrix, 2014; Lewis et al., 2017; Montes-Berges & Augusto, 2007; Rankin, 2013). Development of these concepts with specific curricular activities and exploration of mediating effects with EI would help nurse educators employ efficient teaching strategies. Learning strategies that support self-awareness, such as reflection journals, and that support self-efficacy, may strengthen EI skills (Harrison & Fopma-Loy, 2010; Perkins & Schmid, 2020). Tutorial workshops that foster motivation and self-confidence may also boost EI skills that influence how students perform academically (Roso-Bas et al., 2016). Activities gleaned from the arts and humanities may also be considered to augment didactic and clinical experiences and nurture EI development.

Some researchers have advocated for using EI scores as part of admission criteria for nursing programs along with GPA (Cheshire et al., 2015; Cleary et al., 2018; Codier, 2015; Codier & Odell, 2014; Foster et al., 2017; Gratrix, 2014; Jones-Schenk & Harper, 2014; Rankin, 2013; Shanta & Gargiulo, 2014; Sharon & Grinberg, 2018; Stenhouse et al., 2016). Snowden et al. (2017) and Jones-Schenk and Harper (2014) cautioned that more research is needed, and that

it should not be something that excludes students from admission. Emotional intelligence ability theory submits that EI can be learned and trait theory offers that it can be further developed. It has been proposed that it may be useful to obtain baseline EI scores once students enter a program to target weaknesses for improvement and build on strengths throughout the curriculum (Nosek, 2015; Singh et al., 2020). Important considerations include assessment of EI throughout the nursing program to determine how the program itself is influencing EI and if teaching strategies are effective in generating positive student academic outcomes.

Although the focus of this review was the influence of EI on academic performance expressed as test performance, program or course completion, and GPA, it cannot be discounted that performance in the clinical realm also contributes to academic performance in addition to didactic components. Clinical performance that goes beyond technical execution of basic nursing skills requires in-depth critical thinking, communication, and interpersonal skills, all attributes of EI. Nurse faculty have indicated that having a 4.0 GPA does not guarantee nursing excellence once engaged in professional nursing practice (Cheshire et al., 2015; Codier & Odell, 2014; Codier et al., 2011). Inclusion of EI- promoting activities in both clinical and didactic components, and ongoing assessment of effectiveness, will support academic achievement that is later reflected in students who become highly successful nurses.

**Theoretical Implications**

Theoretical models provide a framework of a concept that guide interpretation of observed phenomena (Portney & Watkins, 2015). Multiple models of EI exist that take slightly different approaches to explaining the nature of EI. The ability and trait models of EI that have guided research in nursing education share commonalities and overlap reflecting interpersonal and intrapersonal skills, but vary in ideology regarding the domain of origin that direct emotional

interpretation and behaviors. Identification of competing models to sort conceptual structuring of studies within an integrative review is appropriate, and aids in clarification of what study findings may mean in a given context (Torraco, 2005).

The ability model has been promoted in the literature as being most relevant to guide studies related to nursing education, however, more studies are needed that conscientiously consider the intricacies inherent to each model to assess what they can contribute to a nursing model of EI. Regarding academic performance, the literature suggests an association exists, but some do not, which could support Mayer and Salovey's assertion that EI is a distinct intelligence from personal and social intelligences, and does not reflect an intelligence traditionally represented by academic achievement (Cheshire et al., 2015; Mayer et al., 2016; Por et al., 2011; Strickland et al., 2017). However, its role as a mediator of other factors that affect cognitive processes that impact academic performance warrant deeper investigation. Nursing encompasses elements used by other disciplines that have researched EI, including psychology, business, education, and medicine, but there are qualities unique to a profession in which emotional work is so highly embedded. A model of EI that considers the unique experiences of what emotional intelligence means in the context of nursing and nursing education is needed to hasten nursing research that would guide nurse educators to maximize emotional intelligence in their students.

**Future Research**

It is clear that EI factors in to success in nursing school, but there is still much to learn about how it facilitates academic achievement. More information is needed about what specific activities can be incorporated into curriculums that will help students evolve EI skills. Evidence suggests that emotionally intelligent nurses improve patient outcomes (Bulmer-Smith et al., 2009; Foster et al., 2015; Shanta & Gargiulo, 2014). For this reason, it is critical to expand

understanding of this concept in nursing education. Incorporation of research designs including both quantitative and qualitative approaches would expedite advancement of nursing knowledge. There is a need to increase sample sizes and study cohorts reflecting diversity in gender, ethnicity, and age, in order to increase generalizability to the larger population (Cheshire et al., 2015). There is a dearth of research that addresses EI and academic achievement as it pertains to males, minority populations, and non-traditional nursing students. There are students who are older, working, raising families and perhaps pursuing nursing after having had other careers, and little is known about how EI affects academic performance among these students (Fernandez et al., 2012).

Studies that examine more than one academic institution or that follow a cohort over time are needed to learn about long-term effects of EI (Fernandez et al., 2012). Longitudinal studies would deepen understanding of how EI changes in students throughout a curriculum, and would provide insight in determining if interventions and teaching strategies are effective (Beauvais et al., 2014; Fernandez et al., 2012; Por et al., 2011; Strickland et al., 2017). To ascertain if nursing schools are equipping students with the emotional skills needed to prosper in the workplace, it will be important to conduct studies that follow students before and after graduating. Studies that examine a cohort while in nursing school, and then follow them as they being working as RNs would provide insight into usefulness of curricular EI interventions (Beauvais et al., 2014; Codier & Odell, 2014).

Relationships of EI to concepts that address student learning styles, coping abilities, resilience, and critical thinking merit further exploration. Comparison studies that assess similarities and differences between nursing students and students of other health care disciplines are recommended and maybe useful in building knowledge about successful functioning in

interdisciplinary teams, and the role EI may play in these interactions (Radford, 2010). It has been suggested by a few researchers that high EI does not always promote favorable behaviors as it can be mediated by other personal traits (Snowden et al., 2018; Petrides & Furnham, 2003). It is necessary to increase understanding of the specific branches or components of EI to understand the nuances of this concept and to determine how it can be cultivated to promote student success.

Exploratory studies that assess EI content already embedded in a curriculum would be valuable to nurse educators who continually revise curriculums to ensure quality. Some nursing programs are transitioning from a traditional curricular model to concept-based nursing (Repsha et al., 2020). Deepening knowledge of teaching strategies that develop nursing students' EI skills would prove timely as some schools make this transition. Qualitative studies are sorely needed to provide a foundation for a nursing framework of EI that can be used in nursing education. Qualitative studies that explore the emotional experience in clinical and didactic settings will enable a deeper understanding of the concept that could be used to inform curricular designs tailored to nursing student populations.

**Study Limitations**

Limitations of this study included the unintentional omission of relevant articles. All of the empirical research was comprised of quantitative designs showing a lack of qualitative evidence. Studies are limited, especially in the United States, that look at the specific role EI has on academic performance in nursing school, and there is wide variability in the tools used to assess this relationship making it difficult to compare outcomes across studies. Some findings support that that there is a significant relationship between EI and academic achievement and some findings do not support this. Studies also lacked diversity in the majority of the articles

reviewed with relation to gender, race and ethnicity, and age. Most of the subjects across studies were female, many reported being White or Caucasian, and most were younger than thirty years of age. This limits generalizability to larger populations. The absence of qualitative designs also limits deeper insights into the construct of EI in nursing. Expanded understanding of EI is necessary to guide efforts in educational interventions that effectively enhance EI in the manner that would be most useful to nursing students.

## Conclusion

The evidence illuminating the role of EI in academic performance is small but growing. Although limited by few and often homogenous study samples, absence of qualitative research designs, and varied theoretical perspectives guiding research efforts, many studies have had the rigor to suggest a strong possibility of EI being significantly associated with academic achievement. Nursing is a profession in which emotional competence is foundational to delivering holistic and compassionate care that positions patients and their families to reach a higher level of health and well- being. The interplay between cognitive intellect and emotional aptitude is worthy of exploration as this combination underlies the art and science of nursing. It is imperative that nurse educators find salient elements that cultivate emotional skills and incorporate them into curriculums to promote success in nursing school and beyond.

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Chapter 4: Relationship of Undergraduate Nursing Students' Emotional Intelligence and other Factors to ATI-NCLEX-RN Comprehensive Predictor Examination Performance


## Abstract

**Background/Problem:** Nursing schools prepare nursing students to provide competent and safe nursing care and to pass NCLEX-RN for professional licensure. The ATI-NCLEX-RN Comprehensive Predictor Examination from Assessment Technologies Institute (ATI) has been used to predict the likelihood of passing NCLEX-RN on the first attempt. Emotional intelligence (EI), critical thinking (CT), and resilience contribute to academic performance and may influence test performance.

**Purpose:** The purpose of this study was to determine significant predictors of ATI-NCLEX-RN Comprehensive Predictor Examination test performance among the variables of EI, CT, and resilience among undergraduate senior nursing students.

**Hypothesis:** There will be an association between EI, critical thinking, resilience, and other demographic factors to nursing student test performance on the proctored ATI-NCLEX-RN Comprehensive Predictor Examination.

**Methods:** A nonprobability convenience sample of 45 undergraduate nursing students at the University of Texas at El Paso completed the MSCEIT V2.0, CCTST, CD-RISC, and demographic surveys. Survey results were compared to ATI-NCLEX-RN Comprehensive Predictor Examination test scores to determine significant relationships.

**Analysis:** Quantitative data were analyzed through conduction of multiple linear regression.

**Results:** There was a statistically significant association between demographics, EI, CT, and resilience collectively to predict ATI-NCLEX-RN Comprehensive Predictor Examination scores.

*Key words: emotional intelligence and nursing students, resilience, critical thinking, NCLEX-RN, ATI comprehensive predictor exam, standardized readiness exams*

## Relationship of Undergraduate Nursing Students' Emotional Intelligence and other Factors to ATI-NCLEX-RN Comprehensive Predictor Examination Performance

### Problem and Significance

The increasing demands of a rapidly evolving health care environment necessitate the building of a workforce of nurses skilled at incorporating complex clinical knowledge and interpersonal skills to deliver client-centered, evidence-based care (National Council of State Boards of Nursing [NCSBN], 2019). A continuing nursing shortage and movement toward health care reforms underscore the need for preparing nurses to meet these crucial challenges (American Association of Colleges of Nursing [AACN], 2019). It is projected that the United States will experience an intensified shortage of registered nurses (RNs) that is expected to spread throughout the country by 2030 (Juraschek et al., 2019). Compounding this shortage is the growing number of baby boomers and the rising number of nurses expected to retire in the next ten years (Buerhaus et al., 2017).

The shortfall of RNs continues to be a significant problem and adversely affects the quality of health care across settings (AACN, 2019). Insufficient nurse staffing has been shown to be associated with increased rates of readmission (Tubbs-Cooley et al., 2013) and increased rates of patient mortality (Aiken et al., 2014; Needleman et al., 2020). To mitigate the impact of the nursing shortage, baccalaureate schools of nursing throughout the United States are tasked with building a workforce of highly competent, well-educated nurses who possess the acumen to manage complex patient situations in collaboration with other health care professionals. To ensure a proficient nursing workforce, nurse faculty aim to impart strong critical reasoning, clinical judgment, communication, and health assessment skills that are essential to enable nurse graduates to provide safe, high quality nursing care (AACN, 2008).

In addition to creating well-rounded, highly skilled nurses, nursing schools are also responsible for preparing students to pass the National Council Licensure Examination for Registered Nurses (NCLEX-RN) on the first attempt to gain prompt entry into professional nursing practice (NCSBN, 2019; Opsahl et al., 2018). The NCSBN is the licensing authority that regulates the practice of nursing through its member board jurisdictions including states, commonwealths, and territorial boards of nursing. To ensure the safety of the public, candidates for licensure must pass the NCLEX-RN examination administered by the NCSBN, which measures competencies required for newly licensed, entry-level nurses.

To support NCLEX-RN success, many nursing programs use standardized readiness tests to assess the likelihood of their graduates passing the NCLEX-RN (Opsahl et al., 2018; Rode & Brown, 2019; Taylor et al., 2014; Yeom, 2013). Assessment Technologies Institute (ATI), LLC. is one company that provides testing resources to nursing schools to increase their NCLEX-RN pass rates. Resources are provided throughout the curriculum and include supplemental resources, videos, and practice examinations on various topics and client-need categories that are assessed on the NCLEX-RN. Subject areas covered include fundamentals of nursing, pharmacology, adult medical-surgical nursing, maternal and newborn care, mental health, and nursing care of children (Assessment Technologies Institute [ATI], 2019). The proctored ATI-NCLEX-RN Comprehensive Predictor Examination is administered to nursing students in the semester prior to graduation to assess their probability of passing the NCLEX-RN (ATI, 2019).

Assessment Technologies Institute (ATI) states that students who achieve a certain score on the ATI- NCLEX-RN Comprehensive Predictor Examination have an increased likelihood of passing NCLEX-RN. They provide students with individual scores that are linked with probability of passing NCLEX-RN. For example, if a student scores between an 80.7% and

100% on the ATI-NCLEX-RN predictor, ATI states that the student has a 99% chance of passing NCLEX-RN (ATI, 2017) on the first attempt. Although it is difficult to predict with certainty first time NCLEX-RN pass rates due to the numerous variables that can influence a student's ability to be successful on this exam, many nursing schools use standardized readiness tests as one approach to prepare students for test achievement (Phelan, 2014).

Emotional intelligence (EI), critical thinking (CT), and resilience have been explored in the literature for their possible relationships to nursing clinical performance and nursing student academic performance. There has been a paucity of research on the relationship of EI, critical thinking, or resilience to performance on the NCLEX-RN, or on any of the standardized readiness tests that predict NCLEX-RN performance. Nursing programs are challenged to discover those elements that not only contribute to passing the NCLEX-RN, but that also build on the skill-set needed by nursing students to be effective providers of quality health care. Increased understanding of these attributes will guide curricular design and inform teaching strategies to develop these qualities in nursing students. Increased knowledge of the relationships between EI, critical thinking, and resilience to NCLEX-RN performance will provide nursing faculty with additional tools to facilitate student success on standardized readiness exams, and ultimately NCLEX-RN.

The purpose of this study was to examine the relationships between EI, critical thinking, and resilience, in addition to demographic factors, to identify the strongest predictors of test achievement on a standardized NCLEX-RN student readiness exam among undergraduate senior nursing students enrolled in a baccalaureate degree-nursing program. This program is offered by an urban public university located on the United States-Mexican border. Findings will provide

insight into designing programs of education that promote EI, critical thinking, and resilience in a manner that facilitates passage of NCLEX-RN on the first attempt.

**Review of the Literature**

The NCLEX-RN is the consistent method used to verify the minimum required knowledge of nurse graduates to ensure patient safety and to provide licensure for professional nursing practice (NCSBN, 2019; Opsahl et al., 2018). Schools of nursing are expected to prepare nurses to pass NCLEX-RN and to equip them to become providers of high-quality patient care. Pass rates of nurse graduates who take the NCLEX-RN are used by accrediting bodies to evaluate program quality and award accreditation (AACN, 2019). Factors associated with performance on nursing licensure exams have been examined for more than fifty years and have focused on both academic and non-academic variables (Giddens & Gloeckner, 2005; Simon et al., 2013).

The concepts of EI, critical thinking and resilience, and their association with NCLEX-RN achievement, have been minimally explored in the literature. Few studies have investigated the relationships of critical thinking to NCLEX-RN examination performance (Romeo, 2013). An integrative review of 12 quantitative studies published between 1996 and 2006 was done by Romeo (2010) that examined studies with findings of both significant and insignificant associations between critical thinking and NCLEX-RN performance. To date, four published studies found significant relationships between critical thinking and passing NCLEX-RN (Facione & Facione, 1997; Frye et al., 1999; Giddens & Gloeckner, 2005; Kaddoura et al., 2017b). No studies were found that showed a significant relationship between critical thinking and performance on standardized readiness tests that predict NCLEX-RN success.

Fewer studies have explored possible relationships between EI or resilience and NCLEX-RN test and standardized readiness test performance. One study by Opsahl et al. (2018) examined the effect an educational intervention that included a component of EI, had on NCLEX-RN pass rates for a sample of 69 undergraduate nursing students at one university. Results of this study revealed an increased rate of passing NCLEX-RN. Another study by Rode and Brown (2019) explored the relationship of EI to performance on the Kaplan Nursing Assessment Test (NAT), a standardized readiness test. They found that global overall EI scores were significantly related to both NAT and NCLEX-RN test performance. No studies were found that examined relationships between resilience and NCLEX-RN achievement or standardized readiness test performance. To elucidate the importance of the concepts of EI, critical thinking, and resilience and their possible influence on test readiness, it is important to understand what these examinations entail.

**The NCLEX-RN Examination**

Graduate nurses gain entry into professional practice by passing NCLEX-RN (NCSBN, 2019). The NCLEX-RN assesses student aptitude in the client-care needs categories of safe and effective care management, health promotion and maintenance, psychosocial integrity, and physiological integrity. It is administered using computerized adaptive testing which proceeds based on user interaction (NCSBN, 2019). As a measure of program effectiveness, the accrediting bodies of the Commission on College Nursing Education (CCNE) and National League of Nursing (NLN) require schools of nursing to demonstrate NCLEX-RN benchmark pass rates of 80% or higher for first-time test takers for the most recent calendar year of January 1st through December 31st, 80% or higher for all tests takers (first-time and repeaters), and a pass rate of 80% or higher for the three most recent calendar years (CCNE, 2018, NLN, 2016). State

Boards of Nursing also set benchmarks for first-time pass rates to ensure safe standards of nursing care (Serembus, 2016). Typically, schools of nursing must maintain a NCLEX-RN pass rate of 80% annually to have Board approval, and if this benchmark is not met, a nursing program will be placed on provisional status for a certain period of time so that deficiencies may be corrected (NCSBN, 2019).

Pass rates for NCLEX-RN have been trending upward, but there is still room for improvement and schools of nursing are continuously challenged to increase NCLEX-RN pass rates (Opsahl et al., 2018). For nurses educated in the United States, the total NCLEX-RN first-time pass rate among graduates including diploma, baccalaureate, associate and other special programs in 2016 was 84.57% of 157,073 total candidates. In 2017, the first-time pass rate was 87.11% of 157,720 candidates, and in 2018, the first-time pass rate was 88.29% of the 163,238 candidates who completed NCLEX-RN (NCSBN, 2019). The most recent year-end figures report 88.18% of 171,387 candidates that passed NCLEX-RN in 2019 (NCSBN, 2020). Nursing school faculty continue to seek ways to increase the number of students who pass the NCLEX-RN on the first attempt to expedite new graduate entry into practice and to prevent the negative effects of graduates failing on the first attempt. Failures result in graduate experiences of embarrassment, anxiety, guilt, decreased self-esteem, and social stigma, which can all negatively affect further attempts at passing NCLEX-RN. These trends directly affect nursing workforce shortages (Griffiths et al., 2004; Roa, et al., 2011; Shoemaker et al., 2017; Yeom, 2013).

**Standardized Readiness Examinations as Predictors of NCLEX-RN Test Performance**

Many schools of nursing use standardized readiness tests to assess the likelihood of their students' probability of passing NCLEX-RN (Alameida et al., 2011; Harding, 2010; Kaddoura, 2017a). The most widely used standardized readiness examinations include the ATI-NCLEX

Comprehensive Predictor Examination from Assessment Technologies Institute (ATI) and the Health Education Systems, Inc. (HESI) Exit Assessment Examination ($E^2$) from Elsevier (DiBartolo & Seldomridge, 2005; Phelan, 2014). The ability of these two examinations to predict the passing of NCLEX-RN have been supported by many studies (Alameida et al., 2011; ATI, 2019; Brodersen & Mills, 2014; Harding, 2010; Langford & Young, 2013; Lauchner et al., 2008; Morrison et al., 2008; Nibert & Morrison, 2013; Penprase & Harris, 2013; Yeom, 2013; Zweighaft, 2013). Test scores from the ATI-NCLEX-RN Comprehensive Predictor Examination are used to determine probability of a student passing NCLEX-RN on the first attempt. This standardized readiness exam is constructed based on the NCLEX-RN test plan to ensure to the greatest extent possible that contents of the test measure the construct of entry-level nursing abilities as outlined in the NCLEX-RN examination developed by the NCSBN (Liu & Mills, 2017). Likewise, the HESI Exit Examination ($E^2$) also reflects the NCLEX-RN test plan (Zweighaft, 2013).

The HESI Exit Examination ($E^2$) is a computerized-based comprehensive nursing exam with 160 multiple-choice questions that test nursing content and application of critical thinking to clinical situations. It has been validated in nine studies as a predictor of NCLEX-RN success (Adamson & Britt, 2009; Langford & Young, 2013; Lauchner et al., 1999; Lewis, 2005; Newman et al., 2000; Nibert & Young, 2001; Nibert & Morrison, 2013; Nibert et al., 2002; Young & Wilson, 2012; Zweighaft, 2013). The ninth validation study by Zweighaft (2013) found $E^2$ to be predictive of NCLEX-RN achievement at 96.61%. Elsevier offers specialized content testing for nursing schools to administer throughout the curriculum and other resources to prepare students for $E^2$ and NCLEX-RN (Zweighaft, 2013). Faculty and students may use these resources throughout the duration of the nursing program as needed.

Assessment Technologies Institute (ATI) also offers nursing schools various resources as well as content specific preparatory tests and tutorial videos to assist them in preparing nursing students to pass the ATI-NCLEX-RN Comprehensive Predictor Examination and NCLEX-RN (ATI, 2019). Students at the University of Texas at El Paso use these ATI resources throughout the curriculum. They take proctored topic-specific ATI exams during each semester of nursing school that coincide with the topics covered in the courses they are currently enrolled in. Topics include nutrition for nursing, pharmacology for nursing, fundamentals for nursing, adult medical surgical nursing, community health nursing, mental health nursing, nursing care of children, maternal newborn nursing, and nursing leadership and management (ATI, 2019). Test performance on these preparatory exams are tied to grades that equal 10% of the total course grade in the associated courses in order to encourage students to seriously engage in preparation.

One ATI resource used by some nursing students is an interactive, media-rich, online tutorial called Nurse Logic 2.0. Students may employ this resource at any time throughout their curriculum. Using a wide array of case studies, videos, applied learning examples, and other resources, this program supports the development of study and test taking skills. Students are introduced to a learning model called the ATI Helix of Success that shows how knowledge and clinical judgment based on Quality and Safety Education in Nursing (QSEN) Competencies and the Institute of Medicine (IOM) recommendations for nursing education can be translated into test success (ATI, 2015).

Key nursing concepts, such as interdisciplinary collaboration, safety, and priority setting, are presented in four one-hour long online tutorial modules. The four modules consist of these topics: a) knowledge and clinical judgment, b) nursing concepts, c) clinical priority-setting frameworks, and d) testing and remediation strategies. Videos accompany the modules that teach

students how to critically read and answer NCLEX-RN-style test items. Each module provides two NCLEX-RN style tests, 20 items on each test, with one test aimed at beginning- level students and one aimed at advanced-level students. A critical thinking guide is located within each module that summarizes concepts of nursing knowledge and judgment and discusses priority-setting frameworks. Instructions on how to read test items critically are presented within this guide (ATI, 2015). Use of this tool is optional for students enrolled in the University of Texas at El Paso School of Nursing program. It is recommended to students who do not pass their topic-specific practice exams or who for any reason are in need of remediation. Only a few nursing instructors require students who fail the practice exams to complete the Nurse Logic 2.0 modules.

**The ATI-NCLEX-RN Comprehensive Predictor Examination**

The ATI-NCLEX-RN Comprehensive Predictor Examination test plan is updated based on the NCLEX-RN test plan that is reviewed and approved every three years (NCSBN, 2019; ATI, 2019). The purpose of this examination is to provide a numeric measurement of the likelihood of passing NCLEX-RN at the student's current level of readiness, and to guide remediation efforts based on content missed in the exam (ATI, 2017). The most recent psychometric analysis of this examination was conducted on students who took the ATI-NCLEX-RN Comprehensive Predictor 2016 version for the first time between April 15, 2016 and December 8, 2016. The number of means, standard deviations, reliability coefficients, and standard errors of measurement (SEM) for the total test score, and scores in each of the standard client need categories and subcategories, were assessed. The reliability index for the total score for a total number of 150 items included a mean of 70.8, standard deviation of 8.72, reliability of

0.96, and a SEM of 1.73. Reliability measures for the subcategories ranged from 0.73 to 0.87 (ATI, 2017). This data indicated reliability for the population measured.

With regard to validity, this examination is a criterion-referenced assessment, and was developed based on the alignment of each item to the NCLEX-RN test plan by a test development team. Statistical analyses were conducted on pretesting data, and content specialists arrived at consensus that the assessment measures what it is intended to measure. Measures of reliability and validity are further detailed in the Educator Implementation Guide from ATI (ATI, 2017). Liu and Mills (2017) used data from the 2013 NCLEX-RN test plan to test entry-level nursing ability second order structure by a confirmatory factor analysis technique. They published the most recent study on the construct congruence of the ATI-NCLEX-RN Comprehensive Predictor Examination in 2017. The results from this study indicated a good fit of the factor model to the data provided by the 2013 ATI-NCLEX-RN Comprehensive Predictor Examination, and provided evidence for construct validity of the 2013 ATI-NCLEX-RN Comprehensive Predictor Examination (Liu & Mills, 2017). Other studies have shown that comprehensive predictor examinations are associated with first-time pass rates on the NCLEX-RN (Alameida et al., 2011; Broderson & Mills, 2014; Brussow & Dunham, 2018).

**Predictors of NCLEX-RN Examination Achievement**

Student characteristics including demographic and academic factors that predict passing NCLEX-RN have been addressed in the literature. Demographic factors such as age, gender, race and ethnicity have been examined among baccalaureate nursing students (Alameida et al., 2011; Kaddoura et al., 2017a; Taylor et al., 2014). Academic factors such as overall nursing grade point averages (GPA), course specific GPAs during high school and college, and scores on standardized readiness tests have been explored for predictive capacity of NCLEX-RN success.

The ATI NCLEX-RN Comprehensive Predictor Examination, the Health Education Systems, Inc. Admission Assessment (HESI) (E $^{2}$) Examination, and the National League for Nursing (NLN) NCLEX  Readiness RN Exam, have been the predominant standardized readiness tests that have been researched (Alameida et al., 2011; Hinderer et al., 2014; Kaddoura et al., 2017a; Taylor et al., 2014).

Demographic factors have been explored for associations with NCLEX-RN performance. With regard to age, a few studies demonstrated a higher pass rate for older graduates (Daley et al., 2003; Humphreys, 2008; Kaddoura et al., 2017a; Vandenhouten, 2008). However, more studies have indicated no significant association of age to NCLEX-RN first-time pass rates (Alameida et al., 2011; Beeson & Kissling, 2001; Giddens & Gloeckner, 2005; Kaddoura et al., 2017a; Lavandera et al., 2011; Lockie et al., 2013). Most studies have shown no significant association of NCLEX-RN first time pass rates to gender (Alameida et al., 2011; Beeman & Waterhouse, 2001; Beeson & Kissling, 2001; Giddens & Gloekner, 2005; Higgins, 2005; Lavandera et al., 2011; Lockie et al., 2013; Rowland, 2013; Sayles et al., 2003). Haas et al. (2004) found lower NCLEX-RN first-time pass rates for males than for females, and Seago and Spetz (2005) found that programs with higher percentages of male students had lower than average first-time pass rates which was similar to the findings in the study by DeLima et al. (2011).

Factors including student ethnicity and English as a primary language have been explored for possible associations with NCLEX-RN first-time pass and failure rates. The study by Seago and Spetz (2005) of California nursing students who completed the NCLEX-RN examination in 2001 and 2002 showed nursing programs with a predominantly African American population had a 77.4% first-time pass rate compared to the overall state average of 84.4%. Sayles et al.

(2003) found that African American and Hispanic nursing students were less likely than White students to pass NCLEX-RN on the first attempt. De Lima et al. (2011) had similar findings in their study, with the additional finding of Asian nursing students also being identified as less likely than White nursing students to pass the NCLEX-RN on their first attempt. Loftus and Duty (2010) reported in their research that 77.8% of African American students passed NLCEX-RN on the first attempt compared to 93% of White students (Taylor et al., 2014).

Some studies have shown that baccalaureate nursing students who were non-native speakers of English were more likely to fail their first attempt on the NCLEX-RN than students for whom English was their primary language (Cunningham et al., 2004; Dudas, 2011; Guhde, 2003; Hansen & Beaver, 2012; Kaddoura et al., 2017a; Olson, 2012; Sears et al., 2015; Silvestri et al., 2013). In a study conducted by O'Neill et al. (2006), of a sample of more than 234,000 nursing students educated in the United States, NCLEX-RN test-takers who indicated their primary language as "other language" or "English and other language" scored 12% to 15% lower on the NCLEX-RN than their counterparts who identified "English only" as their primary language (Kaddoura et al., 2017a).

Relationships between academic performance expressed as cumulative grade point average (GPA) for overall college courses, GPA for specific subject courses, and GPA for nursing school courses, and their relationships to NCLEX-RN performance, have been the most extensively examined (Alameida et al., 2011; Beeson & Kissling, 2001; Havrilla et al., 2018; Hinderer et al., 2014; Kaddoura et al., 2017a; McCarthy et al., 2014; Romero, 2013; Seldomridge & DiBartolo, 2004; Silvestri et al., 2013; Simon et al., 2013; Taylor et al., 2014). Grade point average is defined as "the total number of quality points divided by the number of credits earned for all courses completed as an undergraduate student" (Havrilla et al., 2018,

p.555). Cumulative GPA has been reported as a significant predictor of NCLEX-RN performance among traditional baccalaureate nursing students (Kaddoura et al., 2017a). Higher cumulative GPAs have been associated with passing NCLEX-RN on the first attempt (Alameida et al., 2014; Beeson & Kissling, 2001; Daley et al., 2003; Grossbach & Kuncel, 2011; Haas et al., 2004; Havrilla et al., 2018; Landry et al., 2010; Reeve, 2014; Silvestri et al., 2013; Simon et al., 2013; Vandenhouten, 2008). Higher nursing GPA has also been shown to be a significant predictor of first-attempt success on NCLEX-RN (Kidder, 2015; Lavandera et al., 2011; Romeo, 2013; Sayles et al., 2003). Some studies have examined student grades in various courses in the undergraduate nursing curriculum and their ability to predict passing or failing NCLEX-RN. The number of grades of C or below earned by a student was found to be predictive of NCLEX-RN failure, or decreased likelihood of passing NCLEX-RN (Beeson & Kissling, 2001; Kidder, 2015; Lavandera et al., 2011).

Several studies have examined the predictive abilities of standardized readiness exams in predicting NCLEX-RN success. The ability of the HESI ($E^2$) exam to predict passing of NCLEX-RN on the first attempt has been supported in several studies (Alameida et al., 2014; Brodersen & Mills, 2014; Harding, 2010; Havrilla et al., 2018; Langford et al., 2013; Lauchner et al., 2008; Morrison et al., 2008; Nibert & Morrison, 2013; Penprase et al., 2013; Zweighaft, 2013). The ATI-NCLEX-RN Comprehensive Predictor examination has also been well supported by several studies as predicting first-attempt success (Alameida et al., 2014; Brodersen & Mills, 2014; Penprase & Harris, 2013; Yeom, 2013).

**Predictors of NCLEX-RN Standardized Readiness Examination Performance**

Some published studies have explored factors that affect nursing student performance on standardized readiness tests that predict NCLEX-RN achievement. One published pilot study

was found that explored the relationship of EI to nursing student performance on a standardized readiness exam, which was the Kaplan Nursing Assessment Test (NAT). This study by Rode and Brown (2019) looked at relationships of EI scores as measured by the MSCEIT V2.0, to scores on the Kaplan NAT, and the pass/fail rate on NCLEX-RN. A descriptive cohort design was used with a sample of 53 undergraduate baccalaureate-nursing students. Through multiple regression analysis, they found that EI global scores were significantly related to NAT and NCLEX-RN test achievement. The *understanding emotions* branch was a significant predictor of NAT performance, and the *perceiving emotions* and *understanding emotions* braches were both significant predictors of NCLEX-RN. The small sample size and homogeneity of the sample, which consisted of primarily White females from one institution, limited the generalizability of this study, and the researchers recommended that larger sample sizes be studied.

Prior to this study, research by Simon et al. (2013) was published that examined the relationships among NCLEX-RN readiness exam scores and the variables of age, transfer status, clinical course grades, and National League of Nursing (NLN) readiness test scores, to courses that could predict NLN-readiness exam scores and potentially the NCLEX-RN pass rate. Their descriptive correlational study used regression analyses to explore these relationships. They used 171 transcripts from a public, urban, four-year university school of nursing from students who were eligible to take NCLEX-RN between 2001 and 2004. Student overall GPAs, NLN readiness exam scores, and demographic data was examined. Preclinical science courses and clinical courses were found to influence NLN readiness scores, suggesting likelihood of influencing NCLEX-RN scores. The courses of adult health and maternal-child nursing were found to be highly predictive of NLN readiness success. The presence of transfer credits, usually indicative

of older students and probable higher motivational levels, was found to have a significant relationship to NLN readiness test performance.

Newton and Moore (2009) examined the relationships among scholastic aptitude, nursing aptitude, and BSN student attrition before the final semester of a nursing program, and associations to NCLEX-RN readiness. The sample consisted of one cohort of nursing students ($n$=107) from a large mid-western baccalaureate nursing program. Scholastic aptitude was operationally defined as a student's prenursing GPA based on final grades in the pre-program courses of biology, anatomy and physiology, chemistry, biochemistry, psychology, composition I and composition II. Nursing aptitude was defined as individual ATI Test of Essential Academic Skills (TEAS) scores. Attrition was defined as students who did not progress to the final semester of nursing school on time due to a course failure described as having received one or more nursing course grades of 2.5 or less on the 4-point scale. After completing a regression analysis using stepwise entry, the final model showed that scholastic aptitude was predictive of NCLEX-RN readiness on the ATI-NCLEX-RN Comprehensive Predictor Examination ($P$=.015). Nursing aptitude was found to be not predictive of success on this predictor exam ($P$=.329).

**Emotional Intelligence and Nursing Practice**

Psychologists Mayer and Salovey developed the concept of emotional intelligence (EI) in 1990 (Mayer & Salovey, 1997). They defined it as the "ability to perceive, appraise, and express emotion, access and process emotional information, generate feelings, understand emotional knowledge and regulate emotions for emotional and intellectual growth" (Mayer & Salovey, 1997, p.10). This concept has been widely researched in the areas of psychology, education, and business, but has only recently gained momentum in nursing literature (Benson et al., 2012; Bulmer-Smith et al., 2009). Emotion is fundamental within nursing practice as it influences how

nurses communicate inter-professionally and with their patients (Bulmer-Smith et al., 2009; Shanta & Connolly, 2013). The NCSBN (2019) considers nursing knowledge to encompass ways to engage in relationships with others and within the environment (Rode & Brown, 2019). The Institute of Medicine (2010) also recognized the importance of interpersonal skills in its Future of Nursing report in which it stated that collaborative care among health care professionals is needed to increase patient safety outcomes. Patient outcomes reflect the quality of nursing care.

Some studies have linked emotional intelligence to nursing performance. In one study staff nurse EI scores obtained from the MSCEIT V2.0 correlated positively with performance level (clinical ladder ranking) and retention variables among 193 staff nurses at a large urban medical center (Codier et al., 2009). Morrison (2008) found a positive correlation between EI and collaborative conflict handling styles in a study of registered nurses (RNs). Adams and Iseler (2014) explored connections between nurses' EI scores on the MSCEIT and quality care indicators. The collective level of nurses' total EI scores and scores in the *experiencing emotion* EI branch category, were found to be significant predictors of quality care indicators. These indicators included patient falls, patient falls with injury, medication administration error rate, *clostridium difficile* infection rates, and MRSA infection rates, per 10,000 patient days, and compliance with pressure-ulcer screenings. A study done by Codier et al. (2010) showed a positive correlation between EI and nursing professionalism, performance, and nursing intuition, all traits that promote safe nursing care. Studies that have explored EI and stress in clinical nurses after graduation demonstrated higher EI scores that correlated positively with clinical performance, better coping skills, perceived competency and well-being, and were negatively correlated with lower perceived stress levels (Codier et al., 2009; Codier et al., 2010; Por et al., 2011).

**Emotional Intelligence and Undergraduate Nursing Student Academic Performance**

Emotional intelligence has been linked to academic success and nursing performance among nursing students (Beauvais et al., 2011; Bennington et al., 2020; Codier & Odell, 2014; Nair & Lee, 2016; Fernandez et al., 2012). Significant positive correlational relationships among EI and academic performance represented as GPA have been shown in several studies (Beauvais et al., 2014; Codier & Odell, 2014; Fernandez et al., 2012; Nosek, 2015; Rankine, 2013; Shanta & Gargiulo, 2014; Sharon & Grinberg, 2018; Thomas et al., 2017). Researchers have examined overall or total EI scores as well as area (experiential EI and strategic EI), and EI branch scores including: a) perceiving emotions, b) using emotions for thought facilitation, c) understanding emotions, and d) managing emotions in comparison to indicators of academic success. Academic performance has been expressed predominantly as GPA throughout the literature.

Codier and Odell (2014) explored the relationship between EI and GPA of first year undergraduate baccalaureate nursing students enrolled in a large public land-grant university in the south-central region of the United States. The sample was comprised of 72 participants of which 90% were female and 88% were Caucasian, 7% Asian, 3% Hispanic, and 1% Black. The MSCEIT V2.0 was used to measure EI, and student GPAs (pre-admission) were obtained from the school's record department. Total overall EI scores and one sub-score area score (experiential) were significantly correlated with GPA $r(70) = .25$, $p > .05$. Nosek (2015) also examined a sample of baccalaureate nursing students enrolled in a private Catholic university in Northern California (n=71) to determine associations between overall EI scores and EI components including area and branch scores, age, ethnicity, gender, and academic standing defined as GPA. This study's sample was comprised of females (91.5%), White (50.7%), Asian (35.2%), Latino (12.7%), and African American (1.4%). The MSCEIT V2.0 was used to measure

EI. Higher GPA and being Asian were significantly associated with higher scores in most components of EI. Being male was predictive of higher *facilitating thought* branch scores and being Latino was associated with higher scores in the *perceiving emotions* branch. Shanta and Gargiulo (2014) investigated whether baccalaureate-level nursing education increased the overall level of EI and they looked at EI components as well. The MSCEIT V2.0 was used as the measurement tool. The regression analysis performed in their study showed that self-estimated GPA was the only significant predictor of overall EI.

Fernandez et al. (2012) had similar results. These researchers looked for associations between EI and learning strategies and academic performance among first-year accelerated nursing students (n=81) enrolled in an Australian university. The Trait Emotional Intelligence Questionnaire short form (TEIQue-SF) was the tool used to measure EI and GPA information was taken from school records. Self-regulated learning strategies including critical thinking, were measured using subscales from the Motivated Strategies for Learning Questionnaire (MSLQ). There were statistically significant correlations between EI and critical thinking, and EI was a significant predictor of academic achievement as reflected in students' GPAs. A study conducted at a baccalaureate nursing school in Israel by Sharon and Grinberg (2018) explored similar questions with the aim of determining if level of EI affects the degree of success in nursing studies. The convenience sample totaled 110 first and second year nursing students comprised of females (64%), Jewish (53%), Muslim (44%), and Christian (3%). The Schutte Self-Report Inventory (SSRI) based on Salovey and Mayer's EI Model (1990) was used to measure EI, and nursing student success was reflected in student GPAs in official school records. Statistically significant correlations were discovered between total EI scores and the annual GPA of any of the first-year and second-year students.

Other studies have found no significant relationships between EI and academic performance as reflected in GPA (Ahammad et al., 2011; Beauvais et al., 2014; Bennington et al., 2020; Eyong & Rathee, 2017). Beauvais et al. (2014) explored the relationship between EI, psychological empowerment, resilience, and spiritual well-being to academic success among undergraduate and graduate nursing students enrolled in a medium-sized, private Catholic university in New England. The undergraduate sample included 70 students in the traditional program and 3 students in the RN-BSN program. The majority was female (97.0%) and Caucasian (88.0%). Emotional intelligence was measured using the MSCEIT V2.0 and academic success was reflected in self-reported GPA. Results were mixed in that overall EI was not significantly correlated to academic success, however the EI branch of *perceiving emotions* did show a statistically significant correlation with academic success with a small to moderate effect size $r(73) = -.232$, $p = .048$. Among the sample of graduate students (n=47), overall EI was moderately correlated with academic success $r(47) = .348$, $p = .017$. The EI branches of *facilitating thought* and *managing emotions* also showed a statistically significant correlation with academic success.

Eyong and Rathee (2017) investigated the relationship of EI and authentic leadership with academic achievement of associate's degree nursing students. The sample included 121 nursing students, the majority were female (81.8%) with most classified into the aged 18 to 34 years old age group (76%). Academic achievement was identified as GPA and the Trait Emotional Intelligence questionnaire (TEIQue) was used to measure EI. No statistical significance was found in predicting GPA based on EI and authentic leadership measures. A recent study done by Bennington et al. (2020) to determine if there was a difference in EI levels in students who successfully completed nursing courses on the first attempt as opposed to those

who were not successful, focused on a sample of 110 associate's degree nursing students. Schutte's Self-Report Emotional Intelligence Test (SSEIT) was used to measure EI. They found no significant relationships between EI and academic performance.

In terms of academic success as expressed in nursing student performance, the study done by Beauvais et al. (2011) explored relationships between EI and nursing performance among 87 undergraduate baccalaureate-nursing students. The sample was 93% female, 91% White, 3.5% Asian, 2.5% Hispanic, and 1% Black. Nursing performance was measured using the Six Dimension Scale of Nursing Performance (6-D Scale) in the categories of leadership, critical care, teaching and collaboration, planning and evaluation, interpersonal communications, and professional development. Students used this tool to rate themselves in these areas based on their perceptions. Mean scores for EI measured with the MSCEIT V2.0 were reported as "moderate" and mean scores for nursing performance were reported as "moderate nursing performance". Four of the six nursing performance subscales were significantly correlated with total EI scores.

**Emotional Intelligence and NCLEX-RN Achievement**

Only a few studies have been found that address the relationships of EI to NCLEX-RN test performance and standardized readiness tests. One study by Opsahl et al. (2018) looked at the effect an educational intervention had on NCLEX pass rates for a sample of 69 undergraduate nursing students enrolled in a baccalaureate program at an urban university in the Midwestern United States. The study took place between May 2013 and August 2016 and data was collected from four graduating classes. The educational intervention consisted of a 12- week online coaching program that contained a component of EI education. Students reported satisfaction with the program and there was a significant increase in pass rates ($P<0.01$) after the

online coaching program was implemented as compared to mean pass rates for NCLEX-RN prior to this intervention being implemented.

A study by Rode and Brown (2019) examined the relationship of EI to performance on the Kaplan Nursing Assessment Test (NAT), a standardized readiness test. They used the MSCEIT V2.0 to measure EI and looked at scores on the NAT and NCLEX-RN pass rates. Using a descriptive cohort design, the convenience sample was drawn from senior level students enrolled in a baccalaureate nursing program at a university in the Midwestern United States (n= 53). The sample was 96% female and the majority of participants were White (87%) with participants who were Black making up 6% of the sample. Hispanic and Asian participants accounted for 2% each, and no race or ethnicity information was provided by 3% of the sample. Participants completed the MSCEIT V2.0 and NAT approximately six months before taking the NCLEX-RN examination. The researchers found that overall global EI scores were significantly related to both the NAT and NCLEX-RN test performance. The EI *perceiving emotions* and *understanding emotions* branch scores were found to be significant predictors of NCLEX-RN success. Older participants and those with higher EI scores tended to have higher scores on the Kaplan NAT.

**Critical Thinking and NCLEX-RN Achievement**

Critical thinking is a vital component of nursing practice and is a priority skill that nurse educators must develop in their nursing students to prepare them for the clinical decision-making they will engage in as professional nurses (Giddens & Gloeckner, 2005; Kaddoura et al., 2017b; Romeo, 2013). There is a lack of agreement on a comprehensive definition of critical thinking in nursing; however, it is strongly emphasized as a necessary skill to be taught in nursing curricula (AACN, 2008; Giddens & Gloeckner, 2005; Kaddoura et al., 2017b, NLN-CNEA, 2016). In

terms of nursing, critical thinking has been defined as a cognitive process that includes rational analysis of information to facilitate clinical reasoning, judgement, and decision-making (Alfaro-LeFevre, 2017; Zuriguel Perez et al., 2015). It is such an important skill that the NCLEX-RN tests the critical thinking abilities of nursing students in order to ensure that they have the basic knowledge to provide safe care (NCSBN, 2019; Romeo, 2010).

A few studies have explored the relationship between critical thinking and NCLEX-RN performance. An integrative review by Romeo (2010) looked at 12 quantitative studies of critical thinking as a predictor for NCLEX-RN performance published between 1996 and 2006 that included a mix of significant and insignificant findings of this relationship. Various tools for measuring critical thinking were used across studies and there was a wide range of research designs and study sample sizes in the studies reviewed. Giddens and Gloeckner (2005) used a non- experimental ex-post facto research design and viewed data from 218 nursing students enrolled in a traditional baccalaureate-nursing program between 1998 and 2001. They looked at NCLEX-RN scores and scores from the California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Disposition Inventory (CCTDI). There were significant differences on the results between subjects who passed and failed NCLEX-RN on entry and exit critical thinking instruments, however they were only able to classify 98% of the students who passed NCLEX-RN and incorrectly identified about 79% of those who failed. They concluded that the skill of critical thinking might be useful for the prediction of passing NCLEX-RN, but it is not a reliable predictor of those who may fail NCLEX-RN (Giddens & Gloeckner, 2005; Kaddoura et al., 2017b).

A recent study by Kaddoura et al. (2017b) examined 110 students enrolled in a first-degree accelerated baccalaureate-nursing program to investigate if critical thinking was a predictor of

first-time pass rate on NCLEX-RN. They used the critical thinking instrument from Health Education Systems Incorporated (HESI) to measure critical thinking. They found a statistically significant relationship between critical thinking scores and passing the NCLEX-RN. No studies were found that investigated the relationship between measured critical thinking and standardized readiness test performance.

**Resilience and NCLEX-RN Achievement**

Resilience is an ability that has been recognized to be important to nurses (Jackson et al., 2007; McAllister & McKinnon, 2009; Stephens, 2013). Nurses face many stressors in their working environment including human tragedy, suffering, and human distress, and they assist others to overcome hardships (Jackson et al., 2007; Tusaie & Dyer, 2004). Resilience has also been described as the ability to maintain healthy psychological functioning despite experiencing stressors or trauma (Bezdjian et al., 2017; Tugade & Frederickson, 2004). There are several definitions of resilience, however it has been primarily described as the ability to adjust to adversity, maintain equilibrium, retain some control over the environment, and move in a positive direction (Jackson et al., 2007; Pines et al., 2014). Definitions often include a component in which an individual returns to a previous state after a time of stress or adverse event (Atkinson et al., 2009; Stephens, 2013). To cope with everyday stressors, resilience is needed for nurses to adapt to and manage complex situations where they can effectively provide quality patient care and move forward with a sense of well-being (Cleary et al., 2018).

Resilience has also been recognized as an important ability for nursing students to possess in preparation for professional nursing careers. Nursing students are exposed to stressors related to the rigor of nursing school. Studies have shown high levels of stress due to academic workloads and academic pressures (Edwards et al., 2009; Onan et al., 2018; Reyes et al., 2015).

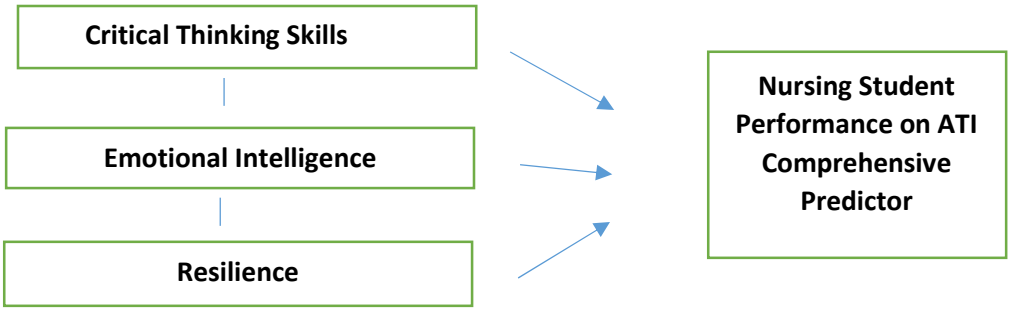
Resilience is comprised of concepts of coping, social support, humor, loyalty, self-esteem and respect, self-efficacy, interpersonal relations, control and sufficiency and change and harmony, as well as the key concepts of critical thinking and problem-solving (Bahadir, 2017; McCallister & McKinnon, 2009; Onan et al., 2018; Sigalit et al., 2016; Thomas & Revell, 2016). These qualities help to mitigate the effects of continuing stress. Unabated stress was shown to negatively affect nursing students' academic performance (Al-Kandari & Vidal, 2007; Jimenez et al., 2010; Reyes et al., 2015).

A few studies have looked at resilience in combination with other factors and academic performance among undergraduate nursing students. A longitudinal descriptive correlational study of 138 preregistration-nursing students in Australia by Pitt et al. (2014) explored relationships between students' personal qualities and academic and clinical performance. Using the Personal Qualities Assessment Tool (PQA), they found significant correlations between academic performance measured as GPA and course aggregate grades, and PQA scores for resilience. The descriptive correlational study done by Beauvais et al. (2014) looked at factors related to academic success among nursing students including resilience. The Wagnild and Young Resilience Scale was the tool used for measuring resilience and a significant relationship between resilience, psychological empowerment, and spiritual well-being to academic success as measured by students' GPAs was found. A study by Van Hoek et al. (2019) on Belgian undergraduate nursing students, explored the influence of socio-demographic factors, resilience, and stress reducing activities on academic outcomes including whether students passed or failed a nursing module (reflecting academic success), dropped out of their program, and expressed intention to leave. The researchers found that higher resilience scores significantly predicted academic success. No studies on possible relationships of resilience to nursing student

performance on standardized readiness exams or NCLEX-RN were found, however, based on the few studies showing relationships of resilience to academic performance, and in light of studies that have shown the relationship of GPA to students' performance on NCLEX-RN, resilience merits further investigation. Resilience has been described as including components of critical thinking and problem solving, both traits that have been ascribed to EI (Beauvais et al., 2014). There are no published studies to date that have examined the variables of EI, critical thinking, and resilience collectively to performance on the ATI-NCLEX-RN comprehensive predictor examination.

**Conceptual Framework**

A conceptual framework of the hypothesized relationships between the independent variables of EI, critical thinking, and resilience, to the dependent variable of nursing student test performance on the ATI-NCLEX-RN Comprehensive Predictor Examination, will guide this study. These concepts are represented in the schematic below:




Based on studies that have examined associations between the variables of critical thinking, EI, and resilience to academic performance and the relationship of academic achievement to passing NCLEX-RN, it is possible that there are significant relationships between each of these variables to how students perform on standardized readiness tests such as the ATI-NCLEX-RN Comprehensive Predictor Examination. Critical thinking skills are essential

in nursing (AACN, 2008; CCNE, 2018; NCSBN, 2019). Nursing knowledge applied within the context of the nursing process is enhanced by critical thinking and is an important component to passing NCLEX-RN (ATI, 2015; NCSBN, 2019 NLN-CNEA, 2007; Romeo, 2010). Some studies have shown relationships between high scores on critical thinking tests and NCLEX-RN test achievement (Facione & Facione, 1997; Frye et al., 1999; Giddens & Gloeckner, 2005; Hoffman, 2009; Kaddoura et al., 2017b; Romeo, 2010, 2013). Skill level in critical thinking may play a key role in how well nursing students do on standardized readiness tests.

Emotional intelligence may also influence standardized readiness test performance. This type of intelligence is theorized to be distinct from personal intelligences, social intelligences, and traditional IQ (Mayer et al., 2016). It is the ability to recognize meaning in emotions and emotional relationships, and to use this information to problem-solve and augment cognitive activities (Mayer et al., 1999). Higher EI scores have been associated with higher academic achievement as reflected in grade point averages (GPAs) and other indicators of academic and nursing student performance. Some studies have linked EI to GPA (Beauvais et al., 2014; Codier & Odell, 2014; Fernandez et al., 2012; Nosek, 2015; Rankine, 2013; Shanta & Gargiulo, 2014; Sharon & Grinberg, 2018; Thomas et al., 2017).

One study linked EI to nursing student performance in the areas of leadership, critical care, teaching and collaboration, planning and evaluation, interpersonal communications, and professional development (Beauvais et al., 2011). At least one study has demonstrated a positive correlation between EI scores and achievement on a standardized readiness test (Rode & Brown, 2019). Another study suggested that EI was a factor in achieving NCLEX-RN success. The study by Opsahl et al. (2018) found that EI was a contributor to passing NCLEX-RN when EI training was included in an intervention for NCLEX-RN preparation.

The concept of resilience may also factor in to how well students do on standard readiness tests and subsequently on NCLEX-RN. Resilience has been defined as the capacity to adjust to adversity, maintain equilibrium, keep control and manage external stressors (Pines et al., 2014). It has been closely associated with EI as both abilities mitigate psychological distress (Benson et al., 2010; Cleary et al., 2018; Min et al., 2013). A few studies have shown an association between higher resilience and higher academic performance (Beauvais et al., 2014; Van Hoek et al., 2019). No published studies to date have examined how resilience affects nursing student performance on standardized readiness tests or NCLEX-RN. Due to the association between resilience and EI and the few studies showing positive correlations of resilience to academic achievement, it is worth exploring how resilience may influence performance on standardized readiness tests. The literature has shown that the attributes of EI, critical thinking, and resilience have had significant associations with academic achievement. It is worth exploring whether and how these relationships extend to successful performance on the ATI-NCLEX-RN Comprehensive Predictor Examination and ultimately on the NCLEX-RN.

**Conceptual and Operational Definitions**

The following table shows the major concepts of the conceptual model as they relate to the variables of this study.

**Table 2: Conceptual and Operational Definitions**

| Variable | Conceptual Definition | Operational Definition |
|---|---|---|
| Emotional intelligence | "The ability to recognize the meaning of emotions and their relationships and to use them as a basis for reasoning and problem-solving". In addition it involves using emotions to enhance cognitive activities (Mayer et al., 1999; Mayer et al., 2001, p. 234) | Emotional intelligence (EI) is assessed based on scores on the validated Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) V2.0. This test is to be completed in 30 to 45 minutes. This 141-item test produces multi-level scores that assess an individual's area and level of EI among the four categories of the model. It consists of 15 scores including a global EI score, and area scores of two categories identified as strategic and experiential. Strategic EI is computed from understanding and managing emotions. Experiential EI is computed from perceiving and using emotions. The four branch scores include:<br>a. Perceiving emotions<br>b. Using emotions<br>c. Understanding emotions<br>d. Managing emotions (Mayer et al., 2003)<br>Eight task level scores are also obtained from the following categories derived from the branch scores:<br>a. Faces<br>b. Pictures<br>c. Facilitation<br>d. Sensations<br>e. Changes<br>f. Blends<br>g. Emotional management<br>h. Emotional relations |

| | | |
|---|---|---|
| | | (Mayer & Salovey, 1997)<br>EIQ Range Scores include the following:<br>• 69 or less = consider development<br>• 70-89 Consider improvement<br>• 90-99 Low average score<br>• 100-109 High average score<br>• 110-119 Competent<br>• 120-129 Strength<br>• 130+ Significant strength<br>Scores are obtained by either consensus or expert scoring (Gosling, 2020; Mayer et al., 2002) |
| Critical Thinking | "Cognitive process that includes rational analysis of information to facilitate clinical reasoning, judgment, and decision-making" (Alfaro-LeFevre, 2017; Zuriguel Perez et al., 2015, p. 821). It is "the process of purposeful, reflective judgment focused on deciding what to believe or what to do" (Insight Assessment, 2020). | Critical thinking is assessed based on scores on the validated California Critical Thinking Skills Test (CCTST). This test is to be completed in 45-50 minutes. It consists of 34 items that can total to 100 points that measure an individual's abilities to draw conclusions in analysis, inference, evaluation, deductive reasoning, inductive reasoning, interpretation, and explanation (Insight Assessment, 2020). Scores are interpreted as follows:<br>• < 63 low critical thinking (CT) skill<br>• 63-69 weak overall CT skill<br>• 70-78 moderate overall CT skill<br>• 79-85 strong overall CT skill |

| | | |
|---|---|---|
| | | • >86-100 superior CT skill<br><br>(Facione et al., 2002; Insight Assessment, 2020). |
| Resilience | An ability to recover from or adjust easily to misfortune or change (Merriam-Webster's Dictionary, 2019)."Resilience embodies the personal qualities that enable one to thrive in the face of adversity" (Connor & Davidson, 2003, p. 76).<br>"Resilience is the ability to adjust to adversity, maintain equilibrium, retain some control over the environment and move in a positive direction (Pines et al., 2014. P. 86; Jackson, et al., 2007)<br>Ability to maintain healthy psychological functioning despite experiencing stressors or trauma (Bezdjian, et al., 2017; Tugade & Frederickson, 2004) | Resilience will be assessed using the Connor-Davidson Resilience Scale (CD-RISC) (Connor & Davidson, 2003; Davidson, 2020). This test contains 25 items to measure resilience. Content includes items regarding patience, ability to endure stress or pain, adaptability, social problem-solving skills, previous experiences of success, control, commitment, and change.<br><br>Each item is rated on a 5 point scale:<br><br>• 0=Not true at all to 4 = True nearly all the time<br>• Higher scores indicate higher resilience<br>(Connor & Davidson, 2003; Davidson, 2020) |
| ATI-NCLEX-RN Comprehensive Predictor Examination Test Performance | Standardized NCLEX-RN readiness test developed by Assessment Technologies Institute (ATI) to assess likelihood of passing NCLEX-RN on the first attempt based on the student's current level of readiness and to guide remediation efforts based on content missed in the exam. Student comprehension and mastery of fundamentals of nursing, pharmacology, adult medical-surgical nursing, maternal newborn care, mental health | The 2019 test contains 180 items. Standard four-option multiple-choice items and six of seven alternate item types that are used on the NCLEX-RN make up this exam. This exam is to be completed in 180 minutes (3 hours). Numeric scores are generated and the following data is provided on this exam:<br>• Individual score (% correct)<br>• Predicated probability to pass NCLEX-RN |

| | | |
|---|---|---|
| | nursing, nursing care of children, nutrition, leadership, and community health nursing are assessed. The following NCLEX client need categories are assessed:<br>• Management of care<br>• Safety and infection control<br>• Health promotion and maintenance<br>• Psychosocial integrity<br>• Basic care and comfort<br>• Pharmacological and parenteral therapies<br>• Reduction of risk potential<br>• Physiological adaptation<br>The percentage of questions from the major NCLEX-RN client-need categories will be similarly distributed in the proctored, comprehensive ATI-NCLEX-RN Predictor (ATI, 2019). | • National and Program means<br>• Individual scores (% correct) within content topic categories, topics to review, and individual scores (% correct) within an outcome to include the following:<br>• Thinking skills<br>• Nursing Process<br>• Priority Setting<br>• NCLEX-RN Client Need Categories<br>• Clinical Areas<br>• QSEN, NLN Competency<br>• BSN Essentials<br><br>(ATI, 2019). |
| Individual Factors | Demographic data to include gender, age, race, ethnicity, work experience, previous degree, marital status, children, nursing school commute and primary language, use of ATI Nurse Logic preparatory resource | Demographic survey through Qualtrics |

**Hypotheses**

Based on a review of the literature concerning the influence of the concepts of emotional intelligence (EI), critical thinking (CT), and resilience on academic performance, it was hypothesized that there would be a significant association between emotional intelligence,

critical thinking, resilience, and other demographic factors to nursing student test performance on the ATI-NCLEX-RN Comprehensive Predictor Examination at the alpha level, $\alpha = .05$.

## Design

An exploratory, cross-sectional, predictive correlational design was used to study one cohort of nursing students enrolled in an undergraduate baccalaureate-nursing program completing their final semester of nursing school and preparing to take the NCLEX-RN. Exploratory studies are used when there is minimal knowledge about a phenomenon (Burns & Grove, 2005). Cross-sectional studies analyze data from a representative subset of a population at a specific point in time (Portney & Watkins, 2015). Predictive correlational studies predict the natural variance of one or more variables based on how other variables vary (Sousa et al., 2007). As this study would entail an exploration of possible relationships between the independent variables of EI, CT, and resilience, to the dependent variable of test performance on the ATI-NCLEX-RN Comprehensive Predictor Examination, it was determined this design would be most suited to support or not support this study's hypothesis.

## Methods

### *Sample*

A nonprobability convenience sample was obtained from a cohort of 75 undergraduate nursing students anticipated to graduate in spring 2020. Prospective study participants were recruited for voluntary participation. These students were enrolled in the traditional baccalaureate-nursing program at the University of Texas at El Paso, a large public university located in a metropolitan border city in the southwestern United States. Inclusion criteria included being enrolled in the baccalaureate-nursing program, completing the final semester before graduation, and being over the age of 18 years. Exclusion criteria included those with

previous experience working as a diploma nurse or a licensed vocational nurse and being under the age of 18 years.

For a multiple regression analysis, determination of an appropriate sample size depends on the number of predictors that are to be entered into the model. A statistical power analysis, G*Power Analysis 3.1.9.2 (Faul et al., 2014) was used to determine the sample size. Statistical power relies on the significance level or probability of making a Type I error, which is the alpha value (α), the size of the sample, and the effect size parameter that defines the hypothesis and indexes the degree of deviation from the null hypothesis in the population of interest (Faul et al., 2007). To avoid a Type II error, the minimal power level of .8 was used (Cohen, 1988). Without previous studies to base an effect size on for this study, a medium effect of $f = .15$ was used. The minimum sample size needed for an alpha at .05, effect size at .15, and power of .8 with three predictors in the regression model would be 77 study participants (Faul et al., 2007). Although 77 participants would have been ideal, only 75 students were enrolled in the course from which the sample was to be taken. The priority three predictors in this study included EI, CT, and resilience.

After obtaining IRB authorization, permission was obtained from the assistant dean of undergraduate nursing students and the nursing leadership course manager to recruit participants for this study from the senior class of baccalaureate nursing students. Each student received an emailed flyer. As stated, the entire senior nursing cohort consisted of 75 students. Of the 75 students, 49 consented to participate. Only 45 participants had a complete set of surveys. This constituted a 60% response rate.

After point-biserial and Pearson correlations were conducted to explore associations between the three priority predictors and other demographic factors to the ATI-NCLEX-RN

Comprehensive Examination scores, the decision was made to examine twelve predictors. These included the priority predictors of EI, CT, and resilience, as well as gender, age, ethnicity, previous work experience, previous degree, use of nurse logic, and native language (reference group English) of Spanish, bilingual, or other. These twelve predictors were placed into the model and a new G*Power analysis was done. For twelve predictors, the ideal sample size with alpha at .05, effect size at .15, and power of .8, was determined to be 127 (Faul et al., 2007). The final sample size consisted of 45 participants which was lower than the a priori power analysis minimum. Assumptions of linear regression were tested based on twelve predictors and all assumptions were met.

***Protection of Human Subjects***

Applications were submitted for study approval to the University of Texas at Tyler (UT Tyler) and University of Texas at El Paso (UTEP) Institutional Review Boards (IRBs) and were approved prior to the study proposal defense (see Appendix C). Identification of the nursing students completing their final semester of nursing school was done with the assistance of the Director of the Undergraduate Nursing Program. A description of the research study and a recruitment flyer was presented to the senior cohort of undergraduate baccalaureate nursing students during their nursing leadership class one week prior to the first data collection point. The recruitment flyer was sent to each of these students through the university email system and they were invited to voluntarily participate in the study (see Appendix B). During the class time in which the study was to be initiated with the collection of the demographic, EI, critical thinking, and resilience survey data, the researcher presented the following information:

1) The study's purpose and explanation of study procedures including the number of surveys to be completed, survey content, time requirements, and data collection methods.

2) Confidentiality measures that would be taken including removal of all names and identifiable information.
3) Potential risks and benefits: Benefits included increased awareness about EI, CT, and resilience. Risks included discomfort with sharing demographic information, time invested in completing the surveys, and possible fatigue.
4) Study participants were instructed and reassured that they could withdraw at any time from participation in this study.
5) Study participants were provided with the researcher's contact information.

Students wishing to participate in the study had to read and sign the consent document in the Qualtrics system (see Appendix D). Once they signed the consent, they could proceed with answering the surveys. The researcher left the room while the study subjects answered their surveys and members of the research team were available to answer any technical questions the students had.

***Instruments***

Demographic information was obtained through a survey loaded on to the Qualtrics survey system. Questions regarding gender, age, race/ethnicity, educational background, prior work experience, prior degrees, marital status, having children, and nursing school commute were asked. Participants were also asked if they had experience using the Nurse Logic 2.0 tutorial resource provided by ATI. This was included on the survey as this tutorial resource is intended to enhance critical thinking skills and could possible influence student scores on the critical thinking skills instrument used for this study. Questions about primary language and language most often used, were included on the survey (see Appendix E). Study participants

used their lap top computers to access the demographic surveys and the links to the instruments surveying EI, CT, and resilience.

Emotional intelligence was measured using the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) Version 2.0 (V2.0). This test is accessed online and is scored by Multi-Health Systems, Inc. This tool was selected for this study based on its high level of reliability and validity. This test produces multi-level scores that assess an individual's level of EI among the four categories or branches of the model that include: a) perceiving emotions, b) using emotions, c) understanding emotions, and d) managing emotions. Perceiving emotions involves recognizing how one feels, and how a person is able to recognize feelings of others. Using emotions, or facilitating thought, is the ability to generate and reason with emotions and includes sensations such as generating empathy, and mood facilitation to support thinking. Understanding emotions is the ability to understand complex emotions and emotional transitions. Managing emotions is the ability to regulate emotions in one's self and others, like alleviating the emotion of anxiety (Gosling, 2010; Mayer et al., 2002).

The entire MSCEIT V2.0 survey consists of 141 items and takes 30-45 minutes to complete. Fifteen main scores are provided that include a total or global, overall EI score, or EIQ score, two area scores (experiential emotional intelligence and strategic emotional intelligence), four branch scores, and eight tasks scores (Mayer et al., 2003; Shanta & Gargiulo, 2014). Scores are calculated like traditional intelligence scales so that the average score is 100 and the *SD* is 15. If a test taker scores 100, then they are considered to be in the average range of EI. If this individual has an overall score of 115, they are at one *SD* above the mean or at the 84$^{th}$ percentile (Gosling, 2010; Mayer et al., 2002). Test scores ranging from 100 to 109 indicate a high average score. Scores of 110 to 119 are classified as being competent. Scores of 120-129 reflect strength,

and scores above 130+ indicate significant strength. Individuals scoring between 90 and 99 are considered to have a low average score. Those who score between 70 and 89 are advised to consider improvement in EI, and those who score 69 or less are advised to consider developing their EI (Gosling, 2010; Mayer et al., 2002).

Two scoring approaches are used for the MSCEIT V2.0. One approach consists of general consensus-based measurement (CBM) and the other consists of expert scoring. Using the CBM method, each response option is weighted according to responses obtained from the normative sample. The normative sample consisted of 5,000 test-takers for this instrument. This sample was weighted to reflect the demographic characteristics of the United States (Rode et al., 2008). For example, if 80% of the sample selected option B and 12% of the sample selected option D, the score for a test taker who selected option B would be incremented 0.80 and the score for the test taker who selected option D would be incremented at 0.12. The general CBM method relies on the assumptions that large samples converge on the correct answers (Mayer et al., 2002). Expert scoring uses the same principle, but uses a sample of 21 emotion experts from which to derive scores associated with responses to each test item (Mayer et al., 2002). The general CBM method is recommended for most users, and this was the method employed in this study.

There are two sets of reliabilities for the MSCEIT V2.0. One reliability is obtained from consensus based scoring (CBM), the other from expert consensus. There are two reliability sets because reliability analyses are based on scored responses at an item level, and this varies depending on the population sample responses that these scores are being compared with. In general, reliability coefficients above .75 indicate good reliability, dependent upon precision of the variable being measured and relative to the applicability of the reliability test results (Portney

& Watkins, 2015). Full-test split half reliability using Spearman-Brown correlation for the overall EI score is $r = .93$ for general and $r = .91$ for expert consensus scores. Subscale reliability scores range from the high 0.70s to low 0.90s (Boyle et al., 2008; Mayer et al., 2002; Mayer et al., 2003; Shanta & Gargiulo, 2014). Previous studies have shown that the MSCEIT V2.0 has demonstrated reliability and validity especially at the total EI score level ($r$ =.93), the experiencing area level ($r$ = .90), and at the strategic area level ($r$ = .88) (Mayer et al., 2003; Shanta & Gargiulo, 2014). Previous studies support the internal consistency and reliability of the MSCEIT V2.0 (Rode et al., 2008). In the study by Rode and Brown (2019), Cronbach's α was .72.

Mayer et al. (2003) demonstrated validity in a factor-analysis of the MSCEIT V2.0. The MSCEIT V1.0 and V2.0 tests were designed to reflect the four-branch Ability model of EI. A confirmatory factor analysis of the eight tasks on the MSCEIT was done using a large portion of this study's standardized sample (N = 1985) to examine structural validity. The fit of one-, two-, and four-factor models were tested, and the researchers determined that each model fit fairly well, and that there was a progressive fit from the one- to the four-factor model.

The goodness-of-fit indices included both expert and consensus scoring. Using the four-factor solution, expert scoring had equivalency to general scoring with NFI = .97, TLI = .96, and RMSEA = .04 (Mayer et al., 2003). This normed fit index value (NFI) of .97 is in an excellent range (Bentler & Bonett, 1980; Mayer et al., 2003). Model fits as measured by TLI values > .95 and RMSEA values < .06 constitute acceptable model fits (Hu & Bentler, 1999; Rode et al., 2008). This study cross-validated other previous studies that supported the one-, two-, and four-factor solutions of the domain of EI (Ciarrochi et al., 2000; Mayer et al., 1999; Mayer et al.,

2003; Roberts et al., 2001). The MSCEIT V2.0 also demonstrates face and content validity (Mayer et al., 2002).

The California Critical Thinking Skills Test (CCTST) was selected to measure critical thinking in this study due to its reported high level of reliability and validity. This instrument is administered online and scored by Insight Assessment, a division of the California Academic Press. This test measures critical thinking skills among individuals who are college-aged and is considered a discipline-neutral instrument (Facione & Facione, 1998; Giddens & Gloeckner, 2005). It consists of 34 multiple-choice items that relate to generic situations and takes approximately 45 minutes to complete (Insight Assessment, 2020; Raymond et al., 2018). These items measure the ability to draw conclusions in the seven areas of analysis, inference, evaluation, deductive reasoning, inductive reasoning, interpretation, and explanation (Facione et al., 2002; Fero et al., 2010; Insight Assessment, 2020; Raymond, et al. 2018). The total score and seven subscale scores are reported on a 100-point scale. Scores below 63 indicate low levels of critical thinking, scores of 63-90 indicate a weak overall critical thinking skills level, scores of 70-78 reflect a moderate skill level, scores of 79-85 indicate a strong overall skill level, and a score greater than 85 reflects superior critical thinking skills (Insight Assessment, 2020).

The CCTST has been used in many studies throughout the past 25 years across a wide variety of populations and contexts (Insight Assessment, 2020). The Kuder Richardson statistic (KR-20) and Cronbach's alpha have been used to determine reliability in terms of critical thinking skills due to the dichotomous nature of scoring this instrument. This coefficient underestimates actual reliability in cases where tests have fewer than 50 items and when the measured concept is not highly homogenous. A Kuder Richardson statistic of .70 indicates strong internal-consistency. Overall scores on the CCTST on the validation samples meet or

exceed .70 and test-retest reliability meets or exceeds .80 in samples demonstrating adequate variance, retested at two weeks post pretest (Insight Assessment, 2020). Studies on nursing students have reported similar reliabilities (Raymond et al., 2018; Shin et al., 2006; Steward & Dempsey, 2005; Stockard Spelic et al., 2001; Suliman, 2006).

Content validity of the CCTST is based on the 1990 APA Delphi report and its definition of critical thinking (Facione, 1990). This report included an expert consensus statement that also supported construct validity (Facione, 1994; Raymond et al., 2018). Critical thinking scores on the CCTST have shown strong correlations to other instruments measuring the critical thinking construct, such as the GRE, in studies involving multiple study sites and 50 health science education programs (Facione & Facione, 1997; Insight Assessment, 2020). Independent research studies in the United States and other countries of the CCTST have demonstrated criterion or predictive validity of professional board licensure, certification, and program completion across working environments (Insight Assessment, 2020).

Resilience was measured using the Connor-Davidson Resilience Scale (CD-RISC). This instrument was selected based on its high level of reliability and validity (see Appendix H). Permission was obtained from Dr. Davidson to use this tool (see Appendices F and G). The CD-RISC questions were added to the Qualtrics survey system. The CD-RISC contains 25 items drawn from several sources including studies of the concept of hardiness done by Kobasa (1979), the concepts of self-esteem, confidence, adaptability, social problem-solving skills, humor, stress management, and affectional bonds done by Rutter (1985), and the concepts of patience and endurance done by Lyons (1991). The role of faith was also incorporated inspired by the account of Sir Edward Shackleton's Antarctic expedition in 1912 (Alexander, 1998; Connor & Davidson, 2003). Attributes assessed on this survey include patience, ability to endure stress and pain,

adaptability, social problem-solving, previous experiences of success, control, commitment and change (Bezdjian et al., 2017; Connor & Davidson, 2003). Each item is rated on a 5-point scale in which 0 represents "not true at all" to 4 which represents "true nearly all of the time". Higher scores indicate greater resilience. Scores can total up to 100 points.

The CD-RISC has been reported as a well-validated measure of resilience in several studies (Bezdjian et al., 2017; Davidson, 2020). Test-retest reliability has been reported as having an internal consistency of $r$ =.87 and strong internal consistency of Cronbach's alpha = .89 in a sample of 577 participants from a general population (Bezdjian et al., 2017; Connor & Davidson, 2003). Studies exploring the psychometric properties of this tool have been comprised of small community and clinical samples with the number of participants ranging from 20 to 2,000. These studies have supported internal consistency, test-retest reliability, and convergent validity (Ahern et al., 2006; Bezdjian et al., 2017; Connor & Davidson, 2003; Davidson, 2020).

The dependent variable of ATI-NCLEX-RN Comprehensive Predictor Exam performance was examined using the total overall test scores obtained from study subjects who completed this standardized readiness exam during their final semester of the undergraduate baccalaureate-nursing program. This examination determines nursing students' probability of passing NCLEX-RN on the first attempt. It is designed based on the NCLEX-RN test plan developed by the National Council of State Boards of Nursing (ATI, 2019; Liu & Mills, 2017).

This is a proctored examination administered through an online format. It contains 180 items and is to be completed in 180 minutes. Numeric scores of zero through 100% are generated based on questions that assess predicted probability to pass NCLEX-RN, evaluate national and individual program means, and score individuals over NCLEX-RN Need categories' content. Specific concepts that are measured include thinking skills, nursing skills, priority setting,

quality and safety education for nursing (QSEN), National League of Nursing competencies (NLN), and baccalaureate of nursing essentials (BSN) (ATI, 2019). Participants are scored on the subscales of: a) management of care, b) safety and infection control, c) health promotion and maintenance, d) psychosocial integrity, e) basic care and comfort, f) pharmacological and parenteral therapies, g) reduction of risk potential, and h) physiologic adaptation (ATI, 2019).

***Data Collection***

This study involved data collection at two points in time, phase one and phase two. The study took place in the month of February during the spring semester. On February 7, 2020, one week after the presentation of the proposed research study, students were invited to participate during their nursing leadership class to be held that day. For those who agreed to participate in the study, the project's purpose, description, procedures, side effects and risks, and potential benefits, were discussed, and questions were answered. Participants were assured that all measures of ensuring confidentiality would be taken. Those who agreed to participate then signed the informed consent form in Qualtrics (see Appendix D). Participants were entered into a drawing for five $50.00 Amazon gift cards. A research assistant held a drawing in April 2020 and the five gift cards were mailed through the U.S. Postal Service to the winners.

Data from the demographic, EI, CT, and resilience surveys was collected from those students who consented to participation in this study. All surveys were completed in one sitting after the students' leadership class using their personal laptops. During phase 1, the participants logged into the Qualtrics system and completed the demographic survey, the CD-RISC survey, the CCTST, and the MSCEIT within an allotted two-hour period. Study participants answered the demographic and CD-RISC questions through Qualtrics. The CCTST was accessed by each student through an online link to Insight Assessment, Inc., and the MSCEIT V2.0 was accessed

through an online link to Multi-Health Systems, Inc., each survey using an assigned password. Both of these links were placed in Qualtrics. Two weeks after this, data was collected during phase 2 on February 21, 2020 after the students completed their proctored online ATI-NCLEX-RN Comprehensive Predictor Examination. Test scores from the consenting participants were then obtained from ATI, LLC on an EXCEL spreadsheet.

Data from the MSCEIT, provided by Multi-Health Systems, Inc. and data from the CCTST, provided by Insight Assessment, were made available with identifiable information on an EXCEL spreadsheet and was accessed and de-identified by a research assistant. Each test subject was assigned a personal identification number by the research assistant. Test scores from the ATI-NCLEX-RN Comprehensive Examination were accessed from the University of Texas at El Paso ATI account by a research assistant, deidentified, and matched to each participant. All deidentified data was placed on to one EXCEL spreadsheet. Once on the EXCEL spreadsheet, the data was screened for incomplete, missing, and duplicate information. The complete data set was then transferred to an SPSS file for statistical analysis.

All study files were encrypted and password protected and kept on the hard-drive of the researcher's computer in a locked campus office. Access was restricted to the researcher and a research assistant designated as a data manager. Computer files with identifiable information was deleted once the analyses were completed. Every measure was taken to ensure the privacy and confidentiality of each participant.

**Analysis**

Windows SPSS program version 26.0 was used for all of the statistical analyses in this study. Descriptive statistics were performed for demographic data. All demographic data were reported as descriptives with percentages and frequencies. Continuous data, including the EI, CT,

resilience, and ATI-NCLEX-RN Comprehensive Predictor Examination scores, were expressed as means and standard deviations along with minimum and maximum values. To determine significant relationships between discrete and continuous variables, point-biserial correlations were used. Demographic nominal variables with more than two categories were dummy coded into dichotomous variables for the point-biserial correlations. To examine associations between the continuous variables, Pearson *r* correlations were used. A Pearson correlation (*r*) is the appropriate analysis to use to determine the association between two continuous-level variables (Pallant, 2013). A multiple regression analysis was done to explore predictive relationships of demographic factors, total EI scores, CT scores, and resilience scores to student test performance on the ATI-NCLEX-RN Comprehensive Predictor Examination. A multiple linear regression is the appropriate statistical analysis to use when testing the predictive relationship between a series of independent variables on a continuous dependent variable (Tabachnick & Fidell, 2013).

The variables of EI, CT, and critical thinking, along with demographic variables showing significant or near significant correlations, were placed into the predictor model using forced entry. Multiple correlation coefficients were evaluated with a power of .80 and alpha set at .05, and effect size set at .15 as recommended by Cohen (1988). Significant predictors were placed into a multiple linear regression model to determine the model of best fit. Prior to building the multiple regression model, the standard assumptions of linear regression, normality, homoscedasticity, and the absence of multicollinearity, were evaluated. The assumptions were met, and the results of the linear regression were examined to determine support of the hypothesis. A post-hoc analysis was done to see if the sample size and $R^2$ had adequate power.

### *Procedures to Enhance Control*

Threats to internal validity involve factors within experimental treatments, procedures, or experiences that threaten a researcher's ability to determine the correct inferences from a population's data (Creswell, 2014). The threat of selection was pertinent to this study, as this sample may have had characteristics that predisposed them to certain outcomes. Mortality was also a possibility. The surveys took approximately one and a half to two hours to complete, and it was anticipated that the participants would become fatigued and decide not to complete all of the surveys. These surveys were administered after their nursing leadership course class time, and after class, the participants were given a fifteen- minute break, and were provided refreshments. Nourishment was made available throughout the survey time in an effort to combat fatigue. Attempts were made to have a large enough sample to account for those who may have dropped out, and an incentive for a gift card drawing for those who completed all of the surveys was put in place to encourage participation.

Threats to external validity arise from arriving at incorrect inferences from the sample data to other persons or settings in past or future situations (Creswell, 2014). The interaction of setting and treatment could have been a threat due to the homogeneity of this sample. The participants consisted of undergraduate nursing enrolled at one specific institution, and this could limit generalizability to other samples of undergraduate nursing students. This was reported as a limitation in this study and further research that extends to other groups of nursing students is recommended. Curriculum differences and admission criteria for this nursing program versus other nursing programs also pose a threat to generalizability.

## Results

### Demographics

A total of 45 participants were included in this study. The sample consisted of 11 males (24.4%) and 34 females (75.6%). Age was distributed between 18-25 year olds ($n$ = 33, 73.3%) and 25-40 year olds ($n$ = 12, 26.7%). A majority of the sample consisted of Hispanic participants ($n$ = 40, 88.9%). Most of the participants reported previous work experience ($n$ = 40, 88.9%). Most participants indicated they did not have a previous degree ($n$ = 31, 68.9%). A majority of the participants reported they were single ($n$ = 35, 77.8%). Most of the participants indicated they did not have one or more children that they provided care for in their home ($n$ = 35, 77.8%). Most reported that they did not commute to nursing school from across the Mexican/United States border ($n$ = 44, 97.8%). A majority of the sample indicated that they had used the Nurse Logic 2.0 resource to prepare for the ATI-NCLEX-RN Comprehensive Predictor Examination ($n$ = 34, 75.6%). Native language for participants was distributed between English ($n$ = 18, 40.0%), Spanish ($n$ = 14, 31.1%), bilingual ($n$ = 12, 26.7%), and other ($n$ = 1, 2.2%). More than half of the sample indicated that they used their native language more than 75% of the time ($n$ = 26, 57.8%). The frequencies and percentages of the nominal-level variables are presented in Table 3.

**Table 3**

*Frequency Distribution for Demographic Variables*

| Demographic | *n* | % |
|---|---|---|
| Gender | | |
| Male | 11 | 24.4 |
| Female | 34 | 75.6 |
| Age | | |
| 18-25 years | 33 | 73.3 |
| 25-40 years | 12 | 26.7 |

| Demographic | *n* | % |
|---|---|---|
| Ethnicity | | |
| Hispanic or Latino | 40 | 88.9 |
| Not Hispanic or Latino | 5 | 11.1 |
| Previous work experience | | |
| Yes | 40 | 88.9 |
| No | 5 | 11.1 |
| Previous degree | | |
| Yes | 14 | 31.1 |
| No | 31 | 68.9 |
| Marital status | | |
| Single | 35 | 77.8 |
| Married | 9 | 20.0 |
| Divorced | 1 | 2.2 |
| Have one or more children that you provide care for in home? | | |
| Yes | 10 | 22.2 |
| No | 35 | 77.8 |
| Commute to nursing school from across the Mexican/U.S. border? | | |
| Yes | 1 | 2.2 |
| No | 44 | 97.8 |
| Use Nurse Logic resource to prepare for the ATI-NCLEX-RN predictor exam? | | |
| Yes | 34 | 75.6 |
| No | 11 | 24.4 |
| Native language | | |
| English | 18 | 40.0 |
| Spanish | 14 | 31.1 |
| Bilingual English and Spanish | 12 | 26.7 |
| Other | 1 | 2.2 |
| Percentage of time do you communicate in your native language? | | |
| Greater than 75% | 26 | 57.8 |
| 60-75% | 13 | 28.9 |
| Greater than 10%, but less than 60% | 5 | 11.1 |
| 10% or less | 1 | 2.2 |

**Emotional Intelligence, Critical Thinking, Resilience, and ATI-NCLEX-RN Predictor**

Descriptive statistics of the continuous study variables were also obtained. Emotional intelligence scores ranged from 61.25 to 121.95, with $M = 94.80$ and $SD = 13.96$. An overall EI score of 100 places a test taker in the average range of emotional intelligence. The mean score of

this sample placed them in the low average score range. A score of 100 represents the population mean with an *SD* of 15 (Mayer et al., 2002). Those scoring in the range of 90-99 are considered to have a low average score (Gosling, 2010; Mayer et al., 2002).

Critical thinking scores ranged from 64.00 to 86.00, with *M*= 71.47 and *SD* = 5.32. An overall score from 70 to 78 on the CCTST demonstrates a moderate critical thinking skill level (Insight Assessment, 2020). Resilience scores ranged from 50.00 to 96.00, with *M* = 73.58 and *SD* = 10.07. The mean score is 80.7 in the US general population (n=577). This mean score reflects an intermediate level of resiliency for this study sample's average scores on the CD-RISC.

Test scores on the ATI-NCLEX-RN Comprehensive Predictor Examination ranged from 62.70 to 88.70, with *M* = 75.08 and *SD* = 4.84. Means and standard deviations of continuous variables are presented in Table 4. Histograms of the four continuous variables are presented in Figures 1-4.

**Table 4**

*Descriptive Statistics of Continuous Variables*

| Composite Scores | *N* | *Min.* | *Max.* | *M* | *SD* |
|---|---|---|---|---|---|
| Emotional intelligence (MSCEIT) | 45 | 61.25 | 121.95 | 94.80 | 13.96 |
| Resilience (CDRISC) | 45 | 50.00 | 96.00 | 73.58 | 10.07 |
| Critical thinking (CCTST) | 45 | 64.00 | 86.00 | 71.47 | 5.32 |
| ATI-NCLEX-RN Predictor test score | 45 | 62.70 | 88.70 | 75.08 | 4.85 |

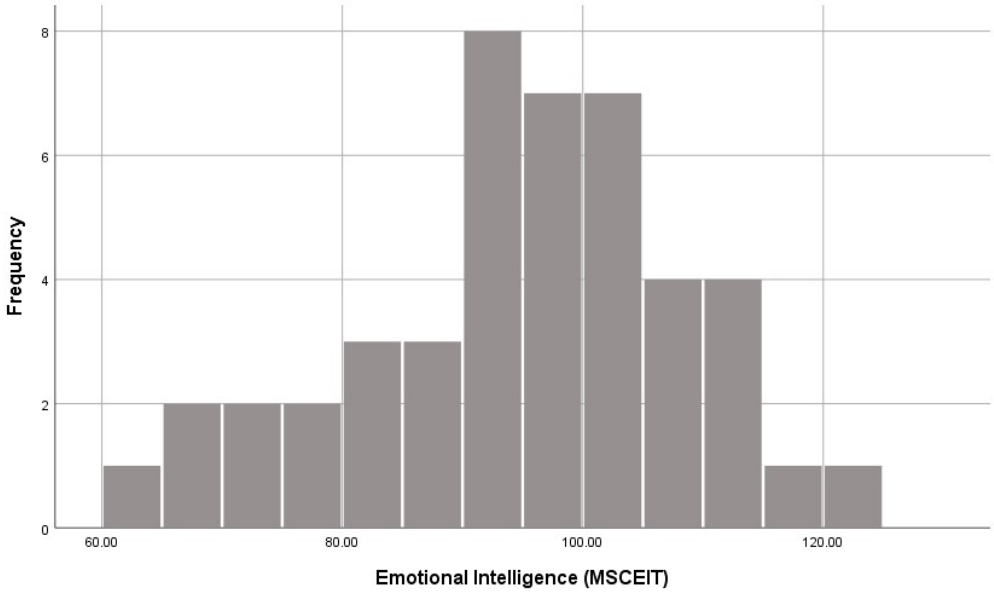



*Figure 1.* Emotional intelligence (MSCEIT V2.0) scores.

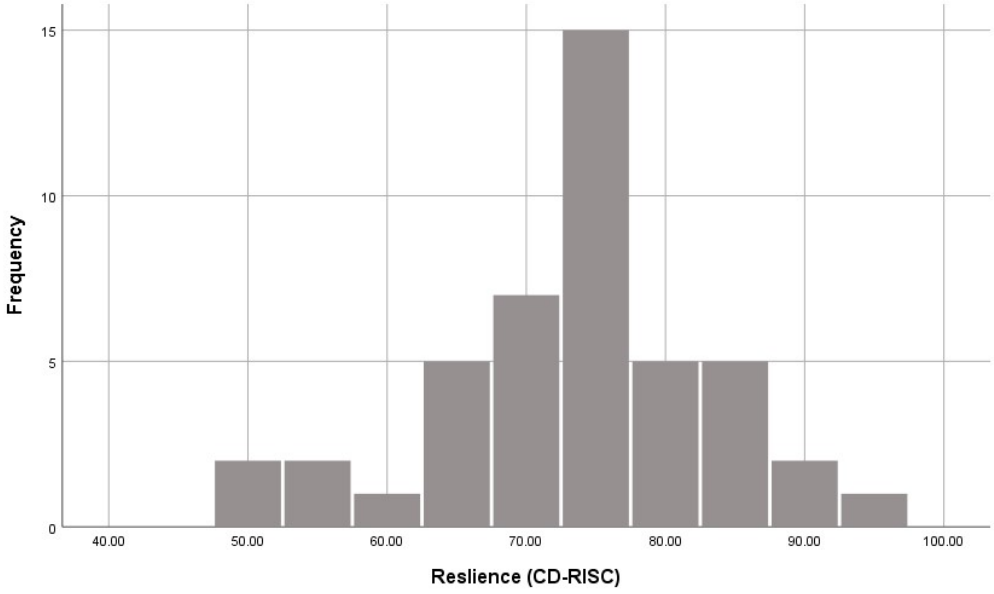



*Figure 2.* Resilience (CD-RISC) scores.

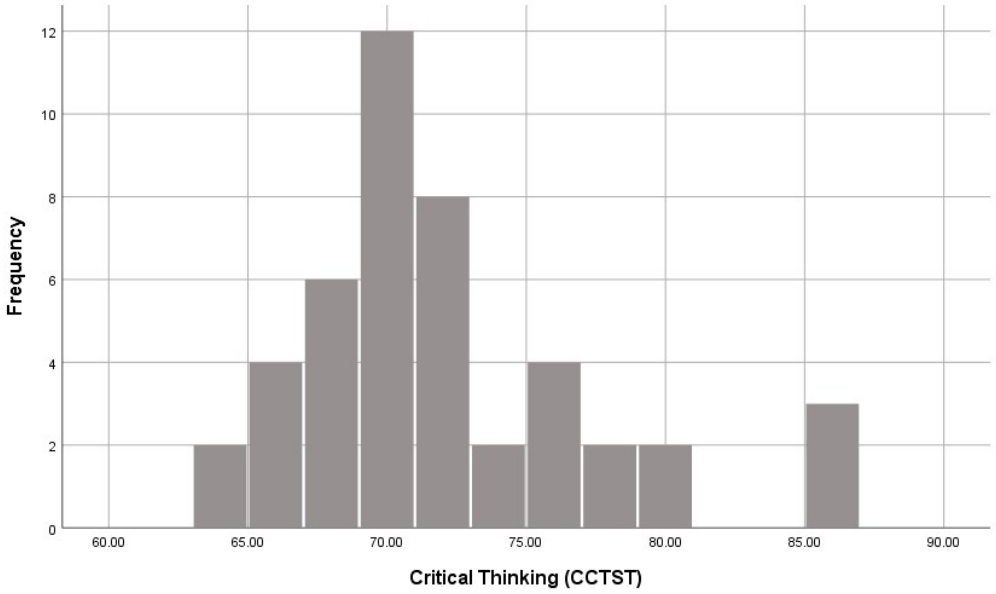



*Figure 3.* Critical thinking (CCTST) scores.

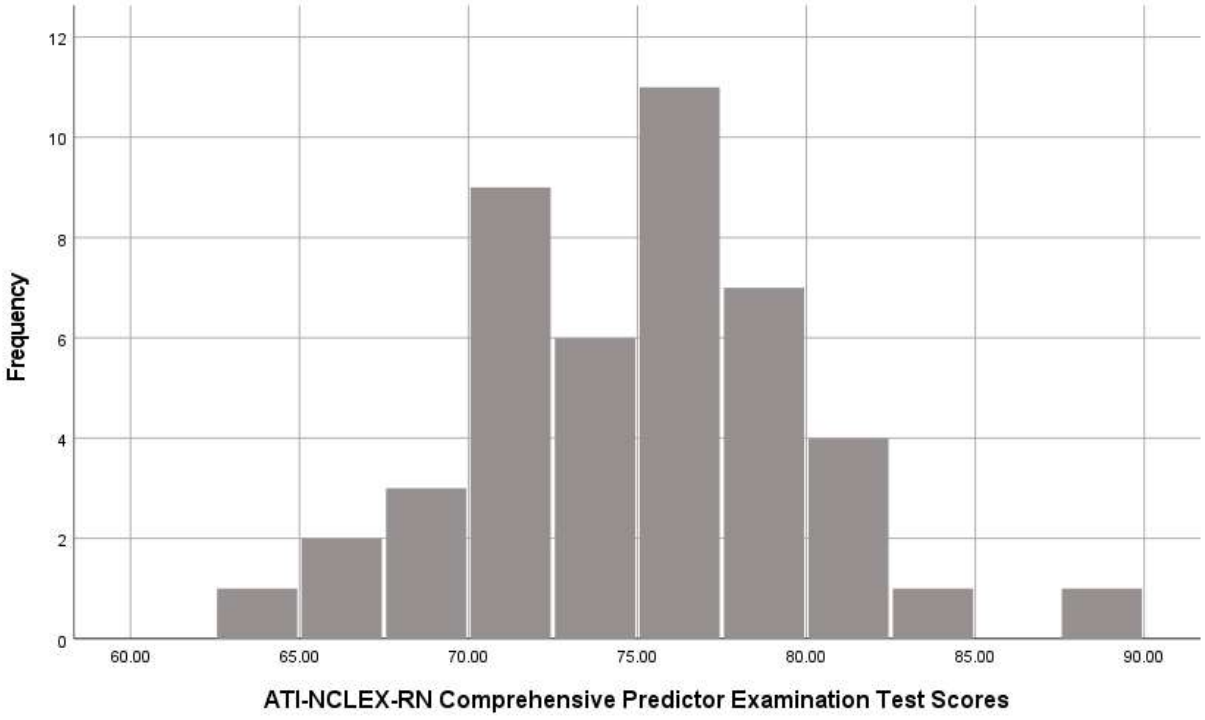



*Figure 4.* ATI-NCLEX-RN Comprehensive Predictor Examination test scores.

To test the hypothesis that there would be a significant association between EI, critical thinking, resilience, and other demographic factors to nursing student test performance on the ATI-NCLEX-RN Comprehensive Predictor Examination a series of correlations was initially conducted to examine these relationships. Associations between demographics and ATI-NCLEX-RN Comprehensive Predictor Examination scores were first explored. Scores obtained on the MSCEIT (EI), CCTST (CT), and CD-RISC (resilience), all continuous data, were then examined for their relationships with ATI-NCLEX-RN test scores.

**Demographics and ATI-NCLEX-RN Comprehensive Predictor Scores**

For the dichotomous demographic variables, a series of point-biserial correlations were obtained. A point-biserial correlation ($r_{pb}$) is an appropriate analysis to use to determine the relationship between a dichotomous variable and a continuous variable (Field, 2013). The finding of a point-biserial correlation showed a significant association between use of the Nurse Logic 2.0 resource and ATI-NCLEX-RN Comprehensive Examination test scores ($r$ = -.51, $p$ < .001). This finding suggests that participants who used Nurse Logic 2.0 tended to have lower ATI-NCLEX-RN Comprehensive Examination test scores in comparison to those who did not use the Nurse Logic 2.0 resource.

**Emotional Intelligence, CT, and Resilience Scores and ATI-NCLEX-RN Predictor Scores**

A series of Pearson correlations was conducted between the survey scores (EI, CT, and resilience) and ATI-NCLEX-RN Comprehensive Predictor Examination test scores. The finding of a Pearson correlation indicated that there was a significant association between scores obtained on the CCTST (critical thinking) and ATI-NCLEX RN Comprehensive Examination test scores ($r$ = .47, $p$ = .001). This finding suggests that higher scores on the CCTST tended to

be associated with higher scores on the ATI-NCLEX-RN Comprehensive Predictor Examination. Table 5 presents the findings of the correlation analyses.

**Table 5**

*Point-biserial Correlations and Pearson Correlations on ATI-NCLEX-RN test scores*

| Source | ATI-NCLEX RN Test Scores | | | |
|---|---|---|---|---|
| | $r_{pb}$ | *P* | *R* | *P* |
| Gender (reference: male) | -.28 | .068 | | |
| Age (reference: 18-25 years) | .03 | .838 | | |
| Ethnicity (reference: not Hispanic) | -.17 | .279 | | |
| Previous work experience (reference: no) | .07 | .642 | | |
| Previous degree (reference: no) | -.08 | .606 | | |
| Use Nurse Logic (reference: no) | -.51 | <.001 | | |
| Native language (reference: English) | | | | |
| Spanish | -.04 | .775 | | |
| Bilingual | .16 | .299 | | |
| Other | -.25 | .105 | | |
| Emotional intelligence (MSCEIT) | | | .04 | .820 |
| Resilience (CDRISC) | | | -.12 | .425 |
| Critical thinking (CCTST) | | | .47 | .001 |

*Note. $r_{pb}$ represents correlation coefficient for point-biserial correlation; *R* represents correlation coefficient for Pearson correlation; *P* denotes level of significance for correlations.

A multiple linear regression analysis was then conducted to examine the predictive association between EI, critical thinking, resilience, and other demographic factors to nursing student test performance on the ATI-NCLEX-RN Comprehensive Predictor Examination. The variables were assigned a reference group prior to entry into the regression model due to the categorical nature of the demographic predictors. First, the assumptions of a linear regression were tested, including: a) normality, b) homoscedasticity, and c) absence of multicollinearity. The normality assumption was confirmed with a P-P scatterplot (see Figure 5). The assumption of normality was verified as the data closely followed the normal trend line.

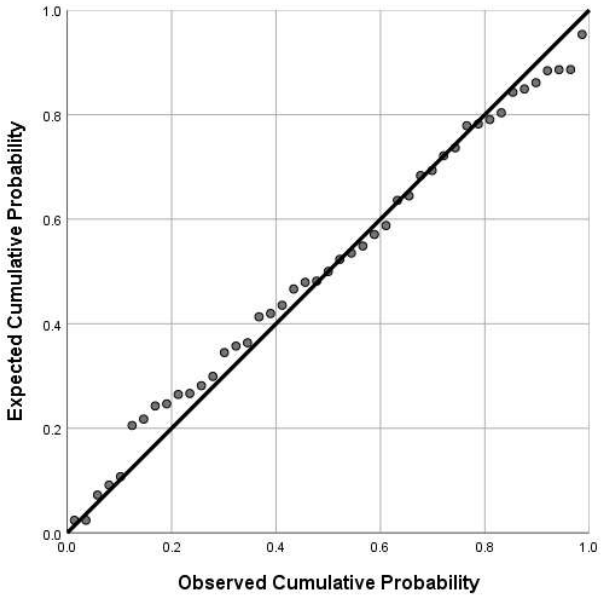



*Figure 5.* Normal P-P scatterplot for relationship between demographics, Emotional Intelligence, Resilience, and Critical Thinking predicting ATI-NCLEX-RN test scores.

The assumption of homoscedasticity was tested with a residuals scatterplot. A non-recurring pattern in the scatterplot showed the assumption for homoscedasticity was met (see Figure 6).

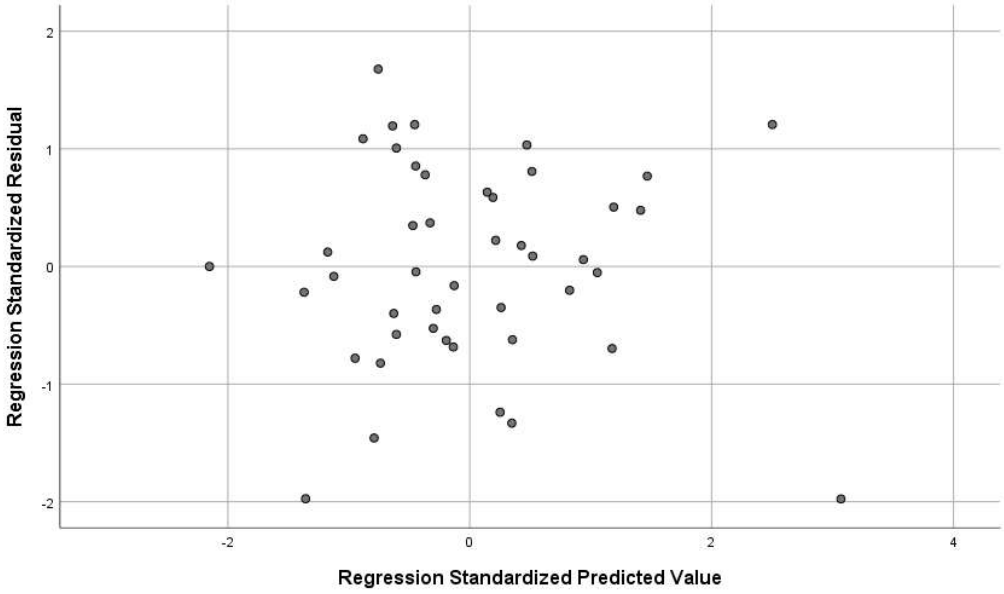



*Figure 6.* Residuals scatterplot for relationship between demographics, Emotional Intelligence, Resilience, and Critical Thinking predicting ATI-NCLEX-RN test scores.

The assumption of absence of multicollinearity refers to the low level of association between the predictor variables. This assumption was examined by using variance inflation factors (VIFs). Variance inflation factors below 10 indicate that predictors have a low association (Stevens, 2009). All of the VIFs were below 10, indicating that this assumption was met. Table 6 presents the VIFs for the predictor variables.

**Table 6**

*Variance Inflation Factors (VIFs) for Predictors*

| Source | *VIFs* |
|---|---|
| Gender (reference: male) | 1.52 |
| female | |
| Age (reference: 18-25 years) | 1.54 |
| 25-40 years | |
| Ethnicity (reference: not Hispanic) | 1.46 |
| Hispanic | |
| Previous work experience (reference: no) | 1.60 |
| Yes, had previous work experience | |
| Previous degree (reference: no) | 1.55 |
| Yes, had previous degree | |
| Use Nurse Logic (reference: no) | 1.43 |
| Yes, used Nurse Logic 2.0 | |
| Native language (reference: English) | |
| Spanish | 1.65 |
| Bilingual | 1.53 |
| Other | 1.36 |
| Emotional intelligence (MSCEIT) | 1.96 |
| Resilience (CDRISC) | 1.35 |
| Critical thinking (CCTST) | 1.37 |

The findings of the overall linear regression were statistically significant, $F(12, 32) = 3.34$, $p = .003$, $R^2 = 0.556$, suggesting that collectively the demographics (gender, age, ethnicity, previous work experience, previous degree, use of Nurse Logic 2.0 resource, native language), emotional intelligence, critical thinking and resilience, significantly predicted ATI-NCLEX-RN Comprehensive Predictor Examination test scores. This supports the hypothesis that in this study,

there was a significant association between emotional intelligence, critical thinking and resilience, combined, to ATI-NCLEX-RN Comprehensive Predictor Examination performance. The $R^2$ indicated that 55.6% of the variance in ATI-NCLEX-RN test scores could be explained by the predictor variables. Based on the demonstrated significance of the overall regression model, the individual predictors were further examined.

Age ($B$ = 3.27, $t$ = 2.07, $p$ = .047) was a significant predictor variable in the model, indicating that participants that were 25-40 years old scored approximately 3.27 units higher on the ATI-NCLEX-RN Comprehensive Predictor Examination in comparison to those who were 18-25 years old. A simple linear regression was conducted and determined that 1.4% ($R^2$ ) of the variance in NCLEX-RN Comprehensive Predictor Examination scores could be explained by age. Use of the Nurse Logic 2.0 resource ($B$ = -6.42, $t$ = -4.08, $p$ < .001) was a significant predictor in the model, indicating that those who used Nurse Logic 2.0 scored approximately 6.42 units lower on the ATI-NCLEX-RN Comprehensive Predictor Examination in comparison to those who did not use Nurse Logic 2.0. A simple linear regression was conducted and determined that 26.1% ($R^2$) of the variance in NCLEX-RN Comprehensive Predictor Examination scores could be explained by Nurse Logic 2.0. Neither emotional intelligence nor resilience were significant predictors in the regression model. Critical thinking ($B$ = 0.34, $t$ = 2.70, $p$ = .011) was a significant predictor in the model, indicating that with every one-unit increase in critical thinking scores, ATI-NCLEX-RN Comprehensive Predictor Examination scores increased by approximately 0.34 units. A simple linear regression was conducted and determined that 21.6% ($R^2$) of the variance in NCLEX-RN Comprehensive Predictor Examination scores could be explained by critical thinking (CCTST) scores. Results of the linear regression are in Table 7.

**Table 7**

*Linear Regression with Demographics, Emotional Intelligence, Resilience, and Critical Thinking Predicting ATI-NCLEX-RN Comprehensive Predictor Examination Test Scores*

| Source | *B* | *SE* | B | *T* | *P* |
|---|---|---|---|---|---|
| Gender (reference: male) | 0.47 | 1.62 | .04 | 0.29 | .776 |
| Female | | | | | |
| Age (reference: 18-25 years) | 3.27 | 1.59 | .30 | 2.07 | .047 |
| 25-40 years | | | | | |
| Ethnicity (reference: not Hispanic) | -1.79 | 2.17 | -.12 | -0.83 | .414 |
| Hispanic | | | | | |
| Previous work experience (reference: no) | 3.06 | 2.27 | .20 | 1.35 | .186 |
| Yes, had previous work experience | | | | | |
| Previous degree (reference: no) | 1.56 | 1.52 | .15 | 1.03 | .312 |
| Yes, had previous degree | | | | | |
| Use Nurse Logic 2.0 (reference: no) | -6.42 | 1.57 | -.58 | -4.08 | <.001 |
| Yes, used Nurse Logic 2.0 | | | | | |
| Native language (reference: English) | | | | | |
| Spanish | 0.48 | 1.57 | .05 | 0.31 | .761 |
| Bilingual | 2.00 | 1.58 | .19 | 1.27 | .214 |
| Other | -8.47 | 4.46 | -.26 | -1.90 | .066 |
| Emotional Intelligence (MSCEIT) | -0.10 | 0.06 | -.29 | -1.76 | .089 |
| Resilience (CDRISC) | 0.05 | 0.07 | .10 | 0.70 | .489 |
| Critical Thinking (CCTST) | 0.34 | 0.13 | .37 | 2.70 | .011 |

*Note.* Overall model: $F(12, 32) = 3.34$, $p = .003$, $R^2 = 0.556$

A post-hoc power analysis was conducted in G*Power 3.1.9 (Faul et al., 2014). Based on the findings of the multiple linear regression, the coefficient of determination ($R^2$) was .556. According to Cohen (1988), the effect size was converted to $f^2$ using the formula $f^2 = R^2/1\text{-}R^2$. Applying the parameters to G*Power, an effect size of 1.25, significance level of .05, total sample size of 45 participants, and 12 predictor variables, it was determined that the achieved power for the statistical analysis was 0.99.

## Discussion

The purpose of this study was to determine significant predictors of ATI-NCLEX-RN Comprehensive Predictor Examination test performance among the variables of EI, critical thinking, and resilience among undergraduate senior nursing students. The results suggest that collectively, demographics, EI, critical thinking, and resilience play a significant role in test performance. Although EI, critical thinking, and resilience have not been previously explored together in the literature, this study's findings build on the evidence from studies that have examined each of these variables independently showing possible associations between these variables to nursing students' academic performance.

Initially, associations between demographic factors and ATI-NCLEX-RN Comprehensive Predictor examination test scores were examined. The sample was comprised of a majority of female students, similar to all of the studies reported in the review of the literature. In contrast, most of this sample identified as being Hispanic as compared to other studies where the majority of subjects have identified as being White or Caucasian. Although almost half of the sample (40%) reported English as being their native language, Spanish, or the combination of bilingual Spanish and English accounted for 57.8% of the sample's reported native language. This study's findings may illuminate factors that affect the relationships between EI, critical thinking, and resilience to academic performance that are unique to this population and may engender further studies concerning Hispanic and bilingual students.

The positive association between CCTST scores (critical thinking) and ATI-NCLEX- RN test scores supports the findings in Giddens and Gloekner's study (2005) in which critical thinking scores on the CCTST were positively associated with passing NCLEX-RN. This finding was encouraging as schools of nursing consistently strive to develop critical thinking skills

among their students, not only to pass NCLEX-RN, but also to provide safe and effective nursing care.

It was hypothesized that there would be a significant association between EI and test performance, however no significant association was found. This would suggest that EI is indicative of a separate intelligence as proposed by Mayer et al. (1999) and not the kind of cognitive intelligence typically ascribed to academic achievement (Cheshire, 2015). It cannot be discounted that EI may factor in to critical thinking as problem solving and decision-making skills are hallmarks of both of these abilities. Emotional intelligence enables one to recognize emotional meanings, ascertain their relationships, and use this information as a basis of reasoning and problem solving (Mayer et al., 1999). Proficient problem solving is necessary for students to perform well academically and on tests such as NCLEX-RN.

A few studies have linked resilience to academic performance (Beauvais et al., 2014; Van Hoek et al., 2019) but no significant associations were found in this study. Resilience has been closely linked with EI (Benson et al., 2010; Cleary et al., 2018; Min et al., 2013). Nurses often experience situations of adversity, stress and conflict, and a high level of resilience and EI may help mitigate and allow nurses to cope with ensuing psychological distress (Cleary et al., 2018). There is a dearth of research on the effects of resilience on academic performance, standardized readiness tests, and NCLEX-RN, accentuating the need for more research in this area. Its connection to EI warrants more in-depth investigation.

One of the most surprising correlation findings was the inverse association of the use of the Nurse Logic 2.0 resource and ATI-NCLEX-RN Comprehensive Predictor Examination test scores. This resource is a tool intended to help students boost their test scores and to refine their critical thinking skills in preparation of NCLEX-RN. In this study, students who had used this

resource tended to have lower test scores than those who never used this tool. Coding for Nurse Logic in SPSS was verified, and "0" was assigned to the "no" response and "1" was assigned to the "yes" response, indicating the appropriate assignment of responses to generate an accurate analysis. It is important to note that although 75.6% of subjects reported using Nurse Logic 2.0, no details were obtained from them regarding the extent to which they used this tool, the point during nursing school at which they used it, or how they actually applied what they learned from this resource. Nurse Logic 2.0 as previously mentioned is not a program mandate, but some instructors reported that they require students who have failed ATI subject exams to use this resource. It is possible that a portion of the lower-scoring students on the ATI-NCLEX-RN Comprehensive Predictor were students who were in need of remediation or additional support at some point during their nursing school career.

To explore the predictive relationship of the study variables to test performance, a multiple linear regression was done. It was determined that there was a collectively significant association between all the demographic factors, emotional intelligence, resilience, and critical thinking on ATI-NCLEX-RN test scores. Age was a significant predictor variable in the model, indicating that participants who were 25-40 years old scored higher on the ATI-NCLEX-RN Comprehensive Predictor Examination in comparison to those who were 18-25 years old. Use of Nurse Logic 2.0 was a significant predictor in the model, indicating that those who used Nurse Logic 2.0 scored lower on the ATI-NCLEX-RN Comprehensive Predictor examination in comparison to those who did not use this resource. This affirmed the finding in the point-biserial correlation that showed an inverse correlational association. Neither emotional intelligence nor resilience were significant predictors in the regression model. Critical thinking was a significant predictor in the model, indicating that as critical thinking scores increased, ATI-NCLEX-RN

Comprehensive Predictor Examination scores also increased. This supports previous research studies that have linked critical thinking skills to academic performance and NCLEX-RN achievement.

The findings of this study expand on the understanding of EI, resilience, and most notably, critical thinking as a predictor of performance on standardized readiness tests. Nurse educators may consider the possible synergistic effects of EI, resilience, and critical thinking to test performance when designing curricula. It is important to note that each of these abilities, EI, critical thinking, and resilience, can be learned and developed (Alfaro-Lefevre, 2017; Mayer et al., 2016; Romeo, 2010; Thomas & Revell, 2016). This is important to take into consideration while evolving teaching strategies and implementing learning activities designed to cultivate these skills. Exploration of how these abilities can be strengthened and the ways by which they influence standardized readiness test and NCLEX-RN success merit further study.

**Strengths and Limitations**

There are no prior studies that have examined the most significant predictors of test performance from among the variables of EI, critical thinking, and resilience, on the widely used standardized readiness test from Assessment Technologies Institute, the ATI-NCLEX-RN Comprehensive Predictor Examination. This study addressed a major gap in the literature. One of this study's strengths was the use of robust instruments to measure the concepts of EI, critical thinking, and resilience. These survey tools have had demonstrated validity and demonstrated reliability in previous studies. Study limitations included the use of a nonprobability convenience sample. Due to non-randomization, the results from this study may not be generalizable to the larger population. Homogeneity of the sample was also a limitation in that the undergraduate nursing students that were surveyed attended the same academic institution at one university.

The majority of study participants were Hispanic (88.9%) which may also limit transferability of findings. However, this may also be a viewed as a strength since studies exploring standardized readiness test performance and NCLEX-RN predictors among this population have been extremely limited. The majority of studies examining critical thinking, EI, and resilience among nursing students in the United States have had samples comprised of mostly White nursing students, and so this study adds to the understanding of the associations of these concepts to NCLEX-RN achievement among Hispanic nursing students. Other limits included the possibility that the students may have become fatigued during their tests, which may have affected their answers over the course of the almost two-hour period it took to complete all of the surveys. Although the sample size was found to be sufficient, a larger sample approaching 127 test subjects would have added power to this study.

**Recommendations**

The findings of this study have underscored the need to expand research into the role of EI, critical thinking and resilience on nursing student performance on standardized readiness tests and NCLEX-RN. The combination of these three variables along with demographic factors collectively predicted success on the ATI-NCLEX-RN Comprehensive Predictor Examination. These results suggest there is an intersectionality of these variables and further investigation would increase understanding of how their relationships contribute to test performance. The implementation of a multi-site study with a larger and more heterogenic sample would increase generalizability of study findings. Additional research could include looking at GPAs and actual NCLEX-RN pass and fail rates in addition to this study's variables.

Other components of EI, critical thinking, and resilience could also be examined for associations to standardized readiness test performance. For example, the MSCEIT V2.0

provides scores on test categories that include the theoretical branches of EI including *perceiving emotions, using emotions, understanding emotions and managing emotions*. These branch scores could be compared to performance on the overall ATI-NCLEX-RN Comprehensive Predictor Examination, or to scores on the psychosocial category of questions on this standardized readiness test. To determine the role test resources from standardized readiness test vendors play in bolstering test scores, questions that are more detailed could be asked of participants. For example, the amount of resources used, the extent to which they are used, and the point in time during the course of undergraduate nursing studies they were used would help researchers understand how they contribute to test success.

The CCTST also provides categorical scores on various aspects of critical thinking including analysis, interpretation, inference, evaluation, explanation, induction, deduction, and numeracy. Researchers may examine associations between these components to area and branch scores on the MSCEIT V2.0. Insight Assessment also provides another tool similar to the CCTST that was designed for students in the health sciences called the Health Sciences Reasoning Test (HSRT). Scores on the HSRT may reveal another aspect of critical thinking ability among nursing students as they prepare for NCLEX-RN.

To further explore the role resilience may play in test performance, other tests in addition to the CD-RISC could be used to broaden understanding of how resilience factors into this mix. Tools that measure coping strategies, or adverse child experiences, may prove useful. Resilience has been the least studied of factors contributing to student test success; however, this study's findings suggest it may play a role in predicting how well students will perform on standardized readiness tests. The use of categorical scores from the various tools used for this study would add dimensionality to understanding how the variables in this study work together. Further

investigation of the possible relationships between EI, critical thinking, and resilience, to standardized readiness test performance, would provide a nuanced understanding of how these traits contribute to NCLEX-RN achievement and would help faculty maximize efforts to prepare their students to pass this most critical examination.

**Summary**

The associations and significant relationships between demographic variables, emotional intelligence, critical thinking, and resilience, to test performance on the ATI-NCLEX-RN Comprehensive Predictor Examination, were explored in this quantitative study. As passing this standardized readiness exam reflects the likelihood of passing the NCLEX-RN on the first attempt, a necessary milestone to permit entry into professional practice, determination of the factors that enhance ATI-NCLEX-RN test performance merit further investigation. This study showed a significant relationship collectively between demographic factors, EI, critical thinking, and resilience, to test performance on the comprehensive predictor examination produced by Assessment Technologies, Inc. This finding suggests this relationship is worth exploring in detail and among larger and more diverse populations.

Identification of factors that influence achievement on standardized readiness tests that predict NCLEX-RN success will provide nurse faculty with insight on how to develop and implement curriculums that will prepare nursing students to pass the NCLEX-RN on the first attempt. Such studies will guide faculty on nurturing personal attributes that not only enable nursing students to pass their licensure examination, but that also empower them to meet the enormous challenges of the current and future health care environment.

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# Chapter 5: Summary and Conclusion

Schools of nursing have the responsibility of preparing new generations of nurses for the rigorous demands of health care systems struggling to meet complex patient needs, manage rising costs, and maintain adequate staffing (AACN, 2019). Nurses must possess not only vast knowledge and technical skills, but must also be able to communicate effectively with members of the health care team to ensure safe, patient-centered, compassionate care. Nurses are immersed in human relationships and continually navigate both intrapersonal and interpersonal emotions. The ability to manage emotion, engage in critical decision-making, and connect with colleagues and patients is a core skill of nursing (Freshwater & Stickley, 2004).

The foundation for strong, capable nurses who will develop into strong leaders in the profession begins in nursing school. Nurse educators and researchers continuously seek factors that predict academic, clinical, and professional success. Emerging evidence suggests that the attributes of EI, CT, and resilience may factor greatly into creating nurses poised to meet the myriad of challenges inherent to practice (Bulmer-Smith et al., 2009; Christianson, 2020; Cleary et al., 2018). As discussed in chapter 2, it is important to clarify the meaning of concepts relevant to nursing to guide nursing research. This chapter explored EI and reviewed the several ways it is defined and expressed. Enhanced conceptual understanding may lead to the development of a theoretical model that describes what EI means in the context of nursing that will guide researchers to expanding the evidence-base as it pertains to nursing education.

Chapter 3 presented a review of literature consisting of empirical studies and other related articles examining the role of EI in academic performance. Success in nursing school is widely considered to be greatly reflected in student standardized test performance, GPA, and course completion (Fernandez et al., 2012). There is much evidence to suggest a positive

relationship between EI and academic performance, but more studies are needed to discover the role of EI in academic achievement and mediating effects it may have with other variables such as critical thinking and resilience. A quantitative, predictive correlational study was done exploring the relationship between EI, critical thinking, and resilience to test scores on the ATI-NCLEX-RN Comprehensive Predictor examination among a cohort of undergraduate nursing students. The findings of this study aligned with other studies showing a significant association of a measure of academic performance with EI. Emotional intelligence, critical thinking, resilience, and demographic factors collectively predicted student performance on a standardized readiness test in this study. As the body of science grows concerning EI, CT, and resilience, and more is known regarding the influence these abilities have on student achievement in nursing school, nurse educators will be able to tailor learning activities to refine these qualities in students. Optimization of these skills can help students succeed in their studies, excel in the workplace, and deliver emotionally competent care to their patients and communities.

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# Appendix A

## Table 1: Emotional Intelligence and Nursing Students and Academic Performance

| Citation: author(s), date of publication& title | Purpose of Study | Participants Sample Setting | Design/ Methods | EI Measurement Instruments | Concept Area | Results | Recommendations |
|---|---|---|---|---|---|---|---|
| Guo et al., 2019 | To explore nursing students' academic procrastination and its relationship to EI and self-efficacy, and self-efficacy's mediation of the relationship between EI and academic procrastination | Convenience sample of 347 nursing students from 2 junior colleges (non-bachelor's degree) in Jinan City, Shandong Province,<br><br>**China**<br><br>**Gender:** Female: 100%<br>**Mean age**: 18.56 years<br>**Nursing school level:** 1st year of study: 48.1% | Cross-sectional survey | EI-Emotional Intelligence Scale (EIS) by Schutte et al. 1998 Chinese version<br><br>General Self Efficacy Scale (GSES)<br><br>Procrastination Assessment Scale (PASS) Chinese version | Factors affecting nursing program completion<br><br>EI and Academic Procrastination and self-efficacy | EI and self-efficacy were negatively associated with academic procrastination<br><br>Self-efficacy mediated the relationship Between EI and academic procrastination | Students who report lower EI and lower self-efficacy may be at higher risk of academic procrastination and college counselors can work to enhance this construct among nursing students.<br><br>One way to weaken procrastination is to strengthen EI<br><br>EI training in nursing curriculums may increase students' self-efficacy and thereby decrease academic procrastination and contribute to academic achievement |
| Rode & Brown, 2019 | To examine emotional intelligence to 2 standardized measures of nursing student performance: the Kaplan Nursing Assessment Test (NAT) | Convenience sample of 53 under-graduate **BSN** students enrolled in University in Midwestern US<br><br>**USA**<br><br>**Gender:** Female: 96% | Descriptive cohort design with 2 data collection time points | EI-Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) Version 2 (V2) by Mayer et al., 2003 | EI and NCLEX-RN and Standardized readiness test outcomes | EI global scores were significantly related to both NAT and NCLEX-RN<br><br>*Understanding emotions* branch was a significant predictor of NAT<br><br>*Understanding emotions* and *Perceiving emotions* branches were both significant predictors of passing NCLEX-RN | EI may be predictive of standardized measures of students' performance and may be a competency necessary for entry-level licensure.<br><br>Enhancing nursing curriculum to include training in perceiving and understanding emotions may be beneficial in augmenting student success. |

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| | and NCLEX-RN | **Mean age:** 25.8 years **Race/Ethnicity** White: 87%, Black, 6%, Hispanic and Asian 2% **Nursing school level:** Seniors | | | | | |
| Opsahl et al., 2018 | To describe the implement-tation of an online coaching program with Appreciative Advising and Emotional Intelligence education as combined educational strategies to improve student learning outcomes | Convenience sample of 69 senior level under-graduate **BSN** students in 4 graduating classes: 2013 n=15, 2014 n=19, 2015 n=18, 2016 n=17<br><br>University in Midwestern US<br><br>**USA**<br><br>**Nursing school level:** BSN graduates who completed NCLEX-RN | T-tests compared mean NCLEX RN pass rates before and after implemen-tation of an intervention that included an EI component and an online coaching program and ATI NCLEX-RN preparation tools | NCLEX RN pass rates<br><br>Likert scale program satisfaction surveys | EI and NCLEX-RN Test Outcomes<br><br>*EI interven-tion | NCLEX-RN pass rates showed significant improvements after implementation of program | Nursing programs that include educational strategies of a comprehensive predictor assessment and online and academic support components, including EI training, can result in positive 1st time pass rates for NCLEX-RN<br><br>More research recommended to investigate multifaceted approaches to support undergraduate nursing programs |
| Codier & Odell, 2014 | To explore the relationship between measured emotional intelligence ability and GPA average of first year | A sample of 72 **BSN** students entering their first year of nursing school at large, public land grant | Quantitatived escriptive, exploratory study | EI-MSCEIT V2 by Mayer et al., 2003<br><br>GPA from prerequisite college courses prior to admission | EI and GPA | Total EI scores and 1 sub score, *experiential emotional intelligence* correlated significantly with GPA | The relationship between pre-graduation measures of success and level of performance post graduation warrants further investigation.<br><br>Research on the relationship between traditional and nontraditional measures of academic success and EI correlation with post graduation performance is needed. |

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|---|---|---|---|---|---|---|---|
| | nursing students | university in south-central US<br><br>**USA**<br><br>**Gender:** Female 90%<br><br>**Mean age:** 24 years<br>**Race/ethnicity:** Caucasian 88%, Asian 7 %, Hispanic 3%, Black <1%<br>**Level in nursing school:** 1st year of nursing school | | to nursing school | | | |
| Fernandez et al., 2012 | To examine the association between trait emotional intelligence and learning strategies and their influence on academic performance among first-year accelerated nursing students | A sample of 81 first-year students enrolled in the accelerated graduate entry **BSN** program<br><br>**Australia**<br><br>**Gender:** Female: 80%<br>**Mean Age:** 29 years<br>**Race/ethnicity:** 72% international<br>**Level of nursing school:** 1st year nursing students 6 | Prospective Survey design | EI-Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF) by Cooper & Petrides, 2010<br><br>Motivated Strategies for Learning Questionnaire (MSLQ) subscales: Self-regulated learning strategies, extrinsic goal motivation, peer | EI and GPA | There was a statistically significant correlation between emotional intelligence scores and critical thinking, help seeking, and peer learning, but not with extrinsic goal orientation<br><br>EI was a significant predictor of academic achievement | EI and learning strategies have positive relationship with student academic achievement; a greater awareness and understanding of learning strategies will assist nursing faculty to support students in achieving academic success. Enhancing EI skills could better prepare nursing students to manage emotional demands in the clinical setting. Further research needed to examine long-term effects of EI on academic success and at subsequent stages of a nursing program<br><br>Also to investigate broader range of indicators for academic success including number of courses completed rather than just GPA<br><br>Also, investigate learning styles of students as more mature-aged and international students enroll in nursing programs. |

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|---|---|---|---|---|---|---|---|
| | | months after commencement of program | | learning, help seeking and critical thinking<br><br>GPA at the end of the 1st 6 months of the nursing program | | | |
| Gratrix, 2014 | | | | | Commentary | | Due to relocation of the international students from one country to another to seek education and employment, they may have possessed a higher level of self-regulated learning strategies and greater understanding, therefore possessing a higher level of emotional intelligence, and affecting study findings<br><br>Although emotional intelligence may indicate academic success, does not propose that EI predicts a more caring and compassionate nurse<br><br>EI may be considered as a factor in nursing school admittance screening<br><br>There are increased calls for health education to use EI testing to assess candidates' suitability for nurse training, however before such reforms are undertaken and curriculums and programmes are redesigned, more investigation is needed to support the view that EI is a valid and reliable indicator of suitability for nurse training beyond academic outcomes. |
| Bennington et al., 2020 | To determine if there was a difference in EI levels in students who successfully completed nursing courses on the 1st attempt compared to students who were not successful in completing nursing courses on the 1st attempt | Convenience sample of 110 **ADN** students enrolled in a two-year community ADN program<br><br>**USA**<br><br>**Gender:** female 85.5%<br>**Mean age:** 30 years<br>**Race/ethnicity:** White 64.5%, African American 17.3%, | Quantitative comparative descriptive study | EI-Schutte's Self-Report Emotional Intelligence Test (SSEIT), by Schutte et al., 1998, based on Mayer and Salovey's ability model<br><br>Self report socio demographic survey including question of whether nursing courses have been | EI and successful completion of nursing courses on 1st attempt (passing) | No significant difference between the number of course failures and EI levels<br><br>No significant difference in EI between nursing students who were successful in nursing courses on the 1st attempt than those who were not successful on the 1st attempt<br><br>EI levels had no relationship to academic performance in ADN nursing students | Recommend to replicate the study during an academic year to increase response rates from nursing students and conduct on more than 1 ADN program, and conduct a longitudinal study to evaluate if EI levels have changed in nursing students |

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|---|---|---|---|---|---|---|---|
| | | Hispanic 6.4%, Other 11.8%<br>**Level of nursing school:** 1,st, 2nd, 3rd or 4th semester | | completed successfully on the 1st attempt | | | |
| Eyong & Rathee, 2017 | To investigate the relationship of emotional intelligence and authentic leadership with academic achievement of community college nursing students | Convenience sample of 121 nursing students from community college in mid-Atlantic region<br>**ADN**<br><br>**USA**<br><br>**Gender:** female 81.8%<br>**Age**: 76% aged 18-34 years, 30% aged 35 to 54 years<br>**Race/Ethnicity:** Not reported<br>**Level in nursing school:** 1st and 2nd level nursing students | Quantitative study | EI-TEIQue SF by Cooper & Petrides, 2010<br><br>Leadership-Authentic leadership Questionnaire<br><br>Fall 2015 GPAs | EI and GPA | Marginally positive correlation between EI and GPA<br><br>EI had no effect on GPA<br><br>No statistical significance in predicting GPA based on EI and authentic leadership | Future research can also be focused on the possibility that emotional intelligence and authentic leadership do not necessarily help students succeed in academics but help them develop other skills such as being sensitive to patients' feelings which is a critical skill necessary to be successful as nurses<br><br>Further research recommended on variables of EI and authentic leadership |
| Cheshire et al., 2015 | To examine the causal relationship between EI scores and the traditional academic admission criteria (GPA) and evaluation | Convenience sample of 85 2nd semester upper division **BSN** nursing students in the southeast US<br><br>**USA** | Descriptive causal comparative design and correlational design | EI-MSCEIT V2.0 by Mayer et al., 2003<br><br>GPA-Admission GPA when they were admitted into upper division, | EI and GPA | No significant relationships or correlations with the current methods of evaluation for admission to nursing school or the evaluation methods used once students are in the program:<br><br>No statistical difference between groups(low, middle, high overall EI scores) on final grade in Fundamentals of Nursing Practice course | The implication is that EI is measuring a different type of intelligence than that represented by academic achievement<br><br>Identify what EI content, if any, is in nursing curricula<br><br>Investigate whether EI skills can be effectively taught and how the teaching of these skills impacts students<br><br>Replicate this study in more diverse population<br><br>Conduct longitudinal study across curriculum to determine whether EI scores have changed |

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| | methods of a BSN program | **Gender:** Female: 83.5% **Mean age:** 21.46 years **Race/Ethnicity:** Caucasian 88%, Hispanic 1%, African American 5%, not-identified 6% **Level in nursing school:** 2nd semester of upper division | | GPA in 2 courses and and final clinical evaluations from Fundamentals of Nursing Practice | | No statistical difference between groups(low, middle, high) based on branch 1 (perception of emotion EI scores) and final grade in Fundamentals or Pharmacology for Nursing Practice courses<br><br>There was a statistical difference between groups (middle and high) based on branch 2 (facilitation of emotion EI scores) and final grades in Fundamentals and Pharmacology courses-however Tukey post hoc showed no significant difference<br><br>No statistical difference between (low, middle, high) based on branch 3 (understanding and analyzing emotions EI scores) or on branch 4 (management of emotions) on final grades in Fundamentals and Pharmacology courses<br><br>There was no significant difference between admission GPA and students' EI branch scores<br><br>There was no significant difference between admission GPA and students' EI raw scores and no correlation between the EI scores and admission GPA | Review clinical evaluation tools to determine validity of these instruments for clinical evaluation<br><br>Evaluate relationship between clinical and classroom grades and MSCEIT scores to determine if infusing EI content in curricula could improve success in nursing profession<br><br>As Fortune 500 companies use EI abilities to guide hiring and firing practices, nursing education should embrace this science<br><br>Include EI abilities as part of admission criteria<br><br>Assessing EI abilities can strengthen students' abilities to establish therapeutic relationships with patients, HCP teams, ensure admission of students who can respond to patients' emotional cues |
| Beauvais et al., 2014 | To describe the relationship between emotional intelligence, psychological empowerment, resilience, spiritual well-being, | Convenience sample of 73 undergraduate nursing students-70 in traditional **BSN** program, 3 in **RN-BSN** program; graduate students | Descriptive correlation-al design | EI-MSCEIT V.2 by Mayer et al., 2003<br><br>Demographic data<br><br>Spreitzer Psychological Empowerment Scale | EI and GPA | Emotional intelligence branch 1 (perceiving emotions) was significantly correlated to academic success, other branches of EI and overall EI were not related to academic success | More research regarding strategies to reduce student attrition and promote academic success<br><br>Research to examine if strategies to enhance EI, psychological empowerment, resilience, and SWB impact other outcomes such as workplace performance and health benefits |

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| | and academic success in undergraduate and graduate nursing students | included in study but not reported in this number for this review- in a medium-sized, private, Catholic university in new England **USA**<br><br>**Gender:** Female 97% **Mean age:** 30 years **Race/ethnicity:** Caucasian 88%, Asian 1%, African American Black 7%, Hispanic 4%, Pacific Islander/Hawaiian 1% **Level in nursing school:** BSN Aspect: traditional and RN to BSN program-freshman excluded | | Wagnild and Young Resilience Scale<br><br>Spiritual Well-Being Scale (SWBS)<br><br>Self-reported GPA | | | |
| Foster et al., 2017 | To measure EI in pre-registration nursing students from programme commenence-ment to conclusion to ascertain EI | Sample of 111 nursing students contributed data on minimum at 2 occasions, enrolled in a **pre-registration** | Longitudinal repeated measures study Between March 2010-February 2013 | EI-Assessing Emotions Scale (AES) by Schutte et al., 1998<br><br>Academic performance measured as weighted | EI and GPA | EI found to be higher at the end of the first year than at the start of the 1st year<br><br>No more increase in EI noted by end of year 4.<br><br>Non-Australians scored higher on subscale (managing own emotions) than Australians | EI may increase over time during pre-registration nursing education<br><br>Relational skills are vital part of effective nursing, recommend to assess EI as part of entry criteria for program selection , but not to use EI scores to outright reject candidates<br><br>Examine associations of EI to academic performance affected by cross-cultural factors |

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| | over time and examine the relationship between EI and academic performance | Master of Nursing degree/BSN track in a metropolitan university in<br><br>**Australia**<br><br>**Gender:** Female 74.8%<br>**Mean age:** 24.7 years<br>**Race/Ethnicity:** Australian 57.7%, several other nationalities<br>**Level in nursing school:** pre-licensure BSN track/MSN track nursing students | | academic mark (WAM) | | One subscale of EI (managing others' emotions) was related to higher academic performance; for every 1 point increase in WAM, this subscale score increased by 0.10 on average<br><br>Significant increase in the subscale (utilizing emotions) over time | |
| Nosek, 2015 | To examine the overall EI and specific components of EI levels and also associations with age, ethnicity, gender, and academic standing in a **BSN** program | Convenience sample of n= 71 from a mandatory professional nursing course as part of a 1st or 2nd semester of the **BSN** nursing program at a private Catholic university in Northern California<br><br>**USA**<br><br>**Gender:** Female 91% | Cross sectional analytical design | EI-MSCEIT V2 by Mayer et al., 2003<br><br>Demographic questionnaire including self-reported GPA | EI and GPA | A higher GPA and being Asian compared to White were associated with **higher scores in mostly all components of EI.**<br><br>Four-year students scored higher than transfer students in the EI branch (understanding emotions)<br><br>Being male was predictive of the EI branch (facilitating thought)<br><br>Latinos were associated with a higher score in EI branch (perceiving emotions) | Recommends to use EI to identify strengths and weaknesses in abilities that can be gleaned or developed as needed<br><br>Nursing programs should also focus on student abilities to perceive, understand, and appraise emotions and utilize them to become creative problem solvers and effective emotional regulators who can de-escalate tense situations or prevent falling victim to or perpetrating workplace violence |

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| | | **Mean age:** 19 years **Race/Ethnicity:** Asian 35.3%, European White: 50.7%, Latino/Hispanic 12.7%, African American 1.4% **Level in nursing school:** 1st or 2nd semester in nursing program | | | | | |
| Sharon & Grinberg, 2018 | To review the relationship between EI level and the degree of success in nursing studies and its importance | Convenience sample of 110 first and second year nursing students in a four-year **BSN** program<br><br>**Israel**<br><br>**Gender:** Female 64% **Mean age:** 21.2 years **Race/Ethnicity:** None reported **Level in nursing school:** 1st and 2nd years nursing students | Cross-sectional prospective study | EI-SSRI Schutte Self-Report Inventory (SSRI) by Schutte et al., 1998<br><br>Psychometric scores measuring learning skills<br><br>Grade transcripts (yearly average) taken from student files | EI and GPA | There was a positive correlation between EI level and the degree of success in nursing studies among nursing students<br><br>EI levels improved during the 2nd year of learning<br><br>The annual average grades was related to EI rather than psychometric scores at the time of admission | Recommend to replicate this study in more academic centers<br><br>To follow level of EI and nursing students' academic achievements in theoretical studies versus clinical training<br><br>To study factors other than EI that may impact annual grade average, such as stress perception or life style behavior<br><br>Examine correlations of all these factors with annual grade average |
| Shanta & Gargiulo, 2014 | To investigate if BSN level nursing | Convenience sample of **BSN** nursing students from | Quasi-experimental between-groups | EI-MSCEIT V2 by Mayer et al., 2003 | GPA and EI | Senior nursing students scored higher on the branch ability to understand and reason about | The prospect that patient outcomes improves when nurses possess higher levels of EI, need to expand understanding of how nursing education affects development of EI |

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| | education increased the level of EI as operational-ized by Mayer and Salovey's four-branch abilities model | 3 Midwestern universities (2 public and 1 private)<br><br>Control Group 1 pre-education majors n=37<br><br>Control Group 2 senior students completing education studies major n=28<br><br>Control Group 3 pre-nursing majors n=119<br><br>Experimental group completing nursing BSN major n=67<br><br>**USA**<br><br>**Gender:** Female 85% (all participants)<br>**Mean age:** BSN majors: 24.04 years<br>**Race/Ethni-city**: Not reported<br>**Level in nursing school:** senior BSN students | comparison research that functioned as a quasi-longitudinal study | GPA self-reported | | emotions over pre-nursing students<br><br>Pre-nursing students scored higher than senior nursing students on the ability to accurately perceive emotions<br><br>Self-estimated GPA was only significant predictor of overall EI | Studies to explore relationship of BSN education to EI<br><br>Studies to explore if nursing education can help those entering programs with lower levels of EI to improve abilities to perceive and use emotions to improve creative thinking to understand and manage emotions.<br><br>Longitudinal studies needed to address limitations inherent to cross-sectional research designs |

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| Por, et al. (2011) | To explore the EI in nursing students and its relationship to perceived stress, coping strategies, subjective well-being, perceived nursing competency and academic performance | Sample of **pre-registration** adult branch nursing students n=130<br><br>**UK**<br><br>**Gender:** Female 90%<br>**Mean age:** 28 years<br>**Race/Ethnicity:** British, 47.7%, African 18.5%, Caribbean 4%, Asian 4.6%, other 23.8%<br>**Level of nursing school:** pre-registration students on nursing diploma or degree programme | Prospective correlational survey design | EI-Schutte Emotional Intelligence Scale (SEIS) by Schutte et al., 1998<br><br>Self-report questionnaire, PSS-10, WCS, SWLS, SNCQ<br><br>Audit of academic performance-GPA comprised the mean grade of 5 modules taken in the first year of study provided by institution | EI and GPA | EI was positively related to well-being, problem-focused coping, and perceived nursing competency<br><br>EI was negatively related to perceived stress<br><br>Students with highest educational background had strongest correlation with EI<br><br>No relationship between EI and GPA in this present study | Nursing curricula need to incorporate EI competencies such as self-awareness into programme outcomes, this may help with coping with stress |
| Rankin, 2013 | To examine the predictive relationship between EI and 1.Clinical practice performance 2. Academic performance 3. Retention | N=178 of self-selected sample of student nurse applicants who applied to begin nurse training at a university in the UK<br><br>**University under-graduates**<br><br>**UK** | Longitudinal study employed a self-report scale correlated to pre-determined programme outcomes | Age, gender, prior academic attainment<br><br>EI-Assessing Emotions Scale (AES) by Schutte et al., 1998<br><br>Academic performance was the mean score for all programme | EI and GPA | There was a significant predictive relationship between EI and all 3 programme outcomes including clinical practice performance, academic performance, and retention after controlling for prior academic achievement, age, and gender | Recruitment and selection procedures should consider EI as an entrance criterion for student nurses<br><br>Need for research exploring relationship between EI and compassionate care |

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| | | **Gender:** Female 94.38% **Mean age:** Age 20-29 highest frequency **Race/Ethnicity:** White 99.44 % **Level in nursing school**: 1st year nursing students-undergraduates | | assignments in year one Retention-enrollment in the 2nd year of the nursing programme<br><br>Clinical practice-clinical assessment tool with scores between 1 and 4 including overall pass/fail rating | | | |
| Suliman, 2010 | To explore the preferred learning abilities or styles of Saudi nursing students in conventional and accelerated programs, the difference in EI social intelligence between the two, and the relationships between academic success and learning styles and EI social intelligence | Nonprobability convenience sample of 98 **BSN** students-n=98 including 50 conventional and 48 accelerated students<br><br>**Saudi Arabia**<br><br>**Gender:** Female 100% **Race/Ethnicity:** Not reported **Level in nursing school:** Undergraduate BSN students | A two-group comparative survey | Demographic questionnaire including age, social status, type of nursing programs, level of education, and GPA<br><br>EI-EQ-I (Bar-On, 2004)<br><br>Learning styles (LSI) Learning styles inventory by Kolb (1985) | EI and GPA | The "self-regard subscale" and the "problem-solving" subscales earned the highest EQ-I content scores<br><br>No significant relationship was found between learning abilities or styles and EI social intelligence and academic success | Replicate study in other places to improve understanding to how EI social intelligence influences academic success-this may contribute to strategies to recruit and retain promising students in the nursing profession |

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| | | in conventional and accelerated track programs | | | | | |
| Codier, 2015 | | | | | Commentary | | Study provides basis for incorporating EI outcomes into those required for both clinical performance in nursing school and I clinical practice after graduation.<br><br>Self-report instruments rely on individual's ability to accurately self-assess, further research using valid and reliable MSCEIT V2 with rigorous validity and reliability that requires performance of emotional tasks would provide important data for comparison<br><br>Nursing school admission criteria screening for EI competency could impact nursing workforce with nurses better equipped to provide human centered care<br>Nurses selected and educated for emotional capability could build workforce with greater resilience and retention<br><br>This study provides foundation for more research on EI measures and successful graduation from nursing school and future success in nursing |
| Roso-Bas et al., 2016 | To investigate whether individual variables of the EI domain such as perceived EI, dispositional optimism/pessimism and depressive rumination are related and/or can predict students' intention to dropout and academic performance | 144 3rd year nursing students N=144<br><br>**University under-graduates**<br><br>**Spain**<br><br>**Gender:** Female 81.94%<br>**Mean age:** 25 years<br>**Race/Ethni-city:** Not reported<br>**Level in nursing school:** 3rd year nursing students | Cross-correlational | EI: Trait Meta-Mood Scale (TMMS-24) by Salovey et al. (1995) Spanish version by Fernandez-Berrocal et al., 2004<br><br>LOT-R Life orientation<br><br>Ruminative Response Scale (RRS)<br><br>Tendency to drop out two-item scale<br><br>Academic performance measured | EI and drop out tendency and subjects passed and registered performance ratio | Students with low levels of emotional clarity and repair and high depressive rumination have pessimistic expectations and more likely to drop out; those with higher EI scores less likely to withdraw or drop out from nursing program<br><br>Lack of statistically significant results to predict academic performance | Offer support through personal tutorials that encourage motivation, confidence, and self-efficacy, workshops to build EI skills for clinical nursing practice and actions to teach positive strategies to cope with academic stress. This could all contribute to academic achievement. |

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| | | | | through ratio between the academic subjects passed and registered during the past academic year | | | |
| | To examine the impact of previous caring experience, EI, and social connection scores on performance and retention in a cohort of first year nursing and midwifery students in Scotland | Adult mental health and midwifery nursing students in a Scottish university N=598<br><br>**University under-graduates**<br><br>**Scotland**<br><br>**Gender:** Female 88.93% | A longitudinal quasi-experimental design | EI-SEIS by Shutte et al., 1998 and the TEIQue-SF by Cooper & Petrides, 2010<br><br>Academic performance: Gathered from university data system-counted as the mean mark over the year at end of year 1, withdrawals and program interruptions also counted | EI and GPA | No significant association found between EI scores and academic performance | Association of social connection factor with program withdrawal needs to be explored and further investigation of this factor to performance and retention will provide information on using this factor to inform basing selection of students into the program on. |
| Jones-Schenk & Harper, 2014 | To determine if students whose emotional intelligence characteristics meet or exceed those of successful staff nurses are more likely to be successful in a BSN | Convenience sample of prelicensure **BSN** students in Texas and California enrolled in multi-state, online, competency-based nursing program N=116, compared to | A descriptive correlational design | EQ-I (Bar-On, 2004). | EI and nursing program retention | Nursing students who remained in program had significantly higher level of total EI, interpersonal capacity, and stress tolerance<br><br>Students who dropped from the nursing program were not significantly different from successful staff nurses in terms of EI | EI may be a compelling adjunct to current selection criteria for nursing students, but need more research to support adoption of this criteria and to determine usefulness of EI as a predictor of student success in nursing programs |

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| | nursing program | staff nurses n=42 from earlier study Harper and Jones-Schenk (2012)<br><br>**USA**<br><br>**Gender:** Female 80.2%<br>**Mean age:** 36.21 years<br>**Race/Ethnicity:** Not reported<br>**Level in nursing school:** prelicensure | | | | | |
| Marvos & Hale, 2015 | To explore the relationship between clinical performance and anticipated retention in nursing students | N=104 nursing students enrolled in a **BSN** program at large, ethnically diverse public university in the pacific region of the US<br><br>**USA**<br><br>**Gender:** Female 73%<br>**Mean age:** 26 years<br>**Race/Ethnicity:** Reported as ethnically diverse<br>**Level in nursing school:** | Exploratoryquantitative, descriptive | EI-MSCEIT V2 by Mayer et al., 2003<br><br>Clinical Performance and anticipated retention-adapted from Lasater's Clinical Judgment /Reasoning Evaluation rubric | EI and clinical performance and anticipated retention | Statistical analysis revealed that although the group average for total EI score and the 6 score subsets were in the average range, approximately 30% of the individual total EI scores and 30% of two branch scores, identifying emotions correctly and understanding emotions, fell in the less than average range.<br><br>EI ability of managing emotions was positively and significantly correlated with clinical performance task of "responding"<br><br>EI ability of understanding emotions, total EI, and strategic EI, was positively and significantly correlated with higher scores of anticipating staying in the nursing profession longer | Due to challenges of health care reform and aging nursing workforce, there is a need to find factors that correlate with high levels of job performance and job retention among nurses<br><br>Further research needed to determine role of EI in preparing students for clinical practice and factors that increase or decrease EI in nursing students |

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| | | Mostly in 4th semester of nursing program | | | | | |
| Snowden et al., 2018 | To examine the baseline emotional intelligence and prior experience with completion of pre-registration nurse and midwifery education | 876 students from two Scottish universities<br><br>**Pre-registration**<br><br>**Scotland**<br><br>**Gender:** Female 89.04<br>**Mean age:** 26.3 years<br>Level in nursing school: pre-registration at the beginning of year 1 | Prospective longitudinal study using self report measures | EI-TEIQue-SF by Petrides, 2006, Cooper & Petrides, 2010<br><br>SEIS by Schutte et al., 1998<br><br>Course completion in 3 years- either yes or no | EI and successful completion of nursing school | Nurses who completed their program scored significantly higher on trait emotional intelligence than those who did not complete their programme<br><br>Nurses who completed their programme scored significantly higher on social connection scores than those who did not<br><br>There was no relationship between "ability" EI and program completion | Global EI should not be used in isolation to recruit nurses |
| Strickland & Cheshire, 2017 | To determine whether a correlation exists between the traditional admission criteria of GPA with the potential admission criteria of EI scores of CT scores to predict upper division student outcomes | Convenience sample of 112 junior level under-graduate nursing students beginning their 1st of a five-semester program<br><br>**University under-graduates**<br><br>**USA**<br><br>The following not reported:<br>**Gender:**<br>**Mean age:** | Quantitative longitudinal design<br><br>Data collected at 3 different time points | EI-MSCEIT at beginning of 1st semester<br><br>Participants admission GPA and HESI A2 scores<br><br>Point 2-end of 1st semester – patho-physiology HESI scores and patho-physiology course GPA<br><br>Point 2- Funda-mental's | EI and HESI subject test performance and course GPAs | EI and HESI CT scores did not significantly correlate with main analysis variables(admission GPA, science GPA, patho HESI score, patho course final grade, fundamentals HESI score, fundamentals final grade) | To expand data collection across all 5 semesters of nursing school rather than 2 semesters to determine EI influence throughout a program<br><br>Research relationships between EI, CT and clinical performance and success<br><br>Quest to identify predictors of student success should remain a priority in nursing research |

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| | | **Race/Ethnicity:**<br><br>**Level in nursing school**: junior level nursing students | | HESI scores and Fundamental's course GPA | | | |
| AkbarilLakeh et al., 2018 | To investigate critical thinking and emotional intelligence skills and relationship with students 'academic achievement in the last year of nursing in Zahedan University of Medical Sciences during 2016-2017 | Sample of 50 senior nursing students<br><br>**University undergraduates**<br><br>**Iran**<br><br>**Gender:** Female 68%<br>**Mean age:** Not reported<br>**Race/Ethnicity:** Local 26%, nonlocal 74%<br>**Level in nursing school:** Senior nursing students | Descriptive cross-sectional | Bar-On Model of emotional intelligence (ESI)<br><br>California Critical Thinking Skills Test (CCTST)<br><br>GPA of last two semesters | EI and GPA and CT | There was a significant relationship between critical thinking and emotional intelligence skills and academic success of senior nursing students in relation to marital status<br><br>There was a significant relationship between CT skills and academic achievement of senior nursing students<br><br>There was a relationship between emotional intelligence and academic achievement of senior nursing students | Experts and critics are invited to the university to enhance critical thinking skills and create an environment conducive to strengthening critical thinking and include activities that build emotional intelligence to promote academic achievement |
| Singh et al., 2020<br><br>**India** | To explore whether EI has any relationship with performance and clinical competence as measured by academic performance in undergraduate medical, dental, and | n-23 articles<br><br>7 of these studies related to nursing students and academic performance | Systematic review | | EI and academic performance among medical, dental, and nursing students | EI has greater role in academic success of clinical year medical and dental students<br><br>Findings suggest that better EI skills of health care team members will have holistic impact on health care improvement<br><br>EI correlates with communication skills | Preclinical year could serve as a baseline for identification of EI in individuals and then training them to make them better equipped to provide holistic care |

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| | nursing students | | | | | | |
| Cleary et al., 2018<br><br>**Australia** | To synthesize the evidence that explored resilience and emotional intelligence in under-graduate nursing students | n=14<br><br>3 articles related to EI and under-graduate nursing student academic performance<br><br>Included descriptive correlational designs, hermeneutic interpretive research, grounded theory, cross-sectional studies, longitudinal studies, and exploratory descriptive designs | Integrative review | | EI and resilience | A positive relationship was found between resilience and performance in undergraduate nursing studies including professional experience placements<br><br>Some studies observed an important role for EI for nursing students, there is insufficient evidence to conclude EI improves nursing students' communication, academic success and retention | Research needed to understand role of resilience in managing adversity and EI elements that assist with management of stressful situations<br><br>Main recommendation among the articles was to encourage understanding among educational staff and preceptors and design nursing courses to develop EI and resilience and to review eligibility criteria for program admission<br>More research needed to determine what aspects of EI assist nursing students with managing adversity and ways to incorporate EI into nursing education<br><br>Research focus needed on experience of nursing students in professional experience placements and the effects these placements have on future practice |
| Lewis et al., 2017<br><br>**Australia** | To investigate the current state of knowledge about emotional intelligence and affective events that arise during nursing students' clinical placement experiences | N=10<br><br>1 article related to EI and under-graduate nursing student academic performance | Narrative review | | EI and affective events | Four main themes:<br><br>1.EI buffers stress<br>2.EI reduces anxiety associated with end of life care<br>3.EI promotes effective communication<br>4.EI improves nursing performance | EI was found to be important in maintaining physical and psychological well-being<br>Development of EI can be useful to improve academic and clinical performance and to reduce risk of emotional distress during clinical placement experiences<br><br>Need more consistency in use of EI tests to create empirical evidence base in nurse education |

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| Christianson, 2020<br><br>**USA** | To review the literature investigating both EI and CT in prelicensure nursing students | N=8<br><br>3 articles related to EI and under-graduate nursing student academic performance | Integrative review | | EI and critical thinking | Three main themes:<br>1.EI and CT are interdependent<br>2.EI and CT competencies are required for success in nursing program<br>3.Nursing education should enhance EI and CT but need more research to evaluate if EI can be used as adjunct admissions criteria to nursing programs | Future research should examine relationship between EI or CT and nursing student clinical performance<br><br>Evaluate how these abilities affect student progression and achievement<br><br>Longitudinal data needs to evaluate long-term effects of EI on clinical achievement at different stages of nursing programs<br><br>Include diverse student populations |
| Radford, 2010 | To determine what correlation exists between nursing students' emotional intelligence and their success in a nursing program | N=115 BSN students attending a rural, public university in the southeastern USA<br><br>**USA**<br><br>**Gender:** Female 85%<br>**Mean age:** Age between 19-24 years with highest % 76.52%<br><br>**Race/Ethni-city:** White 97%, non-white 3%<br>**Level in nursing school**: 1st, 2nd, or 3rd year BSN program | **Dissertation**<br><br>Correlation descriptive design | EI-TEIQue by Petrides et al., 2004<br><br>End of 2nd semester nursing courses GPA | EI and GPA and passing NCLEX-RN | EI was not found to be a significant predictor or nursing students success as measured in nursing school GPA<br><br>The entire sample passed NCLEX-RN; analyses unable to determine relationship due to lack of dichotomous variable<br><br>Only prenursing GPA predicted nursing school GPA | Conduct more studies using ability-based models<br><br>Conduct more studies using trait EI theory tools and TEIQue instruments<br><br>Do research examining other demographic factors and their relationships with EI<br><br>Do research among students of other majors besides nursing for comparison<br><br>Do studies exploring relationship of nursing curriculum to EI levels throughout nursing school |

Appendix B. Study Recruitment Flyer

**Is there a relationship between emotional intelligence, critical thinking skills, and resilience to test performance on the ATI-NCLEX RN Predictor Exam?**

***Participate in a study to explore these relationships!***

Qualifications for Study Participation:

- Must be an undergraduate nursing student completing the last year of undergraduate nursing studies at UTEP and be over 18 years of age
- Must not have experience working as a diploma nurse or an LVN

**WHAT YOU WOULD DO**: You would complete four surveys that take about 90 minutes. This will be a part of your Leadership class so you would not be spending too much extra time out of class for this study.

**COMPENSATION**: Participants will be entered into a drawing for five $50.00 gift cards, plus lunch while you are completing the surveys!

**LOCATION**: The University of Texas at El Paso School of Nursing, room 217, on February 7, 2020 at 3:30 p.m.


**For more information or to participate, please contact Sarah Yvonne Jimenez at 915-525-9716.**

# Appendix C. Institutional Review Board Approval

**Institutional Review Board**

Office of the Vice President for Research and Sponsored Projects
The University of Texas at El Paso IRB
FWA No: 00001224
El Paso, Texas 79968-0587
P: 915-747-7693 E: irb.orsp@utep.edu

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| Date: | January 17, 2020 |
| To: | Sarah Jimenez, MSN |
| From: | University of Texas at El Paso IRB |
| Study Title: | [1541741-1] Relationship of Undergraduate Nursing Students' Emotional Intelligence and other Factors to ATI-NCLEX-RN Comprehensive Predictor Examination Performance |
| IRB Reference #: | External - UT Tyler |
| Submission Type: | New Project |
| Action: | APPROVED |
| Review Type: | Expedited Review |
| Approval Date: | January 17, 2020 |
| Expiration Date: | January 16, 2022 |

The University of Texas at El Paso IRB has approved your submission. This approval is based on the appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This study has received Expedited Review based on the applicable federal regulation.

Based on the risks, this project requires verification on a biennial basis. Please use the appropriate renewal forms for this procedure. The renewal request application must be submitted, reviewed and approved, before the expiration date.

This approval does not replace any departmental or other approvals that may be required. Other institutional clearances and approvals may be required. Accordingly, the project should not begin until all required approvals have been obtained.

Please note that you must conduct your study exactly as it was approved by the IRB. Any revision to previously approved materials must be approved by this office prior to initiation, except when necessary to eliminate apparent immediate hazards to the subject.

All serious and unexpected adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

Please report all Non-Compliance issues or Complaints regarding this study to this office.

Remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

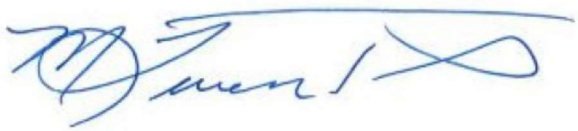
Upon completion of the research study, a Closure Report must be submitted the IRB office.

You should retain a copy of this letter and any associated approved study documents for your records.

All research records must be retained for a minimum of three years after termination of the project. The IRB may review or audit your project at random or for cause. In accordance with federal regulation (45CFR46.113), the board may suspend or terminate your project if your project has not been conducted as approved or if other difficulties are detected.

If you have any questions, please contact the IRB Office at irb.orsp@utep.edu or Christina Ramirez at (915) 747-7693 or by email at cramirez22@utep.edu. Please include your study title and reference number in all correspondence with this office.

Sincerely,



Dr. Lorraine Torres, Ed.D, MT(ASCP)
IRB Chair

Appendix D. Study Consent

University of Texas at El Paso (UTEP) Institutional Review Board
**Informed Consent Form for Research Involving Human Subjects**

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**Protocol Title:** Relationship of Undergraduate Nursing Students' Emotional Intelligence and other Factors to ATI-NCLEX-RN Comprehensive Predictor Examination Performance
**Principal Investigator:** Sarah Yvonne Jimenez, PhD (c), MSN, RN
**Location of Study:** UTEP School of Nursing

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**Introduction**

You are being asked to take part voluntarily in the research project described below. You are encouraged to take your time in making your decision. It is important that you read the information that describes the study. Please ask the study researcher or the study staff to explain any words or information that you do not clearly understand.

**Why is this study being done?**

The purpose of this study is to determine significant predictors of ATI-NCLEX-RN comprehensive exam test performance among the variables of emotional intelligence, critical thinking skills, and resilience among a sample of undergraduate baccalaureate nursing students enrolled in their final semester of the nursing program at the University of Texas at El Paso. Discovery of significant predictors may guide curricular planning within the nursing program to emphasize learning activities that support development of emotional intelligence, and inform curricular designs that already emphasize critical thinking and reinforce skills of resilience.

Approximately, 80 study participants, will be enrolling in this study at UTEP.

You are being asked to be in the study because you are enrolled in your final semester of the nursing program at UTEP and it is anticipated you will take the ATI-NCLEX-RN Comprehensive Predictor Examination, graduate from the school of nursing, and take the NCLEX-RN with the goal of passing this examination to gain entry to professional nursing. Inclusion criteria include being over the age of 18 and exclusion criteria includes having had experience working as a licensed vocational nurse (LVN) or diploma nurse, and being under the age of 18.

If you decide to enroll in this study, your involvement will last about 2 hours for phase 1 of data collection. Data from the ATI-NCLEX-RN Comprehensive Predictor Examination test scores of consented study participants will be obtained for the study for comparison to scores obtained on three survey instruments that will be completed during phase 1. These survey instruments include the Connor-Davidson Resilience Scale (CD-RISC), the Mayer-Salovey-Caruso Intelligence Test (MSCEIT), and the California Critical Thinking Skills Test (CCTST).

**What is involved in the study?**

If you agree to take part in this study, you will have your laptop with you during the leadership course you will be attending on Friday February 7, 2020. If you agree to participate, informed consent will be obtained from you. You will then be able to access the demographic survey and the CD-RISC surveys through Qualtrics, and you will be provided a link to the MSCEIT and CCTST surveys. You will complete these surveys during a two-hour time frame during the Leadership class time. For those who consent to the study, their test scores from the ATI-NCLEX-RN Comprehensive Predictor Examination that will be taken on February 21, 2020 will be obtained after they have completed that examination. Strict confidentiality will be maintained and all data will be de-identified. All data obtained will be secured on an encrypted password protected hard drive in a locked office on the UTEP campus.

**What are the risks and discomforts of the study?**

The risks associated with this research are no greater than those involved in daily activities. There are no known or anticipated risks associated with participation. The only possible risk would be becoming fatigued from completing each of the surveys in one sitting.

**What will happen if I am injured in this study?**

The University of Texas at El Paso and its affiliates do not offer to pay for or cover the cost of medical treatment for research related illness or injury. No funds have been set aside to pay or reimburse you in the event of such injury or illness. You will not give up any of your legal rights by signing this consent form. You should report any such injury to Sarah Yvonne Jimenez, PhD (c), MSN, RN and to the UTEP Institutional Review Board (IRB) at (915-747-7693) or irb.orsp@utep.edu.

**Are there benefits to taking part in this study?**

You are not likely to benefit by taking part in this study. This research may help us to understand the relationships between emotional intelligence, resilience, and critical thinking to test performance on an NCLEX-RN standardized readiness exam (exams that prepare students to pass the NCLEX-RN for entry into professional nursing practice). Nurse educators will have information that can guide curricular development in terms of learning activities that promote development of emotional intelligence, critical thinking, and resilience.

**Who is paying for this study?**

Internal Funding:

Funding for this study is provided by the principal investigator, Sarah Yvonne Jimenez, PhD (c), MSN, RN.

External funding:

None

**What are my costs?**

There are no direct costs.

**Will I be paid to participate in this study?**

You will not be compensated for taking part in this research study. There will be a drawing for 5 fifty dollar Amazon gift cards from among the consented participants and refreshments will be provided during the testing session for all who are completing the surveys on February 7, 2020.

**What other options are there?**

You have the option not to take part in this study. There will be no penalties involved if you choose not to take part in this study.

**What if I want to withdraw, or am asked to withdraw from this study?**

Taking part in this study is voluntary. You have the right to choose not to take part in this study. If you do not take part in the study, there will be no penalty or loss of benefit.

If you choose to take part, you have the right to skip any questions or stop at any time. However, we encourage you to talk to a member of the research group so that they know why you are leaving the study. If there are any new findings during the study that may affect whether you want to continue to take part, you will be told about them.

The researcher may decide to stop your participation without your permission, if he or she thinks that being in the study may cause you harm, or if there are any known environmental threats to the classroom setting or UTEP campus while the surveys are being completed.

**Who do I call if I have questions or problems?**

You may ask any questions you have now. If you have questions later, you may call the principal investigator Sarah Yvonne Jimenez, PhD (c), MSN, RN, at 915-525-9716 or email her at syjimenez2@utep.edu or at sjimenez2@patriots.uttyler.edu.

If you have questions or concerns about your participation as a research subject, please contact the UTEP Institutional Review Board (IRB) at (915-747-7693) or irb.orsp@utep.edu. You may also contact the IRB at the University of Texas at Tyler at 903-566-6109 or by email at dpearson@uttyler.edu.

**What about confidentiality?**

Your part in this study is confidential. The following procedures will be followed to keep their personal information confidential.

1. Data from the surveys will be de-identified. Information connecting your identity to the data will be removed prior to analysis by the data manager of this research project so that neither the principal investigator, nor anyone else will know your identity.

2. The principal investigator and data manager have both received comprehensive confidentiality training including the Protecting Human Research Participants course administered by the National Institutes of Health and the Collaborative Institutional Training Initiative (CITI) course.

3. All study files will be encrypted and password protected and access will be restricted to the PI and data manager. Only computers that are password protected will contain the data files that will be saved on to the hard-drive of the PI's computer and the data

manger's computer in their locked campus offices. All associated data files will be kept in a locked cabinet in a locked office on the UTEP campus in which only the PI and data manager will have access. Any lists with identifiable information will be destroyed once the study analyses are complete. Every measure will be taken to ensure each participant's privacy and confidentiality.

The results of this research study may be presented at meetings or in publications; however, your name will not be disclosed in those presentations.
Every effort will be made to keep your information confidential. Your personal information may be disclosed if required by law.
Organizations that may inspect and/or copy your research records for quality assurance and data analysis include, but are not necessarily limited to:

- Office of Human Research Protections
- UTEP Institutional Review Board
- UT Tyler Institutional Review Board

Because of the need to release information to these parties, absolute confidentiality cannot be guaranteed.
All records will be maintained in a de-identified state until completion of the study. All identifying data will be destroyed prior to the study analyses.

**Mandatory reporting**

If information is revealed about child abuse or neglect, or potentially dangerous future behavior to others, the law requires that this information be reported to the proper authorities.

**Authorization Statement**

I have read each page of this paper about the study (or it was read to me). I will be given a copy of the form to keep. I know I can stop being in this study without penalty. I know that being in this study is voluntary and I choose to be in this study.

_____
Participant's Name (printed)

_____ _____
Participant's Signature Date

_____ _____
Signature of Person Obtaining Consent Date

Appendix E. Demographic Survey

1. My gender is:
   □ Male □ Female

2. My age is: (select the appropriate range)

   □ 18-25 years
   □ 25-40 years
   □ 40-65 years
   □ Older than 65 years

3. I identify my race as:

   □ White
   □ Black or African American
   □ Asian
   □ American Indian or Alaska Native
   □ Native Hawaiian or other Pacific Islander
   □ Other

1. I identify my ethnicity as:

   □ Hispanic or Latino
   □ Not Hispanic or Latino

2. Do you have previous work experience?

   □ No
   □ Yes, please identify what area you worked in _____

3. Do you have a previous degree?

   □ No
   □ Yes, please identify what is the degree _____

4. What is your marital status?

   □ Single
   □ Married
   □ Divorced
   □ Married

5. Do you have one or more children that you provide care for in your home?

   □ Yes
   □ No

6. Do you commute to nursing school from across the Mexican/U.S. border?

   □ Yes
   □ No

7. Did you use the Nurse Logic resource to prepare for the ATI-NCLEX-RN predictor exam?

   □ Yes
   □ No

8. What is your native language?

   □ English
   □ Spanish
   □ Bilingual English and Spanish
   □ Other

9. What percentage of the time do you communicate in your native language?

   □ Greater than 75%
   □ 60%-75%
   □ Greater than 10% but less than 60%
   □ 10% or less

# Appendix F. Request for Use of the Connor-Davidson Resilience Scale

**From:** syjimenez2@utep.edu <syjimenez2@utep.edu>
**Sent:** Wednesday, December 11, 2019 5:54 PM
**To:** mail@cd-risc.com <mail@cd-risc.com>
**Subject:** Request Form from: Sarah Y Jimenez

From: Sarah Y Jimenez
Department: University of Texas at Tyler
Country USA
E-mail: syjimenez2@utep.edu
Purpose Explanation:
Project Description: I am a doctoral student at the University of Texas at Tyler completing a dissertation project in Nursing. I will be examining test scores of undergraduate nursing students at the University of Texas at El Paso on their ATI NCLEX RN predictor and looking for relationships between these scores and scores on emotional intelligence surveys, critical thinking tests, and this resilience test. I'm attempting to find the strongest predictors of testing success.
Sample Size: 80
Number of Times Administered: Once
Project Duration: January  through August of 2020-survey to be administered only 1 time to one cohort of students
Assessment Method: Upload CD-RISC to Qualtrics survey system to collect data

# Appendix G. Connor-Davidson Resilience Scale Author Note

Dear Sarah:

Thank you for your interest in the Connor-Davidson Resilience Scale (CD-RISC). We are pleased to grant permission for use of the CD-RISC in the project you have described under the following terms of agreement:

1. You agree (i) not to use the CD-RISC for any commercial purpose unless permission has been granted, or (ii) in research or other work performed for a third party, or (iii) provide the scale to a third party without permission. If other colleagues or off-site collaborators are involved with your project, their use of the scale is restricted to the project described, and the signatory of this agreement is responsible for ensuring that all other parties adhere to the terms of this agreement.

2. You may use the CD-RISC in written form, by telephone, or in secure electronic format whereby the scale is protected from unauthorized distribution or the possibility of modification. **In all presentations of the CD-RISC, including electronic versions, the full copyright and terms of use statement must appear with the scale. The scale should not appear in any form where it is accessible to the public and should be removed from electronic and other sites once the project has been completed.**

3. Further information on the CD-RISC can be found at the www.cd-risc.com website. The scale's content may not be modified, although in some circumstances the formatting may be adapted with permission of either Dr. Connor or Dr. Davidson. If you wish to create a non-English language translation or culturally modified version of the CD-RISC, please let us know and we will provide details of the standard procedures.

4. Three forms of the scale exist: the original 25-item version and two shorter versions of 10 and 2 items respectively. When using the CD-RISC 25, CD-RISC 10 or CD-RISC 2, whether in English or other language, please include the full copyright statement and use restrictions as it appears on the scale.

5. A **student-rate** fee of $ 30 US is payable to Jonathan Davidson at 2434 Racquet Club Drive, Seabrook Island, SC 29455, USA either by PayPal (www.paypal.com, account mail@cd-risc.com), cheque, bank wire transfer (in US $$) or international money order.

6. Complete and return this form via email to mail@cd-risc.com.

7. In any publication or report resulting from use of the CD-RISC, you do not publish or partially reproduce items from the CD-RISC without first securing permission from the authors.

If you agree to the terms of this agreement, please email a signed copy to the above email address. Upon receipt of the signed agreement and of payment, we will email a copy of the scale.

For questions regarding use of the CD-RISC, please contact Jonathan Davidson at mail@cd-risc.com. We wish you well in pursuing your goals.

Sincerely yours,

Jonathan R. T. Davidson, M.D.

Appendix H. Connor-Davidson Resilience Scale

## Connor-Davidson Resilience Scale 25 (CD-RISC-25) ©

*For each item, please mark an "**x**" in the box below that best indicates how much you agree with the following statements as they apply to you over the last **month**. If a particular situation has not occurred recently, answer according to how you think you would have felt.*

| | | not true at all (0) | rarely true (1) | sometimes true (2) | often true (3) | true nearly all the time (4) |
|---|---|---|---|---|---|---|
| 1. | I am able to adapt when changes occur. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. | I have at least one close and secure relationship that helps me when I am stressed. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. | When there are no clear solutions to my problems, sometimes fate or God can help. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. | I can deal with whatever comes my way. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. | Past successes give me confidence in dealing with new challenges and difficulties. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. | I try to see the humorous side of things when I am faced with problems. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. | Having to cope with stress can make me stronger. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. | I tend to bounce back after illness, injury, or other hardships. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. | Good or bad, I believe that most things happen for a reason. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 10. | I give my best effort no matter what the outcome may be. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. | I believe I can achieve my goals, even if there are obstacles. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. | Even when things look hopeless, I don't give up. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 13. | During times of stress/crisis, I know where to turn for help. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 14. | Under pressure, I stay focused and think clearly. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 15. | I prefer to take the lead in solving problems rather than letting others make all the decisions. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 16. | I am not easily discouraged by failure. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 17. | I think of myself as a strong person when dealing with life's challenges and difficulties. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 18. | I can make unpopular or difficult decisions that affect other people, if it is necessary. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 19. | I am able to handle unpleasant or painful feelings like sadness, fear, and anger. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 20. | In dealing with life's problems, sometimes you have to act on a hunch without knowing why. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 21. | I have a strong sense of purpose in life. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 22. | I feel in control of my life. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 23. | I like challenges. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 24. | I work to attain my goals no matter what roadblocks I encounter along the way. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 25. | I take pride in my achievements. | ☐ | ☐ | ☐ | ☐ | ☐ |
| ***Add up your score for each column*** | | 0 | + ____ | + ____ | + ____ | + ____ |

***Add each of the column totals to obtain CD-RISC score*** = _____



01-01-19

Biographical Sketch

NAME: Sarah Yvonne Jimenez

POSITION TITLE: Doctoral Student

EDUCATION/TRAINING

| INSTITUTION AND LOCATION | DEGREE | Completion Date | FIELD OF STUDY |
|---|---|---|---|
| University of Texas at El Paso | BSN | 05/1999 | Nursing |
| University of Texas at El Paso | MSN | 12/2008 | Nursing |
| University of Texas at Tyler | PhD | 4/2021 | Nursing |

## A. Personal Statement

I am a nursing instructor in clinical nursing. My area of interest has been nursing education and exploring teaching strategies that enhance the development of compassion and academic excellence among undergraduate nursing students. For my doctoral work, I examined the relationships between emotional intelligence (EI), critical thinking (CT) skills, and resilience, to test scores on the ATI-NCLEX-RN Comprehensive Predictor Examination. I have discovered through my research that EI, CT, and resilience warrant more studies to guide curricular development that will support students in advancing their skills in these areas that are key to providing quality patient care. I plan to continue my program of research on building the knowledge base of what is known about these attributes and their influence on nursing student performance, and to participate in curricular designs that enable students to maximize their skills sets in these areas. I also plan to expand my research to the field of Alzheimer's and dementia with a specific focus on interventions that improve the mental well-being of patients and caregivers.

## B. Positions

2014-Present: Instructor in Clinical nursing, University of Texas at El Paso, El Paso, TX

2011-2014: RN Residency Coordinator, the Hospitals of Providence East Campus, El Paso, TX

1999-2012: Registered Nurse, Neonatal Intensive Care Unit, Level I-III, the Hospitals of Providence Memorial Campus, El Paso, TX

## C. Honors

- Texas International Education Consortium (TIEC) awarded $800.00 for participation in international virtual exchange program with Dr. Audrey Tolouian, Ed.D, RN, Dr. Manar

Hamza, PhD, RN University of Helwan, Cairo, Egypt, Dr. Naglaa El Mokadem, PhD, RN Menoufia University, Menoufia, Egypt
August 2020

- Transcultural Scholarship for International Travel School of Nursing, University of Texas at Tyler, Tyler, TX, Shandong, China, 2018
- Faculty Scholarship for PhD Studies, University of Texas at El Paso, 2017
- Graduate School Scholarship, University of Texas at Tyler, 2016
- Banner Bearer for University of Texas at El Paso School of Nursing, BSN graduation ceremony May 2016
- University Scholarship Recipient 2006-2008 University of Texas at El Paso for Master of Science in Nursing Program

**D. Professional Memberships**

- Sigma Theta Tau International Honor Society of Nursing (Sigma) 2008-present

**E. Contributions to Science**

- Jimenez, S. Y. (**Presenter & Author**). What's in a Name? Defining Nurse Residencies to Design Evidence-Based Programs (article). **In Review**: European Journal of Educational Sciences. December 10, 2020

- Wholeben, M (Presenter & Author)**, Jimenez, S. (Author),** & Ellis, C. (author) Community Engagement: Moving from the Classroom to Interprofessional Education Collaboration (article). 1st Educational Science Conference. **In Review**: European Scientific Institute/European Journal of Educational Science. December 10, 2020