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The development and validation of a tool to measure self-confidence and anxiety in nursing students while making clinical decisions

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THE DEVELOPMENT AND VALIDATION OF A TOOL TO MEASURE SELF-CONFIDENCE AND ANXIETY IN NURSING STUDENTS WHILE MAKING CLINICAL DECISIONS

By

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ABSTRACT

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Clinical decision making (CDM) is a cornerstone skill for nurses. Self-confidence and anxiety are two affective influences that impact the learning and adeptness of CDM. Currently, no instruments exist that measure perceived self-confidence and anxiety level of undergraduate nursing students related to CDM. The purpose of this research was to develop, test, and establish psychometric properties for a quantitative instrument that measures the levels of self-confidence and anxiety experienced by undergraduate nursing students while making clinical decisions. The new tool is entitled the Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM) scale. The tool is a self-report, Likert-type instrument with two subscales measuring levels of self-confidence and anxiety. Bandura's social cognitive theory, regarding self-efficacy and anxiety arousal framed the study along with two embedded nursing models which explain the relationship between self-confidence, anxiety, and CDM.

Content validity and face validity were established through critique by a panel of internationally known experts in the area of CDM and by a panel of undergraduate student nurses and registered nurses. Two samples of pre-licensure associate and baccalaureate nursing students participated in either the pilot- (fall 2010, n = 303) or

main-testing (spring 2011, n = 242) phase of the study to test the scale. Exploratory factor analysis was used to examine the scale's construct validity. Items were reduced from the scale based on EFA results from each sample. Similar factor structures were found between the two samples, indicating a stable three dimensional scale. The self-confidence and anxiety subscales of the NASC-CDM scale were correlated with two psychometrically sound instruments to examine convergent validity. Pearson r correlation coefficients examined the relationship between the self-confidence subscale and the General Self-Efficacy (GSE) scale. Results were positive, moderate and significant at .54 and .62 for the fall and spring samples respectively. Pearson r correlation coefficients examined the relationship between the anxiety subscale and the Generalized Anxiety Disorder-7 (GAD-7) scale. Results were positive, low to moderate and significant at .52 and .38 for the fall and spring samples respectively. Internal consistency reliability was assessed using Cronbach's alpha reliability coefficient. Alpha coefficients for the final version were: self-confidence subscale, $\alpha = .97$ and anxiety subscale, $\alpha = .96$.

Results of the study provided initial evidentiary support for the NASC-CDM scale as a content valid, construct valid, convergent valid and reliable measurement tool. Findings of the study have important implications for nursing education. Nurse educators may be able to utilize the NASC-CDM scale in numerous situations, around real-life or simulated clinical experiences. If nurse educators are aware of how affective states, such as levels of self-confidence and anxiety, influence nursing students while moving through the process of making clinical decisions, they can intervene more effectively and facilitate students learning the vital skill of CDM.

ACKNOWLEDGEMENTS AND DEDICATION

Dedication

This dissertation work is dedicated to two people, my husband and my mother-in-law (posthumous). Without the love, support, and commitment of my best friend, this dissertation research, I am certain, would not have come to fruition. Therefore most importantly, this paper is dedicated to the love-of-my-life and very best friend, my husband Kerry White. Despite that she did not physically see this project to its completion, I know my mother-in-law, Hulda White, is watching and cheering from Heaven. Her famous words to me during this journey were, “I love you, now don’t work so hard that you crack-up.” We did it Mom White – sanity intact!

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The representatives who comprise the dissertation committee are imperative for a successful study. Recognition must be given to Dr. Chad Cross for his statistical expertise. As I struggled with normality, outliers, homoscedasticity, and interpreting

outputs, emails were generated. Dr. Cross replied promptly, kindly, and calmly – even when my messages were drafted in panicked frenzy. His demeanor reassured and motivated me to keep going. Conceptual frameworks are fundamentally essential for any scientific inquiry. Dr. Michele Clark was instrumental in helping me see clearly the tenets of Bandura's social cognitive theory. She is certainly an expert. Dr. Lori Candela's experience with the quantitative research process, and novice practitioner populations were vital to my success. When questions arose she provided insightful timely feedback. Thank you. The time and effort put forth by my graduate college representative, Dr. Joanne Thompson, is also appreciated.

There are adjectives which describe the perfect dissertation committee chairperson: cheerful, devoted, meticulous, motivated, patient, tireless, and zealous. Dr. Cheryl Bowles, the chair my PhD dissertation examination committee, epitomizes each of these. She worked thoroughly to help me articulate the best study design. She appropriately questioned components of the design I thought were perfectly apparent… but she knew better and made me clarify. She guided and encouraged me through the IRB approval process at 54 institutions of higher education. She waded through an inordinate number of emails over the course of two and a half years, held video meetings on weekends, and proofread diligently. Had it not been for the perfect dissertation committee chairperson qualities possessed by Dr. Bowles, I would not have earned a new professional credential. My gratitude is immeasurable.

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CHAPTER 1

INTRODUCTION

Few people would argue that professional nurses, as well as student nurses, do not make numerous important decisions on a daily basis. In fact, some author's argue that effective clinical decision making (CDM) "is the principal skill that separates professional nursing personnel from ancillary or technical personnel and differentiates a novice from an expert" (K. K. Hughes & Young, 1990, p. 189). In this era of high acuity patients, CDM skills are important for professional nurses to possess (Baldwin, 2007; Donohue & Martin, 1996): It is a "cornerstone skill for nurses" (Baxter & Boblin, 2008, p. 345). Because nurses remain at the bedside far more than any other member of the multi-disciplinary team, they are generally the first to observe cues in patients which may warrant making a clinical decision. Once contextual cues are assessed by the nurse, appropriate interpretation and action must occur (Bakalis & Watson, 2005; Hammond, 1964). Bakalis and Watson (2005) proclaim nurses who make effective clinical decisions provide safer, more competent nursing care. Thompson (2002) further declares the quality of health care is dependent upon the "clinical decisions of the professionals delivering it" (p. 22). Patient outcomes are significantly influenced by the effectiveness of the clinical decision making process (A. H. White, 2003).

This chapter contains three sections. The first section introduces the background and statement of the research problem and includes the rationale for the pursuance of instrument development for the study. The second section explains briefly the early development of the quantitative self-report instrument that was refined and tested in this study. The third and final section of this chapter describes the purpose of the study.

Background and Statement of the Problem

Since CDM is such an important acquired skill for nurses, the process of learning it must not begin as a graduate nurse; it must be introduced and practiced during pre-licensure nursing education programs. Several influences do exist however, that impact the learning and adeptness of CDM. A lack of self-confidence and a high level of anxiety are affective influences to consider when teaching and learning the process of CDM (Baxter & Rideout, 2006; Haffer & Raingruber, 1998). These influences will be termed emotional barriers to CDM (O'Neill, Dluhy, Fortier, & Michel, 2004a). Because patient outcomes are at stake, it is imperative that nursing students begin to develop and feel confident with CDM steps during the safety of supervised educational experiences (O'Neill, Dluhy, & Chin, 2005). If nurse educators are more fully aware of the CDM processes in students and what affective states influence the processes, they can foster CDM attributes more adeptly, ultimately making students more confident and less anxious with this burgeoning skill (Itano, 1989; Tschikota, 1993).

The primary focus of this research was the emotional barriers, self-confidence and anxiety level (O'Neill et al., 2005) which influence the process of CDM in pre-licensure student nurses during the provision of patient care in the clinical practicum environment. Although a surfeit of research related to CDM has been conducted using qualitative (Baxter & Boblin, 2008; Itano, 1989) and quantitative (Bakalis & Watson, 2005; Grossman, Campbell, & Riley, 1996) methods, the instruments utilized for quantitative inquiry most often have had limited psychometric property testing. Therefore, an extensive search within nursing and allied health literature was conducted to locate a psychometrically sound instrument that measures nursing students' levels of self-

confidence and anxiety during the process of CDM. The results of the inquiry yielded 16 quantitative instruments related to CDM. However, no quantitative instrument was found which measures the construct of CDM within the area of the perceived self-confidence and anxiety level in undergraduate pre-licensure nursing students as they progress through the CDM process.

Numerous instruments located within the literature were designed for the studies in which they were used and demonstrate limited established psychometric properties. Furthermore, existing instruments were often developed to measure CDM in a precise setting and in a certain context, not to measure the CDM process in a more holistic fashion including emotional barriers which influence it. For instance, Fry and Burr (2001) examined emergency room nurses making clinical decisions within triage situations and Papathanassoglou, Tseroni, Karydaki, Vazaious, Kassikou, and Lavdaniti (2005) studied experienced nurses' CDM and autonomy within Hellenic intensive care settings. Finally, sampling methods used to establish psychometric properties for existing measures used primarily experienced clinicians, not undergraduate nursing students. Of the 16 instruments found in the literature related to CDM in nursing, only two (Grundy, 1993; Jenkins, 1983) used undergraduate nursing student samples to establish psychometric properties. Additionally, one instrument was located in the respiratory care literature that relates to the problem solving abilities of respiratory care students.

Early Instrument Development

Because the development of the process of CDM is imperative for novice nurses (Bakalis & Watson, 2005; Baxter & Boblin, 2008; O'Neill et al., 2005), because the emotional barriers of low self-confidence and high anxiety affect decision making processes (Haffer & Raingruber, 1998; Wood & Bandura, 1989), and because no quantitative instrument exists that measures these two important emotional barriers, instrument development was the intent of this research study. A methodological study was planned to develop and test a quantitative research instrument.

A comprehensive concept analysis of self-confidence was conducted as part of the preliminary work for the design of this new quantitative scale (K. A. White, 2009). Theoretical literature and empirical studies were extensively reviewed for construct analysis and for the formulation of content domains within CDM. An initial pool of 82-items within four content domains resulted from the deductive inquiry. These items were used to construct a self-report Likert-type tool entitled the Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM) scale.

The early drafts of the NASC-CDM scale contained two subscales within four content-domains. These subscales related to the two emotional barriers being measured in undergraduate nursing students: self-confidence and anxiety. The content domains of the NASC-CDM scale embraced the process or cognitive steps of CDM: investigating information and cues; interpreting information and meaning; integrating findings and illuminating options; and intervening and reflecting on the decision process. Therefore, users of the tool may have the ability to obtain subscores for respondents that relate to two emotional barriers and four domains of CDM.

A preliminary appraisal of content validity was performed to assess the NASC-CDM scale for relevancy, clarity, and comprehensiveness (DeVellis, 2003). Five internationally known experts in the content area of CDM were invited to evaluate the 82-item first draft of the NASC-CDM scale in spring 2009. Both item-content validity and scale-content validity were calculated (Polit, Beck, & Owen, 2007). Items were reduced or revised based on expert panelist feedback. Subsequently, the second draft of the NASC-CDM scale was critiqued by registered nurses and undergraduate student nurses, including some with English as a second language, to ensure item clarity and readability and ensure face validity (DeVellis, 2003). After significant revision and reduction of items, the NASC-CDM scale was finalized into the draft used in the pilot-testing and validation phase of the research study.

Statement of the Study Purpose

The purpose of this dissertation research was to test, validate, and establish psychometric properties for the NASC-CDM scale which is a Likert-type, norm-referenced, self-report instrument (Polit & Beck, 2008; Waltz, Strickland, & Lenz, 2005). The NASC-CDM scale is designed to measure the level of self-confidence and level of anxiety experienced by undergraduate nursing students as they progress through the CDM process.

The NASC-CDM scale is intended for a number of uses: it was deliberately written in a generic manner to allow for increased generalizability among different program types, different levels of students within a program, and varied clinical situations; it may evaluate changes in self-confidence and anxiety with CDM when used longitudinally

across the curriculum; it may be useful in a formative or summative fashion; and it may be used in a pre- and post-test design surrounding clinical simulation or clinical practicum experiences. The NASC-CDM scale is also intended for use with graduate nurses who again find themselves in affectively charged novice circumstances.

Chapter Summary

This chapter described the importance of CDM to professional nursing. Quality patient care and positive patient outcomes depend on nurses' abilities to accurately recognize a patient problem, assess cues within the situation, consider plausible decision options, and act in the best interest of the patient. The concepts of self-confidence and anxiety as emotional barriers which influence CDM were introduced. Currently no quantitative instrument exists which measures the level of self-confidence and level of anxiety in undergraduate students as they move through the cognitive steps of making a clinical decision. Therefore, instrument development was the purpose of this dissertation research. A brief introduction regarding preliminary work on and structure of the NASC-CDM scale was provided. The following chapter reviews literature related to the constructs of CDM, self-confidence, and anxiety.

CHAPTER 2

REVIEW OF RELATED LITERATURE

The purpose of this chapter is to review seminal works, as well as current literature related to CDM, within medicine and nursing. A domain-referenced approach (Gable & Wolf, 1993) was used to examine the breadth and depth of CDM and to create an inclusive pool of items for the NASC-CDM scale (DeVellis, 2003; Switzer, Wisniewski, Belle, Dew, & Schultz, 1999). Additionally, literature is reviewed which examines the relationship of two emotional barriers, self-confidence and anxiety, to the CDM process. The terms student nurse and novice clinician are used interchangeably.

Six sections comprise this chapter. Three historically relevant viewpoints of CDM are initially presented followed by an explication of four content domains of CDM. Within the third section, several similar constructs related to CDM are defined. Rationale for why these constructs are not CDM, and therefore are not included within the context of the NASC-CDM tool, is provided. In the fourth section, two emotional barriers related to CDM are described. The fifth section contains an explanation of the two theoretical frameworks which undergird the study. In the sixth and final section of this chapter, conceptual and operational definitions of constructs used within the research study are presented.

Historical Viewpoints of Clinical Decision Making

Empirical research related to CDM commonly adheres to three viewpoints: analytic decision theory, information-processing theory, and the intuitive-humanistic model. Early studies were grounded in analytic decision theory, which emphasizes the use of

algorithms and decision trees (Elstein, Shulman, & Sprafka, 1978; Hammond, 1964). Information-processing theory embraces the process of cue recognition, hypothesis generation, and the formulation of decision options (Elstein, Kagan, Shulman, Hilliard, & Loupe, 1972; Harbison, 1991; Westfall, Tanner, Putzier, & Padrick, 1986). The intuitive-humanistic stance asserts that experiential knowledge and intuitive thought are integral to CDM (Banning, 2008; Benner, 2001; Rew, 2000). Items on the NASC-CDM scale were designed to incorporate tenets from information-processing and intuitive-humanist viewpoints.

Analytic Decision Theory

Research methodologies based on probability, logic, and linear sequences are the basis for analytic decision theory (Aspinall, 1979; Thompson, 1999). Bayes' theorem is one example of the prescriptive analytic decision viewpoint. Elstein et al., (1978) cite the premise of Bayesian theory as "a precise mathematical formula for calculating the degree of change that should take place in a belief to reflect accurately the impact of new information" (p. 30). Seminal works within the realm of CDM in nursing used Bayesian methods to determine the extent nurses revised their judgments about patient cues and the probable state-of-the-patient in a manner that could be predicted by a logical mathematical model (Hammond, Kelly, Schneider, & Vancini, 1966). Aspinall (1979) utilized a decision analytic framework, in the form of algorithmic decision trees, to investigate the accuracy of 30 triads of experienced nurses in deciding the correct problem for a post-operative patient. Decision analytic theory has been referred to as a rationalistic (Harbison, 1991) and linear-reductionist (Vance, Groves, Paik, & Kindler, 2007) viewpoint.

Despite the use of decision analytic techniques in early research related to CDM, it is generally not used in current research within clinical professions for one primary reason. Situations with patients are perpetually fluid with innumerable variability; human problem solving cannot be matched to a template or set against textbook descriptions (Elstein et al., 1978). Clinical professions such as medicine, nursing, and clinical psychology boast ambiguity (Pica, 1998) and complexity (Botti & Reeve, 2003; K. K. Hughes & Young, 1990). The tenets of decision analytic theory boast logic and linearity. Because of this principal incongruence between variable clinical professions and logical analytic thinking, often a different methodological approach is taken to examine CDM related to human problems within clinical professions.

Information-Processing Theory

Information-processing theory adheres to a descriptive hypothetico-deductive philosophy (Harbison, 2001; Muir, 2004). Its primary premise is that CDM is an iterative cognitive process whereby clinicians move through steps such as data collection, hypothesis generation, cue interpretation, and hypothesis evaluation. Information is subsequently synthesized, a decision is made, and action ensues.

Early research in the area of CDM using the information-processing viewpoint was conducted with novice and experienced physicians (Elstein et al., 1972; Elstein et al., 1978). Authors of theoretical literature argue paramount to the information-processing viewpoint is the practitioners' recognition and use of patterns of information in order to make quality decisions (Banning, 2008; Harbison, 1991). Information-processing has been referred to as a phenomenological (Harbison, 1991) and non-linear (Vance et al., 2007) viewpoint.

A variety of empirical studies in nursing embrace the tenets of information-processing theory. Jenkins' (1983) doctoral dissertation research adhered to an information-processing framework and examined different levels of undergraduate nursing students and measured perceptions of their own CDM ability. Lauri and Salantera (1995, 1998) used the information-processing viewpoint to guide several studies that identified nursing decision making models used by novice and experienced registered nurses in different clinical arenas. Thiele and her colleagues (1991) carried out a study with undergraduate baccalaureate students to assess perceptions of approaches to CDM and to examine actual patterns of CDM used by novice students during their first clinical nursing course. Their work embraced the information-processing perspective. Because the information-processing viewpoint concedes situations within nursing are complex, fluid, and human-oriented, and because its principles relate to the descriptive process of how CDM occurs, its use is appropriate when studying the process of decision making in clinical settings.

Intuitive-Humanistic Model

The intuitive-humanistic model of CDM acknowledges the concepts of intuition and experiential knowledge as influential in making quality decisions. Thompson (1999) posits this model examines CDM from the perspective of prior experience, expertise, and the use of the nurses' feelings and instincts to assist with making effective decisions. Essential to this viewpoint is the relationship between domain expertise, knowledge enrichment, and how these influence decisions made by clinicians. Unlike the more task-oriented information-processing viewpoint, the intuitive-humanistic viewpoint highlights the clinician who makes the decision (Banning, 2008; Benner, 2001). One author (Rew,

2000) notes intuition is the application of knowledge. Within the context of CDM, intuition was once viewed with skepticism but is now recognized as vital to the process.

Authors differ in their opinions about whether the intuitive-humanistic viewpoint within nursing can be mastered only by experts or whether this ability might also be possessed by novices (Benner, 2001; Lyneham, Parkinson, & Denholm, 2008; Smith, Thurkettle, & dela Cruz, 2004). To confirm the importance of intuition related to CDM, Rew designed a unidimensional quantitative instrument that measures nurses' acknowledgement of using intuition in CDM (Rew, 2000). Because the intuitive-humanistic viewpoint recognizes situations within nursing are human-oriented and domain-dependent, and because its principles relate to the clinician making the decisions, its use is appropriate when studying the process of decision making in nursing (Banning, 2008; Thompson & Dowding, 2002).

Furthermore, there is a philosophy that CDM is not based exclusively on the information-processing theory or the intuitive-humanistic model, but is an amalgamation of the two. Numerous authors agree both these viewpoints are used by nurses when making clinical decisions. Cognitive continuum theory is a multifaceted combined philosophy of CDM. Hammond's cognitive continuum theory arose from cognitive psychology as it applied to medicine and was subsequently applied to nursing by Hamm (Cader, Campbell, & Watson, 2005; Harbison, 2001; Thompson, 1999).

Primary principles of cognitive continuum theory posit decisions are made using information about judgment tasks as well as cognition components. Judgment tasks are related to the structure of a clinical situation; tasks fall on a continuum ranging from ill-structured to well-structured. Cognition components are related to the cerebral portion of

CDM; cognition components fall on a continuum ranging from intuitive thinking to analytical thinking (Cader et al., 2005). This combined information-processing and intuitive-humanistic viewpoint is also a useful framework when addressing CDM in nursing (Lauri et al., 2001; Standing, 2008).

Clinical Decision Making Content Domains

Ensuring content validity is one of the most important steps in instrument development (Beck & Gable, 2001). Items on the instrument should be derived from the possible universe of content within the domain of interest (Gable & Wolf, 1993; Waltz et al., 2005) and is generally a qualitative endeavor. A comprehensive literature review and deductive approach resulted in the formulation of four content domains of CDM upon which items on the NASC-CDM scale are based. It is acknowledged that CDM is contextual and that the cognitive steps of CDM are fluid; hence, students move iteratively through the steps prior to making their final clinical decision.

Investigating Information and Cues

The first content domain of CDM is investigating information and cues. As early as 1964, Kelly acknowledged both the importance and complexity of collecting data related to CDM within nursing; “In the performance of her professional duties the nurse routinely makes important and significant decisions based on uncertain data – data that are complex, non-discriminating, and inconclusive” (p. 314). Early qualitative studies identified attending to available patient cues and recognizing problematic elements from these cues as essential to the decision making process (Elstein et al., 1972; Kelly, 1964). Later studies revealed other important components like pre-encounter data, such as

patient chart information and obligatory knowledge to help identify patient problems, as foundational to the CDM process. Some bit of requisite knowledge is imperative to make quality clinical decisions (Cioffi, 2001; O'Neill, Dluhy, Andrea, & Ryan, 2006; Standing, 2007).

Numerous qualitative and quantitative studies identified data collection, assessment, discovery, or cue recognition as a paramount early step in CDM (Jenkins, 1983; Tanner, Padrick, Westfall, & Putzier, 1987; A. H. White, 2003). Tschikota (1993) calls this process "cue-based data acquisition" (p. 390). Itano (1989) posits cues from patients are the "building blocks or raw data from which decisions are made" (p. 121). Elstein et al. (1978) cite, errors or omissions in data collection often attribute to mistakes made. A theoretical article discussed a classroom teaching strategy to promote CDM in baccalaureate nursing students related to the triage process of a pediatric patient in the emergency department. The author of the article reflects upon the teaching strategy usage, noting the importance of accurate assessment, data collection, and recognition of cues by the students in order to make the best clinical decisions (Baldwin, 2007).

The intent of one exploratory inquiry examined the importance of data collection. The study was conducted to examine cognitive strategies used by students and nurses to derive a diagnosis for a patient problem. The study concentrated on three areas of clinical reasoning: hypothesis activation, data acquisition, and diagnostic accuracy. Results indicated that data acquisition occurred most often through hypothesis-driven and cue-based assessments. Students asked more questions to generate plausible hypotheses for the patient problem than their experienced nurse counterparts (Tanner et al., 1987).

Empirical works revealed additional skills necessary within this content domain. Several studies noted that patients themselves influence the CDM process. Standing (2007) studied novice undergraduate students longitudinally as they moved through their nursing curriculum and into clinical practice. She identified active listening with the patient as an essential conception of nursing and key to the CDM process. A. H. White's (2003) qualitative inquiry of graduating baccalaureate students revealed knowing patients, connecting with them, and observing nonverbal cues as integral to CDM. Another study also confirmed the patient's impact on CDM. Knowing the patient is imperative because "patients influenced every aspect of the student's decision making… The patient provided the students with a multitude of both verbal and nonverbal cues" (Baxter & Boblin, 2008, p. 123).

In Elstein and his colleagues' (1978) seminal work with internal and family medicine physicians, the importance of utilizing nonverbal cues was cited. Most physicians generated a number of plausible diagnoses for the clinical situation and most obtained information using verbal cues from the patient. However, physicians also relied heavily on nonverbal patient cues to judge the accuracy of a specific diagnosis they were considering.

The final skill validated as important in this first content domain of the CDM process is intuition (Rew, 2000; Tanner, 2006). In one study, during the final of four qualitative interviews, participants who began the study as undergraduate students but were now novice nurses in clinical practice discussed intuitive thinking as significant to their CDM process. Interestingly, during the participants' earlier interviews, these same participants did not stress an intuitive process to aid them with making clinical decisions (Standing,

2007). The pilot version of the NASC-CDM scale contained nine items related to elements within this content domain.

Interpreting Information and Meanings

The second content domain of CDM is interpreting information and meanings. Once preliminary cues are assessed they must be interpreted. Attending to the relevancy or irrelevancy of collected data can be a difficult skill for novice clinicians (C. Hughes & Hughes, 1990; O'Neill et al., 2006). Elstein et al., (1978) noted two problems often encountered by medical students during the CDM (termed diagnostic inquiry) process were excessive data collection and un-interpreted cues. They further explained that three types of errors occur in relationship to cue interpretation; the novice tends to engage in over-, under- and mis-interpretation. Kelly (1964) found inexperienced nurses may ignore highly relevant cues while Hammond and his colleagues' (1966) seminal work revealed that overall nurses did not consciously decipher useful and not-useful cues. Girot (2000) examined critical thinking abilities and perceptions of CDM in undergraduate first year and fourth year baccalaureate nursing students, new graduates with baccalaureate degrees, and experienced diploma graduates returning for a bachelor's degree in nursing. Results indicated that the graduate nurses with baccalaureate degrees were more effective in their search for information about patient problems and in their ability to decipher relevancy than were their first year undergraduate and diploma graduate counterparts.

Another study further confirmed that students struggle to interpret the relevancy of data collected. Students often gather large amounts of data then perceive a causal relationship between all the cues and the current state-of-the-patient; they often suffer

from information overload (Itano, 1989). In a study that examined the relationship between locus of control and CDM behaviors, results indicated that both groups of undergraduate students (those whose locus of control was identified as internal and those whose locus of control was identified as external) considered *all* pieces of information they gathered to be relevant to the patient problem (Tschikota, 1993). Furthermore, Thiele et al. (1991) found that novices consider *all* cues to be relevant to the patient problem while Hughes and Young (1990) found that novices gather too much information and put too much importance on irrelevant cues. O'Neill et al. (2006) posited novice clinicians have more difficulty eliminating irrelevant cues and honing in on the real patient problem.

The use of knowledge and past experience to interpret best the information gathered is critical to CDM. Numerous authors argue knowledge and experience are two leading influences on CDM (Bakalis, 2006; Banning, 2008; Benner, 2001; Cioffi, 2001; Itano, 1989; Tanner, 2006); however, novice clinicians lack extensive nursing knowledge and widespread clinical experiences. As students progress through their nursing curriculum, and are exposed to more patient situations, they gain a broader spectrum of knowledge and experiences upon which to draw.

Within an elective undergraduate course on clinical reasoning, all students expressed anxiety and a sense of being overwhelmed by their lack of experience (Haffer & Raingruber, 1998). One researcher studied student perceptions about CDM across different levels of a baccalaureate curriculum and found that "… decision makers faced with familiar problems may rely on simplifying strategies used in the past" (Jenkins, 1983, p. 19). Cioffi (2001) studied 32 experienced nurses to assess the use of past

experiences in CDM in emergent situations. Results revealed that 63 % of nurses among six areas of clinical practice, used knowledge of past experiences to appropriately initiate calls to the medical emergency team (rapid response team) for patients in crisis. Elstein et al., (1978) argue the vastness of experiences makes the difference between experts and weaker problem solvers. Novice clinicians must build their repertory of experiences in order to become stronger decision makers.

Lasater (2007) assessed the effect of high-fidelity simulation experiences on students' development of clinical judgment and decision making abilities. The simulations held throughout the semester gave students controlled experiences which they could later apply to the clinical practicum setting. Focus-groups resulted in the emergence of themes that acknowledged anxiousness, yet an increased awareness, with different clinical situations and connectedness with other students. Often students gained experiences vicariously from one another.

Another inquiry analyzed the CDM processes of expert experienced registered nurses compared to novice senior baccalaureate nursing students during live patient encounters. The researcher concluded that experienced nurses collected more cues than did students, 517 versus 368 respectively. She confirmed the importance of data collection to the accurate CDM and noted that experience does affect the CDM process (Itano, 1989).

Brooks and Shepherd (1990) examined the relationship between CDM and critical thinking in four types of nursing programs; two-year associate, three-year diploma, four-year baccalaureate, and upper-division completion. Findings indicated significantly higher CDM scores in the upper-division students than the other three program types. Such findings suggest that nursing knowledge and expertise gained through clinical

experiences promote the process of CDM. One student's comment exemplifies the importance of requisite knowledge when making sound clinical decisions; "You've got to know normal ranges of blood to deal with the results" (Standing, 2007, p. 264). The pilot version of the NASC-CDM scale contained ten items related to elements within this content domain.

Integrating Findings and Illuminating Options

Integrating findings and illuminating options is the third content domain within CDM upon which items on the NASC-CDM scale are based. This domain includes the components of analyzing the full clinical picture, considering decision options, analyzing the risk-benefit ratio of the options being considered, and utilizing resources to aid in the CDM process. Novice clinicians tend to be analytical and rule-based; they often have difficulty comprehending the whole clinical picture and seeing patterns among cues (Bakalis & Watson, 2005; Benner, 2001; O'Neill et al., 2006). Lauri and Salantera's (1995) investigation of 200 in-patient and public-health Finnish nurses revealed novice nurses rely heavily on protocols, procedures, and other resources during the CDM process. Despite adherence by the novice clinician to a rule-laden philosophy, the development of the ability to see the complete clinical picture is vital to CDM. Until students gain confidence with the process of CDM and begin to see themselves as a professional nurse, integrating the whole picture is limited (A. H. White, 2003).

Two studies, one within nursing and one within medicine, confirmed that accurate decision making improves when cues are not observed in a vacuum; cues must be clustered to see best the complete clinical picture (Elstein et al., 1978; O'Neill et al., 2006). Westfall et al., (1986) cited the importance of comprehending the full clinical

picture related to CDM, referring to this skill as “complexity or pulling it all together” (p. 273). Vance et al., (2007) also posited the importance of the understanding the full clinical picture related to CDM, referring to this ability as the “insightful component” of decision making, the “explicated enlightened solution” - it is seeing clearly the full picture of the clinical situation (p. 170).

Empirical studies reveal the formulation of decision options and the assessment of the risk versus benefit of possible interventions are key elements of CDM. Baldwin’s (2007) summary of a classroom teaching strategy to promote CDM noted students struggle with deliberating decision options and then acting on the decisions they choose. Byrnes and West’s (2000) quantitative exploratory inquiry of 520 registered nurses enrolled in a baccalaureate completion program discovered that participants almost always acknowledged searching for the best alternatives when deliberating about a clinical patient problem. Tschikota (1993) found that senior diploma students formulated hypotheses and considered interventions, but toiled over wanting more information to make their decision. Various authors articulate that paramount to the CDM process is the generation and deliberation of multiple plausible hypotheses as they relate to affects on patient outcome. Moreover, these authors confirm experts can generate more decision options than novices (Elstein et al., 1978; O'Neill et al., 2005).

Assessing the risk versus benefit of decision options is important in CDM and should be considered in order that the ultimate decisions made affect patients in the most positive way possible. Banning (2008) argues anticipating and controlling risks of each potential decision option is imperative to the CDM process. Studies by O’Neill and her colleagues (2005), as well as Baxter and Boblin (2008), indicated that nurses rank the

degree of risk of each potential problem and then implement interventions to decrease the likelihood of the most threatening risk occurring.

Numerous research findings support the importance of novice nurses' utilization of resources to aid the CDM process (O'Neill et al., 2006; Standing, 2008). Resources used by novice clinicians to assist with CDM are described as staff nurses (Baxter & Boblin, 2008), clinical faculty members (Seldomridge, 1997), and evidenced-based literature (Lauri & Salantera, 1995; Lauri et al., 2001). Baxter and Rideout (2006) examined influences on the CDM process using a qualitative methodology. Twelve undergraduate nursing students in their first clinical course used journaling as a springboard for semi-structured interviews. A theme which emerged among students was that one of the hardest decisions is whether to make the clinical decision themselves or consult the nurse or the faculty member. Hughes and Young (1990) conducted an exploratory study that examined 101 medical surgical and intensive care nurses with varied levels of experience. Participants completed a three-part 95-item instrument to measure their consistency of CDM in situations with varied levels of complexity. A key finding indicated the more complex the CDM situation, the more support the nurses required.

One empirical inquiry used interviewing and journaling to assess the kinds of decisions undergraduate students made and factors which influence the CDM process. The findings from the study summarize the various components of this third content domain of CDM. Several themes such as determining interventions, considering the use of outside resources (nurse preceptor or instructor), and acting on their decision options emerged. Students noted that often their decision to act or not to act was based on the risk-benefit assessment to themselves and the patient (Baxter & Boblin, 2008). One

student nurse's comments confirms the importance of the utilization of resources in the CDM process; "I learned nurses often work as a team to make decisions: That has helped me to ask for help" (Haffer & Raingruber, 1998, p. 66). The pilot version of the NASC-CDM scale contained twelve items related to elements within this content domain.

Intervening and Reflecting on the Decision Process

The final content domain is intervening and reflecting on the decision process. This content domain encompasses three primary elements: taking action on the interventions being considered, evaluating outcomes, and being accountable for the action taken. The term that makes the CDM process different from similar constructs such as clinical judgment is action**.** The act of implementing an intervention is unique to CDM. Both qualitative and quantitative studies confirm the importance of acting upon decision options (Bakalis & Watson, 2005; Baxter & Boblin, 2008; Tschikota, 1993). Jenkins (1985a) referred to the culmination of the CDM process or the action part of CDM as choosing the right alternatives to make the most effective decisions.

Once the decision option is chosen and the action is implemented, critical reflection of the outcomes must occur. In Standing's (2007) longitudinal study, she followed undergraduate nursing students through the curriculum and into the first year of professional practice. Students' comments reverberated about the need for reflection about the decisions made. New graduates' comments addressed the stress of making decisions independently and then being accountable for those decisions. Reflective practice is essential for gaining knowledge, for improving clinical reasoning skills (Tanner, 2006) and for improving confidence with decision making skills (Hoffman & Elwin, 2004). During debriefing sessions following numerous high-fidelity simulation

experiences, two undergraduate nursing students summarized the reflective evaluation process related to their CDM. One student commented, “The experiences where I messed up, I learned the most.” A second student voiced, “You could really mess up... you knew sim-man wasn’t going to die” (Lasater, 2007, p. 273).

General professional accountability within nursing is important. Professional accountability for decisions made within one’s own clinical practice is also important (Donohue & Martin, 1996; Muir, 2004). Bakalis (2006) argues that realizing the gravity and taking responsibility for decisions made is a stressful venture. One perception of CDM defined by participants in a study that lasted four years was that nurses must be accountable for both right and wrong decisions made (Standing, 2007). Results of the qualitative content analysis from the journals and interviews of undergraduate nursing students about CDM revealed participants often sought support and utilized resources to help make effective clinical decisions. However despite this fact, the researchers noted that students need to be prepared to support the decisions they make and be accountable for them (Baxter & Boblin, 2008).

Harbison (2001) argues that most nursing activities are not themselves good or bad but nursing activities are assessed within the context of whether they are good or bad for those entrusted to nursing’s care. As such, nurses must make decisions that advocate best for patients and then must be accountable for the decisions implemented. The pilot version of the NASC-CDM scale contained ten items related to elements within this content domain.

Constructs Related to Clinical Decision Making

It must be acknowledged that throughout the literature several terms resound similarly to CDM but are not wholly CDM. Similar terms include clinical judgment, clinical inference, and critical thinking. Often these terms are used interchangeably; however, there are differences. This study pilot-tested and validated a research tool to assess students' perceived levels of self-confidence and anxiety during the CDM process. Therefore, it is important to differentiate between the construct of CDM and related constructs.

CDM is an iterative process whereby clinicians assess cues, gather information (Tschikota, 1993), interpret the meaning of information, determine the relevancy of information (O'Neill et al., 2006), consider plausible decision options (Tanner et al., 1987), choose a decision option in the best interest of the patient (Baxter & Boblin, 2008), and act. Unique to CDM is the element of action; the implementation of an intervention (Bakalis & Watson, 2005; Jenkins, 1985b). Constructs related to CDM embrace processes antecedent to the element of action. This research study was interested in the comprehensive process of CDM, from cue acquisition through action and thus did not include the related terms. Related constructs appear in *italics*.

Some authors propose that *clinical judgment* ensues when the clinician assembles signs and symptoms about the state of a patient and draws a conclusion; the decision making piece of CDM occurs henceforth (Kelly, 1964; Thompson & Dowding, 2002). For example, signs and symptoms indicate the patient is constipated (the judgment). The clinician then intervenes by offering prune juice and administering a laxative (the decision). Therefore, clinical judgment processes precede CDM.

Clinical inference is a thinking process by the nurse that results in the determination of whether or not action is necessary (Harbison, 2001). Once data are gathered within a clinical situation, an inference is the conclusion drawn from that data (Kelly, 1964). In a study of home health nurses, O'Neill (1996) noted that each incidence of CDM "was preceded by an inference about the state of the patient" (p. 365). The researcher conducting this study concedes the constructs clinical judgment and clinical inference are resoundingly similar. Clinical inference processes precede CDM.

Problem solving and *critical thinking* have been used synonymously with CDM. Some pronounce that CDM is actually the end-product of problem solving and critical thinking. Beyond merely problem solving or critical thinking, an elemental component of CDM is action. The culminating piece which represents CDM is that the nurse takes action (Bakalis, 2006; Donohue & Martin, 1996). Consequently CDM is its own entity, separate from both problem solving and critical thinking (Brooks & Shepherd, 1990; Girot, 2000; Oermann, 1997; Shin, 1998).

Another term, *clinical reasoning*, is most similar to CDM. Early studies related to medical inquiry cite the final stage of clinical reasoning is when the clinician makes a choice to implement a decision option from among the diagnostic alternatives (Elstein et al., 1978). Tanner (2006) defines clinical reasoning as the process of making a judgment, deliberating options, weighing them against the evidence, and choosing an appropriate course of action. O'Neill et al. (2005) argue the relationship among clinical reasoning and CDM in their embedded nursing models. They cite novice clinicians develop clinical reasoning skills, use resources, gain working knowledge, and act upon decision options in order to gain experience and become expert decision makers. Other researchers explicate

clinical reasoning is the process of indentifying patients' needs and determining the most appropriate action to achieve positive outcomes (Byrnes & West, 2000).

Emotional Barriers of Self-Confidence and Anxiety

Expert professionals and novice students differ with regard to CDM competence in a number of ways. They differ in the frequency of missed cues (Itano, 1989), the ability to eliminate irrelevant cues (O'Neill et al., 2006), and the number of plausible decision options generated (Elstein et al., 1978). In addition to differences in cognitive processes of CDM between experts and novices, there are affective influences on CDM. Two affective emotional barriers are cited in the literature as paramount for novices to conquer, a lack of self-confidence and emotional arousal or high anxiety.

The relationship between self-confidence, anxiety, and CDM is prevalent in a number of studies. Key to quality CDM is that students must perceive they are capable of making appropriate clinical decisions to achieve positive patient outcomes; hence, be self-confident (Byrnes & West, 2000; Jenkins, 1985a; A. H. White, 2003). O'Neill (1996) examined CDM abilities and influences on CDM among homecare nurses. Results revealed the more confident the nurse, the better the ability to consider plausible decision options.

Congruent themes of fear, stress, anxiety, and a lack of self-confidence related to CDM are apparent in several studies. A qualitative inquiry of 12 undergraduate students in their first nursing clinical rotation revealed themes of knowledge level, confidence level, and fear as most influential to CDM (Baxter & Rideout, 2006). In Standing's (2007) study of nursing students and nursing graduates, confidence was cited as an

important perception of CDM. Furthermore, new graduates in this study posited that being accountable for their decisions was stressful. A. H. White's (2003) phenomenological inquiry of 17 graduating baccalaureate nursing students revealed when the sense of self-confidence with technical and communication skills was stronger, students were better able to focus on the patient. On the other hand, when the sense of self-confidence was diminished, students focused on their own anxiety and not on the patient's clinical situation.

Haffer and Raingruber (1998) examined the experiences of clinical reasoning to gain an understanding of CDM in junior and senior baccalaureate nursing students. Student participants were enrolled in an elective course on clinical reasoning. Their qualitative content analysis revealed the presence of six themes for both diminished confidence and increased confidence with CDM. Examples of themes that diminished confidence were: perceiving others as more capable, being anxious about potential patient harm, and being disorganized or scattered. Examples of themes that enhanced confidence were: drawing strength from others' experiences, learning one's capabilities are comparable to peers, and finding ways to focus on quality CDM under stress. One student wrote in her journal, "… it seems to be that fear and anxiety of the situation leaves me in a paralyzed state and I cannot sort out the steps involved to solve the problem" (Haffer & Raingruber, 1998, p. 66). In another study, one student's comments epitomize the influence of emotional barriers on CDM; "However, the minute I opened the wound and saw what I had to do, all the confidence and excitement I had were gone, I became nervous and unsure of myself" (Baxter & Rideout, 2006, p. 124).

Most nurse educators would agree undergraduate nursing students often suffer from anxiety and fall short on a firm sense of confidence. Rigorous lines of research cannot conclude undeniably whether lesser amounts of anxiety promote self-confidence or whether higher amounts of self-confidence curb anxiety. Various authors argue each is the case. For instance, a concept analysis explicates self-awareness as one of three defining attributes of self-confidence. One facet of self-awareness is the ability to stave emotional arousal. “Anxiety level plays a pivotal role in the amount of confidence one possesses” (K. A. White, 2009, p. 107). Mellalieu et al. (2006) studied self-confidence and anxiety arousal in athletes prior to competition. Findings revealed that athletes who used positive self-talk or self-pep-talks lessened their level of anxiety and thus, promoted their level of self-confidence. Others also argue less emotional arousal equates to more self-confidence (Sanna, 1999; Savitsky, Medvec, Charlton, & Gilovich, 1998).

Conversely, there is considerable empirical evidence to support that individuals who possess higher levels of self-confidence more effectively control emotional arousal that influences performance (Bandura, 1997; Schunk & Pajares, 2005; Zulkosky, 2009). Schunk and Pajares (2005) cite students who are confident embrace more challenging goals and engage in more effective self-regulatory strategies. Such self-regulatory strategies control anxiety arousal. One renowned researcher further articulates that individuals often perform satisfactorily despite high levels of anxiety if their level of self-confidence is strong enough (Bandura, 1983).

The reality is that emotional barriers strongly affect novice clinicians. Literature documents that repeated exposure and experience to situations helps diminish emotional barriers (Bandura, 1977a; Bandura & Jourden, 1991; O'Neill, Dluhy, Fortier, & Michel,

2004b; K. A. White, 2009). Therefore, the more CDM situations the novice experiences and the more clinical successes they encounter, the more emotional barriers can be overcome. Seldomridge (1997) argues although stressful, students must be allowed to "struggle through the judgment process without being told what to do: By reasoning in clinical situations, students gain confidence in their abilities to make decisions" (p. 8). Once students have attempted the CDM process the student-faculty dyad should review and revise the process as necessary. If clinical environments as well as nursing faculty members provide safety and support, students are less fearful and more confident to practice the skill of CDM (Baxter & Rideout, 2006).

Conceptual Frameworks

Research that advances the science of nursing is underpinned by theory (Gall, Gall, & Borg, 2007). The tenets of one learning theory and two embedded theoretical nursing models were foundational to the development, testing, and validation of the NASC-CDM scale. Social cognitive theory (Bandura, 1977b, 1997) along with the clinical decision making and novice clinical reasoning models (O'Neill et al., 2004a; O'Neill et al., 2005) provided the theoretical basis for this research study.

Social Cognitive Theory

Social cognitive theory (SCT) is a multi-faceted complex learning theory. Because this learning theory is highly complex and embodies numerous constructs, the discussion that follows relates to those components of the theory most relevant to the research study. Originally coined social learning theory in 1977, the theory cites key concepts of

modeling of human behaviors, socialization, modes of reinforcement, motivation, self-regulation, and self-efficacy (Bandura, 1977b, 1986; Crain, 2000).

Early work related to social learning theory and human behavior revolved around the construct reciprocal determinism (Bandura, 1978b). Unlike theorists who pronounced influences on human behavior were unidirectional, Bandura argued an interrelated reciprocity among three determinants. The unidirectional premise of social learning theory considered individuals and situations were independent entities that intermingled to produce behavior. Conversely, the reciprocal determinant premise of social learning theory posited that human behavior was dependent upon interactions between a triad of factors; behavioral, cognitive, and environmental. In 1978, Bandura wrote, "The relative influence exerted by these three sets of interlocking factors will vary in different individuals and under different circumstances" (p. 346). Two phenomena instrumental to this triadic viewpoint are the cognitive processes human agency and self-regulation.

The following figure depicts the theoretical relationship among concepts within SCT and the research study. This researcher concedes the process denoted graphically as linear and progressive is iterative in real-life situations. Concepts written in red *italics* represent those elements of SCT most vital to the development, testing, and validation of the NASC-CDM scale.

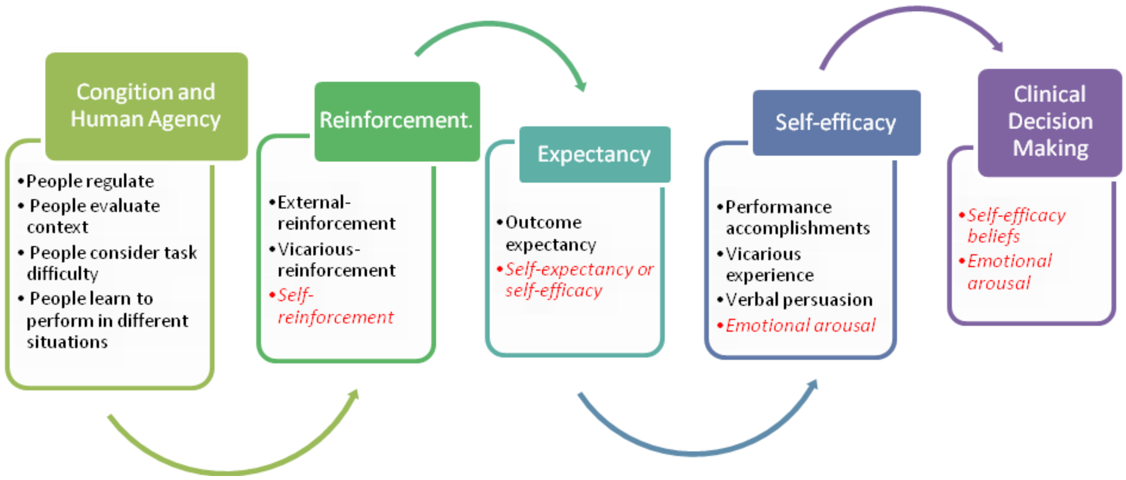


Figure 1. Regulating Behavior Model

The name change to SCT in 1986 resulted from a realization that cognitive processes played an essential role in one's ability to self-regulate, evaluate context, consider task difficulty, and perform in a wide array of situations. A principle philosophy of SCT is that humans are cognitive beings with self-knowledge structures; they are agents of their own behavior (Bandura, 1986, 2001, 2007). Agents make things intentionally happen by their own actions (Bandura, 2001). One means of making things happen is to possess the ability to regulate behaviors. When regulating behavior, a person examines key components of the situation, task difficulty and situational context (Bandura, 1986).

According to SCT, three means of regulating behavior include external-, vicarious-, and self-reinforcement. Although the means of regulating behavior named self-reinforcement is most congruent with the purpose of this study, external- and vicarious-reinforcement are described briefly for comparison. External-reinforcement is the

process by which behavior is influenced by direct and immediate consequences of one's action. Such consequences may come in the form of the observance of outcomes or in the form of direct feedback from others (Bandura, 1977b; Crain, 2000). For instance, a nurse educator demonstrates external-reinforcement when providing written anecdotal comments about a student's performance in the clinical practicum environment.

Vicarious-reinforcement is the process by which behavior is influenced by witnessing the rewards or punishments of others. SCT promotes that seeing behaviors succeed in others increases the propensity to act in a similar way oneself (Bandura, 1977b; Crain, 2000). For example, observing peers implement appropriate interventions during a high-fidelity simulation exercise, and getting faculty praise for those efforts, enhances the likelihood a nursing student who was observing will implement similar interventions in a comparable situation.

Perhaps the most important means of regulating behavior is through self-reinforcement. Self-reinforcement refers to the self-monitored process by which behavior is influenced. Bandura (1977b) argues that if actions were determined "solely by external reward and punishments, people would behave like weathervanes, constantly shifting in different directions to conform to momentary influences…" (p. 128). SCT asserts that individuals impose internal standards for behavior or performance. Once the behavior occurs, the individual reflects upon the behavior and self-corrects as necessary (Bandura, 1977b; Crain, 2000). For instance, a student forgets to confirm patency of a gastric tube prior to administering medications. During the administration process, the student realizes the tube is occluded when the syringe comes dislodged and the medications spew into the patient's bed. Consequently, during the next medication

administration process via a gastric tube, the student remembers to first confirm tube patency.

Performance in a situation is based on considerations of effort expenditure and expectancy. Expectancy is comprised of two factors, outcome expectancy and efficacy expectancy. Outcome expectancy presumes that actions are determined by a person's conviction that the action will result in positive outcomes. Efficacy-expectancy (i.e. self-efficacy) refers to the belief that people can produce the effects they desire by their own actions (Bandura, 2007).

Self-efficacy is foundational to SCT (Bandura, 1977a, 1978a). Self-efficacy is also fundamental to the intent of the newly designed NASC-CDM scale; it is one of the two emotional barriers to CDM (O'Neill et al., 2005). The NASC-CDM scale contains a self-confidence subscale related to undergraduate nursing students' perceptions of their level of self-confidence as they progress through the process of CDM. To be effective decision makers, nursing students must believe they can be successful with the skill. If nurse educators can identify where students fall short on self-efficacy related to CDM, they can intervene best and foster this burgeoning skill.

An influential work by Bandura (1977a) describes four sources of self-efficacy: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal. This research related most congruently to the fourth source of self-efficacy, emotional or anxiety arousal; however, each is defined briefly. The performance accomplishments source of self-efficacy relates to the amount of positive experiences and successes one gains from behaviors and their outcomes. This source is the most

influential to one's perception of self-efficacy because successes authenticate whether someone has what it takes to be successful (Bandura, 1997).

The second source of self-efficacy is vicarious experience. This source involves enacting behavior based on the results of others' actions. Hence, modeling behavior is often an effective means to gain personal self-efficacy (Bandura, 1997).

Verbal persuasion is the third source of self-efficacy. This source comes in the form of feedback from others, positive self-talk, and desensitization techniques. When persons are persuaded verbally they have the capabilities to succeed, they are more likely to do so (Bandura, 1977a; Bandura, Adams, & Beyer, 1977).

The fourth source of self-efficacy is emotional arousal. Emotional arousal equates to the level of anxiety, vulnerability, physiological arousal, or visceral agitation one experiences when confronted with threatening situations (Bandura, 1982, 1997). Control over emotional and physiological agitation to improve performance is a vital precept of SCT.

Another concept fundamental to the intent of the newly designed NASC-CDM scale and congruent with SCT is anxiety or emotional arousal; it is one of the two emotional barriers to CDM (O'Neill et al., 2005). The NASC-CDM scale contains an anxiety subscale related to undergraduate nursing students' perceptions of their level of anxiety as they progress through the process of CDM. Nursing students must be able to realize and curtail their level of emotional arousal before they can engage fully in the CDM process. If nurse educators can identify where students experience high levels of anxiety related to CDM, they can intervene best and foster this developing skill.

A strong inverse relationship has been evidenced between the level of anxiety arousal and the level of self-efficacy. One study demonstrated that 48 college students with higher levels of perceived self-efficacy and stronger abilities to cope with emotional arousal during mathematical computational situations displayed diminished intrinsic opioid activation (Bandura, Cioffi, Taylor, & Brouillard, 1988). Also, Ozer and Bandura (1990) found that women who participated in a self-defense class showed less anxiety arousal, less avoidance behaviors, and higher self-efficacy about defending themselves against a potential assailant. Finally, one self-efficacy expert notes because high levels of emotional arousal frequently debilitate performance, individuals usually consider themselves more capable when they are less anxious (Bandura et al., 1977).

A result of the inability to control anxiety arousal is the avoidance of the activity which causes the physiological and emotional arousal response. For example, "being bitten severely by a dog can instill belief in one's inefficacy to control their dangerousness and can produce… avoidance of dogs" (Bandura, 1986, p. 188). The research study adhered to the belief if nursing students have low self-efficacy and high anxiety arousal with the CDM process they will not engage fully in the experience. Avoidance behaviors will occur and this lack of engagement will squelch exposure to and practice of CDM. If one cannot practice, one cannot master (Bandura, 1977a; Clark, Owen, & Tholcken, 2004; K. A. White, 2009). Therefore, it is important for nurse educators to know the levels of self-confidence and anxiety undergraduate nursing students experience while making clinical decisions in order to intervene appropriately.

Clinical Decision Making and Novice Clinical Reasoning Models

Not only did SCT ground this research, but a nursing framework also served to undergird the study. Two embedded models reveal the relationship between the emotional barriers, a lack of self-confidence and high anxiety, and the development of CDM in novice clinicians (O'Neill et al., 2005). As such, the primary intention of the NASC-CDM scale is based on concepts rooted within the models of O'Neill and her colleagues.

The impetus for the creation of the clinical decision making model (CDMM) and the novice clinical reasoning model (NCRM) was to ground a computerized decision support system called the Nurse Computer Decision Support (N-CODES) project. N-CODES is "a point-of-care system that will make relevant client information available to acute care nurses as they make decisions" (O'Neill et al., 2004b, p. 345). Knowledge within the N-CODES system is based on IF… THEN… rules: IF the patient has pneumonia and is restless… THEN consider hypoxia (O'Neill et al., 2006).

The N-CODES project is designed primarily to assist novice practitioners. The project's aim is to create informatics as a means to manage risk and support novice nurses while they develop clinical experiences with CDM (O'Neill et al., 2005). However, because no theoretical framework was found at the project's inception that illuminated the process of how novices learn CDM, the NCRM was conceived (E. O'Neill, personal communication, February 13, 2009).

Clinical Decision Making Model

Although the CDMM and the NCRM are separate graphic depictions, their concepts are intertwined. See Appendix A for an illustration of the CDMM and the NCRM. The

intent of the CDMM is to illustrate the multi-dimensional CDM process of experienced nurses. The CDMM, based on the precepts of information-processing theory, includes pre-encounter data, risk-benefit assessment, hypothesis generation, hypothesis selection, and nursing action (O'Neill et al., 2005). Paramount to the CDMM is the working knowledge of the nurse. Working knowledge is the body of information, gained from textbooks and experiences that are used in one's day-to-day work. An example of working knowledge is the nurse's awareness if post-operative patients remain in bed they are at risk for the development of venous thrombosis. Working knowledge "contains memories of previous patients as well as composite pictures of commonly confronted problems" (O'Neill et al., 2005, p. 71): It is elemental to CDM. Novice clinicians have limited working knowledge.

Novice Clinical Reasoning Model

The NCRM, on the other hand, illustrates variables that influence the development of working knowledge in novice clinicians. The NCRM highlights such variables as: limited perceptions of clinical situations, cognitive and emotional barriers, resource utilization within the clinical setting, and the importance of positive clinical experiences (O'Neill et al., 2005). Emotional barriers that affect CDM in novice clinicians are cited as high anxiety and a lack of self-confidence (O'Neill et al., 2004a; O'Neill et al., 2005). The model indicates practice experiences influence levels of self-confidence and anxiety.

Although the NCRM identifies a number of influences on CDM experienced by novice clinicians, the emotional barriers related to CDM are the component of the model most relevant to the research study. Numerous authors support that more experiences promote more confidence (Lindsey & Kleiner, 2005), successful outcomes enhance

confidence (Bandura & Jourden, 1991; Savitsky et al., 1998), and higher confidence promotes increased performance (Schunk & Pajares, 2005; Wood & Bandura, 1989); all of which diminish anxiety arousal. Hence, the design of not only the NASC-CDM scale's items but also the scale's prime purpose, to measure self-confidence and anxiety levels in undergraduate nursing students as they progress through the CDM process, are fundamentally similar with the underlying principles of both SCT and the embedded CDM and NCR models.

Definitions of Constructs

When designing a quantitative research instrument it is important to explicate theoretical or conceptual definitions for the constructs under study. Additionally, operational definitions are presented where applicable (Waltz et al., 2005). Several constructs were used repeatedly within this research study and thus are defined to avoid confusion about their meanings. The defined constructs appear in *italics*.

For the purpose of this study a definition was presented which this researcher believes best exemplifies the conceptualization of *clinical decision making* in student nurses. Standing (2007) posits CDM is "a complex process involving information processing, critical thinking, evaluating evidence, applying knowledge, problem-solving skills, reflection, and clinical judgment to implement the best course of action" (p. 266). This research study maintained congruence with this definition throughout both design and revision phases of the NASC-CDM scale.

CDM was operationally defined as the pool of items that make up the NASC-CDM scale. Four content domains of CDM were represented in the newly developed tool: (a)

investigating information and cues; (b) interpreting information and meanings; (c) integrating findings and illuminating options; and (d) intervening and reflecting on the decision process.

For the purpose of this research study *emotional barrier* was defined as an affective influence on the process of CDM in the novice clinician. The two emotional barriers addressed in the study were self-confidence and anxiety (O'Neill et al., 2004b; O'Neill et al., 2005).

Self-confidence was conceptually defined as "beliefs in one's capabilities to organize and execute the courses of action required that produce given attainments" (Bandura, 1997, p. 3). Self-confidence was noted as one of two emotional barriers that influence CDM processes in novice clinicians. This methodological inquiry to pilot-test and validate the NASC-CDM scale embraced the ideals presented in a comprehensive concept analysis of self-confidence (K. A. White, 2009). For the purpose of this research study the terms self-confidence and self-efficacy were used synonymously. Self-confidence was operationally defined as the scores obtained on the self-confidence subscale of the NASC-CDM measurement tool.

Anxiety was conceptually defined for this research study using two sources. The *American Heritage Dictionary* defines anxiety as "a state of uneasiness and distress about future uncertainties… apprehension…intense fear or dread …" (Boyer et al., 1985, p. 117). Bandura (1988) cites anxiety as "a state of anticipatory apprehension over possible deleterious happenings… an emotion of fright indexed by physiological arousal or subjective feelings of agitation" (p. 77-78): He further argues that anxiety or emotional arousal is a physiological as well as emotional state. Anxiety was noted as one of two

emotional barriers that influence CDM processes in novice clinicians. Within this research study the terms anxiety arousal and emotional arousal were used synonymously with the term anxiety. Anxiety was operationally defined as the scores obtained on the anxiety subscale of the NASC-CDM measurement tool.

The term *nursing program* was conceptually defined for this empirical research as a course of study in higher education that leads to either an associate's or bachelor's degree in nursing. Graduates from such programs are eligible to take the national licensure exam to become a registered nurse. Nursing programs invited to participate in this study met the national standards for accreditation by either the National League for Nursing - Accrediting Commission (NLNAC), the American Association of Colleges of Nursing – Commission on Collegiate Nursing Education (CCNE) or both accrediting bodies. Further, each nursing program invited to participate met all other inclusion criteria for the study.

For the purpose of this research study the term *undergraduate nursing student* was defined conceptually as an individual who was enrolled in a nationally accredited, associate or baccalaureate nursing program and who met all other inclusion criteria for the study. Throughout the study the term novice clinician, nursing student, or undergraduate pre-licensure nursing student were used synonymously with undergraduate nursing student.

Clinical nursing course was defined conceptually for this research study as one of the final two courses within the nursing program with a clinical practicum component in real-life patient care settings. For study purposes the clinical nursing course could be non-integrated, whereby students provide care to patients in real-life clinical settings but the

course contains no didactic component. However, the clinical nursing course could also be integrated, whereby students provide care to patients in real-life clinical settings and the course does contain a didactic component.

Chapter Summary

Chapter two examined both early influential as well as current relevant literature related to CDM, self-confidence, and anxiety arousal. Several historical viewpoints related to CDM were introduced and verification was provided to demonstrate that items on the NASC-CDM scale embrace the precepts of the information-processing and intuitive-humanistic viewpoints. Four content domains which address steps in the iterative process of CDM were explicated and evidence was provided to substantiate rationale for the inclusion of items on the newly designed NASC-CDM scale. Constructs related to but not entirely like CDM were described.

Levels of self-confidence and anxiety were the two emotional barriers measured in the research study. Hence, literature relevant to these important constructs was cited to authenticate their impact on the CDM process in novice clinicians. Two theoretical frameworks used to undergird the research study were discussed. The final section of chapter two identified terms important to the research study; terms were introduced and defined conceptually and operationally when appropriate. The following chapter reviews the methodological approach undertaken for this research.

CHAPTER 3

METHODOLOGY

The methodology chapter discusses the scientific approach undertaken for this research. The purpose of this study was to develop, test, and establish psychometric properties for a norm-referenced, self-report quantitative research instrument entitled the Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM) scale.

Six sections comprise the methodology chapter. Section one addresses research questions. The second section examines psychometric theory and discusses key terms such as validity and reliability. Section three summarizes the process of instrument development. Section four describes the sampling framework for the study. The fifth section explains data collection methods for the study, including recruitment of participants and procedural steps. Finally, section six illustrates techniques for data analysis.

Research Questions

The goal of instrument development is to create a collection of items which can be combined into a composite score; its intent is to reveal various levels of an attribute or construct which are not directly observable (DeVellis, 2003). Subsequent to item construction, psychometric properties such as validity and reliability are established. As a means to this end, several research questions were posed.

1. Do the self-confidence and anxiety subscales of the NASC-CDM scale provide a valid measure of undergraduate nursing students' perceptions of self-confidence and anxiety levels during the process of CDM?
2. Do the self-confidence and anxiety subscales of the NASC-CDM scale relate satisfactorily with two established reliable and valid quantitative instruments measuring generalized self-efficacy and generalized anxiety?
3. Do the self-confidence and anxiety subscales of the NASC-CDM scale provide a reliable measure of undergraduate nursing students' perceptions of self-confidence and anxiety levels during the process of CDM?

Psychometric Theory

Psychometrics refers to the qualities of an instrument that measures variations of a construct within the context in which the instrument was designed (Switzer et al., 1999). Psychometric theory is the foundation which undergirds instrument development (Rust & Golombok, 2009; Waltz et al., 2005). Two concepts essential to psychometric theory are reliability and validity. Reliability refers to the consistency of the instrument. It is the amount of variance in scores on a tool which can be accounted for by the *true* score of the attribute being measured and not by *error* (DeVellis, 2003). Validity refers to the extent to which a research instrument measures the attribute it is intended to measure and not some other attribute (Waltz et al., 2005).

In order to establish psychometric properties for the NASC-CDM scale, the tool was subjected to testing using two samples of pre-licensure undergraduate nursing students.

Both reliability and validity aspects of psychometric theory were assessed (DeVellis, 2003; Waltz et al., 2005).

The first research question addressed the newly developed scale's validity. Several forms of validity were assessed, namely content validity (Davis, 1992; Polit et al., 2007) and construct validity (DeVon et al., 2007; Polit & Beck, 2008). To ensure the NASC-CDM scale was content valid it was subjected to critical review by a panel of expert judges in the area of CDM. Content validity was also established through comprehensive literature review of both theoretical and research works in the area of CDM. An inclusive review of literature which authenticated the relationships of self-confidence and anxiety with CDM further demonstrated the content validity of the NASC-CDM scale. Item analysis and exploratory factor analytic techniques were employed to begin the accruement of construct validity (DeVon et al., 2007; Waltz et al., 2005) of the NASC-CDM scale.

Research question number two considered the convergent validity of the NASC-CDM scale. A means of examining convergent validity was to correlate scores on the newly developed NASC-CDM scale with scores on existing, psychometrically sound instruments (Waltz et al., 2005). The newly designed scale includes a self-confidence subscale and an anxiety subscale. Respondents' scores from each of these subscales were compared with respondents' scores on a generalized self-efficacy scale and generalized anxiety scale respectively.

The third research question related to the reliability of the NASC-CDM scale. A reliable instrument is one that is repeatable and consistent (DeVellis, 2003; Waltz et al., 2005). Reliability was assessed using Cronbach's alpha for internal consistency

(Cronbach, 1951). The examination of psychometric properties for the NASC-CDM scale is discussed more fully within the data analysis section of this chapter.

Instrument Development

The NASC-CDM scale is considered a hybrid or mixed scale. Cognitive scales examine subjects' achievement of knowledge or process while affective measures examine subjects' interests, values, and attitudes (Waltz et al., 2005). The NASC-CDM scale examines the cognitive process of making a clinical decision, but its ultimate purpose is to appraise the affective domain (Gable & Wolf, 1993; Polit & Beck, 2008) of the self-confidence and anxiety levels experienced by undergraduate nursing students as they proceed through the CDM process.

DeVellis (2003) argues scale development specificity must be congruent with the broadness or narrowness of the tool's focus, its content, setting, and population. The NASC-CDM is intended for use primarily with undergraduate nursing students; is designed to measure two affective emotional barriers, self-confidence and anxiety; and is intended for use within the clinical practicum environment. Because of the specific population, focus, and setting of the proposed instrument, the scale is considered narrowly defined.

Confirmation of a level of measurement is important for research instruments. The NASC-CDM scale is by design an ordinal-level scale. Ordinal-level scales rank-order the relative amount of the attributes being measured (Waltz et al., 2005), in this case the perceived amounts of self-confidence and anxiety experienced by nursing students while performing CDM. Summated composite scores are calculated for both subscales of the

tool. Scores obtained in summed fashion yield raw scores, a form of continuous data. Interval-level data are continuous in nature (Gall et al., 2007; Polit & Beck, 2008). Hence, the NASC-CDM was considered interval-level for the purposes of data analysis.

Initial Item Pool and Response Format

The initial pool of 82 items was generated using a domain-referenced approach (Gable & Wolf, 1993). This pool was sufficient to allow for an approximate 50% reduction of items (DeVellis, 2003; DeVon et al., 2007) resulting from expert feedback and pilot-testing. *A priori* consideration of content areas, scale objectives, and numbers of items within each is paramount during early instrument development (Gable & Wolf, 1993; Waltz et al., 2005). See Appendix B for the initial NASC-CDM scale blueprint. See Appendix C for initial draft of items by content domain.

In the initial draft of the scale the statement, *I am ____ self-confident and ____ anxious in my ability to….* was written at the start of the survey with the declarative portion of each statement concluding this sentence. For instance, an item read *I am _____ self-confident and I am _____ anxious in my ability to….*correlate physical assessment findings with what the client tells me. A neutral 5-point, Likert-type (Likert, 1932) scale with 1 = *not at all*, 2 = *somewhat*, 3 = *equally and not equally*, 4 = *mostly*, and 5 = *totally* was chosen for the first draft of the NASC-CDM scale. DeVellis (2003) discusses numerous discrete responses (using a scale from 1 to 100) and simple binary selections (Yes or No) as being potentially problematic. He further writes the number of response options must be congruent with the overarching objective of the scale. The utilization of five anchors would allow respondents to meaningfully discriminate among the offered choices but not confuse respondents with too many options.

During the initial phase of instrument development the purposeful decision to adopt an odd response option format was made (Francis & Busch, 1975; Mercer & Durham, 2001). Because the undergraduate nursing student, as a novice clinical decision maker, may actually feel equally confident and not confident or equally anxious and not anxious with a step of the CDM process, a neutral response option was used. This neutral response option was worded in a positive as opposed to negative manner (DeVellis, 2003; Gable & Wolf, 1993). For instance, the third anchor could have read, *neither fully confident nor unconfident* as opposed to *equally confident and not confident.*

Numerous components such as item length, reading level, redundancy, positive or negative wording, and grammar (Comrey, 1988; DeVellis, 2003; DeVon et al., 2007; Gable & Wolf, 1993) were considered when writing items for inclusion in the first draft of the NASC-CDM scale. To enhance reliability and validity, instrument developers must ensure all items that make up the tool are congruent with the construct under study (DeVellis, 2003); in this case CDM. All drafts of the NASC-CDM scale used declarative, closed-ended statements that align with the steps in the cognitive process of CDM. The language used is familiar to undergraduate nursing students.

Internationally Known Expert Panel

After the phenomenon under study is operationally defined, an item blueprint is developed and items are constructed, the judgment quantification phase (Grant & Davis, 1997) of scale development must begin. The judgment quantification component of scale development occurs when expert panelists evaluate items on the scale and the scale in its entirety (Grant & Davis, 1997). Several criteria are necessary to assess when choosing an expert reviewer. Davis (1992) posits experts should have expertise with the target

population, presented professionally on the topic of interested, published papers within peer-reviewed journals, or conducted research on the topic area. The intent of the newly developed scale is to measure perceptions of the levels of two affective barriers experienced during the process of CDM in undergraduate nursing students as it relates to patient care in the clinical practicum environment. For this reason, content experts in the field of clinical decision making with undergraduate student nurses were invited to critique the NASC-CDM scale.

Rationale for Expert Reviewers

Five internationally known content experts were invited and agreed to evaluate the 82-item first draft of the NASC-CDM scale in spring 2009 for relevancy, clarity, and comprehensiveness (Davis, 1992; DeVellis, 2003; Grant & Davis, 1997). The number of content experts is consistent with recommendations by Gable and Wolf (1993). Content experts were chosen because of their expertise in the area of CDM, scale development, or both. See Appendix D for a sample of the invitation sent to the expert reviewers via electronic mail (email). Expert # 1 did not return the packet, Expert # 5 completed feedback on only one half of the 82 items. Further, Expert # 5 seemingly misinterpreted the primary intent of the instrument as generic, citing comments that the scale developer should assign a specific clinical situation upon which the students would base their responses. After serious consideration, feedback from Expert # 5 was not included in further tallies. Item-content validity and scale-content validity was calculated (Beck & Gable, 2001; Waltz et al., 2005) based on feedback from three of five expert judges. Brief biographical summaries for the three expert panelists who completed comprehensive feedback provide justification for their selection.

Expert # 2 is a doctorally prepared registered nurse from the southwest portion of the United States. This expert was sought as a valuable source of feedback not only because she has completed research in the area of CDM, but also because she has expertise with instrument development related to CDM. Of primary interest to this expert is the use of intuition within CDM and self-reflection as part of the process of learning CDM. The quantitative instrument developed by this expert is a unidimensional questionnaire which measures the acknowledgement of the use of intuition in CDM by nurses. This expert has more than 25 years in undergraduate and graduate nursing education. She also maintains a quality funded research program, conducting qualitative and quantitative studies in the domains of decision making, intuition, decision making in underserved populations, and health behaviors of underserved youth.

Expert # 3 is a doctorally prepared registered nurse from southwest Finland. Like expert number two, expert number three was sought as a valuable panelist not only because she has completed research in the area of CDM, but also because of her expertise with instrument development related to CDM. She co-designed a quantitative self-report instrument which assesses the CDM model used by nurses. This research instrument determines the model of CDM (information-processing or intuitive-humanistic) used by nurses in various clinical settings, in various countries, and at various levels of experience. She has completed numerous qualitative and quantitative studies. Her doctoral work was completed in the domain of CDM. In addition to her many years teaching undergraduate and graduate nursing students, this expert has authored or co-authored more than 60 peer-reviewed articles and textbook chapters, many in the area of CDM, and has presented internationally in the content-area of CDM.

Expert # 4 is a doctorally prepared registered nurse from the northwest portion of the United States. Over the past 25 years, this expert has worked as an undergraduate nurse educator and established a credible career as a nurse researcher and author in the area of clinical judgment and clinical reasoning. This expert currently teaches masters, post-master and doctoral students. Additionally, she has advised many students pursuing research interests related to clinical judgment, clinical education, and simulation. She has completed numerous funded studies using qualitative and quantitative modes of inquiry related to intuition, knowing the patient, and reflection and its relationship to the process of clinical judgment. Finally, this expert serves as editor for a national peer-reviewed journal. Expert # 4 was invited to serve as a panelist because of her expertise not only in the area of CDM, but also because of her internationally renowned work in the area of intuition, clinical judgment with level of experience, and skill acquisition of novice as well as experienced nurses.

Packet for Expert Reviewers

Numerous authors describe elements which should be provided to and asked of an expert reviewer (Davis, 1992; DeVellis, 2003; Grant & Davis, 1997). Components contained within the packet given to the experts who reviewed the NACS-CDM scale were consistent with these recommendations. A reviewer packet was sent to each expert panelist electronically (their preferred means) after receipt of their willingness to serve was affirmed. The packet included: a cover letter that introduced the researcher of the study, explained the purpose of the NASC-CDM scale, and thanked the individual for agreeing to serve as an expert instrument reviewer; a definition of the construct under study; a summary and definitions of scale content domains around which the tool was

designed; and the expert reviewer rating form with rating instructions. See Appendix E for the expert reviewer rating packet.

Feedback from Expert Reviewers

Each expert completed the rating form independently. They were given one month to complete the instrument review form and return it to the researcher electronically. Content experts unanimously agreed that 38 of the 82 items were *moderately relevant* or *highly relevant* to the CDM construct. Beck and Gable (2001) cite that content validity indices should be assessed on those items achieving a *moderately relevant* or *highly relevant* rating. Additionally, the researcher retained 12 items because of their strong theoretical relevance to the scale.

Content experts placed items within the correct content domain with 63% accuracy. Expert # 2 mentioned placing items within a content domain was difficult. She further commented that some items did not seem mutually exclusive to a domain. She suggested as instrument development progresses, a small sample similar to the intended population should evaluate the tool for content, readability, and item clarity.

Comments provided by the content experts were beneficial to the process of item revision and reduction. With regard to comprehensiveness of the NASC-CDM scale, one expert noted the NASC-CDM scale to be *very comprehensive*, one cited the scale to be *moderately comprehensive*, and one cited the scale to be *slightly comprehensive*. Expert # 3, from Finland, commented that her evaluation of items was influenced by the language barrier and cited that each item required several reads before relevancy rating or placement into content domain could commence. In retrospect, the use of an expert panelist with English as a second language may have been prohibitory to this phase of the

scale review process. Two experts suggested that the final scale be comprised of fewer items because an 82-item scale may be tedious for students to complete.

Each of the three experts provided feedback which might facilitate clarity of items. Two experts noted the scale to be *moderately clear,* and one noted the scale to be *slightly clear.* Both experts who rated the scale as *moderately clear* scale commented that items were written at a high level; this may be detrimental to easy student completion. Expert # 3 commented that items were difficult to read because they were not written as full-sentences. The beginning of the sentence, *I am ___ confident and ___ anxious with my ability to…*was noted only at the start of the tool with each item being written as the completion of that sentence. This researcher acknowledged the initial sentence structure as an intrinsic design flaw. Revisions to item sentence structure were made in subsequent drafts of the scale. All content experts cited feedback about the revision or elimination of specific items to enhance the scale's clarity. Item revision and reduction was made accordingly.

The panelists were asked to respond to one final statement. Experts were asked their opinion about the use of a 4-point forced-choice, Likert-type scale versus a 5-point neutral-option, Likert-type scale. Two of the three experts suggested using a forced-choice response format. Rationale for the selection of a 4-point format included the decrease in ambivalent responses, hence gathering more accurate data. Expert # 2 suggested the option of using a 6-point forced-choice format in lieu of the more limited 4-point scale to gain a fuller picture of students' self-confidence and anxiety level while they engage in the process of CDM. Expert # 3 recommended using a neutral-option

format, arguing that the use of a 5-point scale allows respondents to have no opinion. This expert panelist cited a 4-point scale may result in a higher amount of missing data.

Content validity is a valuable and necessary preliminary step in evaluating any newly developed research instrument. It is most often achieved through the use of content experts who quantify the content of multi-item scales (Polit et al., 2007). The scale-content validity index (S-CVI) is determined by assessing the proportion of expert reviewers who score items as a three or four on the relevancy scale, where 1 = *not at all relevant* and 4 = *highly relevant*, to the total number of items on the scale (Grant & Davis, 1997). The item-content validity index (I-CVI) is determined by assessing the proportion of relevance of each item to the number of expert reviewers (Waltz et al., 2005). Davis (1992) advocates new instruments should attempt to achieve .80 for I-CVI. Others argue for a scale to have exceptional content validity it should have an I-CVI of .78 or higher and an S-CVI of .90 or higher (Polit et al., 2007). Items on the NASC-CDM scale were retained that achieved unanimous agreement among the three expert reviewers. See Appendix F for content validity indices from expert reviewers from the initial draft of items. The second draft of the scale consisted of 50 items.

Registered Nurse and Undergraduate Student Panel

In addition to a panel of internationally known content experts within the area of CDM, another panel of experts was sought. One content expert cited the importance of critique of the scale by a population similar to that which will complete the scale. For this reason, and also to reduce the risk of differential item functioning (Kaplan & Saccuzzo, 2005; Rust & Golombok, 2009) items from the second draft were reviewed by seven registered nurses with Filipino as their primary language. Eight undergraduate

nursing students, three with English as their second language, also evaluated items for readability and clarity. Although the NACS-CDM scale is not specifically designed for international use, the researcher considered it important that nurse clinicians, nursing students, and those whose first language is not English could easily understand items. Review by this group of panelists ensured the scale's face validity. Items were again revised or reduced based on their feedback (Rust & Golombok, 2009). The researcher subsequently scrutinized all items a final time for redundancy, readability, and clarity.

Pilot Item Pool and Response Format

The draft of the NASC-CDM scale that was pilot tested contained 41 items. See Appendix G for the pilot version of the scale by content domain. Each item within the survey begins with the stem of the sentence. The stem of the item reads; *I am ____ self-confident and ____ anxious in my ability to…* The declarative portion of each item concludes the sentence. This sentence structure was a dramatic modification from the initial draft and enhanced clarity and readability. A 6-point, forced choice, Likert-type response format is used (Likert, 1932). The anchors read: 1 = *not at all*, 2 = *just a little*, 3 = *somewhat*, 4 = *mostly*, 5 = *almost totally*, and 6 = *totally*.

There are practical and empirical considerations when determining response format. Gable and Wolf (1993) argue practical reasons for limiting response options because the higher the number of anchors from which to chose, the higher the level of thinking required when completing the scale. The 6-point likelihood format was chosen for the NASC-CDM scale because it allows respondents to discriminate adequately their perception of self-confidence and anxiety without confusing them with too fine a discrimination level (DeVellis, 2003; Gable & Wolf, 1993). A 6-point Likert-type scale

gathers a fuller view of student perception and gathers fuller data than a 4-point response option because of the broader array of anchor points. Two empirical reasons exist for the use of a 6-point scale. Gable and Wolf (1993) cite 5- and 6-point scales are more reliable and Comrey (1988) posits 6- and 7-point scales provide more stable factor solutions.

The forced-choice format was chosen to avoid ambiguity and neutrality in an attempt to gather more discriminate data (Coombs & Coombs, 1976; Cronbach, 1946). Gathering fuller data and reducing ambiguous items is beneficial during scale development; stronger items improve the tool's reliability and interpretability (Coombs & Coombs, 1976). Forced-choice is a useful response format if respondents are apathetic toward the topic under study because it promotes higher-level thinking and eliminates the ability for a noncommittal response (Coombs & Coombs, 1976). Forced-choice is also useful if respondents are female, as females tend to demonstrate more neutrality during survey completion than males (Francis & Busch, 1975). Some authors cite the use of a forced-choice response option may result in more missing data as respondents may skip an item if they can not commit to one of the anchors (Rust & Golombok, 2009). Conversely, results of one empirical inquiry noted no increase in missing data when comparing two versions of a tool, one with neutral-option and one with forced-choice (Mercer & Durham, 2001).

Although there is a reciprocal relationship between self-confidence and anxiety with regard to CDM, both subscales use the same six anchor points and flow in the same direction. Utilizing the same anchors and the same direction for both subscales allows respondents to rate the amount of the attribute they possess with more ease and less

deliberation. For instance, if a respondent possesses higher self-confidence and higher anxiety on an item, a higher anchor point is chosen for each.

The NASC-CDM scale responses are considered subjective, supply-type items. Waltz et al. (2005) explicate that such items are warranted for norm-referenced scales in which respondents supply a number, symbol, or statement best representing the amount of a specified attribute they possess. Items are short and concisely written. For this reason, the researcher believes respondent fatigue, because of difficulty level and scale length (DeVellis, 2003; Waltz et al., 2005), will not significantly impact survey completion. Early versions of the NASC-CDM scale had two subscales within four content-domains. Therefore, administrators of the tool had the ability to obtain a composite score for each subscale, self-confidence and anxiety, per respondent that relates to a domain of CDM.

Sampling Framework

Two phases of testing were completed to establish psychometric properties of the NASC-CDM scale. Pilot-testing with a sample of undergraduate pre-licensure nursing students was completed to preliminarily assess the reliability and validity of the tool (DeVon et al., 2007; Waltz et al., 2005). The scale was revised and items reduced based on data analysis from this sample. Main-testing of the revised tool was completed by a second sample, drawn from the same population, for assessment of reliability and validity of the revised tool.

A convenience sampling framework (Gall et al., 2007; Polit & Beck, 2008) was used for both pilot- and main-testing phases of the study. Convenience sampling is a nonprobability or nonrandom technique. Although nonprobability sampling is commonly

used for methodological research, it is recognized that caution must be taken “in generalizing results from the sample to the target population” (Huck, 2004, p. 109).

The target population includes associate and baccalaureate nursing students in the United States. The accessible population includes the nursing programs and nursing students that meet inclusion criteria within four states in the northeast portion of the United States. Generalizability and thus external validity of the study may be enhanced because sampling occurred in rural, suburban, and urban areas and included associate and baccalaureate nursing programs (Gall et al., 2007). Demographic data were gathered from all study participants to assess the representativeness of the sample in relation to the target population (Polit & Beck, 2008), determine an exclusion criterion, and examine information related to the intent of the NASC-CDM scale.

Inclusion criteria encompassed requirements for not only the nursing programs but also the pre-licensure undergraduate nursing students selected to receive an invitation to participate in the research study. Inclusion criteria required that: (a) nursing programs were a nationally accredited associate degree or baccalaureate degree program, (b) nursing programs were located within the confined area of a 150 mile radius of a city located in the northeast area of the United States, (c) nursing programs maintained an annual graduation rate of greater than or equal to 30 students, (d) nursing students were in one of their final two clinical nursing semesters of the program, (e) nursing students were at least 18 years of age, and (f) nursing students agreed to participate. It was anticipated that an undergraduate nursing student who is also a licensed practical nurse (LPN) has experience with CDM and therefore may have fundamentally different levels of self-confidence and anxiety than a student who is not an LPN (Faulk, Parker, Lazenby, &

Morris, 2008; Qadri, Wang, Ruiz, & Roos, 2009). For this reason, LPNs were excluded from the study.

Rationale for nursing program and nursing student inclusion criteria are provided. First, the inclusion of nationally accredited nursing programs ensured participants attended a school of nursing which adheres to common standards for nursing education programs. Programs were selected from lists generated by the National League for Nursing - Accrediting Commission (NLNAC) and the American Association of Colleges of Nursing (AACN) websites of nationally accredited associate and baccalaureate degree nursing programs within the specified area.

Second, the inclusion criterion that nursing programs be located within 150 mile radius of a city within the northeast United States allowed the researcher to visit numerous programs and potentially improve response rate. Eligible programs were located within the states of Delaware, Maryland, New Jersey, and Pennsylvania.

The final nursing program inclusion criterion related to program size. To maximize the potential number of participants, only programs within the confined area with annual graduation rates of greater than or equal to 30 students were invited to participate.

Rationale for the use of three inclusion criteria related to nursing students included: First, sampling students in one of their final two clinical nursing semesters ensured lesser variability in scores and enhanced the stability of factor solutions during data analysis (Tabachnick & Fidell, 2007). Second, confirming student participants were at least 18 years of age eliminated the need for parental consent. Third, voluntary participation in the study facilitated protection of the rights of student participants. Eligible students from each of the eligible programs were invited to participate in either the pilot- or main-

testing phases after permission was secured from the nursing program and the Institutional Review Board (IRB).

A total of 27 associate and 27 baccalaureate degree nursing programs met inclusion criteria. The Table 1 depicts eligible nursing programs included in either pilot- or main-testing phases of the study.

Table 1. Eligible Associate and Baccalaureate Nursing Programs

State	Type of Degree	Number of Eligible Programs	Approximate Number of Eligible Students
Delaware	Associate	3	584
Delaware	Baccalaureate	2	406
Maryland	Associate	9	1,444
Maryland	Baccalaureate	5	1,564
New Jersey	Associate	3	550
New Jersey	Baccalaureate	2	242
Pennsylvania	Associate	12	3,144
Pennsylvania	Baccalaureate	18	4,396
	Total	**54**	**12,330**

Eligible student numbers were calculated using annual graduation rate per program, times ten percent for estimated program growth, times recruitment of two classes within each program. Thus, the accessible population of participants for the study was approximately 12,300 students. In accordance with scale development and factor analytic experts, attempts were made to obtain six to ten participants per item for both pilot- and main-testing phases (DeVellis, 2003; Gable & Wolf, 1993). A sample size of at least 300 nursing students was anticipated for both testing phases.

Data Collection Methods

Electronic Survey Format

The Survey Monkey (https://www.surveymonkey.com) survey platform was used to provide an online version of the NASC-CDM scale and the full survey package for both pilot- and main-testing phases. Data collection in an online format has several advantages, namely confirmed anonymity which may lead to less social response bias, convenience for the participant, and the ability to sample a broader geographical area. There are limitations however, such as the inability to follow-up with respondents with missing data, collaboration among respondents who complete the survey at the same place and time, the possibility of computer malfunction (Cantrell & Lupinacci, 2007). Another limitation to an online survey format is lower response rates for online surveys versus mailed surveys. Online survey response rates differ widely. One study in a nonprofit organization invited 1,696 subjects and yielded a response rate of 16.5% (Wright & Schwager, 2008) while another study within a university setting invited 5,430 undergraduate students and achieved a response rate of 34.5% (Crawford, Couper, & Lamias, 2001).

The full survey package in the pilot phase contained 78 items and seven parts. Part one contained informed consent. Part two explained background information about the study, the parts of the survey package, directions, completion timeframe, and completion deadline. Part three contained demographic questions. See Appendix H for demographic questions. Part four included the NASC-CDM scale. Part five contained a general self-efficacy scale. Part six included a general anxiety scale. The survey package used during pilot-testing included six additional items related to the NASC-CDM scale. These items

requested respondents' feedback about the clarity of directions, clarity of item meaning, readability of items, overall survey length, ease of completion, and invited respondents to provide general comments about the NASC-CDM scale.

Instrumentation

Nursing Anxiety and Self-Confidence with Clinical Decision Making Scale

A comprehensive discussion of the NASC-CDM scale's development ensued in a previous section of this chapter. The first item on the NASC-CDM scale was chosen deliberately. Rust and Golombok (2009) advise the first item of the tool should be "an interesting and unthreatening item" (p. 221). Thereafter, placement of the remaining 40 items on the NASC-CDM scale were randomly selected (by pulling from a hat) to avoid the risk of inflated reliability coefficients and decrease proximity effect (Gable & Wolf, 1993).

In addition to the completion of the newly designed NASC-CDM scale, respondents completed two existing psychometrically sound scales. The General Perceived Self-Efficacy (GSE) scale and the Generalized Anxiety Disorder-7 (GAD-7) scale were completed by all student participants. This strategy began the assessment of convergent validity (DeVon et al., 2007; Gall et al., 2007).

General Perceived Self-Efficacy Scale

Although self-efficacy is generally considered to be domain-specific, some researchers have conceptualized that generalized self-efficacy does exist (Imam, 2007; Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005; Schwarzer, Mueller, & Greenglass, 1999). General self-efficacy is deemed an overall usual sense of confidence in coping ability across an array of life situations (Scholz, Gutiérrez-Doña, Sud, & Schwarzer,

2002). The GSE scale was developed in Germany over a period of 20 years and has strong psychometric properties established from an original sample of 3,816 students and teachers. The GSE scale has been translated into 28 languages and has been used in nearly 1,000 empirical studies (Luszczynska, Scholz, & Schwarzer, 2005).

An advantage of the GSE scale lies with its brevity; it is a unidimensional 10-item, 4-point Likert-type scale. Principal component analysis using Kaiser's eigenvalue criterion and scree plot evaluation, computed separately on 25 subsamples confirmed the single-factor solution of the GSE scale (Scholz et al., 2002). See Appendix I for the GSE scale and permission. Scores are obtained in summative fashion and range from 10 to 40 points where lower scores indicate less self-efficacy and higher scores indicate more self-efficacy. The arithmetic mean can be calculated. There is no cut-off score. Norms for the GSE scale are available and were derived from a sample of 1,595 adults in the United States (Schwarzer, 2009). The GSE scale is public domain and no cost was incurred for its use.

Psychometric testing of the GSE scale with different samples has produced consistently acceptable reliability and validity assessments. A multicultural validation of the instrument revealed alpha coefficients ranging from .86 to .94 in a sample from Germany, Poland, and South Korea (Luszczynska, Scholz, et al., 2005). Psychometric properties of an online version of the GSE scale were compared with previously achieved psychometrics from a traditional paper-pencil version of the GSE scale using a sample of internet users ages 15 to 50 years ($n = 1,314$), German teachers ($n = 274$), German high school students ($n = 3,077$), and Canadian university students ($n = 290$). Internal consistency ranged from $\alpha = .78$ in the high school sample to $\alpha = .89$ in the university

student sample (Schwarzer et al., 1999). A sample of 19,120 subjects examined the global nature of self-efficacy across 25 countries; a Cronbach's alpha of .87 was obtained from the sample of the 1,594 United States subjects. Test-retest reliability after one year yielded significant coefficients (r = .75) and after two years in German females (r = .63) (Scholz et al., 2002).

Convergent and divergent validity have been demonstrated through comparisons with similar (optimism) and dissimilar (anxiety) constructs. In a Costa Rican sample of 393 people, GSE correlated with anxiety for women (r = -.43) and anxiety for men (r = -.42). Further, correlations between GSE and other personality traits were highly significant in a sample of 180 university students: extraversion (r = .64), decision or action orientation (r =.49), hope for success (r = .46), neuroticism (r = -.42), and fear of failure (r = -.45) (Schwarzer, 2009). Another study assessed the relationship among scores on the GSE scale with scores on items from numerous quantitative measures related to personality, affect, and life appraisal. The relationships between GSE scores and self-esteem, optimism, self-regulation, and quality of life were significant and positive. The relationships between GSE scores and anxiety and depression were significant and negative (Luszczynska, Gutiérrez-Doña, et al., 2005).

Rationale exists for comparing undergraduate nursing students' scores on the NASC-CDM scale with scores on the GSE scale to begin the establishment of convergent validity. The NASC-CDM scale is domain-specific in that its intent is to affirm the levels of two emotional barriers within a certain context; while making clinical decisions. A study which examined the relationship between general self-efficacy and domain-specific self-efficacy (i.e. physical activity self-efficacy), revealed that across all three culturally

diverse samples general self-efficacy beliefs were significantly positively related to domain-specific self-efficacy beliefs (Luszczynska, Scholz, et al., 2005).

Numerous empirical studies using the GSE scale within a wide variety of contexts continue to amass psychometric value of this brief self-report tool. For example, the measurement of GSE and its connection with coping was examined in two healthcare studies: one related to coping and social support after cancer surgery (Luszczynska, Mohamed, & Schwarzer, 2005) while the other related to GSE as a predictor of four sources of coping after tumor removal surgery (Schwarzer, Boehmer, Luszczynska, Mohamed, & Knoll, 2005). Other studies used the GSE scale to examine students and teachers. Student populations were studied within the context of the perceived levels of stress, levels of GSE, and psychological well-being among male high school students (Moeini et al., 2008) and within the context of interpersonal attribution and GSE among female nursing students (Zhang, Yuan, Zhang, & Lu, 2009). Teachers were studied within the context of measuring perceived GSE as a predictor of job stress and burnout (Schwarzer & Hallum, 2008). One final example of the use of the GSE scale is cited. A recent study measured the relationship between GSE and the prevalence and severity of posttraumatic stress disorder in persons impacted by hurricane Katrina (Hirschel & Schulenberg, 2009).

Generalized Anxiety Disorder-7 Scale

Generalized anxiety disorders (GAD) rival only depression as the most common mental health disorder influencing the lives of its victims. GAD effects can be seen in the loss of individual functioning, decreased work productivity, and enormous health care costs (Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007; Titov et al., 2009). The

GAD-7 scale was developed as part of a family of self-report surveys entitled the Patient Health Questionnaire (PHQ). Scales within the PHQ include two depression indices (one shorter and one longer), the GAD-7 scale, a 2-item version of the GAD-7 scale, and a scale to measure somatic symptom severity. Each of the scales that make up the PHQ may be used separately or in combination (Kroenke et al., 2007).

Development of the PHQ and the scales contained within it began in 1999 with an American and German team of instrument developers. The GAD-7 scale has solid psychometric properties established from an original sample of 2,740 patients from primary care clinics in the United States and was designed to reflect the symptom criteria for GAD within the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (Spitzer, Kroenke, Williams, & Lowe, 2006). A recent report confirmed the GAD-7 scale has been translated successfully into Spanish and has been tested successful within a Spanish speaking population (García-Campayo et al., 2009).

An advantage of the GAD-7 scale lies with its brevity; it is a unidimensional 7-item, 4-point Likert-type scale intended to screen patients for symptoms of GAD (Löwe et al., 2008; Spitzer, Kroenke, Williams, & Swinson, 2006). See Appendix J for the GAD-7 scale and permissions. Scores are obtained in summative fashion and range from 0 to 21 points. The GAD-7 scale is a tool for assessing symptoms related to four major anxiety disorders; GAD, panic, social anxiety, and posttraumatic stress disorder. Operating characteristics of the GAD-7 scale determined cut-points scores; “scores of 5, 10, and 15 represent mild, moderate, and severe anxiety symptoms”, respectively (Kroenke et al., 2007, p. 318). The GAD-7 scale is public domain and no cost was incurred for its use.

Although a relatively new instrument, psychometric testing of the GAD-7 scale has provided consistently acceptable reliability and validity assessments. Data from 5,036 Germans from the general population yielded an alpha coefficient of .89 (Löwe et al., 2008). While Cronbach's alpha for internal consistency reliability was cited in one study, results that presented different types of validity assessments and confirmed operating characteristics related to the GAD-7 were cited more frequently.

Convergent and divergent validity was demonstrated through comparisons with eight well-established anxiety and depression measures in a study conducted in the United States (Spitzer, Kroenke, Williams, & Lowe, 2006) and through comparisons with four well-established anxiety and depression measures in a study conducted in Germany (Löwe et al., 2008). Results from both inquiries provided continued confirmation of the validity of the GAD-7 scale. A study to establish psychometric properties and assess construct validity of the GAD-7 scale examined 5,036 subjects in the general population in Germany. Multi-group confirmatory factor analysis was used to test the unidemensionality of the GAD-7 scale. Results indicated factor solutions for the 7-item scale as unifactorial; goodness-of-fit index, $X^2 = 314.1$, $df = 14$, $p < .001$; factor loadings ranged from .76 to .90 (Löwe et al., 2008, p. 268). Blinded interviews with mental health practitioners to ascertain a GAD diagnosis were correlated with scores on the GAD-7 scale, thus substantiating evidence of criterion-referenced validity (Kroenke et al., 2007).

Operating characteristics of the GAD-7 scale provide evidence the instrument is highly effective in screening for GAD. Sensitivity, specificity, and likelihood ratios are commonly used to describe operating characteristics of quantitative measures used for screening purposes (Polit & Beck, 2008). Sensitivity of a screening tool describes its

ability to diagnose the condition correctly, whereas specificity describes its ability to screen-out correctly those without the condition. Likelihood ratios summarize the relationship between sensitivity and specificity; they reveal how much more likely it is that scores on the scale will be positive in those *with* the condition than in those without the condition (Polit & Beck, 2008).

One study that examined psychometrics of the GAD-7 scale revealed a sensitivity and specificity of .92 and .76 (95% confidence interval [CI]) respectively and a likelihood ratio of +3.8 (95% CI) was reached at a cut-point of $\geq$ 8 for GAD. The same study revealed a sensitivity and specificity of .89 and .82 (95% CI) respectively and a likelihood ratio of +5.1 (95% CI) was reached at a cut-point of $\geq$ 10 for GAD (Kroenke et al., 2007). An interpretation of these findings indicates those people with a score of $\geq$ 10 were diagnosed with GAD correctly 89% of the time. Further, the odds that a person has GAD is 5.1 times more likely if his or her score is $\geq$ 10. Haligren and Morton (2007) compared the operating characteristics of three brief anxiety measures commonly used within healthcare settings and found the GAD-7 had the best operating characteristics and most usefulness for GAD in primary care settings.

An empirical study to validate and standardize the GAD-7 scale was conducted with a non-American sample. However, generalizability to United States populations is argued. Developers of the GAD-7 scale cited demographic characteristics of the German study sample mirrored the characteristics of both the German and United States general population (Löwe et al., 2008). Therefore, it is appropriate to use the GAD-7 scale with United States samples.

Rationale exists for comparing undergraduate nursing students' score on the NASC-CDM scale with scores on the GAD-7 scale to assess convergent validity. Empirical inquiry is widespread in the arena of anxiety because disorders in this area are extremely common (Kroenke et al., 2007). Further, Skapinakis (2007) argues anxiety disorders are not only widespread but are also generally chronic in nature. In light of this information, it was anticipated that for this research, student nurses who exhibit higher anxiety arousal during the process of CDM will also exhibit higher scores on the GAD-7 scale.

Studies using the GAD-7 scale within different contexts provide supplementary psychometric support of this brief self-report tool. For instance, one study used the GAD-7 scale along with other measures to assess the interaction effects of age and gender differences on life-satisfaction. This study also examined to what degree depressive and anxiety symptoms are associated with life-satisfaction (Daig, Herschbach, Lehmann, Knoll, & Decker, 2009). In another study, the GAD-7 scale and a worry survey were used in a pre- and post-test format to examine the effectiveness of an online cognitive behavioral treatment program for people with diagnosed GAD (Titov et al., 2009). The prevalence and relationship between depression, anxiety, and gastrointestinal symptoms was studied in Germany using the GAD-7 scale as the measure to indicate anxiety severity (Mussell et al., 2008). One final example of the use of the GAD-7 scale is cited. A recent Italian study examined the prevalence and clinical implications of white-coat syndrome. The GAD-7 scale was used in the study to compare the incidence of anxiety with the incidence of white-coat syndrome (Mario et al., 2009).

Summary of Instrumentation

Student respondents in both phases of the study completed the newly designed NASC-CDM scale, the GSE scale, and the GAD-7 scale. Three versions of the survey package were constructed, each with the three scales in a different order. Rationale for the creation of three versions allowed for randomization of a version upon deployment to a nursing program; thus, diminishing the risk of intrinsic test bias (Rust & Golombok, 2009). All students within a single nursing program received the same version of the survey package. The three scales were assigned letters on separate pieces of paper (A = NASC-CDM; B = GSE; C = GAD-7) and then randomly selected to indicate which scale would be placed first in each of three versions. Results revealed version one placed the NASC-CDM scale first, version two positioned the GSE scale first, and version three situated the GAD-7 scale first. To avoid similar positioning of scales within the survey package, scales were ordered as follows. Table 2 indicates the position of the three scales within the survey package.

Table 2. Position of Three Scales within the Survey Package

Version of Survey Package	Position 1 of Scales within the Package	Position 2 of Scales within the Package	Position 3 of Scales within the Package
1	A	B	C
2	B	C	A
3	C	A	B

Each of the three versions of the survey package contained the same background color, font, and design format to maintain constant conditions for all participants. The use of radio buttons as opposed to a drop box format for items was maintained

throughout the survey package. Experts in online survey design posit that participants prefer a radio button format and are able to complete them more quickly than a drop box format (Couper, Tourangeau, Conrad, & Crawford, 2004). The format and design of the survey package remained the same for both testing phases.

It was anticipated that student respondents who experience lower levels of self-confidence with CDM in the clinical practicum environment would report lower self-confidence scores on the GSE scale. It was also anticipated that student respondents who experience higher levels of anxiety with CDM in the clinical practicum environment would report higher anxiety scores on the GAD-7 scale.

Procedure

Approval from Nursing Programs

Data collection for both pilot- and main-testing phases followed the same procedures. Nursing programs that met inclusion criteria were invited to participate in either the pilot- or main-testing phase of the study. Approval for the study was obtained from the IRB of the University of Nevada, Las Vegas (UNLV). See Appendix K for the IRB approval letter from UNLV and informed consent. Approval from the IRB of each nursing program in the accessible population was secured prior to subject recruitment. Each institutional IRB was contacted to identify their requirements to grant permission for participation in the research study. Requirements were submitted to each eligible nursing program as requested.

Figure 2 depicts the methodological process for the study. Important persons or entities are presented on the left side of the diagram and key components implemented by the researcher are listed on the right side of the diagram.

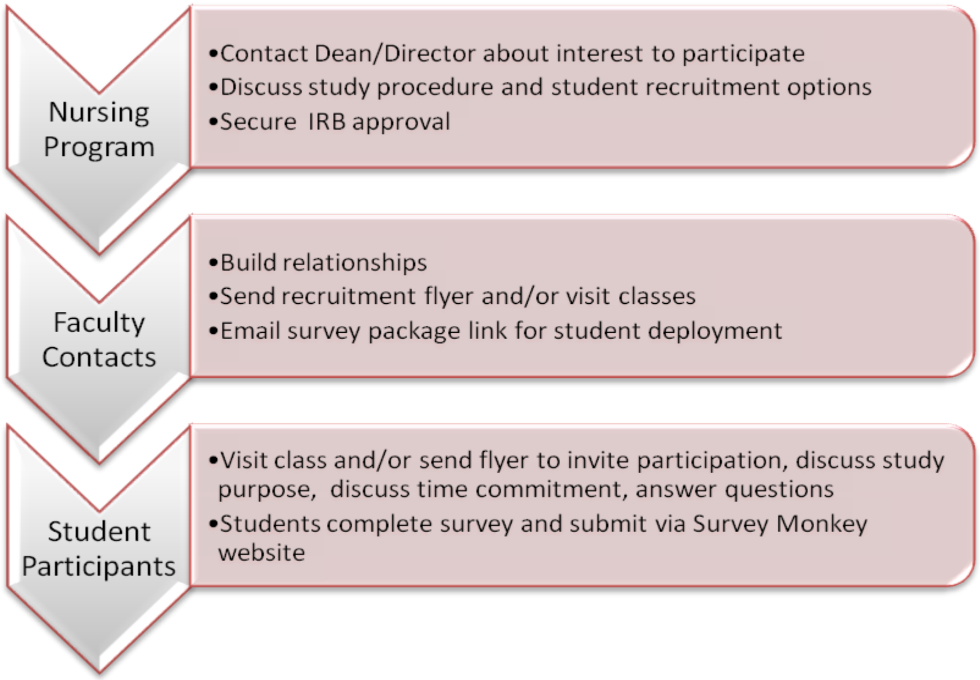


Figure 2. Methodological Flow Chart

Selection of Nursing Programs

One half of the 54 eligible nursing programs were randomly assigned and invited to participate in the pilot-testing phase. The remaining nursing programs were invited to participate in the main-testing phase. Completion of instrument testing in this fashion eliminated the risk of the same students completing the survey during the pilot- and again during the main-testing phase. The pilot-testing phase of the study commenced during the fall 2010 semester and the main-testing phase of the study occurred during the spring 2011 semester.

Recruitment of Student Participants

Deans/Directors of the selected nursing programs were contacted by phone or email. The intent of the study and time commitment for participants was described and the

program was invited to participate (Gable & Wolf, 1993). If consent to participate was confirmed by the Dean/Director, the researcher requested contact names of those faculty who lead/coordinate the final two clinical nursing courses within the curriculum. Student recruitment procedures were discussed with the Deans/Directors.

Key to student recruitment was the development of a relationship with faculty-contacts after initial contact was made by phone or email. The faculty-contacts could be the lead/coordinators of the final two clinical courses or a designate; they assisted with data collection. A contact letter was sent via email to the faculty-contacts. See Appendix L for contact letter for faculty-contact. After contact between the researcher and the faculty-contacts was established, a recruitment flyer was sent via email to the faculty-contacts to be distributed to and discussed with students. After faculty-contacts received the recruitment flyer the researcher initiated a phone call or email to the faculty-contacts to answer any questions or provide clarification about the study. This dialogue ensured that information to students was relayed properly and that questions asked by students were answered appropriately. The conversation took place prior to the distribution of flyers to students. Suggestions were made that the faculty-contacts distribute the recruitment flyer to students by sending it through course email and by printing the flyer and posting it in the classroom. Faculty-contacts were asked to discuss the flyer and answer questions posed by students. See Appendix M for the student recruitment flyer.

Additionally, if permission by the nursing program was obtained and schedules permitted, the researcher attempted to visit as many nursing programs as possible. Face-to-face contact and rapport building was completed in an attempt to improve response rates (Gable & Wolf, 1993). During the site visit the researcher informed participants of

the intent of the study, time commitment, encouraged students to voluntarily complete the online survey, and answered questions. Visits to campus were completed for student recruitment purposes only. No data collection occurred at the time of the site visits.

Survey Deployment and Completion

The researcher sent an email to faculty-contacts which contained a link to the online Survey Monkey (https://www.surveymonkey.com) survey package. Page one of the survey package contained the informed consent. This email was sent after recruitment flyer information had been discussed and all student questions were answered by the faculty-contacts or researcher. Faculty-contacts were asked to send the email with the survey package link to all students through their course email routing list or similar means to ensure *all* students in the course received the email. See Appendix N for the initial email to be sent to students that contains survey package electronic link.

One of three versions of the survey package was randomly selected for a single nursing program at the time of survey deployment to the faculty-contacts. The researcher did not meet with student participants either to distribute or collect hard-copy surveys. Student respondents completed the survey package fully online. The email containing the survey package link was deployed during the second half of the semester for both pilot-testing and main-testing phases. This deployment strategy ensured consistency of conditions and reduced maturity effects (Polit & Beck, 2008).

At one week and at three weeks after the initial deployment of the survey package link, faculty-contacts were sent two follow-up emails (Crawford et al., 2001). The first follow-up email at weeks one and three asked the faculty-contacts to remind their students verbally about the study. The second follow-up email at weeks one and three

contained the secure survey package link, reminded students about the intent of the study, and encouraged them to voluntarily participate. Faculty-contacts were asked to forward the second email onto their students via the course routing list or similar means to ensure *all* students received the reminder. See Appendix O for the two follow-up emails.

Therefore, eligible students received a verbal reminder from the faculty-contact at one and three weeks after the initial survey invitation, as well as received an email reminder from the researcher (forwarded by the faculty-contact) at one and three weeks following the initial survey invitation. Gall et al. (2007), Huck (2004), and Polit and Beck (2008) all argue the importance of follow-up with research subjects to improve response rates. The cutoff date for pilot-phase survey completion was Friday, December 10, 2010. The cutoff date for main-phase survey completion was Friday, May 6, 2011.

The accessible population, inclusive of both pilot- and main-testing samples was approximately 12,300 pre-licensure undergraduate nursing students. Response rates for online surveys tend to be low (Cantrell & Lupinacci, 2007; Polit & Beck, 2008). A 20% response rate was estimated which is consistent with literature related to online survey response rates (Crawford et al., 2001; Wright & Schwager, 2008). Consequently, the number of completed surveys submitted, inclusive of both samples, was anticipated to approach 2,460 nursing students. This estimated response rate would exceed the proposed sample size of 300 respondents for pilot-testing and 300 respondents for main-testing to ensure adequate sample size for multivariate statistical analysis.

Data Handling and Privacy of Participants

Survey data were stored in encrypted data bases within Survey Monkey (https://www.surveymonkey.com). In addition, the researcher purchased a second layer

of encrypted security through Survey Monkey. Only the principal investigator and the student investigator had password access to the survey platform account. The names of the nursing programs that participated in the study were not revealed and data could not be matched to any program. Hence, program confidentiality was maintained. Student participant data could not be matched to any nursing program and their responses were anonymous.

After the submission deadline for the pilot- and the main-testing phases of the study, data from Survey Monkey (https://www.surveymonkey.com) were downloaded into a spreadsheet software program and the Survey Monkey online files were permanently deleted at that time. Subsequently, the spreadsheet data were cleaned and uploaded into Statistical Package for the Social Sciences® (SPSS®) for Windows, version 17.0.0 with graduate package (SPSS, 2008). This statistical package was used for all statistical analysis. All research data were stored on a password-protected four gigabyte (4GB) Sandisk Cruzer USB flash drive during data analysis and interpretation. All research data and files related to this study will be stored on a password-protected computer in the principal investigator's locked office for a period of three years after study completion at which time all research data, files, and storage media will be permanently destroyed.

Informed Consent and Ethical Considerations

The informed consent document was provided to participants when they clicked on the electronic link provided in the email from the researcher, sent by the faculty-contacts. The informed consent was page one of the survey package. Participants began completion of the survey package by clicking on the word NEXT at the bottom of the informed consent. Student participants were informed that by clicking the word NEXT at

the end of the informed consent document and entering the survey package their informed consent was indicated.

The researcher obtained IRB approval from UNLV as well as IRB approval from each institution from which student participants were recruited. Faculty-contacts from the participating nursing programs were instructed to inform students their participation was voluntary and anonymous. In addition, participants were told their decision to participate or not participate in the study would have no effect on their progress or success in any of the nursing courses in which they were currently enrolled. This information was also included in the informed consent presented to participants when they clicked on the survey package link provided in the email sent to the faculty-contacts by the researcher.

The researcher did not have access to individual student email accounts or lists of students at any participating institution. Survey access information was deployed to students by the faculty-contacts for each participating program. Student respondents were told the purpose, procedure, and time commitment of the study and faculty-contacts or the researcher responded to questions.

Student respondents completed the online survey at a time and place convenient to their schedules. During the completion of the online survey, student respondents had the option to skip any item which might cause physical or emotional distress, pass over that item, and then proceed with survey completion. Participants also had the option to exit the survey at any time. The content of the NASC-CDM, GSE, and GAD-7 measurement tools were anticipated to result in little or no psychological distress to participants. The

researcher's contact information as well as contact information of the UNLV IRB was provided if participants had questions prior to, during, or after the study.

Data Analysis

Data analysis for pilot- and main-testing phases utilized univariate descriptive and multivariate techniques. Descriptive statistical analysis examined demographic data and composite scale scores from both pilot-testing and main-testing samples (Huck, 2004; Polit & Beck, 2008). Multiple linear regression analysis examined predictions between demographic data and scores on the NASC-CDM subscales (Munro, 2005; Pallant, 2007). The majority of data analysis was conducted in order to begin the assessment of psychometric properties of the newly designed NASC-CDM scale. Reliability coefficients were calculated for both pilot and main sample data. Content validity had been assessed previously. Item analysis, convergent assessment, and exploratory factor analysis comprised a large portion of data analysis for the research study and assisted in the assessment of construct validity of the NASC-CDM scale (Comrey & Lee, 1992; Rust & Golombok, 2009).

Descriptive Analysis

Descriptive statistical analysis of data included the use of frequency distribution tables to present categorical nominal and ordinal level demographic data; for instance, gender, ethnicity, and current work status as a nursing assistant. Histograms are appropriate for use with interval and ratio level data (Polit & Beck, 2008) and therefore were used to demonstrate such variables as age, composite scores on the self-confidence and anxiety subscales of the NASC-CDM scale, and composite scores on the GSE and

GAD-7 scales. The examination of the shape of the distributions for study variables using histograms provides information about skewness, modality, and kurtosis of data and therefore assists in ascertaining normality. Shapiro-Wilk tests to assess normality were conducted on data from both pilot- and main-testing phases. Because numerous statistical tests are sensitive to outliers, histograms and boxplots were also used to assess the presence of univariate outliers (Huck, 2004; Pallant, 2007). Univaritate outlier values were replaced with the largest value which was not an outlier (Munro, 2005; Tabachnick & Fidell, 2007).

Measures of central tendency and variability were calculated for the demographic variable age, as well as for composite scores on the NASC-CDM subscales, the GSE scale, and the GAD-7 scale. The use of standard deviation is beneficial not only because it indicates the average amount of deviation of scores around the mean but also because it indicates homogeneity or heterogeneity of the study population (Huck, 2004; Polit & Beck, 2008).

Missing data occur if items within the survey package are intentionally or unintentionally unanswered. Three issues are considered related to missing data: determine how much and the randomness of missing data, consider why data are missing, and decide how to handle missing data (Duffy, 2006). Different techniques are available to handle missing data. Techniques are often based on the randomness of the data that are missing.

The study used SPSS® Missing Values Analysis (SPSS, 2008) software to screen for patterns of missing data. The use of regression imputation with random error term and multiple imputation was considered to estimate missing data. Regression imputation with

random error term uses known data values and missing data to create regression equation that predict missing values (Musil, Warner, Yobas, & Jones, 2002). Multiple imputation uses both logistic regression and statistically generated data sets to create equations that estimate missing values. Data found to be missing not at random (MNAR) negates the use of regression with random error term and multiple imputations (Tabachnick & Fidell, 2007).

One easily implemented technique that has been used commonly in quantitative studies is group value replacement with the arithmetic mean or mode (Munro, 2005). Some experts argue value replacement should be used cautiously because it reduces variance of items and there are advanced statistical algorithmic options readily available to estimate missing data values. Statisticians advise the use of mean or modal value replacement for missing data only if limited amounts of missing data are found (Musil et al., 2002; Tabachnick & Fidell, 2007). Very small amounts of missing values during both phases of the study were replaced.

Multiple Linear Regression Analysis

Multiple linear regression (MLR) is a complex analysis based on correlation. MLR statistically establishes a prediction equation where the predictor variables are assigned a weight based on their relationship to the outcome variable (Huck, 2004; Munro, 2005). This statistical technique was used to examine relationships among theoretically important demographic variables and outcome variables, namely composite scores on the self-confidence and anxiety subscales of the NASC-CDM scale. For instance, variances in scores on the self-confidence subscale (outcome or dependent variable) may be

explained best by the contributions of age, current work status within healthcare, and prior college experience (predictor or independent variables) respectively.

MLR is a powerful multivariate technique and can be used with either categorical or continuous data; however, it is not especially robust to violations of assumptions. Adherence to MLR assumptions is important in order to generalize findings beyond the study sample. Assumptions of MLR are checked from the residuals generated when computing the test and include: linearity, representativeness of the sample, normality, and homoscedasticity (Munro, 2005; Pallant, 2007). Statistical experts argue adequate sample size is imperative when using MLR. They cite adequate sample size as: $N > 50 + 8m$ (where m is the number of predictor variables). MLR computations are sensitive to multivariate outliers and multicollinearity (Tabachnick & Fidell, 2007). The researcher tested each assumption, examined sample size, and assessed for outliers (univariate and multivariate) as well as multicollinearity prior to implementing MLR procedures. Violations of assumptions were handled by transforming variables or excluding cases as appropriate.

When computing MLR, predictor variables are entered into the regression equation using one of three different methods: standard, hierarchical, and stepwise. Standard MLR, the most common method, is used when the researcher considers all variables as equally important and thus enters all predictor variables into the equation simultaneously (Pallant, 2007). Hierarchical MLR methods are used when the researcher chooses in which order to enter predictor variables into the equation. Variables must not be chosen randomly for entrance into the equation. There must be sound theoretical rationale for their order of selection. The third method of selecting variables for regression is

stepwise. In stepwise MLR the researcher enters first the predictor variable with the highest correlation to the outcome variable and then enters additional variables in stepwise fashion based on a set of statistical criteria (Munro, 2005; Tabachnick & Fidell, 2007). Because the researcher concluded several demographic questions were most theoretically relevant to the outcome variable, the study utilized the standard MLR method for selecting variables.

Development, refinement, and testing of a newly designed quantitative self-report scale were purposes of this methodological study. Accordingly, the following section of the chapter addresses statistical techniques that provided support for the psychometric properties of the NASC-CDM scale. The section is divided into two primary areas paramount to psychometric theory – reliability and validity.

Reliability

Reliability theory cites that no quantitative measure is flawless, error influences observed scores. This premise is expressed using the equation: Observed score = true score $\pm$ error score (DeVon et al., 2007). The less error in scores the more reliable the instrument. In other words, reliability is the consistency or dependability with which the instrument measures the intended affective construct for a specified sample. A commonly referenced formula for reliability is:

$$\text{Reliability} = 1 - \frac{V_E}{V_{Total}}$$

Because perfect reliability is represented as 1, the reliability equals 1 minus the proportion of error variance to total variance of scores (Kerlinger, 1973).

The reliability of an instrument can be assessed using several methods: internal consistency, temporal stability, and parallel forms. Reliability of the self-confidence and anxiety subscales of the NASC-CDM scale was assessed using internal consistency reliability; the Cronbach's alpha (Cronbach, 1951). Cronbach's alpha is based on inter-item correlations and is the most commonly reported evaluation of internal consistency for quantitative measurement instruments. The internal consistency implies items within a scale are homogeneous in nature; that is they have a strong relationship to the latent variable under study (DeVellis, 2003).

Several factors influence internal consistency reliability, namely sample characteristics and sample size, homogeneity of the item content, and number and response format of items (Gable & Wolf, 1993). As recommended by psychometric experts, both pilot- and main-testing samples used to test the NASC-CDM scale were drawn from the same population; undergraduate nursing students in one of their final two clinical nursing courses. Attempts were made to obtain six to ten student participants per item on the scale during both pilot- and main-testing phases. Items on the NASC-CDM scale share similar content meaning and are a subset of the possible universe of items within the domain of CDM as deduced through comprehensive literature review. There were 41 items on the pilot version of the NASC-CDM scale. The response format is a 6-point Likert-type format. Scale development experts posit scales with higher numbers of items generally have higher reliability coefficients (Gable & Wolf, 1993; Waltz et al., 2005). Comrey (1988) cites a scale with at least 20 items should obtain adequate reliability coefficients.

Scale development experts note .70 is a good coefficient alpha for a newly developed affective scale (DeVellis, 2003; Gable & Wolf, 1993; Rust & Golombok, 2009). It is generally accepted “the higher the coefficient, the more stable the measure” (Polit & Beck, 2008, p. 454). Because the two subscales within the NASC-CDM tool measure two different but related affective constructs, it is appropriate to assess Cronbach’s alpha for each subscale individually rather than computing one alpha coefficient for the entire NASC-CDM scale.

During analysis of internal consistency reliability, correlations of items with one another were examined to observe the effect on alpha coefficient. Items which reduced alpha when retained were reviewed or reduced; items which improved alpha when retained remained in the scale (DeVellis, 2003; Polit & Beck, 2008). The use of this strategy assisted in reduction of items during analysis of data from the pilot-testing sample. This process was repeated during analysis of data from the main-testing sample. Also, an assessment of patterns of correlation among items between pilot-testing data and main-testing data were completed.

The assessment of temporal stability is another means of estimating reliability, but is recommended only when the construct under study is stable over time (DeVon et al., 2007). Because the emotional barriers of self-confidence and anxiety that influence CDM are affective concepts with a potential for large variability and because natural progression through the nursing program, student maturation, and exposure to clinical situations where CDM occurs will affect students’ perceptions of their self-confidence and anxiety, test-retest reliability assessment was not appropriate. The use of parallel

forms to establish reliability was not appropriate for purposes of this study (Rust & Golombok, 2009).

Validity

Validity of the NASC-CDM scale was examined in a number of ways. Previously discussed activities undertaken during the early phases of instrument development were focused on content validity and face validity. Procedures such as inter-item and item-total correlation, convergent assessment, and exploratory factor analysis (Munro, 2005; Tabachnick & Fidell, 2007; Waltz et al., 2005) were used to build evidence of construct validity for the pilot tool and the revised tool. These assessments assisted in determining needed revisions to the tool from pilot-testing data results and for validating the revised tool from main-testing data results.

Content Validity and Face Validity

The focus of content validity is primarily qualitative and determines whether the pool of items for inclusion in the scale is representative of and relevant to the content domain (DeVellis, 2003; Waltz et al., 2005). Content validity was assessed in several ways, including a widespread review of the literature and evaluation of items by a panel of content experts. A review of items for readability and clarity by registered nurses and student nurses, some with English as a second language, was also done during the early stages of instrument development. A comprehensive discussion of the process utilized to enhance content validity of the NASC-CDM scale is presented earlier in this chapter.

Item Analysis

Item analysis can be conducted to reveal the relationship of one item with another item (inter-item correlation) and also to examine the relationship of one item with the

total scale (item-total correlation). Opinions differ about item analytic findings. Some psychometricians posit that correlations between .30 and .70 are reasonable to expect but correlations of greater than .70 may indicate redundancy of items (Munro, 2005; Waltz et al., 2005) while others argue correlations between .30 and .50 are acceptable. Items with correlations of less than .20 should be considered seriously for reduction (Gable & Wolf, 1993). This research study used the criterion of item correlations between .30 and .70 to review and reduce items accordingly.

Convergent Assessment

Another means of accumulating support for the construct validity of a new scale is through the use of convergent techniques. Like numerous other techniques related to instrument validity, convergent validity is based on correlation and is an assessment of the relationship between tools that measure theoretically similar constructs (DeVellis, 2003). During the process of instrument development and testing, the new scale should be subjected to comparisons with like (convergent validity) and unlike (discriminant validity) constructs (Huck, 2004).

A correlation of scores on the psychometrically sound GSE scale and GAD-7 scale with scores on the newly developed NASC-CDM scale provided assessments of convergent validity (DeVon et al., 2007; Polit & Beck, 2008) for the two subscales of the NASC-CDM instrument. For instance, a student with higher scores on the anxiety subscale of the NASC-CDM tool should theoretically obtain higher scores on the GAD-7 which screens for generalized anxiety disorders. Findings similar to those in the previous example would lend support for the convergent validity of the new tool tested in the study. The research study did not examine discriminant validity.

Though psychometric experts differ in their opinion about an adequate correlation coefficient to indicate convergence, some agree that *r* greater than or equal to .50 is acceptable for newly designed instruments. Sample size does influence *r* (Huck, 2004). In addition to the criterion *r* greater than or equal to .50, this study examined data results for positive correlation coefficients as well as statistical significance (Gall et al., 2007); thus providing evidence of convergent validity between the two established scales and the two newly designed subscales on the NASC-CDM tool. This strategy to assess convergent validity was used during both pilot- and main-testing phases of the study.

Exploratory Factor Analysis

Exploratory factor analysis (EFA) comprised a large portion of data analysis for the pilot and main samples and was used to enhance construct validity. EFA is commonly used during instrument development and is best applied when there are groups of variables that relate strongly to several relatively independent constructs (Comrey, 1988). The family of factor analytic techniques is based primarily on correlation, variance, matrix algebra, and coordinate geometry. Although EFA is a complex multivariate family of statistical techniques some components are practical and subjective, not statistical in nature. Subjective pieces of EFA include decisions about the number of factors identified, rotational schemes chosen, and factor labels placed (Comrey & Lee, 1992).

There are several main purposes of EFA. One purpose is to determine underlying factors or components for a set of variables. Another purpose is to provide a means of explaining the amount of variance among variables and their associated factors. The final

purpose of EFA is to identify variables that covary with similar items and likely define some meaningful construct.

Data assumptions of EFA are similar to other techniques related to correlation. EFA assumptions include: adequate sample size, data are interval level or treated as interval level, items correlate reasonably to at least one other variable, normality, and linearity. EFA is sensitive to univariate and multivariate outliers (Munro, 2005; Tabachnick & Fidell, 2007). Violations of assumptions were handled by excluding cases as appropriate.

Opinions about adequate sample size to obtain stable factor solutions during factor analytic procedures differ widely. Some psychometricians argue samples of greater than 500 are preferable for stable factor solutions (Comrey & Lee, 1992); others note it is unnecessary to secure samples of more than 100 subjects when using factor analytic techniques for instrument development (Sapnas & Zeller, 2002). One scale development expert notes samples of 200 subjects are adequate for a scale of approximately 40 items; however, a sample of 400 subjects improves factor structure (Comrey, 1988). Another team of investigators argue there is no set rule for sample size in relation to stable factor solutions. Their empirical inquiry using different sample sizes revealed that variables within the study, study design, and level of communality all played roles in adequate sample sizes. Overall, samples of less than 100 resulted in nonconvergent solutions but samples of 200 to 400 were adequate under all conditions tested (MacCallum, Widaman, Zhang, & Hong, 1999).

Two tests assess the suitability of data for EFA, Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. Bartlett's test of sphericity should reach a significance of $p < .05$ and the KMO index should be $> .6$ for data to be

considered appropriate for EFA computations (Pallant, 2007; Tabachnick & Fidell, 2007). Composite scores on the NASC-CDM, GSE, and GAD-7 scales were considered continuous outcome variables (Gall et al., 2007). Assumptions of EFA were tested prior to the initial EFA run. Bartlett's test and the KMO index were examined and tests were run to identify outliers. Sample sizes of at least 300 student participants were planned for both pilot- and main-testing phases of the study.

There are five primary steps of EFA. Each of these steps was implemented during both pilot- and main-testing phases of the study. The first step of EFA is the consideration of which EFA method to use. Principal components analysis (PCA) and Common factor analysis (CFA) are two common methods of EFA. PCA is commonly used and easily interpreted when used for the initial run of data (Comrey & Lee, 1992; Tabachnick & Fidell, 2007). Additionally, the use of PCA for the initial data run is justified because all items on the scale are assumed to be reliable. A key premise of PCA is that error and unique variance is used in the computation of factors. Whereas a key premise of CFA is that only shared variance among items is used in the computation of factors (Ford, MacCallum, & Tait, 1986). The initial run of data in the research study utilized PCA (Rust & Golombok, 2009).

During the second phase of EFA the researcher decides the number of factors to extract. Pallant (2007) and Tabachnik and Fidell (2007) discuss the use of Kaiser's criterion and the scree plot when determining the number of factors to extract. Kaiser's criterion (Kaiser, 1960) for the extraction of factors cites factors are retained when eigenvalues of greater than 1 are obtained after the factor analysis run. Generally, the use of Kaiser's criterion works well with PCA where unities are placed in the main diagonal

cells (Ford et al., 1986). Because the eigenvalue is a notation of the amount of total variance accounted for by that factor, the larger the eigenvalue the more important the factor. Eigenvalues of less than one are often attributed to error. Consequently, factors related to values less than one should not be extracted (Rust & Golombok, 2009).

Cattell's scree plot (Cattell, 1966) which plots eigenvalues against successive factor numbers, is also used to determine the number of factors to extract. Factors with higher eigenvalues are depicted vertically and factors with lower eigenvalues are seen as scree or rubble, depicted horizontally after a notable elbow on the graph. Factors are retained that lie above the metaphorical elbow on the grid (DeVellis, 2003; Munro, 2005). This research used Kaiser's criterion and Cattell's scree plot for the determination of the number of factors to extract.

The third step of EFA relates to the selection of a method of rotation. Based upon the graphic depiction of factors-in-rotated-space with the initial PCA run, a rotational scheme was chosen. Munro (2005) cites by using rotation, distinct patterns emerge in the factor matrix, certain items go with certain factors and others do not. Unrotated data are uninterpretable. Rotation allows the researcher to view the relationship among variables from different vantage points, making connection appear more readily (DeVellis, 2003).

When the factor matrix cluster show unrelated patterns an orthogonal (varimax) rotation is utilized in a subsequent run (Kaiser, 1958). When the factor matrix patterns appear not to be independent then oblique rotation is implemented. Oblimin rotation is the most commonly used method of oblique rotation (Tabachnick & Fidell, 2007). Comrey and Lee (1992) recommend data should be run using orthogonal rotation toward a simple solution prior to running oblique rotation. Gable and Wolf (1993) recommend

instrument developers run both varimax and oblique rotations to examine which produces more stable meaningful solutions. Some factor analytic experts advocate the use of oblique rotation because it most accurately represents complex real-world variables (Ford et al., 1986). For the study, the initial PCA run used a varimax rotational scheme. However, because of the complex iterative interdependent nature of the process of CDM, it was likely items on the NASC-CDM scale would not be independent of one another. The interdependent nature of items necessitated the use of an oblique rotational scheme during subsquent runs.

The fourth step assesses factor loadings. Factor loadings are examined upon completion of orthogonal and oblique data runs. The loading or correlation coefficient represents the degree of intercorrelation between items on the scale. Though cut off values for factor loadings differ among studies, .40 generally consitutes a substantial loading on a factor (Ellenbecker & Byleckie, 2005; Gable & Wolf, 1993; Gall et al., 2007). Several tables related to factor loadings are contained in the SPSS® output (SPSS, 2008). To most accurately interpret how substantially items load on a particular factor, information within the pattern matrix as opposed to the structure matrix is used (Pallant, 2007). The study used the cut off value for factor loadings of less then .40 to warrant review, reduction, or revision of items on the NASC-CDM scale.

The final phase of EFA comprises the determination of label names for factors (Munro, 2005; Pallant, 2007). The labels assigned to factor solutions are determined by the researcher and are based on the content of the items which comprise the factor. Researchers must use caution and be open to indentifying labels for factor solutions they did not expect to find (Ford et al., 1986). Factor labeling is a qualitative, somewhat

subjective process. One means of reducing subjectivity when labeling factors is for an independent panel to examine factor solutions and provide suggestions of labels (Ford et al., 1986). Once factor loadings were examined and stable factor solutions reached, factors were labeled. To maintian the highest level of objectivity when labeling, the researcher and a panel of five doctorally prepared nurses, independently reviewed factor structures and assigned labels. The final labels that thematically summarized each factor were ultimately assigned by the researcher.

Factor analytic procedures have statistical as well as pragmatic goals. Two statistical goals of EFA are to uncover the simplest factor solution with as few a number of factors as possible and to explain as much variance as possible from the data (Munro, 2005; Tabachnick & Fidell, 2007). EFA is intended to reduce a set of variables to a few factors by combining variables (i.e. items within a scale) that are correlated with each other (Gall et al., 2007; Tabachnick & Fidell, 2007).

Pragmatic goals are important when EFA is used during instrument development. The practical goals of factor analysis include: identifying stable factors, determining which items relate to which factors, screening items for poor fit, revising and reducing items as appropriate, and re-testing the tool (Comrey & Lee, 1992; Tabachnick & Fidell, 2007). In the study, EFA was utilized to analyze data from the sample that tested the pilot version of the NASC-CDM scale. Factor analytic techniques used with data from the pilot-testing phase determined factor solutions for the tool and identified which items related to those factors. It was anticipated that factors achieved during pilot-testing EFA would relate to the content domains of CDM determined by the researcher. Items with poor loadings were revised or reduced.

Participants in the main-testing phase completed the revised tool. EFA procedures were again completed. Main-testing sample data were compared with pilot-testing data to confirm or dispute initial factor solutions and item loadings. It was anticipated that factor solutions attained during main-testing would be similar to those achieved during pilot-testing. Items were again revised or reduced after data analysis from the main-testing phase of the study.

Chapter Summary

Chapter three examined the methodological process undertaken for the study. Three research questions were noted as a means of testing the NASC-CDM scale. An introduction to psychometric theory was presented which included an overview of key terms such as reliability and validity. The comprehensive process of instrument development was discussed. Methods of sampling and data collection were explicated. The full procedure for collecting data was cited and a flow chart was presented to summarize this procedure. Data analysis for the study included descriptive as well as multivariate techniques. Statistical techniques were used to build evidence for the reliability and validity of the NASC-CDM scale. The subsequent chapter discusses research findings from both pilot- and main-testing phases of the study.

CHAPTER 4

FINDINGS OF THE STUDY

The purpose of this chapter is to present results for both the pilot- and main-testing phases of the study. Pilot-testing to preliminarily assess the reliability and validity of the Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM) scale took place during the fall 2010 semester. Main-testing of the revised scale took place during the spring 2011 semester. Two independent samples of pre-licensure undergraduate nursing students were used to test and validate the scale.

This chapter includes six sections for the pilot-testing phase and five sections for the main-testing phase of the study. Nursing program participation and factors which influenced it is explored in the first section. Nursing student participation, response rate, and missing data are discussed in section two. Characteristics of the undergraduate nursing student samples are examined using descriptive and univariate statistics in the third section of the chapter. Information related to the three research questions designed for the study is examined in the fourth section of the chapter. Predictive relationships between demographic variables and outcome variables using standard multiple linear regression (SMLR) are described in part five. An analysis of six questions asked to help refine the NASC-CDM scale is contained in the sixth and final section of the chapter (for the pilot-testing phase only).

Results from the Pilot-Testing Phase

Fifty-four nursing programs within the states of Delaware, Maryland, New Jersey, and Pennsylvania met criteria for inclusion in the study. Twenty-seven nursing programs

were randomly assigned for participation in the pilot-testing phase of the study. The IRB from each eligible institution was contacted and inquires were made about requirements for approval to recruit undergraduate nursing students to voluntarily complete an anonymous online survey package. Information was submitted accordingly.

Nursing Program Participation

Randomly assigned institutions for the pilot-testing phase included 15 baccalaureate degree and 12 associate degree nursing programs. However, the final number of nursing programs was comprised of six baccalaureate degree and six associate degree programs. Three primary factors influenced the final number of nursing programs that participated in the pilot phase: IRB approval, Dean/Director approval, and faculty-contact willingness to participate.

After submission and repeated follow-up by the researcher over a period of three months, the IRB offices from *four* institutions did not respond to the researcher regarding the submitted IRB application and packet of supporting documents. The remaining 23 institutions either granted IRB approval for the recruitment of nursing students or noted they had no formal IRB process. Those institutions with no formal IRB approval process instructed the researcher to secure a willingness-to-participate statement from the Dean/Director of nursing and subsequently work in collaboration with the department of nursing to recruit students.

The second factor that influenced the final number of nursing programs in the pilot-testing phase was a lack of response from several Dean/Directors of eligible nursing programs. Numerous attempts were made to contact these administrators by email and telephone. After four attempts to contact each Dean/Director over a period of three

months, nonresponders from *five* programs were eliminated from the study. The remaining 18 nursing administrators provided names and contact information for faculty who coordinated the final two clinical courses in the curriculum. These faculty members were contacted by the researcher about their willingness to assist with data collection.

Faculty unwillingness to assist with data collection was the third issue that influenced the final number of nursing programs participating in the pilot phase. After several attempts to contact faculty whose names were provided by their Deans/Directors, nonresponders from *six* programs were eliminated from the study. The remaining 12 nursing programs were included in the study. Table 3 outlines the total number of nursing programs that agreed to participate in the pilot phase of the study.

Table 3. Nursing Programs Agreeing to Participate, Pilot

State	Baccalaureate Degree	Associate Degree	Potential Student Numbers
Delaware **(None)**			
Maryland		1	99
New Jersey **(None)**			
Pennsylvania	6	5	1,149
Totals	**6**	**6**	**1,248**

Faculty-contacts who responded affirmatively about their willingness to participate were sent an IRB approved letter via email which outlined the intent of the study and informed faculty members of their role with data collection. Throughout the fall 2010 semester the researcher worked closely with faculty-contacts about the feasibility of campus visits, the deployment of the survey link, forwarding email reminders, and reminding students to participate in the study.

Nursing Student Participation and Survey Response Rate

Researchers argue response rate for online surveys is often appreciably lower than for paper-pencil surveys completed onsite (Cantrell & Lupinacci, 2007; Polit & Beck, 2008). A 20% response rate was estimated for the study. Attempts were made to visit as many eligible nursing classes as possible during the fall 2010 semester. Rationale for campus visits was to discuss the intent of the study, invite students to participate, answer questions, and improve response rate (Gable & Wolf, 1993).

Once permission from nursing departments was obtained, the researcher made 14 visits to eligible nursing classes from nine programs. Email invitations with the survey package link were deployed to students during the second half of the fall 2010 semester. The invitation with link was sent by the researcher to the faculty-contacts who forwarded it onto students via the class routing list or other means to ensure *all* students received the invitation. No data were collected during visits to campuses. A personal schedule was made by the researcher to ensure important information was sent in timely fashion to each participating faculty member. For instance, the recruitment flyer was sent to faculty-contacts about one and a half weeks prior to the email invitation and survey package deployment. Reminder emails were sent to faculty-contacts at approximately one-week and three-weeks after the initial invitation. For those schools where the researcher made a face-to-face visit, the survey deployment date corresponded with the classroom visit date. Rationale for this strategy was that proximity of time between introduction to the study and survey deployment would improve response rate.

A total of 1,248 students from 12 nursing programs were invited to participate in the pilot-testing phase. The survey closed on December 10, 2010 at 5:00 p.m. At the time of

the download of data from Survey Monkey (https://www.surveymonkey.com) into the spreadsheet software package, 382 respondents completed the survey package. Response rate for the pilot phase was 30.6%. This exceeded the estimated 20% response rate.

Study design warranted the exclusion of LPNs. It was hypothesized that nursing students licensed as LPNs have experience with CDM and may have inherently different levels of self-confidence and anxiety in the clinical practicum setting than their pre-licensed student counterparts (Faulk et al., 2008; Unruh, 2003). Thus, LPNs were excluded from the study. Thirty-three LPNs were deleted from the dataset immediately upon the download from the survey platform. This resulted in 349 remaining surveys.

The Missing Values Analysis (MVA) software (SPSS, 2008) was used to determine patterns of missing data within the dataset. The amount of missing data was calculated as 10.8%. Results indicated data were missing not at random (MNAR); therefore, imputations and estimated value replacements were not utilized (Tabachnick & Fidell, 2007). Data were MNAR because 46 student respondents completed only the demographic questions within the survey package. Although these respondents were not deleted from the dataset, they were excluded from data analysis. Additionally, minimal sporadic amounts of data values were missing across variables which were replaced with the arithmetic group mean for that item. Total scores on the scales were normally distributed and thus, the mean, median, and mode were similar values. Statistical experts note value replacement should occur only when very small amounts of data are missing (Tabachnick & Fidell, 2007). A number of respondents, either inadvertently or intentionally, did not complete one or several items within the survey package. The use

of mean replacement for missing values replaced less than 1% of survey package data. The number of suitable surveys utilized for data analysis was 303.

Sample Characteristics

A convenience sampling framework was used for this study. A sample of undergraduate nursing students in one of their final two clinical nursing courses completed the pilot-version of the scale during the fall 2010 semester. The sample (N = 349) completing the NASC-CDM scale consisted of pre-licensure undergraduate baccalaureate (BSN) and associate (ADN) degree nursing students from two states in the northeastern portion of the United States. Forty-six students did not complete the entire survey package while 303 students completed the full survey package.

Descriptive statistics were used to examine the characteristics of those students who completed the full survey package and those who completed demographic questions only. A total of 111 (36.6%) BSN students and 192 (63.4%) ADN students completed the survey package. The mean age of participants who completed the survey was 29.16 $\pm$ 7.5 with a range in years from 20 to 45. Furthermore, 23 survey completers were greater than 45 years of age. In addition to sociodemographic questions, students were asked several questions related to their nursing program, work experience, and previous college experience. See Appendix P for characteristics and comparisons of the pilot-sample completers and noncompleters.

Parametric and nonparametric statistics were used to compare students who completed the survey package with those who did not to see if the groups were inherently different. Although the Shapiro-Wilk test for normality of age was statistically significant, indicating a violation of normality, both skewness and kurtosis did not exceed

± 1 (Munro, 2005). For this reason, preliminary analysis assumed normality for age for the two independent groups. Table 4 indicates assessment of the normality assumption for age.

Table 4. Assessment of Normality for Age, Pilot

Group	Shapiro-Wilk	Skewness	Kurtosis
Complete Surveys (n = 303)	.89(271), $p < .001$	.63	-.93
Incomplete Surveys (n = 46)	.86(42), $p < .001$	.86	-.46

An independent samples *t*-test was used to compare the groups of survey completers and noncompleters with regard to age. The chi-square for independence (Pallant, 2007) was used to compare survey completers and noncompleters with regard to a number of categorical sociodemographic variables when no expected frequency per cell requirement was violated. Likelihood ratio was used when expected cell frequencies fell below five. Fisher's exact test was computed instead of chi-square for independence or likelihood ratio for two-by-two tables that violated the expected frequency per cell requirement (Munro, 2005).

Results of the comparison indicated that completers and noncompleters were statistically different in several ways. One difference between the groups related to the type of program in which they were enrolled. Students who completed the full survey package were more often enrolled in ADN programs (63.4%) whereas students who did not complete the full survey package were more often enrolled in BSN programs (63%). Another significant difference was related to the format of the nursing program students

attended. More survey completers (25.1%) than noncompleters (13%) were enrolled in year round nursing programs. More survey noncompleters (17.4%) than completers (5.9%) were enrolled in an accelerated program format.

A third difference was related to the current semester of nursing in which students were enrolled; however, the practical significance of this finding is questionable. The researcher speculated respondents misunderstood this question. It was believed responses varied widely because students interpreted the question to mean the TOTAL semesters of college in which they had been enrolled, instead of the current NURSING semester in which they were enrolled. The word nursing was capitalized to enhance question clarity for the main-testing phase of the study.

The final two sociodemographic questions asked students about the difficulty level and course letter grade of the current clinical nursing course(s) in which they were enrolled. The nonparametric Spearman *rho* correlation was used to examine the correlation of course difficulty with course grade (see Appendix P). The Spearman *rho* was appropriate because the relationship between two rank-order variables was examined (Munro, 2005). Numerous statistically significant findings were revealed. However, the practical significance of these findings is questionable because it was posited students misunderstood the questions. Upon inspection of the data, the researcher believed that instead of indicating the level of difficulty and letter grade for the current CLINICAL NURSING COURSE in which the students were enrolled, students indicated the difficulty and grade of each CLINICAL ROTATION within one course. For this reason, results from the analysis of these data were not used for further analysis. The phrase

clinical nursing course was capitalized to enhance question clarity for the main-testing phase of the study.

Measures of central tendency and variability were calculated for composite scores on the subscales of the NASC-CDM, the General Perceived Self-Efficacy (GSE), and the Generalized Anxiety Disorder-7 (GAD-7) scales for the pilot sample. Table 5 summarizes these results. Interpretations of these findings are discussed in chapter five.

Table 5. Results of Composite Scores for Four Scales, Pilot

Scale Name	Number of Items	Response Option	Scoring Range	Mean Score, (SD) [a]
NASC-CDM, Self-Confidence (n = 291)	41	6-point Likert	41 - 246	161.42 (± 36.73)
NASC-CDM, Anxiety (n = 293)	41	6-point Likert	41 - 246	106.24 (± 32.72)
GSE (n = 300)	10	4-point Likert	10 – 40	31.84 (± 3.67)
GAD-7 (n = 299)	7	4-point Likert	0 - 21	9.09 (± 5.55)

a, SD = standard deviation

Results Related to the Research Questions

The purpose of the pilot-testing phase of the study was to test and begin the establishment of psychometric properties for the newly designed self-report, 6-point Likert-type scale entitled the Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM) scale. The majority of data analysis was completed to answer the three research questions which framed the methodology of the study (see page 42). Two research questions were related to the establishment of the NASC-CDM scale's

validity. One research question was related to the establishment of the scale's reliability. Data from 303 undergraduate nursing students who completed the full survey package were included in analyses.

Normality and Linearity Assumptions

Because the assumptions of normality and linearity are vital for a number of statistical analyses, the process of their assessment is discussed here. Preliminary analyses of composite scores on the NASC-CDM, Self-Confidence (NASC-CDM, SC) subscale scores, the NASC-CDM, Anxiety (NASC-CDM, A) subscale scores, the GSE scale total scores, and the GAD-7 scale total scores were completed to test the assumptions of normality and linearity. Univariate outliers were identified by examining histogram and boxplot graphs: Outlier values were replaced with the largest data value which was not an outlier (Munro, 2005; Tabachnick & Fidell, 2007). Although several results of the Shapiro-Wilk test for normality were statistically significant, indicating a violation of normality, both skewness and kurtosis did not exceed $\pm$ 1. Based on these results, data were assumed to be normally distributed. Table 6 summarizes assessment of normality after values for univariate outliers were replaced.

Table 6. Assessment of Normality for Total Scores on Scales, Pilot

Scale Name	Shapiro-Wilk	Skewness	Kurtosis	Initial Outliers
NASC-CDM, SC (n = 291)	.99(291), p = .13	-.11	-.17	1
NASC-CDM, A (n = 293)	.98(293), p = .001	.39	.09	4
GSE (n = 300)	.98(300), p < .001	.14	-.42	7
GAD-7 (n = 299)	.96(299), p < .001	.32	-.86	0

The assumption of linearity was assessed using scatterplots (Munro, 2005; Pallant, 2007). A scatterplot was created for scores on the NASC-CDM, SC with scores on the GSE scale. Another scatterplot was created for scores on the NASC-CDM, A with scores on the GAD-7 scale. Examination of the swarm indicated linear relationships between the variables. The following three sections address each of the research questions.

NASC-CDM Scale as a Valid Measurement Tool

The first research question addressed in the study was: Do the self-confidence and anxiety subscales of the NASC-CDM scale provide a valid measure of undergraduate nursing students' perceptions of self-confidence and anxiety levels during the process of CDM?

Exploratory factor analysis (EFA) and item analysis were conducted to begin the initial assessment of construct validity for the subscales of the pilot version of the NASC-CDM scale. Results of EFA techniques allowed the researcher to revise and reduce items based on complex statistical techniques that incorporate the concepts of matrix algebra, variance, correlation, and coordinate geometry (Comrey & Lee, 1992). EFA procedures were run separately for each NASC-CDM subscale, self-confidence and anxiety.

A number of statistical assumptions were considered prior to the initial EFA procedure: level of data, normality, linearity, inter-items correlation, outliers, and sample size. The continuous composite scores on the NASC-CDM, SC and NASC-CDM, A subscales were deemed interval level data for the purpose of data analysis (Gall et al., 2007; Polit & Beck, 2008). Preliminary analyses of the dataset were conducted to test the assumptions of normality and linearity. Based on assessments of normality from the section above, data were assumed to be normally distributed. Linearity was assessed

through visual inspection of the normal probability plots (P-P plots) and scatterplots within the residual statistics of the linear regression model. Several random spot-checks of the scatterplots of two items on the subscales were also assessed for linearity. Residual normal P-P plots revealed a reasonably straight line while scatterplots resembled rectangular shapes (Tabachnick & Fidell, 2007).

There were 41 items on the pilot version of the NASC-CDM scale; therefore the inter-item correlation analyses created a 41 by 41 correlation matrix for scores on each subscale. Inter-item correlations were reviewed to visualize substantial relationships, .30 and above (Munro, 2005; Rust & Golombok, 2009), and to ensure the suitability of data for factor analytic procedures. Based on results of item analysis, no items were reduced prior to factor analysis initiation.

EFA is sensitive to multivariate outliers, thus these must be identified and removed prior to implementation. Multivariate outliers were identified using linear regression analysis and locating the maximum value for Mahalanobis distance from the residual statistics (Pallant, 2007; Tabachnick & Fidell, 2007). The maximum value for Mahalanobis distance (p = .001) for the NASC-CDM, SC subscale was 130.66 (critical value = 73.40(41), n = 291). Twenty-three cases exceeded the critical value for Mahalanobis distance and were excluded from EFA runs for the self-confidence subscale. The maximum value for Mahalanobis distance for the NASC-CDM, A subscale was 135.88 (critical value = 73.40(41), n = 293). Thirty-five cases exceeded the critical value for Mahalanobis distance and were excluded from EFA runs for the anxiety subscale. The final number of cases used in factor analysis runs for the self-confidence and anxiety subscales was 268 and 258 respectively.

Sufficient sample size was assumed at between six and ten subjects per 41 items on the NASC-CDM scale, which is consistent with scale development and factor analytic experts (Comrey, 1978; Gable & Wolf, 1993; Sapnas & Zeller, 2002). The subject number to item number ratio equaled 7.39 if the complete dataset of 303 participants had been used for EFA procedures. After exclusion of multivariate outlier cases the subject number to item number ratio for the self-confidence and anxiety subscales was 6.54 and 6.29 respectively.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity examine the suitability of data for factor analysis (Comrey & Lee, 1992). Table 7 reveals results of the KMO and Bartlett's tests for the self-confidence and anxiety subscales. Results indicated data were appropriate for factor analytic procedures.

Table 7. KMO and Bartlett's Test Results, Pilot

Scale Name	KMO Measure of Sampling Adequacy [a]	Bartlett's Test of Sphericity [b]
NASC-CDM, SC	.98	*df* 820, $p < .001$
NASC-CDM, A	.98	*df* 820, $p < .001$

a, Should exceed .60
b, Should reach significance, $p < .05$

Numerous steps are involved with EFA, namely determining a factor analysis method, deciding the number of factors to extract, choosing a rotational scheme, assessing factor loadings, and labeling the factors. Principal component analysis (PCA) with varimax rotation was used for the initial factor analysis run for both subscales (Comrey & Lee, 1992; Tabachnick & Fidell, 2007). Using Kaiser's criterion (Kaiser,

1958), four factors for the NASC-CDM, SC subscale and three factors for the NASC-CDM, A subscale achieved eigenvalues exceeding 1.

Visual inspection of the scree plots (Cattell, 1966) indicated a metaphoric elbow between factors four and five for the self-confidence subscale and between three and four for the anxiety subscale. These findings further confirmed a four factor solution explaining 71.83% of the total variance for the NASC-CDM, SC and a three factor solution explaining 66.57% of the total variance for the NASC-CDM, A. See Appendix Q and Appendix R for results of Kaiser's criterion and variance explained for the subscales. For clarity, factor analysis results in the appendices are reported separately for the self-confidence and anxiety subscales.

Factor loadings were examined using the rotated component matrices on the PCA with varimax rotation output. Factor plots were examined. Numerous secondary loadings and multiple loadings were seen among the 41 items. It is recognized theoretically that the process of clinical decision making is an iterative one; that is students move back and forth through the process until a decision is made and action occurs. Because of the considerable overlap among factor loadings, because of intermingled points on the factor plots, and because items concerning the iterative process of decision making are associated, items within the factor solutions were determined to be related. Therefore, to enhance interpretability, subsequent factor analytic runs implemented oblique rotational schemes (Comrey, 1978; Tabachnick & Fidell, 2007).

The most commonly used oblique rotational scheme is direct oblimin. When PCA with oblimin rotation was used with items for both self-confidence and anxiety subscales

no stable factor solutions were derived at 25 iterations. Analyses were also run using PCA with promax rotation. Results indicated substantial factor loadings of some items using this technique. Factor analytic experts and scale development experts note it is appropriate to initiate multiple runs of factor analysis techniques to achieve the most stable factors, with substantial factor loadings, with reasonable iterations (Comrey, 1978; Gable & Wolf, 1993).

Alpha factoring maximizes the alpha reliability of factors and is appropriate during the process of scale development (Munro, 2005; Tabachnick & Fidell, 2007). The final run for both subscales used alpha factoring with promax rotation. Similar to the initial run using PCA with varimax rotation, four factors were retained for the self-confidence subscale and three factors were retained for the anxiety subscale. Factor loadings from the pattern matrices were used to interpret the meaning of factors because they represent unique variance of items. Structure matrices contain considerable overlap among items and were not considered as interpretable (Comrey & Lee, 1992; Munro, 2005). See Appendix Q and Appendix R for alpha factoring with promax rotation results for the subscales. Cumulative total variance explained after rotation cannot be determined when oblique rotational schemes are implemented because of the inter-related nature of items and factors (Munro, 2005; Pallant, 2007); therefore, they are absent from both appendices.

The intent of the NASC-CDM scale is to measure students' levels of self-confidence *and* anxiety during the process of clinical decision making. Consequently, although the number of factors and structure of loadings on factors varied between the self-confidence and anxiety subscales, the researcher decided items should remain identical on both

subscales. Nine items were reduced from the NASC-CDM scale based on item analysis and factor analysis results. Another four items were modified slightly for grammatical and clarification purposes only. The content of these four items was not altered.

Considerations for item reduction included items correlating weakly or strongly with a number of other items, items not loading on either of the two subscales, and items with smaller or secondary loadings. Items were reviewed with inter-item correlations of < .30 and > .70 (Gable & Wolf, 1993; Waltz et al., 2005). Factor loadings were noted as substantial if they reached at least .40 (DeVellis, 2003; Ellenbecker & Byleckie, 2005). Not all items with secondary loadings were reduced. Some redundancy among items is beneficial during the process of instrument development. Patterns of factor loadings should be reexamined for similarities with another sample (Comrey, Reise, & Waller, 2000; DeVellis, 2003; Tabachnick & Fidell, 2007).

The nine items reduced from the NASC-CDM scale and the rationale for their reduction follow. *I am ___ self-confident and ___ anxious in by ability to…*

Q8: Recognize a possible client problem by reading the patients chart (No problems with item analysis, no loading on anxiety subscale, and substantial loading on self-confidence subscale).

Q12: Evaluate how successful my clinical decision was in improving the client's physical assessment findings (Correlations of > .70 with several items, small loading on anxiety subscale, and no loading on self-confidence subscale).

Q21: Evaluate whether the clinical decision I made actually made the client better, worse, or didn't make a difference (Correlations of > .70 with several items, substantial loading on anxiety subscale, and small loading on self-confidence subscale).

Q25: Know when enough information about the current problem has been gathered from the client (Correlations of > .70 with several items, substantial loading on anxiety subscale, and small loading on self-confidence subscale).

Q26: Identify which pieces of clinical information I gathered are NOT related to the client's current problem (Correlations of > .70 with several items, small loading on anxiety subscale, and no loading on self-confidence subscale).

Q28: Change my assessment based on the client's signs and symptoms of the current problem (Correlation of > .70 with one item, substantial loading on anxiety subscale, and no loading on self-confidence subscale).

Q33: Correlate the client's diagnostic study results with his or her physical assessment findings (Correlations of > .70 with several items, small loading on anxiety subscale, and secondary loading on self-confidence subscale).

Q37: Follow a 'feeling' that something is wrong with the client and then begin to gather information (Correlations of > .70 with several items, secondary loading on anxiety subscale, and strong loading on self-confidence subscale).

Q41: Take the full responsibility for the clinical decision I made (Correlations of < .30 with one item, strong loading on anxiety subscale, and no loading on self-confidence subscale).

Secondary loadings of several items occurred on the self-confidence subscale. Q2 loaded on factor II at .474 and on factor III at .417 while Q9 loaded on factor II at .461 and on factor III at .426. Based on the content of these items, each was placed with similar items into factor III. Q30 loaded at .411 on factor II and at .375 on factor III; however after review of its content, this item was determined to fit best in factor III.

Finally, although Q14 loaded stronger on factor I (.624) than on factor IV (.412) its content about listening was determined to fit best with the items in factor IV. Secondary loading of one item was found on the anxiety subscale. Q2 loaded at .450 on factor II and at .469 on factor III. Based on its content, Q2 was placed with similar items into factor II.

Four factors were extracted for the self-confidence subscale explaining 21.37%, 20.65%, 21.09% and 11.94% of variance respectively. Three factors were extracted for the anxiety subscale explaining 22.13%, 18.73% and 18.15% of variance respectively. Factor correlation matrices results revealed correlation coefficients of > .40 on both subscales indicating interrelatedness among factors (Pallant, 2007). See Appendix Q and Appendix R for factor correlation matrices. There was considerable overlap of item loadings onto factors of the self-confidence and anxiety subscales. See Appendix S for overlapping items among subscales.

The final step of factor analytic procedures is labeling factors. Because the factor structures of the two subscales were similar, they were given similar labels. The researcher reviewed and labeled factors based on the content of items which comprised each factor (Munro, 2005). Additionally, a panel of five doctorally prepared nurse educators independently reviewed factor analysis results and were asked to provide labels for factors. Rationale for using a panel of experts was to reduce the subjectivity inherently associated with factor labeling (Ford et al., 1986). Input from the expert panelists was advantageous; nevertheless, factor labels were assigned ultimately by the researcher. The four factors of the self-confidence subscale were labeled: (I) using resources to gather information, (II) using information to see the big picture, (III)

knowing and acting, and (IV) listening fully. The three factors of the anxiety subscale were labeled: (I) using resources to gather information and listening fully, (II) knowing and acting, and (III) using information to see the big picture.

Results of item analysis and factor analytic procedures answered research question one affirmatively during the pilot phase. Stable factor solutions were confirmed for the self-confidence and anxiety subscales of the NASC-CDM scale. Items contained within these factors for the subscales revealed considerable overlap, indicating their interrelatedness. These outcomes contributed positively to the establishment of construct validation of the newly designed scale.

Convergent Validity of the NASC-CDM Scale

The second research question was designed to initially assess convergent validity of the NASC-CDM scale. This research question asked: Do the self-confidence and anxiety subscales of the NASC-CDM scale relate satisfactorily with two established reliable and valid quantitative instruments measuring generalized self-efficacy and generalized anxiety?

The relationship between students' perceived self-confidence during clinical decision making (as measured by the NASC-CDM, SC) and general self-efficacy (as measured by the GSE), and the relationship between students' perceived anxiety during clinical decision making (as measured by the NASC-CDM, A) and generalized anxiety (as measured by the GAD-7) were examined using the Pearson product moment correlation coefficient (*r*). The continuous composite scores for all scales were deemed interval level for data analysis. Preliminary analyses of these data were completed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity (DeVon et al.,

2007; Munro, 2005). The analysis of normality and linearity are addressed in an earlier section of this chapter. Normality and linearity were assumed. The assumption of homoscedasticity was assessed by examining the shape of the scatterplots, as well as by using a linear regression model and examining the residual plot for rectangular shape and a lack of obvious funneling. No violations were found.

Pearson *r* correlation computations were completed for the first sample data from the pilot phase using pairwise exclusion. There was a statistically significant, moderate positive correlation between the variables NASC-CDM, SC and GSE ($r = .54$, $p < .001$, n = 290). There was also a statistically significant, moderate positive correlation between the variables NASC-CDM, A and GAD-7 ($r = .52$, $p < .001$, n = 290). Internal consistency reliability coefficients for the GSE and GAD-7 scales were examined for the pilot sample; GSE ($\alpha = .85$, n = 300), GAD-7 ($\alpha = .90$, n = 299).

Results of this analysis answered research question two affirmatively. Results revealed there was a statistically significant, moderate positive relationship between the self-confidence and anxiety subscales of the NASC-CDM scale and the psychometrically sound instruments with which they were compared. A positive correlation in the range of .50 is respectable for a newly designed scale (Gable & Wolf, 1993; Waltz et al., 2005). These findings indicate undergraduate nursing students with higher levels of self-confidence during the process of CDM had higher levels of general self-confidence. Similarly, students with higher levels of anxiety during the process of CDM had higher levels of generalized anxiety.

Additionally, Pearson product moment correlation coefficient (*r*) with pairwise exclusion was computed to examine the relationship between scores on the NASC-CDM,

SC and NASC-CDM, A subscales. Preliminary analyses of these data were completed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity (DeVon et al., 2007; Munro, 2005). As noted above, normality and linearity were assumed. The assumption of homoscedasticity was assessed by examining the shape of the scatterplots as well as by using a linear regression model and examining the residual plot for rectangular shape and a lack of funneling. No violations were found.

There was a statistically significant, moderate negative correlation between the variables NASC-CDM, SC and NASC-CDM, A (r = -.67, p < .001, n = 287). Results indicated those undergraduate nursing students with higher levels of self-confidence during the process of CDM had lower levels of anxiety during the process and vice versa.

NASC-CDM Scale as a Reliable Measurement Tool

The third research question evaluated in this study was: Do the self-confidence and anxiety subscales of the NASC-CDM scale provide a reliable measure of undergraduate nursing students' perceptions of self-confidence and anxiety levels during the process of CDM?

Cronbach's alpha internal consistency reliability coefficient (Cronbach, 1951) was used to compute the reliability for the self-confidence and anxiety subscales of the NASC-CDM scale. Items included on each of the subscales of the NASC-CDM scale are identical. Student respondents were asked to identify their level of self-confidence and level of anxiety for each item; thus the number of items and scoring range for both subscales are the same. Examination of the item-total statistics for both subscales revealed no substantial influence on alpha if any item was deleted. Scale development experts note an alpha of .70 is acceptable for a newly designed affective scale (DeVellis,

2003; Rust & Golombok, 2009). See Appendix T for reliability results of the subscales for the pilot version and the rerun of reliability after the reduction of nine items.

Review of inter-item correlations is beneficial to identify weak or redundant items on a scale. Items with inter-item correlations of < .20 should be considered for reduction because of their lack of relationship with other items on the scale. Those with inter-item correlations of > .70 should be reviewed for content redundancy (Gable & Wolf, 1993; Munro, 2005; Waltz et al., 2005). The mean inter-item correlation for the subscales of the pilot version and revised version of the NASC-CDM scale did not exceed .70 but several inter-item dyads did top .70 – these were reviewed. Furthermore, no inter-item dyad correlation fell below .20. Although inter-item correlation review was valuable for the assessment of internal consistency reliability of a scale, this information was also used for the purposes of the establishment of construct validity. The majority of discussion about inter-item correlation and its use occurred during the section of this chapter that relates to the first research question.

Results of this analysis answered research question three affirmatively. Reliability coefficients for both subscales of the NASC-CDM scale were satisfactory (Cronbach, 1951; DeVellis, 2003). Inter-item and item-total findings were reviewed with regard to the appraisal of reliability and construct validity. Items were rephrased or reduced based on these results.

Predictions using Multiple Linear Regression

Standard multiple linear regression analysis (SMLR) was used to examine the predictive relationship of several demographic variables (independent or predictor variables) with composite scores on the NASC-CDM, SC and NASC-CDM, A subscales

(dependent or outcome variables). It is acknowledged that including numerous independent variables in MLR reduces degrees of freedom and ultimately lessens the power of the analysis (Tabachnick & Fidell, 2007). For this reason, independent variables were chosen thoughtfully based on their theoretical importance to the concepts of self-confidence and anxiety with the process of CDM.

Demographic questions considered for SMLR included age, gender, program type, program format, employment as a nursing assistant, prior college experience, and participation in an externship program. The researcher's original intent was to include the demographic questions related to current course difficulty and current course grade in the regression analysis. However, as previously discussed, it was surmised these questions were misconstrued and responses were ambiguous. Therefore, data from these two questions were not incorporated into regression analytic procedures.

Preliminary analyses, using independent samples *t*-tests, were conducted on dichotomous independent variables to reveal significant differences of mean scores (Munro, 2005) on the self-confidence and anxiety subscales. Variables with nonsignificant *t*-test results, indicating no differences between the groups, were excluded from regression analysis.

Independent samples *t*-tests were conducted separately to compare mean scores for each of the NASC-CDM subscales for several variables: gender (male or female), program type (associate or baccalaureate), participation in an externship program (yes or no), and current employment as a nursing assistant (yes or no). The question related to participation in an externship program included a third response option, *I am not familiar with this type of program*; however, only 15 of 303 respondents who fully completed the

survey chose this option. These 15 cases were excluded from the *t*-test analysis for this variable. Nonsignificant Levene tests for each variable assumed equal variance. See Appendix U for *t*-test results.

There was a nearly significant difference in mean self-confidence scores between males and females. There was a statistically significant difference in mean anxiety scores between males and females. Because of these results, gender was included in SMLR runs. There was no significant difference in mean self-confidence scores for students enrolled in either associate or baccalaureate degree programs. There was no significant difference in mean anxiety scores for students enrolled in either type of program. In light of these results, program type was not included in SMLR runs.

There was no significant difference in mean self-confidence scores for students who participated in an externship program and students who did not. There was no significant difference in mean anxiety scores for students who participated in an externship program and students who did not. Because of these results, externship participation was not included in SMLR runs. There was no significant difference in mean self-confidence scores for students who were employed as a nursing assistant and students who were not. There was no significant difference in mean anxiety scores for students who were employed as a nursing assistant and students who were. Based on these results, nursing assistant employment status was not included in SMLR runs.

Four independent variables were included in regression analysis using pairwise exclusion. Variables included were gender, age (measured in years), format of program (measured as accelerated, evening/weekend, traditional, and year-round), and amount of prior college experience (measured as none, 1 to 2 semesters, 3 to 4 semesters, greater

than 4 semesters, and completion of a college degree). Nominal and ordinal level independent variables were recoded into DUMMY variables for interpretability in regression analyses. Evaluation of assumptions (Munro, 2005; Pallant, 2007; Tabachnick & Fidell, 2007) was completed related to each subscale independently prior to the final SMLR analysis.

Adequate sample size was assumed with approximately 230 student respondents for each subscale. Data did not violate the multicollinearity assumption, as no correlations exceeded .70, no tolerance was less than .10, and no variance inflation factor (VIF) exceeded 2. Normality of total scores was previously examined and did not violate this assumption. Additionally, normality and linearity of data were assumed by reviewing the regression standardized residual plots. Normal P-P plots for both subscales indicated a reasonably straight line. Scatterplot swarms revealed randomness, with no discernible patterns of concern. Examination of residual scatterplots revealed no obvious funneling; thus, homogeneity of variance or homoscedasticity was assumed.

Mahalanobis distance ($p < .001$) was used from the residual statistics to determine multivariate outliers. For the self-confidence subscale, 10 cases exceeded the critical value of 18.47 with a maximum value of 24.36. For the anxiety subscale, 16 cases exceeded the critical value or 18.47 with a maximum value of 42.05 for the anxiety subscale. These 10 and 16 cases respectively were excluded from subsequent regression runs. Nonsignificant results of the Durbin-Watson statistic (1.98 for the self-confidence subscale and 1.86 for the anxiety subscale) indicated no violation of the assumption independence of errors.

Results of early runs of standard regression analysis using four independent variables indicated, for the question about amount of college experience, only the recoded variable for the completion of a college degree (New for prior college4) appeared to contribute significantly to the regression model. Consequently, New for prior college4 was the only response related to amount of college experience included in subsequent SMLR runs.

Results of SMLR revealed no statistical significance in the overall regression model for either subscale. Analysis of Variance (ANOVA) tables for the NASC-CDM, SC subscale indicated, $F(4, 231) = 1.20$, $p = .31$ and for the NASC-CDM, A subscale revealed, $F(3, 225) = 1.11$, $p = .35$. Correlations for scores on the anxiety subscale and gender were missing from the NASC-CDM, A regression output; therefore, this variable was deleted from the analysis.

R^2 for both subscales confirmed the regression model (including gender [for SC only], age, format of program, and New for prior college4) explained only 2% and 1.5% of the variance in total scores on the self-confidence and anxiety subscales respectively. Evaluation of the Beta standardized coefficients revealed the amount each independent variable contributed to the model. Beta coefficients indicated having a college degree was the largest contributor to the overall regression model. Nonetheless, these findings were not statistically significant. See Table 8 for the regression coefficients table results.

Table 8. Results of Coefficients Table for Standard Multiple Regression Analysis, Pilot

Scale Name	Independent Variable	Beta	*t*	Significance, *p* [a]
NASC-CDM, SC	Gender	.05	.74	.46
(n = 243)	Age	.04	.58	.56
	Format of Program	.04	.62	.53
	New for prior college4	.12	1.7	.09
NASC-CDM, A	Gender	---	---	---
(n = 229)	Age	-.03	-.37	.74
	Format of Program	.02	.22	.82
	New for prior college4	-.10	-1.4	.16

a, No independent variable contributed significantly to the regression model.

Because New for prior college4 (completion of a college degree) contributed most to the regression model, SMLR was rerun for each subscale including only this independent variable. Results indicated no statistical significance of the overall model for the self-confidence or the anxiety subscales. Self-confidence: $F(1, 237) = 3.41$, $p = .07$; R^2 = 1.4% total variance explained; Beta coefficient = .12, $t = 1.85$, $p = .07$. Anxiety: $F(1, 227) = 3.17$, $p = .08$; R^2 = 1.4% total variance explained; Beta coefficient = -.12, $t = -1.78$, $p = .08$.

Results Related to Questions to Refine the NASC-CDM Scale

Undergraduate nursing students in the pilot-testing phase of the study were asked five 4-point Likert-type questions which helped the researcher refine the newly developed NASC-CDM scale. Respondents were also asked one open-ended question. The open-ended item invited students to provide additional comments they thought might be beneficial for the researcher to improve the scale.

The Likert-type questions addressed the topics of clarity of directions, meaning of items, appropriateness of reading level, appropriateness of survey length, and ease of survey completion. Response anchors were written such that 1 indicated the most negative response (i.e. *directions were not at all clear*) and 4 indicated the most positive response (i.e. *directions were totally clear*). Frequency distributions revealed $\geq$ 75% of respondents answered either a 3 or 4 for each of these items. See Appendix V for the results of descriptive analysis for the five questions related to the NASC-CDM scale. Based on these results, the directions, item meaning, reading level, and design format of the NASC-CDM scale remained the same for the second sample in the main-testing phase. The length of the scale was reduced from 41 to 32 items.

In addition to the five closed-ended questions, respondents were asked one open-ended question related to the NASC-CDM scale. The question read: *Any comments about specific items or comments in general about the NASC-CDM tool are appreciated. I am interested in the feedback you provide which might allow me to improve the tool. Thank you again for your time and cooperation.* Seventy-two students responded to this question. See Appendix W for results of the content analysis for the open-ended question. A number of comments were simply words of encouragement to the researcher. For instance, several comments read “Good luck with your research.”, “Good luck with your journey.”, “Thanks for including us in your survey.”, and “Thanks for doing this survey…students like me need it!”.

Content analysis was completed to distinguish similarities among comments. Students’ responses were arranged within four comment types: positive, negative, format

of scale, and unrelated to scale. Several comments written by students were especially profound and thus, are included here.

Several positive comments included: "It was interesting how there were similar questions phrased differently each time. The wording made me really think it through… well structured survey." Another student wrote, "I enjoyed the statements because most of them are what I think about at times during clinical. The questions were very applicable to nursing students' situations." A second degree respondent commented, "Many times when I take this type of survey the questions seem repetitive. I appreciate that each question focused on a particular and different aspect so that I felt I was giving new information with each answer. This was a very thoughtful set of questions."

Several negative comments related to the length of the scale, "This survey was long, tedious and therefore frustrating…I didn't finish it" and "The questions were a bit 'wordy'. It was a little difficult at the end after reading so many questions." Other student comments related to redundancy of items, "I got bored in the middle of the 41 questions because many of them seemed very similar" and "I felt like one question repeated a lot… something about determining whether or not an intervention was effective with your patient."

Six student respondents indicated they believed the format of the scale should separate the self-confidence and anxiety subscales. For instance, one student wrote: "It was a little confusing rating confidence and anxiety in the same question. It would have made more sense to me if they were separated." Another student commented on design format, "The format was a little distracting to me. I would have liked each question to start with the content of the question, since they all started the same."

Interestingly, 12 student comments did not relate at all to the NASC-CDM scale. Instead, these comments recounted other factors which influence their level of self-confidence or anxiety in the clinical practicum setting. These comments are discussed in chapter five.

Results from the Main-Testing Phase

Similar to the pilot-testing phase of the study, 27 nursing programs were randomly assigned and invited to participate in the main-testing phase of the study. The main-testing phase was conducted to test and accrue validation for the revised version of the NASC-CDM scale. The IRB from each eligible institution was contacted and inquires were made about requirements for approval to recruit undergraduate nursing students to voluntarily complete an anonymous online survey package. Information was submitted accordingly.

Nursing Program Participation

Randomly assigned institutions for the main-testing phase included 13 baccalaureate degree and 14 associate degree nursing programs. However, the final number of nursing programs was comprised of eight baccalaureate degree and six associate degree programs. One nursing program was excluded from the main-testing phase of the study, prior to seeking IRB approval, because it was determined to be an LPN to RN transition program only. The same three factors influenced the final number of nursing programs that participated in the main-testing phase as the pilot-testing phase: IRB approval, Dean/Director approval, and faculty-contact willingness to participate. One additional

factor influenced the final number of nursing programs: student contact by external researcher policy.

After submission and repeated follow-up by the researcher over a period of six months, the IRB offices from *two* institutions did not respond to the researcher regarding the submitted IRB application and packet of supporting documents. The remaining 24 institutions either granted IRB approval for the recruitment of nursing students or noted they had no formal IRB process. If no formal IRB process was in place, the researcher worked directly with nursing to secure permission and willingness to participate.

The second factor that influenced the final number of nursing programs in the main-testing phase was a lack of response from several Dean/Directors of eligible nursing programs. After four attempts to contact each Dean/Director over a period of six months, nonresponders from *five* programs were eliminated from the study. The remaining 19 nursing administrators provided names and contact information of faculty who coordinated the final two clinical courses in the curriculum. These faculty members were contacted by the researcher about their willingness to assist with data collection.

Faculty unwillingness to assist with data collection was the third issue that influenced the final number of nursing programs participating in the main-testing phase. After several attempts to contact faculty whose names were provided by their Deans/Directors, nonresponders from *three* programs were eliminated from the study. Of the remaining 16 nursing programs, *two* noted they would not allow external researchers to contact students. The remaining 14 nursing programs were included in the study. Table 9 outlines the total number of nursing programs that agreed to participate in the main-testing phase of the study.

Table 9. Nursing Programs Agreeing to Participate, Main

State	Baccalaureate Degree	Associate Degree	Potential Student Numbers
Delaware	1	1	154
Maryland	1	3	298
New Jersey **(None)**			
Pennsylvania	6	2	823
Totals	**8**	**6**	**1,275**

Faculty-contacts who responded affirmatively about their willingness to participate were sent an IRB approved letter via email which outlined the intent of the study and informed faculty members of their role with data collection. Throughout the spring 2011 semester the researcher worked closely with faculty-contacts about the feasibility of campus visits, the deployment of the survey link, forwarding email reminders, and reminding students to participate in the study.

Nursing Student Participation and Survey Response Rate

During the spring 2011 semester, attempts were made to visit as many eligible nursing classes as possible. Campus visits were completed to discuss the intent of the study, invite student participation, answer questions, and improve response rate (Gable & Wolf, 1993). Once permission from nursing departments was secured, the researcher made 20 visits to eligible nursing classes from 12 programs. A procedure similar to the one utilized during the fall 2010 semester was used to invite student participation and deploy the survey package. Students were never contacted individually via email. All email correspondence was completed through the use of faculty-contacts at each nursing program. No data were collected during visits to campuses. Reminder emails were sent in a fashion similar to those sent during the pilot-testing phase.

A total of 1,275 students from 14 nursing programs were invited to participate in the main-testing phase. The survey closed on May 6, 2011 at 5:00 p.m. Survey data were then downloaded from Survey Monkey (https://www.surveymonkey.com) into a spreadsheet software package. A total of 313 students completed the survey package. Response rate for the main phase was 24.5% which exceeded the estimated 20% response rate. Because of the criterion to exclude LPNs from the study, 38 surveys completed by nursing students licensed as LPNs were removed from the dataset immediately upon download from the survey platform. This resulted in 275 remaining surveys.

The Missing Values Analysis (MVA) software (SPSS, 2008) was again used to determine patterns of missing data within the dataset. The amount of missing data was calculated as 9.3%. Results indicated data were missing not at random (MNAR); therefore, imputations and estimated value replacements were not utilized (Tabachnick & Fidell, 2007). Data were MNAR for several reasons. Sixteen respondents completed only the demographic questions within the survey package. Another seven respondents completed demographic questions and the GAD-7 scale but completed no additional items within the survey package. Yet another 10 respondents completed demographic questions as well as items on the GAD-7 and GSE scales but did not complete any item on the NASC-CDM scale. Data from these 33 respondents were excluded from data analysis.

Additionally, minimal sporadic amounts of data values were missing across variables which were replaced with the modal value for that item. Total scores on the scales were normally distributed and thus, the mean, median, and mode were similar values. Statistical experts note value replacement strategies should occur only when very small

amounts of data are missing (Tabachnick & Fidell, 2007). A number of respondents, either inadvertently or intentionally, did not complete one or several items within the survey package. The use of modal replacement for missing values replaced less than 1% of survey package data. The number of suitable surveys used for data analysis was 242.

Sample Characteristics

A sample of 275 undergraduate nursing students in one of their final two clinical nursing courses completed the 32-item revised version of the NASC-CDM scale during the spring 2011 semester. The sample was comprised of pre-licensure undergraduate baccalaureate (BSN) and associate (ADN) degree nursing students from three states in the northeastern portion of the United States. Thirty-three students did not complete the entire survey package while 242 students completed the full survey package.

Descriptive statistics were used to examine the characteristics of those students who completed the full survey package and those who did not. A total of 168 (69.4%) BSN students and 74 (30.6%) ADN students completed the survey package. The mean age of participants who completed the survey was 25.19 $\pm$ 5.67 with a range from 19 to 45 years. More than one half of participants (60.7%) fell between 21 and 23 years of age. Eight (3.3%) survey completers were greater than 45 years of age. See Appendix X for characteristics and comparisons of the main-sample completers and noncompleters.

Parametric and nonparametric statistics were used to compare students who completed the survey package with those who did not to see if the groups were inherently different. The Shapiro-Wilk test for normality of age for those who completed the full survey package was statistically significant, and both skewness and kurtosis exceeded + 1 (Munro, 2005); thus indicating a violation of normality. Age was assumed to be

normally distributed for the noncompleters as skewness and kurtosis did not exceed $\pm$ 1. Table 10 indicates assessment of the normality assumption for age.

Table 10. Assessment of Normality for Age, Main

Group[a]	Shapiro-Wilk	Skewness	Kurtosis
Complete Surveys (n = 221)	.76(221), $p < .001$	1.62	1.68
Incomplete Surveys (n = 29)	.77(29), $p < .001$	.98	-.62

a, System-missing = 13. This analysis does not include those > 45 years.

Use of the nonparametric Mann-Whitney U test was appropriate for the comparison of age between groups because of a violation of normality. The use of Fisher's exact test, likelihood ratio, and chi-square for independence were utilized appropriately (Huck, 2004; Munro, 2005). Results of the comparison indicated that completers and noncompleters were not statistically different from one another.

Despite capitalization modifications from fall to spring semester, the researcher again speculated respondents misunderstood several demographic questions. Responses varied widely for the question relating to the current nursing semester in which students were enrolled. Similar to responses from the fall 2010 sample, it was believed a number of student respondents interpreted the question to mean the TOTAL semesters of college in which they were enrolled, instead of the current NURSING semester in which they were enrolled. Therefore, the practicality of these results is questionable.

The final two sociodemographic questions asked students about the difficulty level and course letter grade of the current clinical nursing course(s) in which they were

enrolled. The nonparametric Spearman *rho* correlation was used to examine the correlation of course difficulty with course grade (see Appendix X). The Spearman *rho* was appropriate because the relationship between two rank-order variables was examined (Munro, 2005). Several statistically significant findings were revealed. Despite capitalization modifications from fall to spring semester, the researcher again believed that instead of indicating the level of difficulty and letter grade for the current CLINICAL NURSING COURSE in which the students were enrolled, students indicated the difficulty and grade of each CLINICAL ROTATION within one course. Thus, the practical significance of these findings is questionable. Results from the analysis of these data were not used for further analysis.

Measures of central tendency and variability were calculated for composite scores on the subscales of the NASC-CDM, the General Perceived Self-Efficacy (GSE), and the Generalized Anxiety Disorder-7 (GAD-7) scales for the main sample. Table 11 summarizes these results. Interpretations of these findings are discussed in chapter five.

Table 11. Results of Composite Scores for Four Scales, Main

Scale Name	Number of Items	Response Option	Scoring Range	Mean Score, (SD) [a]
NASC-CDM, Self-Confidence (n = 242)	32	6-point Likert	32 - 192	126.88 (± 27.40)
NASC-CDM, Anxiety (n = 242)	32	6-point Likert	32 - 192	78.48 (± 23.01)
GSE (n = 242)	10	4-point Likert	10 – 40	31.70 (± 3.48)
GAD-7 (n = 241)	7	4-point Likert	0 - 21	8.13 (± 5.31)

a, SD = standard deviation

Results Related to the Research Questions

The purpose of the main-testing phase of the study was to test the revised version of the NASC-CDM scale and continue the establishment of psychometric properties by using a second sample of pre-licensure undergraduate nursing students. This section examines data analysis results used to answer the three research questions which framed the methodology of the study (see page 42). Data from 242 student respondents who completed the full revised survey package during the spring 2011 semester were included in analyses.

Normality and Linearity Assumptions

Preliminary analyses of composite scores on the revised NASC-CDM, Self-Confidence (NASC-CDM, SC) subscale scores, the NASC-CDM, Anxiety (NASC-CDM, A) subscale scores, the GSE scale total scores, and the GAD-7 scale total scores were completed to test the assumptions of normality and linearity. Univariate outliers were identified by examining histogram and boxplot graphs: Outlier values were replaced with the largest data value which was not an outlier (Munro, 2005; Tabachnick & Fidell, 2007). Although several results of the Shapiro-Wilk test for normality were statistically significant, indicating a violation of normality, both skewness and kurtosis did not exceed $\pm$ 1. Based on these results, data were assumed to be normally distributed. Table 12 summarizes assessment of normality after values for univariate outliers were replaced.

Table 12. Assessment of Normality for Total Scores on Scales, Main

Scale Name	Shapiro-Wilk	Skewness	Kurtosis	Initial Outliers
NASC-CDM, SC (n = 242)	.93(242), $p = .22$	.06	-.42	0
NASC-CDM, A (n = 242)	.99(242), $p = .04$	.24	-.35	3
GSE (n = 242)	.98(242), $p < .001$	-.01	-.08	7
GAD-7 (n = 241)	.94(241), $p < .001$	.70	-.27	0

The assumption of linearity was assessed using scatterplots (Munro, 2005; Pallant, 2007). A scatterplot was created for scores on the NASC-CDM, SC with scores on the GSE scale. Examination of the swarm indicated a strong linear relationship between variables. Another scatterplot was created for scores on the NASC-CDM, A with scores on the GAD-7 scale. Although results did not reveal a tight swarm pattern, no evidence of a curvilinear relationship was seen between variables. Hence, linearity of data was assumed. The following three sections address each of the research questions.

NASC-CDM Scale as a Valid Measurement Tool

The first research question addressed in the study was: Do the self-confidence and anxiety subscales of the NASC-CDM scale provide a valid measure of undergraduate nursing students' perceptions of self-confidence and anxiety levels during the process of CDM?

Exploratory factor analysis (EFA) and item analysis were conducted to continue the assessment of construct validity for the subscales of the 32-item revised NASC-CDM scale. EFA procedures were again run separately for each NASC-CDM subscale, self-

confidence and anxiety. Results of EFA techniques, using data from the second sample, allowed the researcher to reduce items as necessary.

A number of statistical assumptions were considered prior to the initial EFA procedure. The continuous composite scores on the NASC-CDM, SC and NASC-CDM, A subscales were deemed interval level data for the purpose of data analysis (Gall et al., 2007; Polit & Beck, 2008). Preliminary analyses of the dataset were conducted to test the assumptions of normality and linearity. Based on assessments of normality from the section above, data were assumed to be normally distributed. Linearity was assessed through visual inspection of the normal probability plots (P-P plots) and scatterplots within the residual statistics of the linear regression model output. Several random spot-checks of the scatterplots of two items on the subscales were also assessed for linearity. Residual normal P-P plots revealed a reasonably straight line while scatterplots resembled rectangular shapes (Tabachnick & Fidell, 2007). No curvilinear relationships were found.

There were 32 items on the revised version of the NASC-CDM scale; therefore the inter-item correlation analyses created a 32 by 32 correlation matrix for scores on each subscale. Inter-item correlations were reviewed to visualize substantial relationships, .30 and above (Munro, 2005; Rust & Golombok, 2009), and to ensure the suitability of data for factor analytic procedures. Based on results of item analysis, no items were reduced prior to factor analysis initiation.

Multivariate outliers were identified using linear regression analysis and locating the maximum value for Mahalanobis distance from the residual statistics (Pallant, 2007; Tabachnick & Fidell, 2007). The maximum value for Mahalanobis distance (p = .001)

for the NASC-CDM, SC subscale was 86.28 (critical value = 59.70(32), n = 242). Nineteen cases exceeded the critical value for Mahalanobis distance and were excluded from EFA runs for the self-confidence subscale. The maximum value for Mahalanobis distance for the NASC-CDM, A subscale was 86.75 (critical value = 59.70(32), n = 242). Twenty-seven cases exceeded the critical value for Mahalanobis distance and were excluded from EFA runs for the anxiety subscale. The final number of cases used in factor analysis runs for the self-confidence and anxiety subscales was 223 and 215 respectively.

Sufficient sample size was assumed at between six and ten subjects per 32 items on the revised NASC-CDM scale, which is consistent with scale development and factor analytic experts (Comrey, 1978; Gable & Wolf, 1993; Sapnas & Zeller, 2002). The subject number to item number ratio equaled 7.56 if the complete dataset of 242 participants had been used for EFA procedures. After exclusion of multivariate outlier cases the subject number to item number ratio for the self-confidence and anxiety subscales was 6.96 and 6.72 respectively.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity examine the suitability of data for factor analysis (Comrey & Lee, 1992). Table 13 reveals results of the KMO and Bartlett's tests for the self-confidence and anxiety subscales of the revised NASC-CDM scale. Results indicated data were appropriate for factor analytic procedures.

Table 13. KMO and Bartlett's Test Results, Main

Scale Name	KMO Measure of Sampling Adequacy [a]	Bartlett's Test of Sphericity [b]
NASC-CDM, SC	.97	*df* 496, $p < .001$
NASC-CDM, A	.97	*df* 496, $p < .001$

a, Should exceed .60
b, Should reach significance, $p < .05$

For constancy and ease of comparison, EFA procedures were run for the second sample (spring 2011) similar to those used with the first sample (fall 2010). To further maintain ease of comparison of results between the first and second samples, items on the revised NASC-CDM scale were *not* renumbered after the reduction of nine items from the pilot version of the scale. For instance, Q13 from the pilot version remained Q13 on the revised version despite the removal of Q8 and Q12 from the pilot version. Principal component analysis (PCA) with varimax rotation was used for the initial factor analysis run for both subscales (Comrey & Lee, 1992; Tabachnick & Fidell, 2007). Using Kaiser's criterion (Kaiser, 1958), three factors for the NASC-CDM, SC and the NASC-CDM, A subscale achieved eigenvalues exceeding 1.

Visual inspection of the scree plots (Cattell, 1966) indicated a metaphoric elbow between factors three and four for both subscales. These findings further confirmed a three factor solution explaining 69.51% of the total variance for the NASC-CDM, SC and a three factor solution explaining 63.39% of the total variance for the NASC-CDM, A. See Appendix Y and Appendix Z for results of Kaiser's criterion and variance explained for the subscales.

Factor loadings were examined using the rotated component matrices on the PCA with varimax rotation output. Factor plots were examined. Numerous secondary loadings and multiple loadings were seen among the 32 items. These results were similar to those found with the first sample of students from the fall 2010 semester. Because of the considerable overlap among factor loadings, because of intermingled points on the factor plots, and because items concerning the iterative process of decision making are associated, items within the factor solutions were determined to be related.

Alpha factoring with promax rotation was used for the subsequent factor analysis run in order to maintain consistency between data analysis from the first and second samples (Comrey, 1978; Tabachnick & Fidell, 2007). Analysis from the second run using alpha factoring with promax rotation revealed findings similar to the initial run using PCA with varimax rotation. Three factors were extracted for the self-confidence subscale as well as the anxiety subscale. Factor loadings from the pattern matrices were used to interpret the meaning of factors because they represent unique variance of items (Comrey & Lee, 1992). See Appendix Y and Appendix Z for alpha factoring with promax rotation results for the subscales.

Items remained identical on both subscales of the revised NASC-CDM scale because the intent is to measure students' levels of self-confidence *and* anxiety during the process of clinical decision making. The decision to have items remain the same on both subscales was similar to that used during analysis of data from the first sample. Criteria for item review in the main-testing phase remained consistent with the criteria for item review in the pilot-testing phase. These criteria included: inter-item correlations of < .30

and > .70, secondary factor loadings, and factor loadings of < .40 (DeVellis, 2003; Gable & Wolf, 1993; Waltz et al., 2005).

Five items were reduced from the revised version of the NASC-CDM scale based on item analysis and factor analysis results. No items were modified or rephrased. The five items reduced from the revised NASC-CDM scale and the rationale for their reduction follow. *I am ___ self-confident and ___ anxious in by ability to…*

Q1: Listen carefully to what the client tells me about his or her health problem (No problems with item analysis, no loading on anxiety subscale, and minimal loading on self-confidence subscale).

Q2: Make the FINAL decision after information is gathered, analyzed, and possible interventions are evaluated (No problems with item analysis, secondary loading on anxiety subscale, and substantial loading on self-confidence subscale). Analysis of this item from the fall 2010 sample revealed weak secondary loadings on both subscales.

Q6: Detect when verbal and nonverbal cues from the patient don't match (Correlation of > .70 with one item, substantial loading on anxiety subscale, and no loading on self-confidence subscale).

Q27: Draw on my own past clinical experiences to help interpret information about the client's current problem (No problems with item analysis, secondary loading on anxiety subscale, and no loading on self-confidence subscale). This item did not overlap between factor structures among subscales during data analysis from the fall 2010 sample.

Q40: Perform additional system-assessments to gather more information about the client's current problem (No problems with item analysis, no loading on anxiety subscale, and no loading on self-confidence subscale).

Secondary loadings of two items occurred on the self-confidence subscale. Q36 loaded on factor III at .512 and on factor I at .403 while Q38 loaded on factor III at .565 and on factor I at .405. Based on the content of these items, each was placed with similar items into factor I. Q36 loaded substantially on factor I during data analysis from the fall 2010 sample. Secondary loading of one item was found on the anxiety subscale. Q31 loaded at .489 on factor III and at .404 on factor II. Based on its content, Q31 was placed with similar items into factor II. Q31 loaded substantially on factor III on the self-confidence subscale. For this reason, Q31 was placed with related items in factor II on the anxiety subscale.

Three factors were extracted for the self-confidence subscale explaining 16.40%, 16.55%, and 15.97% of variance respectively. Three factors were extracted for the anxiety subscale explaining 14.77%, 14.28% and 13.07% of variance respectively. Factor correlation matrices results revealed correlation coefficients of > .40 on both subscales indicating interrelatedness among factors (Pallant, 2007). See Appendix Y and Appendix Z for factor correlation matrices. There was considerable overlap of item loadings onto factors of the self-confidence and anxiety subscales. This was not surprising given the complex and iterative process of clinical decision making. See Appendix AA for overlapping items among subscales.

The final step of factor analytic procedures is labeling factors. The researcher reviewed and labeled factors based on the content of items which comprised each factor (Munro, 2005). Because the factor structures of the two subscales were similar, they were given similar labels. The factor structure for the anxiety subscale from the first and second samples remained the same; thus, factor labels remained the same. The factor

structure for the self-confidence subscale from the first sample revealed a four factor solution and the factor structure for the second sample revealed a three factor solution. Results of EFA for the NASC-CDM, SC subscale revealed factors I and IV with the first sample combined to be factor I with the second sample. A panel of five doctorally prepared nurse educators to review factor analysis results was not necessary during the main-testing phase given the similarity of factor structures from fall 2010 to spring 2011. The three factors of the self-confidence and anxiety subscales were labeled: (I) using resources to gather information and listening fully, (II) knowing and acting, and (III) using information to see the big picture.

Results of item analysis and factor analytic procedures answered research question one affirmatively during the main phase. Stable factor solutions were confirmed for the self-confidence and anxiety subscales of the revised NASC-CDM scale. Items contained within these factors for the subscales revealed considerable overlap, indicating their interrelatedness. EFA results were similar based on data from the fall 2010 and spring 2011 samples. These outcomes demonstrated positive continued establishment of construct validation of the newly designed scale.

Convergent Validity of the NASC-CDM Scale

The second research question was designed to reassess convergent validity of the NASC-CDM scale. This research question asked: Do the self-confidence and anxiety subscales of the NASC-CDM scale relate satisfactorily with two established reliable and valid quantitative instruments measuring generalized self-efficacy and generalized anxiety?

The Pearson product moment correlation coefficient (*r*) was used to examine the relationship between students' perceived self-confidence during clinical decision making and general self-efficacy. These constructs were operationalized by the revised NASC-CDM, SC subscale and the GSE scale respectively. Additionally, Pearson *r* was utilized to appraise the relationship between students' perceived anxiety during clinical decision making and generalized anxiety. These constructs were operationalized by the revised NASC-CDM, A subscale and the GAD-7 scale respectively. The continuous composite scores for all scales were deemed interval level for the purpose of data analysis. Preliminary analyses of these data were completed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity (DeVon et al., 2007; Munro, 2005). The analysis of normality and linearity are addressed in an earlier section of this chapter. Normality and linearity were assumed. The assumption of homoscedasticity was assessed by examining the swarm of the scatterplots, as well as by using a linear regression model and examining the residual plot for rectangular shape and a lack of obvious funneling. No violations were found.

Pearson *r* correlation computations were completed for the second sample data from the main-testing phase using pairwise exclusion. There was a statistically significant, moderate positive correlation between the variables NASC-CDM, SC and GSE (r = .62, p < .001, n = 242), indicating a stronger relationship than was found with the first sample in fall 2010 (r = .54). There was a statistically significant, low positive correlation between the variables NASC-CDM, A and GAD-7 (r = .38, p < .001, n = 241), indicating a weaker relationship than was found with the first sample in fall 2010 (r = .52). Internal consistency reliability coefficients for the GSE and GAD-7 scales were examined for the

second sample (GSE, α = .84, n = 242 and GAD-7, α = .91, n = 241) and were found to be similar to those computed with the first sample.

Results revealed the convergent validity was similar to the findings for the fall 2010 sample with the self-confidence subscale. Findings for the correlation between the anxiety subscale and the GAD-7 scale were lower than those found with the fall 2010 sample, although still statistically significant and positive. Instrument development experts note a positive correlation in the range of .50, when considering convergent validity, as acceptable for a newly designed scale (Gable & Wolf, 1993; Waltz et al., 2005).

Additionally, Pearson product moment correlation coefficient (r) with pairwise exclusion was computed to examine the relationship between scores on the revised NASC-CDM, SC and NASC-CDM, A subscales from the second sample. Preliminary analyses of these data were completed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity (DeVon et al., 2007; Munro, 2005). No violations were found.

There was a statistically significant, high negative correlation between the variables NASC-CDM, SC and NASC-CDM, A (r = -.75, $p < .001$, n = 242), indicating a stronger negative relationship than was found during the pilot phase of the study (r = -.67). Results indicated those undergraduate nursing students with higher levels of self-confidence during the process of CDM had lower levels of anxiety during the process and vice versa.

NASC-CDM Scale as a Reliable Measurement Tool

The third research question evaluated in this study was: Do the self-confidence and anxiety subscales of the NASC-CDM scale provide a reliable measure of undergraduate nursing students' perceptions of self-confidence and anxiety levels during the process of CDM?

Similar to the pilot phase of the study, Cronbach's alpha internal consistency reliability coefficient (Cronbach, 1951) was used to compute the reliability for the self-confidence and anxiety subscales of the revised NASC-CDM scale. Examination of the item-total statistics for both subscales revealed no substantial influence on alpha if any item was deleted. Scale development experts note an alpha of .70 is acceptable for a newly designed affective scale (DeVellis, 2003; Rust & Golombok, 2009). See Appendix BB for reliability results for the revised version of the scale and for the rerun of reliability after the reduction of five items from the main sample.

In a procedure similar to the one used during the pilot phase of the study, items with inter-item correlations of < .20 or > .70 were reviewed. Inter-item correlations of < .20 may signify a lack of relationship with other items on the scale while inter-item correlations of > .70 may suggest content redundancy (Gable & Wolf, 1993; Munro, 2005; Waltz et al., 2005). The mean inter-item correlation for the subscales of the revised version and final version of the NASC-CDM scale did not exceed .70 but several inter-item dyads did top .70 and thus, were reviewed for content redundancy. No inter-item dyad correlation fell below .20.

Results of this analysis answered research question three affirmatively. Reliability coefficients for both subscales of the revised NASC-CDM scale were satisfactory

(DeVellis, 2003). Cronbach's alpha and item-analysis results were similar between the first and second samples. These findings provide evidentiary support for the internal consistency or stability of the NASC-CDM scale.

Predictions using Multiple Linear Regression

Standard multiple linear regression analysis (SMLR) was used to examine the predictive relationship of several demographic variables (independent or predictor variables) with composite scores on the revised NASC-CDM, SC and NASC-CDM, A subscales (dependent or outcome variables). Demographic questions used for SMLR in the main-testing phase were similar to those used in the pilot-testing phase in order to facilitate ease of comparison. These included age, gender, program type, program format, employment as a nursing assistant, prior college experience, and participation in an externship program.

Preliminary analyses, using independent samples *t*-tests, were conducted on dichotomous independent variables to reveal significant differences of mean scores (Munro, 2005) on the self-confidence and anxiety subscales. Variables with nonsignificant *t*-test results, indicating no differences between the groups, were excluded from regression analysis.

The independent variable, age, was statistically transformed using logarithm transformation in light of its highly positive skew and leptokurtic appearance (Munro, 2005; Tabachnick & Fidell, 2007). Despite improvement after statistical transformation these data remained nonnormal (Shapiro-Wilk = .79(221), $p < .001$; skewness = 1.34; and kurtosis = .69). Nine outliers were replaced with the highest value which was not an outlier with no improvement in normality (Shapiro-Wilk = .79(221), $p < .001$; skewness

= 1.24; and kurtosis = .30). Original age data were subsequently recoded in a dichotomous variable for use in SMLR analysis (Tabachnick & Fidell, 2007).

Independent samples *t*-tests were conducted separately to compare mean scores for each of the revised NASC-CDM subscales for several variables: age (18 to 31 years or 32 to > 45 years), gender (male or female), program type (associate or baccalaureate), participation in an externship program (yes or no), and current employment as a nursing assistant (yes or no). The question related to participation in an externship program included a third response option, *I am not familiar with this type of program*; however, only three of 242 respondents who fully completed the survey package chose this option. These three cases were excluded from the *t*-test analysis for this variable. Nonsignificant Levene tests for each variable, except one, assumed equal variance. Equal variance was not assumed for the demographic question for both subscales related to participation in an extern program; thus, the appropriate *t*-test statistic was reported. See Appendix CC for *t*-test results.

Independent samples *t*-test results from the second sample were similar to those from the first sample with two exceptions. First, *t*-test results for males and females indicated no significant difference in mean scores for both subscales of the revised NASC-CDM scale. Hence, gender was not included as an independent variable in SMLR analysis. Second, there was a significant difference in mean self-confidence and anxiety scores for students who participated in externship programs and students who did not. Because of these results, externship participation was included in SMLR runs.

Three independent variables were included in regression analysis using pairwise exclusion. Variables included were format of program (measured as accelerated,

evening/weekend, traditional, and year-round), amount of prior college experience (measured as none, 1 to 2 semesters, 3 to 4 semesters, greater than 4 semesters, and completion of a college degree) and participation in an extern program (measured as yes or no). Nominal and ordinal level independent variables were recoded into DUMMY variables for interpretability in regression analyses. Evaluation of assumptions (Munro, 2005; Pallant, 2007; Tabachnick & Fidell, 2007) was completed related to each subscale independently prior to the final SMLR analysis.

Adequate sample size was assumed with approximately 230 student respondents for each subscale. Data did not violate the multicollinearity assumption, as no correlations exceeded .70, no tolerance was less than .10, and no variance inflation factor (VIF) exceeded 2. Normality of total scores was previously examined and did not violate this assumption. Additionally, normality and linearity of data were assumed by reviewing the regression standardized residual plots. Normal P-P plots for both subscales indicated a reasonably straight line. Scatterplot swarms revealed randomness, with no discernible patterns of concern. Examination of residual scatterplots revealed no obvious funneling; thus, homogeneity of variance or homoscedasticity was assumed.

Mahalanobis distance ($p < .001$) was used from the residual statistics to determine multivariate outliers. For the self-confidence subscale, 12 cases exceeded the critical value of 26.12 with a maximum value of 53.56. For the anxiety subscale, 11 cases exceeded the critical value or 26.12 with a maximum value of 53.16 for the anxiety subscale. These 12 and 11 cases respectively were excluded from subsequent regression runs. Nonsignificant results of the Durbin-Watson statistic (2.06 for the self-confidence

subscale and 1.98 for the anxiety subscale) indicated no violation of the assumption independence of errors.

Results of early SMLR runs indicated, for the question about amount of college experience, that the recoded variable for 3 to 4 semesters of college prior to beginning a nursing program (New for prior college2) appeared to contribute significantly to the regression model. New for prior college2 was therefore included in subsequent SMLR runs. The recoded variable for the completion of a college degree (New for prior college4) was also included in subsequent SMLR runs because of its contribution to the regression model during the pilot phase of the study and in order to make adequate comparisons between the first and second samples. Participation in an extern program appeared to contribute to the regression model and thus was included in subsequent runs. During early runs, format of program did not contribute to the regression model; this variable was not included in subsequent runs.

Results of SMLR revealed no statistical significance in the overall regression model for the self-confidence subscale and minimal statistical significance in the overall regression model for the anxiety subscale. ANOVA tables for the NASC-CDM, SC subscale indicated, $F(3, 223) = 1.65$, $p = .18$ and for the NASC-CDM, A subscale revealed, $F(3, 225) = 2.64$, $p = .05$.

R^2 for both subscales confirmed the regression model (including participation in extern program, New for prior college2, and New for prior college4) explained only 2.2% and 3.4% of the variance in total scores on the self-confidence and anxiety subscales respectively. Evaluation of the Beta standardized coefficients revealed the amount each independent variable contributed to the model. Beta coefficients indicated participation

in an extern program was the largest contributor to the overall regression model. Nonetheless, these findings were not statistically significant for the NASC-CDM, SC subscale and were barely statistically significant for the NASC-CDM, A subscale. See Table 14 for the coefficients table results.

Table 14. Results of Coefficients Table for Standard Multiple Regression Analysis, Main

Scale Name	Independent Variable	Beta	*t*	Significance, *p*
NASC-CDM, SC (n = 229)	Participate in extern program	.12	1.82	.07
	New for prior college2	-.08	-1.21	.23
	New for prior college4	.01	.06	.95
NASC-CDM, A (n = 231)	Participate in extern program	-.13	-2.04	.04[a]
	New for prior college2	.94	1.38	.17
	New for prior college4	-.08	-1.15	.25

a, Statistically significant contribution to the regression model.

Because participation in an extern program contributed most to the regression model, SMLR was rerun for each subscale including only this independent variable. Results indicated no statistical significance of the overall model for the self-confidence or the anxiety subscales. Self-confidence: $F(1, 226) = 3.34$, $p = .07$; R^2 = 1.4% total variance explained; Beta coefficient = .12, $t = 1.83$, $p = .07$. Anxiety: $F(1, 228) = 3.51$, $p = .06$; R^2 = 1.5% total variance explained; Beta coefficient = -.12, $t = -1.87$, $p = .06$.

Chapter Summary

This chapter discussed the results of data analysis conducted during the pilot- and main-testing phases of the study. Participation by nursing programs was examined. Characteristics of the first sample (fall 2010 semester) and second sample (spring 2011 semester) of pre-licensure undergraduate nursing students who completed the survey package were described. Students in the first sample completed the 41-item pilot version of the NASC-CDM scale while students in the second sample completed the 32-item revised version of the NASC-CDM scale. Data analysis results were explained in a manner that answered the three research questions which framed the methodology of the study. Statistical analyses revealed consistent findings between the first and second samples for the newly designed 6-point Likert, self-report NASC-CDM scale. The final chapter discusses the findings of the study as well as strengths and limitations and explains conclusions and recommendations.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this investigation was to develop, test, and validate a quantitative self-report, Likert-type scale that measures nursing students' perception of their levels of self-confidence and anxiety during the process of clinical decision making (CDM). Items on the scale entitled the Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM) scale were generated using deductive inquiry. After extensive literature review, the pilot version of the NASC-CDM scale contained 41 items and two subscales within four content domains. These subscales relate to two emotional barriers which influence the process of CDM in novice nurses: self-confidence and anxiety (Haffer & Raingruber, 1998; O'Neill et al., 2005). In order to test the scale and begin the establishment of psychometric properties, data were gathered from two samples of pre-licensure undergraduate nursing students. The purpose of this chapter is to interpret the results of the study, discuss strengths and limitations, provide conclusions, and propose recommendations.

There are six sections within the chapter. Section one discusses results of the findings of the study. Similarities and differences between the two samples with regard to sociodemographic questions are explained. Conclusions related to validity testing, reliability assessment, and ancillary findings are explicated. Section two addresses the relationship between results of the study and the two conceptual frameworks which undergirded the inquiry. The third and fourth sections discuss strengths and limitations of the study. Section five reviews implications for nursing education and nursing practice. The final section examines recommendations for further research.

Discussion of Study Results

Characteristics of Samples

A convenience sampling framework was used for this study. The first sample (fall 2010) was drawn from a population of pre-licensure nursing students from six baccalaureate and six associate degree programs from the northeastern portion of the United States. The second sample (spring 2011) was recruited from the same population and included students from eight baccalaureate and six associate degree programs. Students in the second sample were recruited from the same geographic area as the first but were from different nursing programs.

A number of student respondents, during both phases, did not complete the full survey package and were excluded from data analytic procedures. However, comparisons were made between survey completers and noncompleters to examine intrinsic differences on sociodemographic variables. Results of these comparisons for each sample are presented in chapter four.

Comparisons were also completed to evaluate the homogeneity of students who comprised the first and second samples. Despite having been drawn from the same population, the first and second samples were not statistically equivalent on nearly every sociodemographic variable. See Appendix DD for characteristics and comparisons of the pilot and main samples. A total of 545 student respondents among two groups were compared on eight sociodemographic variables. Only two variables, gender and ethnicity, did not reveal statistically significant findings.

Differences between groups were as follows. Nursing students in the second sample were younger than students in the first sample. Approximately 60% of students from the

second sample were between the ages of 21 and 23 years. Interestingly, the percentage of students enrolled in ADN versus BSN programs was reversed between the first and second samples. The first sample consisted of 63.4% ADN students and 36.6% BSN students while the second sample consisted of 30.6% ADN students and 69.4% BSN students. Program format also revealed significant results. Ninety percent of students in the second sample attended traditional, two semesters per academic year programs while only 46% of those in the first sample attended traditional programs.

Overall, results of comparisons between the first and second samples revealed heterogeneous groups. The majority of students in the first sample were older, attended ADN programs in traditional, accelerated or evening/weekend format, completed more than four semesters of college or completed a college degree before beginning their nursing program, did not work as a nursing assistant, and did not participate in an extern program. Conversely, the majority of students in the second sample was younger, attended BSN programs in traditional format, and completed little to no semesters of college before beginning their nursing program. The majority did not participate in an extern program. One half of student respondents in the second sample worked as a nursing assistant; one half did not.

In order to assess the representativeness of the study samples with the overall nursing student population, national statistics on sociodemographic variables were reviewed. Among pre-licensure nursing programs (ADN and BSN) approximately 87% of students are female and 13% of students are male (National League for Nursing, 2011). Descriptive statistics for both study samples for gender revealed approximately 93% were female and 7% were male. Approximate frequencies of ethnicity among pre-licensure

nursing students are described as: 74% Caucasian, 12% African American, 8% Hispanic, 6% Asian, and 1% American Indian (Kaufman, 2011; National League for Nursing, 2011). Both study samples were similar to the national statistics for ethnicity with Caucasian frequencies being somewhat higher and Hispanic and African American frequencies being somewhat lower.

Sixty percent of pre-licensure students in the United States graduate from ADN programs while 37% graduate from BSN programs (National League for Nursing, 2011). Percentages from the fall 2010 sample were consistent with these national statistics. Seventy percent of students enrolled in BSN programs are < 25 years of age while only 26% of students enrolled in ADN programs are < 25 years of age. Only 14% of students enrolled in BSN programs are > 31 years of age while 49% of students enrolled in ADN programs are > 31 years of age (National League for Nursing, 2011). Descriptive statistics from both study samples were consistent with these frequencies.

Speculations were made about the heterogeneity of groups. Data collection procedures were identical during both phases of the study to maintain consistency. Classrooms visits for the purpose of student recruitment were completed equally between ADN and BSN programs during the fall 2010 and spring 2011 semesters. Perhaps faculty-contacts within the baccalaureate programs during the spring 2011 semester were more invested in participation; hence, encouraging more student involvement. Given that BSN but not ADN students are required to study the research process (American Association of Colleges of Nursing, 2008; National League for Nursing, 2008), both BSN students and faculty may have embraced more fully participation in a dissertation research study. The potential higher amount of commitment to the research study amid

traditional baccalaureate nursing faculty during the spring semester may have accounted for the higher numbers of younger students with less prior college experience.

The lack of homogeneous groups did not discernibly influence results between the pilot-testing and main-testing phases. Data analysis results regarding scale validity, scale reliability, and linear regression were comparable from fall 2010 to spring 2011. The lack of homogeneity may have in fact strengthened findings of the study and enhanced generalizability.

Conclusions of Validity Testing

Two research questions addressed the examination of the validity of the two NASC-CDM subscales. Construct validity was examined through the use of EFA and convergent validity. To maintain consistency and promote ease of comparison, similar data analysis procedures were used during the pilot- and main-testing phases.

Exploratory Factor Analysis Results

The original set of items on the NASC-CDM scale was derived from the possible universe of content within the domain of CDM (Gable & Wolf, 1993). Items were subjected to critical review by an internationally known panel of CDM experts to ensure the scale was content valid. Forty-one items, within four content domains, comprised the pilot version of the scale. Although it was recognized the process of CDM is an iterative one, the content domains were named in sequential fashion from the acquisition of cues, through consideration of decision options, through intervention, and finally to reflection.

Investigating information and cues was the first content domain. This domain contained items related to acquisition of cues, collecting data, listening, knowing the patient, observing nonverbal cues, and using intuition (Baxter & Boblin, 2008; Elstein et

al., 1972; Rew, 2000; Tschikota, 1993). The pilot version contained nine items within this domain: Q1, Q8, Q14, Q15, Q22, Q28, Q35, Q37, and Q40.

Interpreting information and meanings was the second content domain. This domain contained items related to interpreting the meaning of cues, attending to the relevancy of information, and using knowledge from past experiences (Banning, 2008; Benner, 2001; Elstein et al., 1978; Girot, 2000). The pilot version contained ten items within this domain: Q4, Q6, Q7, Q10, Q17, Q18, Q24, Q25, Q26, and Q27.

Integrating findings and illuminating options was the third content domain of CDM. Items which comprised this domain related to analyzing the full clinical picture, considering decision options, examining the risk-benefit ratios of decision options, and utilizing resources (Baxter & Rideout, 2006; O'Neill et al., 2006; A. H. White, 2003). The pilot version contained twelve items within this domain: Q3, Q5, Q13, Q16, Q20, Q29, Q31, Q32, Q33, Q34, Q38, and Q39.

Intervening and reflecting on the decision process was the final content domain. Items included in this domain related to taking action upon decision options being considered, evaluating outcomes, and being accountable for the actions taken (Bakalis, 2006; Jenkins, 1985a; Standing, 2007). The pilot version contained ten items within this domain: Q2, Q9, Q11, Q12, Q19, Q21, Q23, Q30, Q36, and Q41.

The EFA results from the first sample data revealed a stable factor solution for both NASC-CDM subscales. The four factors of the self-confidence subscale were labeled: (I) using resources to gather information, (II) using information to see the big picture, (III) knowing and acting, and (IV) listening fully. The three factors of the anxiety subscale were labeled: (I) using resources to gather information and listening fully, (II) knowing

and acting, and (III) using information to see the big picture. Because EFA resulted in more than one factor, the scale is referred to as multidimensional (Comrey et al., 2000).

Nine items were reduced from the scale based on EFA results from the first sample. The reduced items ranged across each of the four content domains: Q8, Q28, and Q 37 were deleted from the first content domain; Q25 and Q26 were removed from the second content domain; Q33 was removed from the third content domain; and Q12, Q21, and Q41 were reduced from the fourth content domain. Rationale for the reduction of these items is presented in chapter four.

The EFA results from the second sample data revealed a stable three factor solution for both NASC-CDM subscales. Factor structures remained consistent between the first and second samples with the exception of factors I and IV for the NASC-CDM, SC subscale. These two factors merged with the second sample. Factor labels remained consistent between the pilot-testing and main-testing phases. Final factor labels were: (I) using resources to gather information and listening fully, (II) knowing and acting, and (III) using information to see the big picture.

Five items were reduced from the scale based on EFA results from the second sample. Items reduced ranged across three of four content domains: Q1 and Q 40 were deleted from the first content domain; Q6 and Q27 were removed from the second content domain; and Q2 was reduced from the fourth content domain. No items were removed from the third content domain on the revised version of the NASC-CDM scale. Rationale for the reduction of these items is presented in chapter four.

A primary tenet of factor analytic procedures notes factor structures are revealed when like items group together. Items should correlate strongly with similar ones and

weakly with those that are dissimilar. Because of this principle, the resultant factors emerged as thematic rather than sequential (Comrey, 1988; Munro, 2005). Three stable factors (themes or dimensions) were established from the EFA results, indicating the NASC-CDM scale was multidimensional.

Items on the NASC-CDM subscales did not remain in their content domains once the multidimensional factor structures were achieved. Content domains were created based upon the sequence of the CDM process, not by theme (Banning, 2008; Elstein et al., 1972; Thiele et al., 1991). Factor analytic experts note stable factor structures are not linear but dimensional (Comrey et al., 2000; DeVellis, 2003). Hence, the incongruence between content domain structure and factor structure was not entirely unexpected. See Appendix EE for the overlap of factor structures and content domains for the pilot and main sample.

During the design of the study it was determined items should remain identical on both subscales of the NASC-CDM scale. This strategy maintains the intent of measuring levels of self-confidence *and* anxiety during the process of CDM. For easier interpretation and consistency, items should be placed within only one dimension. After thorough review of the final 27 items on the NASC-CDM scale, 22 items revealed substantial loadings onto the three dimensions between the first and second sample. Five items; however, warranted further review. These items are discussed.

Each statement on the NASC-CDM scale begins with, *I am ___ self-confident and ___ anxious in my ability to…* The declarative portions of the statements are noted below. Information about factor loadings with samples and rationale about item placement in a factor is provided.

Q9: Implement the ‘best’ priority decision option for the client’s problem. This item revealed secondary loadings on the ‘knowing and acting’ and ‘using information to see the big picture’ factors of the self-confidence subscale and loaded substantially on the ‘knowing and acting’ factor of the anxiety subscale with the first sample. It loaded substantially on the ‘using information to see the big picture’ factor of the self-confidence subscale but loaded on the ‘knowing and acting’ factor of the anxiety subscale with the second sample. The decision was made to retain the item because of its strong theoretical importance to prioritization of decision options (Jenkins, 1985a; Tschikota, 1993). Based on its content, the item was placed most appropriately in the ‘knowing and acting’ factor (II).

Q23: INDEPENDENTLY make a clinical decision to solve a client’s problem. This item loaded very strongly on the ‘knowing and acting’ factor for both subscales with the first sample. With the second sample, it loaded on the ‘knowing and acting’ factor of the anxiety subscale but loaded on the ‘using information to see the big picture’ factor of the self-confidence subscale. Question 23 was ultimately placed in the ‘knowing and acting’ factor (II) because of its inherent affinity to the action component of the CDM process (Baxter & Boblin, 2008).

Q29: Correlate physical assessment findings with the client’s nonverbal cues to see if they match or don’t match. This item achieved the smallest loadings on the ‘knowing and acting’ factor of the self-confidence subscale with both samples. It loaded substantially on the ‘using resources to gather information and listening fully’ factor of the anxiety subscale with both samples. Because the item loaded substantially on the

‘using resources to gather information and listening fully’ factor, and based on its content (Tanner, 2006; A. H. White, 2003), it was placed within this factor structure (I).

Q31: Use my knowledge of diagnostic tests, like lab results or x-ray findings, to help create a possible list of decisions I could implement. This item loaded substantially on the ‘using information to see the big picture’ factor of both subscales with the first sample. With the second sample, it loaded substantially on the ‘knowing and acting’ factor of the self-confidence subscale but revealed secondary loadings between the ‘using information to see the big picture’ factor and the ‘knowing and acting’ factor of the anxiety subscale. Based on the content of the item (Brooks & Shepherd, 1990; Standing, 2007), it was placed with similar items within the ‘knowing and acting’ factor (II).

Q38: Incorporate personal things I know about the client in order to make decisions in his or her best interest. This item loaded substantially on the ‘knowing and acting’ factor of the self-confidence subscale with the first sample. On the anxiety subscale with the first sample and on both subscales with the second sample, the item loaded strongly on the ‘using resources to gather information and listening fully’ factor. Because the item infers using the client as a resource as well as listening to what the client says (Rew, 2000; A. H. White, 2003), this item was placed in the ‘using resources to gather information and listening fully’ factor (I).

Despite heterogeneity among the two samples used to test the NASC-CDM scale, these differences did not demonstrably impact EFA results. Statistical results were in fact strikingly similar. Comparable EFA results between two heterogeneous samples and stable factor solutions during both fall 2010 and spring 2011 semesters provided evidentiary support the NASC-CDM subscales are construct valid (Comrey et al., 2000).

Convergent Validity Results

The examination of relationships between the two subscales of the NASC-CDM scale and two established psychometrically sound scales addressed convergent validity. Scores on the NASC-CDM, SC were correlated with scores on the GSE scale. Scores on the NASC-CDM, A were correlated with scores on the GAD-7 scale. Pearson *r* correlation coefficients were computed.

The researcher anticipated a positive correlation of $\geq .50$ between the NASC-CDM subscales and their respective established scale. When considering convergent validity, a positive correlation in the range of .50 is respectable for a newly designed scale (Gable & Wolf, 1993; Waltz et al., 2005). It is recognized the level of statistical significance is influenced by sample size (Huck, 2004; Polit & Beck, 2008).

Results of these computations revealed a stronger, more positive correlation between the NASC-CDM, SC subscale and GSE scale from the first to the second sample, with the Pearson *r* exceeding the goal of $\geq .50$. Students with higher amounts of self-confidence on the NASC-CDM, SC subscale showed higher levels of general self-confidence on the GSE scale. This was an anticipated finding and provided evidence to support the convergent validity of the self-confidence subscale.

Pearson *r* computations to assess the relationship between the NASC-CDM, A and GAD-7 scale revealed a weaker, less positive correlation from the first to the second sample, with the Pearson *r* falling short of the $\geq .50$ goal. While the decline in correlation was not substantial (from approximately .50 to approximately .40) it was not anticipated. The Pearson *r* was; nonetheless, statistically significant and correlations did flow in a positive direction. It is acknowledged that statistical significance is influenced by sample

size. Further, statistical significance does not necessarily infer meaningfulness (Munro, 2005; Polit & Beck, 2008). This lower correlation was an unexpected finding and provided incomplete support for the convergent validity of the anxiety subscale.

Reasons for the decline in the correlation between the NASC-CDM, A subscale and GAD-7 scale were considered. Examination of mean scores on the NASC-CDM, A subscale and GAD-7 scale indicated several facts. Mean scores on the GAD-7 scale remained consistent between the fall and spring samples (approximately 9 $\pm$ 5.5 to 8 $\pm$ 5.3 respectively). Mean scores on the NASC-CDM, A subscale declined between the fall and spring samples (approximately 83 $\pm$ 25.4 to 78 $\pm$ 23.1 respectively). Mean scores were recalculated during the pilot phase after the nine items were reduced. This recalculation allowed for easier comparisons between the first and second sample. There was no appreciable change in the high alpha coefficient for reliability on either subscale after the removal of nine items from the pilot version of the scale. Such findings suggested lower mean scores on the NASC-CDM, A subscale were the explanation for the lower Pearson *r* value.

Attempts were made to maintain constant study conditions and diminish variability between the two samples. For instance, students were recruited from the final two clinical courses during both pilot and main phases of the study. Student respondents in both phases were enrolled in ADN and BSN programs. Clinical content to which students were exposed remained reasonably consistent between the fall and spring samples. Despite attempts at constancy, variability did occur. Several explanations were considered for findings related to lower anxiety subscale scores for the spring sample.

First, age frequently influences anxiety (Titov et al., 2009). Often, existing instruments are normed or standardized for age; as was the case with the GAD-7 scale during validation and standardization studies. Statistically significant differences were found among categorical age groups with participants in the general population. Ages ranged from 14 to > 75 years. The investigators acknowledged this result as an expected association (Löwe et al., 2008). Examination of results from the independent samples *t*-test in this dissertation research indicated no difference in mean scores on the NASC-CDM, A subscale between younger (age 18 – 31) and older (age 32 - > 45) students. Therefore, age may not have influenced lower anxiety scores for the spring sample.

Second, higher numbers of BSN students in the second sample may have influenced NASC-CDM, A subscale scores. If BSN students were less anxious than ADN students, mean scores during the spring 2011 semester would have been lower. Examination of independent samples *t*-test results indicated BSN students actually scored higher on the NASC-CDM, A subscale than did their ADN counterparts. Therefore, higher numbers of BSN students were not likely an influence on lower anxiety scores during the spring 2011 semester.

Third, the nine items reduced from the pilot version may have been items causing students appreciably more anxiety. Thus when these items were reduced, mean scores would have decreased. These nine items were reviewed. Their content was not believed to have substantially impacted the change in mean scores from fall to spring.

Fourth, response set bias may have influenced results with the first or second sample. Student respondents during the fall 2010 semester may have inflated their responses regarding anxiety or during the spring 2011 semester minimized their perception of

anxiety. Respondents may have provided what they believed were socially acceptable answers (Rust & Golombok, 2009). Response bias is believed to be a plausible influence on mean anxiety scores and thus, an influence on the lower Pearson *r* correlation coefficient from fall 2010 to spring 2011.

One final reason was considered for differences in anxiety subscale scores from the first to the second sample. True differences in levels of anxiety related to the process of CDM may have influenced scores. Student respondents in both samples were enrolled in one of their final two clinical courses and clinical content within those courses was similar. In spite of this consistency, students during the fall semester perceived higher levels of anxiety with CDM than did students during the spring semester.

Conclusions of Reliability Testing

One research question addressed the assessment of reliability of the two NASC-CDM subscales. To maintain consistency and promote ease of comparison, similar data analysis procedures were used during the pilot- and main-testing phases of the study. The alpha coefficient was used to assess the reliability of the NASC-CDM subscales. Scale development experts note an alpha of .70 is acceptable for a newly designed affective scale (DeVellis, 2003; Rust & Golombok, 2009).

The alpha coefficients met psychometric criteria for newly designed instruments. High alpha coefficients for both subscales indicated variance in scores was attributed to the measurement of true score and not the measurement of error (DeVellis, 2003; Rust & Golombok, 2009). Such findings lend support to a high degree of internal consistency and suggest the NASC-CDM subscales do in fact measure the constructs of self-confidence and anxiety during the process of CDM.

It is acknowledged that higher numbers of items on a scale, alpha factoring usage, and large sample size generally result in higher reliability coefficients (Gable & Wolf, 1993; Tabachnick & Fidell, 2007). Therefore, because the revised version and final version of the NASC-CDM scale contained 32 and 27 items, because alpha factoring was the factor extraction method utilized, and because sample numbers were 303 (fall) and 242 (spring), the alpha reliability coefficient was likely inflated. No appreciable change in alpha was noted if any item was deleted. This finding may be a function of the fairly large numbers of items on the NASC-CDM scale and large sample size.

Ancillary Findings

Independent Samples *t*-test Results

Prior to standard multiple linear regression (SMLR) analysis, independent samples *t*-tests were conducted using dichotomous sociodemographic variables and mean scores on the NASC-CDM subscales to evaluate group differences. Several interesting findings are discussed. Student data from the second sample revealed those employed as nursing assistants had higher levels of self-confidence during the process of CDM than those not employed as nursing assistants. Though not statistically significant, data from the first and second samples revealed students employed as nursing assistants consistently indicated lower levels of anxiety during the process of CDM than those not employed as nursing assistants.

Data from the first and second samples indicated student respondents who participated in extern programs perceived higher levels of self-confidence and lower levels of anxiety during the process of CDM than those who did not participate in extern programs. These results were not statistically significant for the fall 2010 sample but

were statistically significant for the spring 2011 sample. Moreover, mean scores on the self-confidence subscale (fall 2010 and spring 2011) were higher for those who participated in extern programs than for those employed as nursing assistants. Mean scores on the anxiety subscale (spring 2011) were lower for those participating in extern programs than for those employed as nursing assistants.

Presumptions were made about these findings. Results of the study provide evidence to support the advantage of nursing students working as nursing assistants and participating in extern programs. Based on comparisons between groups, findings revealed employment as a nursing assistant was beneficial to students' perception of their levels of self-confidence and anxiety while making clinical decisions. Further, involvement in an extern program was even more beneficial to the enhancement of self-confidence and reduction of anxiety among nursing student respondents. These findings are consistent with current literature related to student extern program outcomes (Redding & Flatley, 2003; Ruth-Sahd, Beck, & McCall, 2010).

A primary tenet of student nurse extern programs is externs work to emulate the registered nurse (RN) role instead of functioning in a nursing assistant capacity. Student nurse externs have opportunities to collaborate with RN preceptors, discuss decision making, and practice this burgeoning skill (Cantrell & Browne, 2005; Ruth-Sahd et al., 2010). Nursing assistants, on the other hand, may not have opportunities to engage in clinical decision making. Nursing programs and clinical practice arenas would be well-served to collaborate and institute quality nursing assistant and extern programs for student nurses. It appears the NASC-CDM scale would be useful as a tool to measure

levels of self-confidence and anxiety during the process of CDM in nursing students employed as nursing assistants and those involved in student extern programs.

Multiple Linear Regression Results

During data analysis from the first and second samples, SMLR was used to determine if several sociodemographic variables demonstrated predictive value in explaining scores on the NASC-CDM subscales (Tabachnick & Fidell, 2007). Four independent variables with strong theoretical relationships to self-confidence, anxiety, and CDM were included in the analysis from the first sample: gender, age, program format, and amount of college experience prior to beginning a nursing program. Although results revealed the completion of a college degree prior to entering a nursing program contributed most substantially to the regression model, no significant predictive ability was found among the variables included and self-confidence and anxiety scores.

Three independent variables with theoretical relationships to the constructs of the study were included in the analysis from the second sample: program format, amount of college experience prior to beginning a nursing program, and participation in an extern program. Results indicated participation in an extern program contributed most considerably to the regression model but was not statistically significant as a predictor of self-confidence scores. This predictor variable was barely significant to predict anxiety scores. SMLR analysis was rerun to include only participation in an extern program as the predictor variable; it had no predictive value toward scores on either NASC-CDM subscale.

Sociodemographic questions were considered thoughtfully during the design of the study. An unanticipated finding was that no sociodemographic variable was meaningful

in predicting scores on the subscales of the NASC-CDM scale. Consequently, sociodemography did not carry the predictive weight that was presumed with regard to students' perceptions of their levels of self-confidence and anxiety while making clinical decisions.

Because no quantitative instrument exists which measures constructs similar to those of the NASC-CDM scale, comparison of the SMLR findings with current literature was difficult. Hoffman et al. (2004) concluded age was not a predictor of the number of clinical decisions make by nurses. Ruth-Sahd et al. (2010) concluded self-confidence was enhanced in student nurses who participated in an extern program.

Open-Ended Question about NASC-CDM Scale

During the pilot-testing phase, student respondents were asked one open-ended question along with five closed-ended questions to assist the researcher with refinement of the scale. Interestingly, 12 student comments did not relate at all to the NASC-CDM scale but rather recounted other factors which influence their level of self-confidence or anxiety in the clinical practicum setting. Such factors as number of clinical hours, clinical experiences, overall nursing student stress, fatigue, and faculty member behavior resounded strongly in the comments.

Several notable quotes are included here. One student commented, "[My] clinical instructor is easy to approach but there are clinical instructors that make the student freak out and not want to ask questions for fear of being chastised." Another wrote, "In my experience, and in some of my classmates, the biggest factor that contributed to anxiety in the clinical setting was contingent on who the instructor was." "I would have liked to have seen questions on how fatigued, stressed SNs [student nurses] are going into the

clinical site…this really has affected my ability for recall, applying new knowledge, and overall performance. This decreases my self-confidence and increases my anxiety tenfold!"

The importance of these comments must be acknowledged. The NASC-CDM scale is intended to measure students' perceptions of their levels of self-confidence and anxiety during the process of CDM. Despite this fact, student respondents felt compelled to include comments about factors which affect their overall level of self-confidence or anxiety in the clinical setting. Such remarks speak loudly about influences on students' emotional state during clinical practicum experiences. Comments presented by student respondents in this study resonate similarly to factors which influence overall self-confidence and anxiety among nursing students in the clinical practicum environment (Baxter & Rideout, 2006; Haffer & Raingruber, 1998; Kushnir, 1986; Moscaritolo, 2009).

Relationship with Conceptual Frameworks

Two conceptual frameworks undergirded the development, testing, and validation of the NASC-CDM scale. One social learning theory (Bandura, 1977b, 1997) and two embedded theoretical nursing models (O'Neill et al., 2004a; O'Neill et al., 2005) provided the theoretical foundation for this methodological inquiry. Both frameworks related strongly to the constructs inherent to the study.

Congruent themes of fear, stress, anxiety, and a lack of self-confidence related to CDM are prevalent in the literature (Baxter & Rideout, 2006; O'Neill et al., 2004a; Standing, 2007). Rigorous lines of research cannot conclude undeniably whether lesser

amounts of anxiety promote self-confidence or whether higher amounts of self-confidence curb anxiety. Various authors argue each is the case. Despite this debate, the reality is that emotional barriers (self-confidence and anxiety) strongly affect novice clinicians (Haffer & Raingruber, 1998; O'Neill et al., 2006; K. A. White, 2009). In this section, results of the study and their relationship to the two conceptual frameworks are presents. Conclusions are inferred.

Social Cognitive Theory

The first theory which framed the study was social cognitive theory (SCT). There are numerous complex components of SCT. Those most similar with the intent of this study are self-reinforcement, self-efficacy, and emotional arousal (Bandura, 1986; Bandura et al., 1977). See Figure 1 on page 30 for a graphic depiction of these principles. Bandura (1977a) explains four sources of self-efficacy: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal (anxiety). Control over emotional and visceral arousal is a vital precept of SCT. Research studies validate there is reciprocity between the constructs self-confidence and emotional arousal (Bandura et al., 1988; Mellalieu et al., 2006; Ozer & Bandura, 1990).

Results of the study revealed an inverse relationship between students' perceived levels of self-confidence and anxiety during the process of CDM. Scores on both subscales during the pilot phase had a possible range from 41 to 246. The pilot version of the scale contained 41 items. Student respondents scored an average 161.42 $\pm$ 36.73 on the self-confidence subscale and an average 106.24 $\pm$ 32.72 on the anxiety subscale. Similar results were found during the main phase of the study. The revised version contained 32 items with a possible scoring range of 32 to 192. Student respondents

scored an average 126.88 ± 27.40 on the self-confidence subscale and an average 78.48 ± 23.01 on the anxiety subscale.

The result that students perceived higher levels of self-confidence and lower levels of anxiety during the process of CDM was an unanticipated finding. CDM literature related to novice practitioners supports the opposite is true (Bakalis & Watson, 2005; O'Neill et al., 2005; Standing, 2007). An expected finding; however, was scores on the NASC-CDM, SC and NASC-CDM, A subscales revealed an inverse relationship. There was a statistically significant, moderate to strong negative correlation for both samples between the scores on the NASC-CDM, SC and NASC-CDM, A subscales. The correlation finding is consistent with research literature.

It is difficult to determine whether student respondents' levels of confidence diminished their anxiety or whether their ability to control anxiety elevated their confidence. Because the intent of this study was to test, validate, and establish psychometric properties of the newly designed NASC-CDM scale, the researcher did not nominate a specific patient problem on which students based their responses. It is recognized if student responses were determined around a particular real-life or simulated patient situation, perceptions of the levels of self-confidence and anxiety may differ. Conclusions about these findings are discussed more fully in the section related to the embedded nursing models.

Clinical Decision Making and Novice Clinical Reasoning Models

The second framework foundational to the study was two embedded nursing models related to CDM. The purpose of the clinical decision making model (CDMM) is to illustrate the multidimensional CDM process of experienced nurses. Steps of the CDMM

include: data gathering, risk-benefit assessment, hypothesis generation, hypothesis selection, and nursing action. Important to this model is the concept of working knowledge; the body of knowledge gained from textbooks and experiences. Novice clinicians have limited working knowledge. An embedded model, partnered with the CDMM, is the novice clinical reasoning model (NCRM). This model identifies variables that influence the development of working knowledge in novice nurses. A lack of self-confidence and high anxiety are cited as two emotional barriers that influence the process of CDM in inexperienced clinicians (O'Neill et al., 2006; O'Neill et al., 2005).

Despite literature that supports diminished levels of self-confidence and increased levels of anxiety in nursing students during the CDM process (Lauri et al., 2001; Tanner, 2006; A. H. White, 2003) results of the study did not confirm this claim. Explanations for the unanticipated results were considered. First, students who find themselves in clinical practicum settings which are safe and nurturing may be more willing to practice the skill of CDM. More practice subsequently improves self-confidence and lessens anxiety (Baxter & Rideout, 2006; Jenkins, 1983; K. A. White, 2009). Student respondents in the study may have perceived their clinical settings as safe and nurturing. For this reason, they would rate their levels of self-confidence higher and their levels of anxiety lower.

Second, numerous authors cite the utilization of resources to assist with CDM as paramount for the novice nurse. Student respondents may have utilized a variety of resources in the clinical setting and therefore, perceived higher levels of self-confidence and lower levels of anxiety while making clinical decisions. Utilization of resources

include: nursing staff (Baxter & Boblin, 2008), nursing faculty members (Seldomridge, 1997), or evidence-based literature (Lauri & Salantera, 2002).

Third, more clinical experiences with real-life patient encounters enhance students' opportunities to work through the process of CDM. Overwhelmingly, experts in the area of CDM posit experience is vital to foster self-confidence and reduce anxiety arousal (Bakalis, 2006; Banning, 2008; Benner, 2001; O'Neill et al., 2004b). Students in this study were recruited from the final two clinical semesters of the curriculum and thus, may have experienced enough real-life patient encounters to have bolstered their self-confidence levels and diminished their anxiety levels. It is recognized students in beginning nursing courses may have responded differently to items on the NASC-CDM scale. Because the purpose of the study was instrument development, a specific patient experience for which students base their responses was not enlisted. Student respondents were asked to think about their experiences with CDM over the current semester.

Students in the pilot phase of the study were asked for feedback to help refine the NASC-CDM scale. One particular comment epitomized that novice practitioners often lack working knowledge. The student wrote: "As a novice nurse and having little experience, I thought about each question asked and re-framed it in my mind as; 'With my current knowledge, I am ___ confident…' The truth is that without real nursing experience the knowledge I have is most certainly lacking."

Strengths of the Study

Experts in the area of instrument development posit quantitative assessment tools should be "reliable, valid, standardized, and free from bias" (Rust & Golombok, 2009, p.

5). In order to accomplish these goals, it is imperative methodological studies conducted to test newly designed instruments have strong rational scientific designs. Careful consideration was given to study design to strengthen its procedures and enhance its findings.

The inclusion of strategies to improve response rate is noted as a strength of the study. Response rates for online surveys tend to be lower than when administered face-to-face (Cantrell & Lupinacci, 2007; Wright & Schwager, 2008). For this reason, the researcher intentionally built-in several ways to enhance numbers of respondents. Adequate numbers of respondents were vital for multivariate data analysis procedures and to maximize the potential for stable factor solutions during EFA (Comrey, 1978; Polit & Beck, 2008). A response rate of 20% was estimated for both the first and second samples. Actual response rates for the first sample (fall 2010) and the second sample (spring 2011) were 30.6% and 24.5% respectively.

Strategies used to improve response rate are discussed. First, the researcher visited 34 eligible nursing classes over the course of two semesters to recruit student participation. Second, all students received the initial survey invitation as well as two follow-up reminders, each were verbal and written. Third, the online survey platform used in the study is completely anonymous which may have positively influenced students' willingness to participate. Fourth, a strong rapport was built with faculty-contacts during both semesters of data collection. A strong rapport may have enhanced faculty members' willingness to participate fully. These faculty members may have encouraged greater student involvement. Many faculty-contacts discussed with their

students that engagement in nursing research is not only essential to their professional growth but also builds the body of nursing knowledge.

Another strength was the use of randomization when feasible. Gall et al. (2007) argue the use of random assignment is a quality technique to ensure equivalence and thus, strengthens study design. Methods used for randomization are discussed. First, all nursing program names were drawn randomly from slips of paper placed in a hat to determine their inclusion into either the pilot-testing or main-testing phase. Second, the three scales (NASC-CDM, GSE, and GAD-7) were selected randomly to determine their placement within one of three versions of the survey package. Versions of the survey package were identical except the three scales were placed in different orders. Third, at the time of survey deployment to a nursing program one of three versions of the survey package was drawn randomly. The chosen version of the survey package was deployed to all students in that nursing program.

Maintaining constancy of conditions was also a strength of the study. Polit and Beck (2008) note a lack of constancy increases extraneous variations and diminishes the strength of a study. Because data collection occurred with two samples over the course of two academic semesters, the researcher utilized identical methodological procedures. For instance, contact with course faculty, student recruitment, survey deployment, and survey reminding was completed in similar fashion for both pilot-testing and main-testing phases.

One final strength is related to differences among samples. Although the original presumption of study design was the fall 2010 and spring 2011 samples would be homogeneous across sociodemographic variables, this was not the case. The groups were

found to be statistically different in a number of ways. Differences among samples are acknowledged as a strength in light of the similarities of data analysis results despite dissimilarities of samples. These findings provide evidentiary support for the stability of the NASC-CDM scale across heterogeneous groups and thus, augment generalizability and improve external validity (DeVon et al., 2007; Gall et al., 2007).

Limitations of the Study

Though study design, sampling, procedure, measurement instruments, and statistical analysis were all considered carefully, limitations are inherent in any research study. Due to study design and inclusion criteria, nonprobability convenience sampling was necessary. Convenience sampling was used to enhance the likelihood of visiting as many programs as possible; however, not *all* eligible nursing classes were visited. That *all* eligible classes were not visited is, in itself, a limitation. The convenience sampling framework created selection bias (Polit & Beck, 2008; Rust & Golombok, 2009) and must be noted as a limitation of the study.

Additionally, the use of a convenience sampling framework limits the generalizability of findings (Gall et al., 2007; Polit & Beck, 2008). Nursing programs from four states within the northeast portion of the United States were invited to participate in the study. Therefore, findings may not be generalizable to undergraduate nursing students across the country and abroad. The two samples of pre-licensure nursing students used to test and validate the NASC-CDM scale were representative of the population of pre-licensure nursing students from which they were drawn. This similarity may contribute to enhanced generalizability (Huck, 2004).

Another limitation intrinsic to study design is that student respondents voluntarily completed the survey fully online. Because no contact occurred at the time of survey completion and because survey completion was completely voluntary, response rates were appreciably lower than if surveys were completed during face-to-face meeting time (Wright & Schwager, 2008). Furthermore, participants from the first sample (fall 2010) who chose to complete the survey package were inherently different in several ways from those who chose not to participate. Students voluntarily agreed or self-selected their participation in the study which also must be recognized as a limitation. Therefore, response and selection biases are cited as limitations of the study.

Other limitations of the study are described. Response set bias occurred if student respondents provided socially acceptable or extreme response answers to items. Gable and Wolf (1993) argue if the purpose and intent of the research, as well as practical uses of study results are explained to respondents and if the study situation is non-threatening, subjects should answer honestly: The incidence of faking should be low. If student respondents communicated during the completion of the online survey, contamination may have been a factor. Measurement error occurs in varying degrees during scientific inquiry. The NASC-CDM, brief GSE, and brief GAD-7 scales, that contained 41 (pilot version), 32 (revised version), 10, and 7 items respectively, should have diminished testing fatigue and thus, diminished measurement error (Gable & Wolf, 1993; Polit & Beck, 2008).

Implications for Nursing Education and Practice

Professional nurses as well as student nurses make numerous clinical decisions on a daily basis. Most authors concur that CDM is a skill paramount for the professional nurse to master. Most would also agree it is difficult to learn (Baldwin, 2007; K. K. Hughes & Young, 1990). Because the skill is cornerstone to professional nursing, learning the process of CDM must not begin after graduation but must be introduced, taught, and practiced in the safe confines of pre-licensure nursing programs.

The purpose of the study was the development and validation of a newly designed self-report Likert-type instrument. As a means to that end, three research questions were asked and answered. The development of the NASC-CDM scale represents a quantitative measure from which considerable knowledge can be gained about nursing students' perceptions of their levels of self-confidence and anxiety during the process of CDM. This section presents implications of study results for nursing education as well as nursing practice.

The NASC-CDM scale was designed for a number of intended uses. It was deliberately written in a generic manner to allow for utilization among different program types, different levels of students within a program, and varied clinical situations. The scale may be useful to evaluate changes in self-confidence and anxiety with CDM when used longitudinally across the curriculum. It could be used in a formative or summative fashion around real-life or simulated patient encounters. The NASC-CDM scale may also have a potential use in a pre- and post-test design surrounding clinical simulation or clinical practicum experiences. Although the purpose of the scale relates to these uses, confirmation of its merit in these situations will come only from its actual usage in these

situations. Results of studies which utilize the NASC-CDM scale will indicate its performance in a variety of situations across a variety of populations.

Most nurse educators would concede at times faculty and student perceptions of similar events differ. A primary implication for nursing education is nurse educators can utilize the scale to assess their students' perceptions of their levels of self-confidence and anxiety during the process of CDM. Items which comprise the scale were placed into three themes or dimensions based on EFA results from two samples. Therefore, nurse educators have the ability to not only measure self-confidence and anxiety levels broadly but also examine specifically in what areas students need assistance.

When nurse educators evaluate successfully where students' levels of self-confidence and anxiety lie, they can intervene with appropriate teaching-learning strategies (Itano, 1989). For instance, nurse educators might assess high levels of anxiety across dimensions as a barrier to students learning the process of CDM. Armed with this knowledge, teaching-learning strategies could be implemented to ensure a safe, calm environment (Baxter & Rideout, 2006; Moscaritolo, 2009; O'Neill et al., 2005) where students can practice the skill. Conversely, nurse educators may conclude low levels of self-confidence across all three dimensions are the obstacle to learning the process of CDM. In this case, strategies to foster self-confidence such as positive external reinforcement (Bandura & Locke, 2003) or the encouragement of positive self-talk (Mellalieu et al., 2006; Schunk & Pajares, 2005) might be employed.

Items on the NASC-CDM scale were placed within three dimensions based on EFA results. Nurse educators will have the ability to not only measure students' levels of self-confidence and anxiety with CDM in a broader context but also measure levels specific to

one of three dimensions. For example, students may indicate high levels of anxiety related to several items within the dimension ‘using information to gather information and listening fully’. The items producing high anxiety levels may be: Q14 - use active listening skills when gathering information about the client’s current problem, Q35 – ask the client’s significant other/family questions to gather information about the current problem, and Q38 – incorporate personal things I know about the client in order to make decisions in his or her best interest. Each of these items relates to gathering information through the use of therapeutic communication and engagement with clients and families. In this case, the nurse educator might use teaching-learning strategies with the student to improve communication and listening skills.

One implication is explicated for the use of the NASC-CDM scale within nursing practice. Nursing students nearing the completion of their programs may perceive higher levels of self-confidence and lower levels of anxiety during the process of CDM; as indicated by the results of this inquiry. However, upon commencement of their first professional nursing position, graduate nurses may again find themselves in affectively charged novice situations. Levels of self-confidence may fall and levels of anxiety may rise as graduate nurses realize the substantial accountability which accompanies the CDM process (Bakalis, 2006; Muir, 2004; Standing, 2007). The NASC-CDM scale could be utilized by nurse managers or RN preceptors to examine levels of two emotional barriers across three dimensions related to CDM.

Recommendations for Further Research

Empirical inquiry answers posed questions; it also generates new questions. This methodological study was no exception. Results of the study support the reliability and validity of the newly designed NASC-CDM scale and have begun the establishment of sound psychometric properties. Scientific inquiry; however, cannot end here. Two areas for further research are presented that would continue to build strong psychometrics for the scale. One area relates to inquiry which would continue validation of the NASC-CDM scale for advanced assessments of reliability and accruements of validity. The second area relates to research which would utilize the NASC-CDM scale within nursing education and practice.

Further Validation of the NASC-CDM Scale

This dissertation research developed and validated a quantitative self-report 6-point Likert scale that measures students' perceptions of their levels of self-confidence and anxiety during the process of clinical decision making. Two samples of associate and baccalaureate pre-licensure nursing students from four states within the northeastern portion of the United States were invited to participate in the study. Scale development experts agree the use of different samples to test measurement tools adds to the establishment of psychometric properties (DeVellis, 2003; Switzer et al., 1999).

In order to offer continued support for the reliability and validity of the scale, a third sample should be used to test the 27-item final version of the NASC-CDM scale. The researcher recommends the third sample be recruited from a different geographic region of the United States. Data from the third sample would be analyzed and compared with results from the first and second samples to assess similarities or differences. Congruent

findings would provide further evidence for the psychometric soundness of the NASC-CDM scale.

A second recommendation is to conduct a research study to ensure the NASC-CDM scale is discriminant valid. Discriminant validity, a component of construct validity, purports scales that measure theoretically unrelated constructs should correlate minimally (DeVellis, 2003; DeVon et al., 2007). Further investigation should explore the relationship between the constructs measured by the NASC-CDM scale and theoretically unrelated constructs. For instance, to ensure discriminant validity, composite scores on the NASC-CDM self-confidence subscale should be correlated with scores on a scale that measures an similar yet unrelated construct; self-esteem (Davidhizar, 1993; Kröner & Biermann, 2007). Low nonsignificant correlations would support the self-confidence subscale does not measure the construct of self-esteem. Correlation between the anxiety subscale and a similar yet unrelated construct should also be examined.

Research to determine norm-references or standardization of the NASC-CDM scale is a third recommendation for further inquiry. It is not necessary for all research instruments to be standardized or norm-referenced; however, such referencing increases interpretability and meaningfulness of the scale. It must be acknowledged that standardization is a complicated process and norming sample sizes must be very large in order to obtain stable results (Gall et al., 2007; Rust & Golombok, 2009). A study should be completed to establish standard scores for different groups of pre-licensure nursing students. Norming the NASC-CDM scale would allow nurse educators to compare their own students' scores with like students' scores. For example, standardization of scores could be norm-referenced for different program formats (accelerated, evening/weekend,

and traditional), gender, and curricular level (first semester nursing, second semester nursing, etc.).

Utilization of the NASC-CDM Scale in Nursing Education and Practice

It is recommended a second version of the NASC-CDM scale be developed for completion by nursing faculty members. Results of the current study revealed students surprisingly had higher levels of self-confidence and lower levels of anxiety during the process of CDM. Most experienced nurse educators' perception of students' levels of affective influences (self-confidence and anxiety) while making clinical decisions might not coincide with these findings. Few would argue that at times faculty perception and student perception of affective influences on clinical experiences differ. A faculty version of the NASC-CDM scale could be used to compare faculty perception with student perception related to the same clinical experience. If nursing faculty members are cognizant of students' levels of self-confidence and anxiety during the process of CDM, they can tailor strategies to facilitate learning most effectively this important skill.

The intent of the NASC-CDM scale's design was that nurse educators might use it with different levels of students, in various settings, and in different clinical situations. Until the NASC-CDM scale is tested in diverse settings and situations it is unknown how it will perform. Therefore, another area of further research is that the scale be used in scientific inquiry across the curriculum, with varied levels of students, in different real-life and simulated clinical situations. Results of these studies will accrue additional information about the performance of the scale as well as continue the establishment of psychometric properties.

One final recommendation is made for further research. Based on results from the regression analysis from the second sample data, participation in an extern program contributed to scores on the NASC-CDM subscales. Therefore, a suggested research inquiry is for the nursing practice arena to utilize the scale with student nurse externs. The NASC-CDM scale could be completed in a pre- and post-program fashion to measure changes in levels of self-confidence and anxiety during CDM as a result of participation in the program.

Chapter Summary and Conclusions

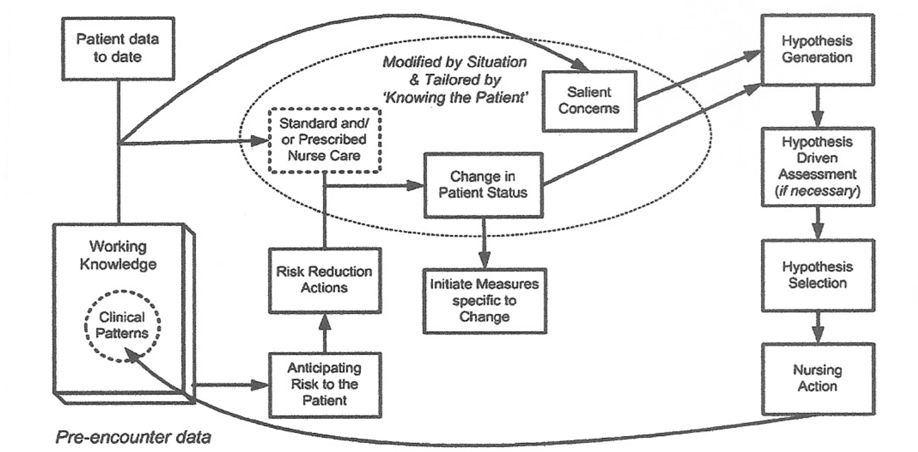
This chapter provided a summary of findings related to characteristics of the two samples, the assessment of reliability, and the accruement of validity. Miscellaneous results from *t*-tests and regression analysis were examined. Conclusions were made between results of the study and the two conceptual frameworks which formed its foundation. Strengths and limitations were explored. Implications of findings for nursing education and nursing practice as well as areas for further research were presented.

The NASC-CDM scale has important potential uses in nursing education as well as nursing practice. The establishment of sound psychometric properties for any newly designed quantitative measure is vital to its success. Results of this dissertation research have initially indicated that the scale is a reliable and valid measure of two emotional barriers, self-confidence and anxiety, which influence the process of CDM in novice nurse clinicians.

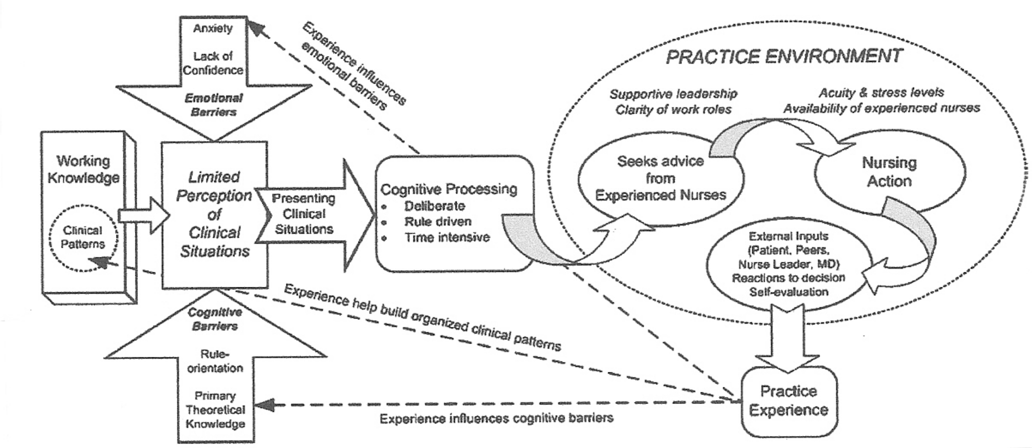
APPENDIX A

Nursing Models and Permission

Theoretical Framework Models Related to the NASC-CDM scale



Clinical Decision Making Model
(O'Neill, Dluhy, & Chin, 2005)



Novice Clinical Reasoning Model
(O'Neill, et al., 2005)

O'Neill, E., Dluhy, N. M., & Chin, E. (2005). Modelling novice clinical reasoning for a computerized decision support system. *Journal of Advanced Nursing, 49*, 68-77.

Nursing Models Permission

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Start page	68
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APPENDIX B

Initial NASC-CDM Scale Blueprint

Objectives	**Content-Domains**				
The student nurse will select the ***self-confidence level*** and ***anxiety level*** reflective of his or her ability to:	Investigating information and cues	Interpreting information and meanings	Integrating findings and Illuminating options	Intervening and Reflecting on the decision process	**Totals**
Gather information appropriate to a client problem.	14				**14**
Decipher meanings of cues present within a client problem.		8			**8**
Employ an intuitive-humanist stance when faced with a client problem.	4		3	1	**8**
Utilize pre-encounter data when faced with a client problem.	2	2		1	**5**
Analyze the information gathered within a client problem.		5			**5**
Utilize pre-requisite knowledge within a client problem.		3	3		**6**
Integrate data related to a client problem to formulate plausible decision options.			7		**7**
Deliberate plausible decision options and/or seek additional resource assistance for information validation or to assess decision options.			14		**14**
Implement the clinical decision.				8	**8**
Evaluate the effectiveness of the implemented clinical decision relevant to a client problem.				7	**7**
Total =	**20**	**18**	**27**	**17**	**82**

APPENDIX C

Initial Item-Pool of the NASC-CDM Scale by Content Domain

Think about this statement as you read each item:

“I am _________ self-confident and I am ___ anxious in my ability to:”

1 = *not at all*; 2 = *somewhat*; 3 = *equal and not equally;* 4 = *mostly;* 5 = *totally*

Content-Domain	Item
Investigating information and cues (20)	3. Implement two ways of gathering information related to the client’s problem. 5. Describe to my clinical nursing instructor the subjective data gathered from the client. 8. Quickly develop a therapeutic relationship with the client. 9. Gather at least two pieces of objective data about the client’s problem. 11. Listen carefully to what the client tells me about his or her health problem. 15. Perform the steps of a basic head-to-toe physical assessment. 19. State a reason why assessing the client’s nonverbal cues is important. 24. Ask directed questions to really get to know my client. 28. Summarize to my clinical nursing instructor the objective data gathered from the client. 33. Describe normal findings from the physical exam performed on the client. 34. Utilize family members when collecting data. 41. Identify a potential client problem by reading the client’s chart. 49. Explain to my nursing instructor abnormal client findings. 51. Implement active listening techniques. 57. Gather at least two pieces of subjective data from the client about the health problem. 58. Restate to my clinical nursing instructor the client’s signs and symptoms in my own words. 60. Identify important data about a client problem from information given in the shift-change report. 67. Tailor my assessment based on the client’s signs and symptoms of the current problem. 74. Ask the client’s significant others questions to collect data about the current problem. 82. Follow a feeling that something is wrong with the client and then begin to gather information.

Interpreting information and meanings (18)	1. Determine clinical information that is not relevant to the current client problem. 12. Communicate client assessment findings to healthcare team members. 16. Recognize subtle changes in the client's baseline assessment findings. 20. Analyze the meaning of a certain clinical finding related to the client's problem. 25. Determine if enough pertinent information about the current problem has been gathered from the client. 26. Detect when verbal and nonverbal client cues don't match. 29. Draw on my own clinical experiences to help interpret the client's cues. 35. Interpret the relevance of information provided by family members. 40. Ask additional questions when needed to get more specific data about the current client problem. 43. Use my knowledge of anatomy and physiology to interpret cues related to the current client problem. 45. Determine clinical information that is relevant to the current client problem. 53. Fully assess the client even if early cues seem to lead to one certain problem. 61. Discuss three possible problems that could occur within the client's clinical situation once data is gathered. 65. Perform additional system assessments to gather more data about the client's health problem. 66. Interpret subtle nonverbal cues in the client related to the present problem. 73. Recall information I learned in the past that relates to the client's current problem. 77. Draw on the clinical experiences of my student-peers to help interpret the client's cues. 78. Apply information about disease processes learned in the classroom to my client's clinical problem.
Integrating findings and Illuminating options (27)	2. Analyze the risks of one decision option. 4. Determine the need to search professional literature to help clarify the client's clinical findings. 7. Correlate physical assessment findings with what the client tells me. 10. Formulate at least one possible intervention I could implement for the client's current problem. 17. Consider an intervention for the current client problem based on my gut-feeling. 18. Identify the need to talk with my clinical nursing instructor about decision options.

	21. Recognize the need to use the staff nurse as a resource to discuss decision options. 27. Use my knowledge of diagnostic tests to make an effective decision option for the client. 30. Disregard cues that do not apply to the full clinical picture of the client's current problem. 36. Identify the need to talk with my nursing instructor to help confirm client findings about the current problem. 37. Correlate the client's diagnostic study results with the physical exam findings. 39. Generate two possible interventions I could implement for the client's current problem. 46. Apply my knowledge of medications to make a positive decision and improve the client's outcomes. 47. Collaborate with the doctor about the client's problem. 48. Pull together a full clinical picture of the client's situation. 50. Analyze the benefits of one decision option. 54. Create three or more possible interventions I could implement for the client's current problem. 55. Determine the need to consult a protocol/procedure to validate information about the client's problem. 59. Integrate physical assessment findings with the client's nonverbal cues. 63. Remain open to a number of reasons for the client's problem despite cues that point to one problem. 64. Generate at least one possible intervention for the client's problem within the first minute or two of my assessment. 68. Integrate personal knowledge about the client in order to make decisions in his or her best interest. 70. Decide to discuss an intervention I am considering with a student-peer. 71. Consider a possible intervention for the client problem because it seems right, despite a lack of supporting evidence. 75. Determine the need to search professional literature to help find an appropriate decision option. 79. Easily see relevant patterns in client cues so I can determine the best decision option. 81. Use my knowledge of lab values to make a positive clinical decision that benefits the client.
Intervening and Reflecting on the decision process (17)	6. Evaluate how effective the decision option was in improving the client's physical assessment findings. 13. Accurately choose one plausible intervention if the client is in a life threatening situation. 14. Evaluate if the clinical decision made influenced client satisfaction. 22. Act upon at least one decision option I consider to be important in solving the client's problem. 23. Take full responsibility for the decision I made.

TOTAL ITEMS = 82	31. Implement the "best" decision option for the client's problem. 32. Judge how successful the clinical decision was in having the client's laboratory findings improve. 38. Reflect upon whether my chosen decision affected overall client outcomes. 42. Evaluate specific consequences of my decision option. 44. Make the final clinical decision after cues are analyzed and decision options are deliberated. 52. Implement a decision option for a client problem during my first week in a new clinical environment. 56. Act upon at least two decision options that I consider to be important in solving the client's problem. 62. Evaluate if the clinical decision made affected the client's overall length of stay. 69. Independently make a clinical decision to solve the client's problem. 72. Draw on my own past clinical experiences to help make a current decision. 76. Act upon at least one specific intervention based on my gut-feeling. 80. Implement a decision option for a client problem in a clinical environment where I have been for several weeks.

APPENDIX D

Sample Invitation Sent to Expert Reviewers

Dear Dr. ---, I am a PhD in Nursing student at the University of Nevada, Las Vegas and am beginning work on the development of a quantitative research instrument in the area of **self-confidence and clinical decision making in student nurses**.

Currently, I am completing an extensive literature review in the content-domain of clinical decision making and constructing items for an instrument which will *measure the self-confidence and anxiety levels of student nurses as they progress through the process of making clinical decisions.* Items will be included on the instrument embracing both the information-processing and intuitive sides of decision-making. I am writing to ask if you would be willing to **serve as an expert reviewer for these items.** Your expertise in the genre of intuitive-humanistic clinical decision making would make your feedback most welcome. My hope is that this preliminary work to assess validity will support the need and appropriateness of my tool. Hence, instrument development is what I am anxious to pursue for dissertation.

If you agree to serve as an expert panelist **I would send you a Reviewer Packet either by mail or electronic means, according to your preference, approximately the second week of March, 2009. You would have one month to complete your feedback and return the packet to me.** Please let me know if you are willing to assist me with this early work in instrument development. I look forward to your expertise and feedback to guide this process.

If you would like any additional information prior to making a decision to serve as a reviewer, please feel free to let me know. I will attempt to clarify anything for you that I can! Thank you for your time and consideration.

Most Sincerely,
Krista A. White RN, MSN, CCRN
PhD in Nursing, student, UNLV

APPENDIX E

Expert Reviewer Rating Packet

March 13, 2009

Dear Dr. -----,
Thank you so much for agreeing to serve as an expert reviewer for the quantitative tool I have developed to **measure the self-confidence and anxiety level of student nurses as they progress through the process of clinical decision making** (CDM). I am a doctoral student in nursing at the University of Nevada, Las Vegas and am working in the area of examining the self-confidence and anxiety level felt by student nurses as they make clinical decisions. To measure this construct, I have developed a norm-referenced, Likert-type, self-report tool. The design of the tool is for use in the clinical practicum environment. This instrument is designed to reflect both the information-processing and intuitive-humanist sides of CDM. Your impressive expertise in the domain of clinical judgment and prolific authorship in this area will be very beneficial to the development of this tool! Further, your participation in the instrument review will serve as a vital preliminary step in the establishment of a credible research tool.

In this era of high acuity patients, clinical decision making skills are important for professional nurses not only to possess but also to feel confident. Because nurses remain at the bedside far more than any other member of the multi-disciplinary team, they are generally the first to observe cues in patients which may warrant making critical clinical decisions. Once contextual cues are assessed by the nurse, appropriate interpretation and action must occur. Since clinical decision making is such an important acquired skill for nurses, the process of learning to make decisions, and gaining confidence with this process, must not begin as a graduate nurse - it must be introduced and practiced during nursing education programs. Because patient outcomes are at stake, it is imperative that nursing students begin to develop confidence with clinical decision making steps during the safety of supervised educational experiences. After extensive literature review, a dearth of existing instruments has been found which assess the level of self-confidence and anxiety perceived by student nurses as they move through the process of CDM.

<u>As an instrument reviewer I will ask you to:</u> (1) review the overall objective for the tool, conceptual definition, and content-domains for CDM; (2) complete the expert rating form which will require you to rate each item on its relevancy to the domain of CDM; (3) complete the expert rating form which will require you to designate, by checkmark, in which content-domain of CDM you believe each item would be placed; (4) judge the overall clarity and comprehensiveness of the tool; (5) offer suggestions about using a 4-point forced-choice response format or a 5-point response format; and (6) offer suggestions about revision, addition, or deletion of items that might facilitate refinement of the tool.

Again, thank you again for agreeing to serve in the capacity of expert reviewer. **Your feedback is appreciated by Monday April 13, 2009.** I am grateful for your commitment to this important matter. If you have any questions, please feel free to contact me.

Sincerely,
Krista A. White, MSN, RN, CCRN
PhD in Nursing Student, UNLV

Definitions of Clinical Decision Making and Content Domains for the Nursing Anxiety and Self-Confidence with Clinical Decision Making Scale

Instrument Intent: The primary interest of the tool developer is in the perceived self-confidence and anxiety level throughout the process of clinical decision making (CDM) in an undergraduate student nurse population as it relates to client care in the clinical practicum environment. More specifically, I am interested in the confidence level and anxiety level students experience while engaging in the various components of making clinical decisions. The *Nursing Anxiety and Self-Confidence with Clinical Decision Making* scale (NASC-CDM) is considered a hybrid scale because it examines the cognitive and intuitive process of making a clinical decision but its ultimate purpose is to appraise the affective domain of the self-confidence and anxiety level experienced by the student nurse while carrying out the CDM process

Clinical Decision Making Definitions: Standing (2007) defines CDM as "a complex process involving information processing, critical thinking, evaluating evidence, applying knowledge, problem-solving skills, reflection, and clinical judgment to select the best course of action" (p. 266). In the mixed methodological study by Tschikota (1993), she defines CDM as "the formulation of hypotheses and/or the selection of nursing interventions" (p. 389). The content domains are identified below which reflect the definition and the overarching intent of the tool.

<u>Content-Domains of CDM</u>

Investigating Information and Cues: Includes data gathering, cue acquisition, and assessment skills related to a client problem. This may include the utilization of both information-processing and intuitive means.

Interpreting Information and Meanings: Includes summarizing the meaning of cues present in a client situation, distinguishing if enough information has been obtained, interpreting which information is relevant and irrelevant to the client problem, implementing more pointed physical assessment, and asking specific questions to validate the cues presented. Pre-requisite knowledge is required for this domain.

Integrating Findings and Illuminating Options: Includes incorporating, cognitively and intuitively, the full clinical picture in order that one or more plausible decision option may be deliberated. Includes analyzing a number of decision options and determining the need to seek assistance with the CDM process. This domain includes the risk/benefit analysis for plausible decision options. Pre-requisite knowledge is required for this domain.

Intervening and Reflecting on the Decision Process: Includes making the final decision to act based on cues presented, data gathered, clinical picture synthesis, and plausible decision options considered. This domain also includes appraising the outcome or the effectiveness of the clinical decision chosen, reflecting on the CDM process, and taking responsibility for one's actions.

Nursing Anxiety and Self-Confidence with Clinical Decision Making Scale

I have included a sample of the instrument simply for your perusal. The **expert reviewer rating form** follows this scale example. This instrument is designed for undergraduate nursing students as they near the completion of their program.
Student Directions: Think about a few client problems you have experienced in the clinical setting in the past two weeks where you needed to make a decision. Read each item below. Circle the number for each item on the left side of the survey that best identifies the level of **self-confidence** you usually feel in a given situation. Also, circle the number for each item on the right side of the survey that best identifies the level of **anxiety** you usually feel in a given situation.

Please provide a response for each item presented.
Self-Confidence Scale: *1 = not at all confident*; *2 = somewhat confident*; *3 = equally confident and not confident*; *4 = mostly confident*; *5 = totally confident.*

Anxiety Scale: *1 = not at all anxious; 2 = somewhat anxious; 3 = equally anxious and not anxious; 4 = mostly anxious; 5 = totally anxious.*
Think about this statement as you read each item: "I am _______ in my ability to:"

Circle the Number Best Identifying your Self-Confidence Level	Read Each Item Carefully	Circle the Number Best Identifying your Anxiety Level
1 2 3 4 5	1. Determine clinical information that is not relevant to the current client problem.	1 2 3 4 5
1 2 3 4 5	2. Analyze the risks of one decision option.	1 2 3 4 5
1 2 3 4 5	3. Implement two ways of gathering information related to the client's problem.	1 2 3 4 5
1 2 3 4 5	4. Determine the need to search professional literature to help clarify the client's clinical findings.	1 2 3 4 5
1 2 3 4 5	5. Describe to my clinical nursing instructor the subjective data gathered from the client.	1 2 3 4 5
1 2 3 4 5	6. Evaluate how effective the decision option was in improving	1 2 3 4 5

	the client's physical assessment findings.	
1 2 3 4 5	7. Correlate physical assessment findings with what the client tells me.	1 2 3 4 5
1 2 3 4 5	8. Gather at least two pieces of objective data about the client's problem.	1 2 3 4 5
1 2 3 4 5	9. Formulate at least one possible intervention I could implement for the client's current problem.	1 2 3 4 5
1 2 3 4 5	10. Listen carefully to what the client tells me about his or her current health problem.	1 2 3 4 5

Expert Reviewer Rating Form for the
Nursing Anxiety and Self-Confidence with Clinical Decision Making Scale

Rating Instructions: For each item please indicate:

1. How *relevant* the item is to the process of making a clinical decision. Your notation may be made by placing a **checkmark** in the appropriate box.

   1 = not at all relevant 2 = slightly relevant 3 = moderately relevant 4 = highly relevant

2. In which *content domain* (i.e. investigating information and cues) you believe the item belongs. Your notation may be made by placing a **checkmark** in the appropriate box. If you feel an item is ambiguous and thus cannot be placed in a content domain, please leave the spaces blank.

Relevance				**Item**	**Content-Domains**			
1	**2**	**3**	**4**	**Listed below are the 82 items proposed for the NASC-CDM scale.**	**Investigating Information and Cues**	**Interpreting Information and Meanings**	**Integrating Findings and Illuminating Options**	**Intervening and Reflecting on the Decision Process**
				1. Determine clinical information that is not relevant to the current client problem.				
				2. Analyze the risks of one decision option.				
				3. Implement two ways of gathering information related to the client's problem.				
				4. Determine the need to search professional literature to help clarify the				

Relevance				Item	Content-Domains			
1	**2**	**3**	**4**	**Listed below are the 82 items proposed for the NASC-CDM scale.**	**Investigating Information and Cues**	**Interpreting Information and Meanings**	**Integrating Findings and Illuminating Options**	**Intervening and Reflecting on the Decision Process**
				client's clinical findings.				
				5. Describe to my clinical nursing instructor the subjective data gathered from the client.				
				6. Evaluate how effective the decision option was in improving the client's physical assessment findings.				
				7. Correlate physical assessment findings with what the client tells me.				
				8. Quickly develop a therapeutic relationship with the client.				
				9. Gather at least two pieces of objective data about the client's problem.				
				10. Formulate at least one possible intervention I could implement for the client's current problem.				
				11. Listen carefully to what the client tells me about his or her health problem.				
				12. Communicate client assessment findings to healthcare team members.				
				13. Accurately choose one plausible intervention if the client is in a life threatening situation.				
				14. Evaluate if the clinical decision made influenced client satisfaction.				

Relevance				Item	Content-Domains			
1	2	3	4	Listed below are the 82 items proposed for the NASC-CDM scale.	Investigating Information and Cues	Interpreting Information and Meanings	Integrating Findings and Illuminating Options	Intervening and Reflecting on the Decision Process
				15. Perform the steps of a basic head-to-toe physical assessment.				
				16. Recognize subtle changes in the client's baseline assessment findings.				
				17. Consider an intervention for the current client problem based on my gut-feeling.				
				18. Identify the need to talk with my clinical nursing instructor about decision options.				
				19. State a reason why assessing the client's nonverbal cues is important.				
				20. Analyze the meaning of a certain clinical finding related to the client's problem.				
				21. Recognize the need to use the staff nurse as a resource to discuss decision options.				
				22. Act upon at least one decision option I consider to be important in solving the client's problem.				
				23. Take full responsibility for the decision I made.				
				24. Ask directed questions to really get to				

Relevance				Item	Content-Domains			
1	2	3	4	**Listed below are the 82 items proposed for the NASC-CDM scale.**	**Investigating Information and Cues**	**Interpreting Information and Meanings**	**Integrating Findings and Illuminating Options**	**Intervening and Reflecting on the Decision Process**
				know my client.				
				25. Determine if enough pertinent information about the current problem has been gathered from the client.				
				26. Detect when verbal and nonverbal client cues don't match.				
				27. Use my knowledge of diagnostic tests to make an effective decision option for the client.				
				28. Summarize to my clinical nursing instructor the objective data gathered from the client.				
				29. Draw on my own clinical experiences to help interpret the client's cues.				
				30. Disregard cues that do not apply to the full clinical picture of the client's current problem.				
				31. Implement the "best" decision option for the client's problem.				
				32. Judge how successful the clinical decision was in having the client's laboratory findings improve.				
				33. Describe normal findings from the physical exam performed on the client.				

Relevance				Item	Content-Domains			
1	**2**	**3**	**4**	**Listed below are the 82 items proposed for the NASC-CDM scale.**	**Investigating Information and Cues**	**Interpreting Information and Meanings**	**Integrating Findings and Illuminating Options**	**Intervening and Reflecting on the Decision Process**
				34. Utilize family members when collecting data.				
				35. Interpret the relevance of information provided by family members.				
				36. Identify the need to talk with my nursing instructor to help confirm client findings about the current problem.				
				37. Correlate the client's diagnostic study results with the physical exam findings.				
				38. Reflect upon whether my chosen decision affected overall client outcomes.				
				39. Generate two possible interventions I could implement for the client's current problem.				
				40. Ask additional questions when needed to get more specific data about the current client problem.				
				41. Identify a potential client problem by reading the client's chart.				
				42. Evaluate specific consequences of my decision option.				
				43. Use my knowledge of anatomy and physiology to interpret cues related to the current client problem.				
				44. Make the final clinical decision after				

Relevance				Item	Content-Domains			
1	2	3	4	Listed below are the 82 items proposed for the NASC-CDM scale.	Investigating Information and Cues	Interpreting Information and Meanings	Integrating Findings and Illuminating Options	Intervening and Reflecting on the Decision Process
				cues are analyzed and decision options are deliberated.				
				45. Determine clinical information that is relevant to the current client problem.				
				46. Apply my knowledge of medications to make a positive decision and improve the client's outcomes.				
				47. Collaborate with the doctor about the client's problem.				
				48. Pull together a full clinical picture of the client's situation.				
				49. Explain to my nursing instructor abnormal client findings.				
				50. Analyze the benefits of one decision option.				
				51. Implement active listening techniques.				
				52. Implement a decision option for a client problem during my first week in a new clinical environment.				
				53. Fully assess the client even if early cues seem to lead to one certain problem.				
				54. Create three or more possible interventions I could implement for the				

Relevance				Item	Content-Domains			
1	2	3	4	**Listed below are the 82 items proposed for the NASC-CDM scale.**	**Investigating Information and Cues**	**Interpreting Information and Meanings**	**Integrating Findings and Illuminating Options**	**Intervening and Reflecting on the Decision Process**
				client's current problem.				
				55. Determine the need to consult a protocol/procedure to validate information about the client's problem.				
				56. Act upon at least two decision options that I consider to be important in solving the client's problem.				
				57. Gather at least two pieces of subjective data from the client about the health problem.				
				58. Restate to my clinical nursing instructor the client's signs and symptoms in my own words.				
				59. Integrate physical assessment findings with the client's nonverbal cues.				
				60. Identify important data about a client problem from information given in the shift-change report.				
				61. Discuss three possible problems that could occur within the client's clinical situation once data is gathered.				
				62. Evaluate if the clinical decision made affected the client's overall length of stay.				
				63. Remain open to a number of reasons for the client's problem despite cues that				

Relevance				Item	Content-Domains			
1	**2**	**3**	**4**	**Listed below are the 82 items proposed for the NASC-CDM scale.**	**Investigating Information and Cues**	**Interpreting Information and Meanings**	**Integrating Findings and Illuminating Options**	**Intervening and Reflecting on the Decision Process**
				point to one problem.				
				64. Generate at least one possible intervention for the client's problem within the first minute or two of my assessment.				
				65. Perform additional system assessments to gather more data about the client's health problem.				
				66. Interpret subtle nonverbal cues in the client related to the present problem.				
				67. Tailor my assessment based on the client's signs and symptoms of the current problem.				
				68. Integrate personal knowledge about the client in order to make decisions in his or her best interest.				
				69. Independently make a clinical decision to solve the client's problem.				
				70. Decide to discuss an intervention I am considering with a student-peer.				
				71. Consider a possible intervention for the client problem because it seems right, despite a lack of supporting evidence.				
				72. Draw on my own past clinical				

Relevance				Item	Content-Domains			
1	**2**	**3**	**4**	**Listed below are the 82 items proposed for the NASC-CDM scale.**	**Investigating Information and Cues**	**Interpreting Information and Meanings**	**Integrating Findings and Illuminating Options**	**Intervening and Reflecting on the Decision Process**
				experiences to help make a current decision.				
				73. Recall information I learned in the past that relates to the client's current problem.				
				74. Ask the client's significant others questions to collect data about the current problem.				
				75. Determine the need to search professional literature to help find an appropriate decision option.				
				76. Act upon at least one specific intervention based on my gut-feeling.				
				77. Draw on the clinical experiences of my student-peers to help interpret the client's cues.				
				78. Apply information about disease processes learned in the classroom to my client's clinical problem.				
				79. Easily see relevant patterns in client cues so I can determine the best decision option.				
				80. Implement a decision option for a client problem in a clinical environment where I have been for several weeks.				

Relevance				Item	Content-Domains			
1	2	3	4	Listed below are the 82 items proposed for the NASC-CDM scale.	Investigating Information and Cues	Interpreting Information and Meanings	Integrating Findings and Illuminating Options	Intervening and Reflecting on the Decision Process
				81. Use my knowledge of lab values to make a positive clinical decision that benefits the client.				
				82. Follow a feeling that something is wrong with the client and then begin to gather information.				

Thank you for completing this instrument review form. I would appreciate a few more minutes of your time.

Rate the following:

1. Overall clarity of the instrument (mark one please by changing font color or highlighting):

   1 = not at all clear 2 = slightly clear 3 = moderately clear 4 = very clear

Any suggestions to improve the clarity:

2. Overall comprehensiveness of the instrument (mark one please by changing font color or highlighting):

   1 = not at all comprehensive 2 = slightly comprehensive 3 = moderately comprehensive 4 = very comprehensive

   Any suggestions to improve the comprehensiveness:

3. Opinion about using a 4-point, forced-choice, Likert-scale versus a 5-point, neutral-option, Likert scale (mark one please by
changing font color or highlighting):

4-point scale **5-point scale**

Rationale for selection**:**

4. Comments or suggestions about the wording of existing items, items that you believe should be deleted, and/or items which you
believe should be added. I encourage you to note any comments you believe might facilitate the most effective revisions to the SCCDM scale.

One Final Request: I have reviewed your information on the ----- website, examined the list of your publications, and reviewed the bio-sheet. Would you be willing to forward to me your CV – if you feel this would be more inclusive? Pertinent professional information about each content expert will be beneficial as I progress through dissertation.

Thank you ☺

Standing, M. (2007). Clinical decision-making skills on the developmental journal from student to registered nurse: A longitudinal inquiry. *Journal of Advanced Nursing*, *60*, 257-269.

Tschikota, S. (1993). The clinical decision-making processes of student nurses. *Journal of Nursing Education*, *32*, 389-398

APPENDIX F

Content Validity Indices from Expert Reviewers

Items rated as 3 = *moderately relevant* or 4 = *highly relevant* are considered in this table.

Item	Expert #1	Expert #2	Expert #3	Expert #4	Experts in Agreement	I-CVI
1	---	No	Yes	Yes	2	.67
2	---	Yes	Yes	Yes	3	1.00
3	---	Yes	No	Yes	2	.67
4	---	Yes	Yes	Yes	3	1.00
5	---	No	Yes	No	1	.33
6	---	No	Yes	Yes	2	.67
7	---	Yes	---	Yes	2	.67
8	---	No	---	No	0	---
9	---	Yes	No	Yes	2	.67
10	---	Yes	No	Yes	2	.67
11	---	Yes	Yes	Yes	3	1.00
12	---	No	Yes	No	1	.33
13	---	Yes	Yes	Yes	3	1.00
14	---	Yes	Yes	Yes	3	1.00*
15	---	Yes	Yes	No	2	.67
16	---	Yes	---	Yes	2	.67
17	---	Yes	No	Yes	2	.67
18	---	Yes	Yes	Yes	3	1.00
19	---	No	Yes	No	1	.33
20	---	Yes	Yes	Yes	3	1.00
21	---	Yes	---	Yes	2	.67
22	---	Yes	Yes	Yes	3	1.00*
23	---	Yes	Yes	Yes	3	1.00
24	---	Yes	Yes	No	2	.67
25	---	Yes	Yes	Yes	3	1.00
26	---	Yes	Yes	Yes	3	1.00*
27	---	Yes	Yes	Yes	3	1.00

Item	Expert #1	Expert #2	Expert #3	Expert #4	Experts in Agreement	I-CVI
28	---	Yes	No	No	1	.33
29	---	Yes	Yes	Yes	3	1.00
30	---	Yes	No	Yes	2	.67
31	---	Yes	Yes	Yes	3	1.00
32	---	Yes	Yes	Yes	3	1.00
33	---	Yes	Yes	No	2	.67
34	---	Yes	Yes	Yes	3	1.00
35	---	Yes	Yes	Yes	3	1.00
36	---	No	Yes	Yes	2	.67
37	---	Yes	Yes	Yes	3	1.00*
38	---	Yes	Yes	Yes	3	1.00
39	---	Yes	No	---	1	.33
40	---	Yes	Yes	Yes	3	1.00
41	---	Yes	Yes	Yes	3	1.00*
42	---	Yes	Yes	Yes	3	1.00
43	---	Yes	Yes	Yes	3	1.00*
44	---	Yes	Yes	Yes	3	1.00*
45	---	Yes	Yes	Yes	3	1.00*
46	---	Yes	---	Yes	2	. 67
47	---	Yes	Yes	No	2	.67
48	---	Yes	Yes	Yes	3	1.00
49	---	No	Yes	No	1	.33
50	---	Yes	---	Yes	2	.67
51	---	No	Yes	Yes	2	.67
52	---	No	No	No	0	---
53	---	No	No	No	0	---
54	---	No	No	---	0	---
55	---	Yes	Yes	Yes	3	1.00
56	---	Yes	No	---	1	.33
57	---	Yes	No	---	1	.33
58	---	No	No	No	0	---
59	---	Yes	Yes	Yes	3	1.00
60	---	Yes	Yes	Yes	3	1.00
61	---	Yes	No	Yes	2	.67

Item	Expert #1	Expert #2	Expert #3	Expert #4	Experts in Agreement	I-CVI
62	---	Yes	No	Yes	2	.67
63	---	Yes	No	Yes	2	.67
64	---	Yes	No	Yes	2	.67
65	---	Yes	No	Yes	2	.67
66	---	Yes	No	Yes	2	.67
67	---	Yes	No	Yes	2	.67
68	---	Yes	Yes	Yes	3	1.00
69	---	Yes	No	Yes	2	.67
70	---	No	No	No	0	---
71	---	Yes	Yes	Yes	3	1.00
72	---	Yes	Yes	Yes	3	1.00
73	---	Yes	Yes	Yes	3	1.00
74	---	Yes	Yes	Yes	3	1.00
75	---	Yes	Yes	Yes	3	1.00
76	---	Yes	No	Yes	2	.67
77	---	No	Yes	---	1	.33
78	---	Yes	Yes	---	2	.67
79	---	Yes	Yes	Yes	3	1.00
80	---	Yes	Yes	No	2	.67
81	---	Yes	Yes	Yes	3	1.00
82	---	Yes	Yes	Yes	3	1.00
Proportion Relevant Per Expert		**.82**	**.65**	**.74**	**Scale CVI =**	**.46**

Expert # 3 has a low proportion of relevancy. Perhaps she left blank of answered “NO” because of the admitted language barrier.

* Became 100% relevant after removal of Expert # 5.

APPENDIX G

Pilot Version Item-Pool of the NASC-CDM Scale by Content Domain

Item	Response Format						
		Not at all	*Just a little*	*Somewhat*	*Mostly*	*Almost totally*	*Totally*
Domain: Investigating information and cues (9)							
1. I am _____ self-confident and _____ anxious in my ability to listen carefully to what the client tells me about his or her health problem.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
2. I am _____ self-confident and _____ anxious in my ability to assess the client's nonverbal cues.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
3. I am _____ self-confident and _____ anxious in my ability to recognize a possible client problem by reading the client's chart.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
4. I am _____ self-confident and _____ anxious in my ability to use active listening skills to gather information about the client's current problem.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6

Item	Response Format						
		Not at all	*Just a little*	*Somewhat*	*Mostly*	*Almost totally*	*Totally*
5. I am _____ self-confident and _____ anxious in my ability to recognize important information about a client problem from information given in the shift-change report.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
6. I am _____ self-confident and _____ anxious in my ability to change my assessment based on the client's signs and symptoms of the current problem.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
7. I am _____ self-confident and _____ anxious in my ability to ask the client's significant others/family questions to gather information about the current problem.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
8. I am _____ self-confident and _____ anxious in my ability to follow a 'feeling' that something is wrong with the client and then begin to gather information.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
9. I am _____ self-confident and _____ anxious in my ability to perform additional system-assessments to gather more information about the client's current problem.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
Domain: Interpreting information and meanings (10)							

Item	Response Format						
		Not at all	*Just a little*	*Somewhat*	*Mostly*	*Almost totally*	*Totally*
10. I am _____ self-confident and _____ anxious in my ability to identify which pieces of clinical information I gathered are not related to the client's current problem.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
11. I am _____ self-confident and _____ anxious in my ability to interpret the meaning of a specific assessment finding related to the client's current problem.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
12. I am _____ self-confident and _____ anxious in my ability to know when enough information about the current problem has been gathered from the client.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
13. I am _____ self-confident and _____ anxious in my ability to detect when verbal and nonverbal cues from the client don't match.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
14. I am _____ self-confident and _____ anxious in my ability to draw on my own past clinical experiences to help interpret information about the client's current problem.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
15. I am _____ self-confident and _____ anxious in my ability to decide if information	Self-confident	1	2	3	4	5	6

Item	Response Format						
		Not at all	*Just a little*	*Somewhat*	*Mostly*	*Almost totally*	*Totally*
given by significant others/families is important to the client's current problem.	Anxious	1	2	3	4	5	6
16. I am _____ self-confident and _____ anxious in my ability to ask the client additional questions to get more specific information about the current problem.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
17. I am _____ self-confident and _____ anxious in my ability to use my knowledge of anatomy and physiology to interpret information I gathered about the client's current problem.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
18. I am _____ self-confident and _____ anxious in my ability to identify which pieces of clinical information I gathered are related to the client's current problem.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
19. I am _____ self-confident and _____ anxious in my ability to recall knowledge I learned in the past that relates to the client's current problem.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
Domain: Integrating findings and Illuminating options (12)							

Item	Response Format						
		Not at all	*Just a little*	*Somewhat*	*Mostly*	*Almost totally*	*Totally*
20. I am _____ self-confident and _____ anxious in my ability to analyze the risks of the interventions I am considering for the client's current problem.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
21. I am _____ self-confident and _____ anxious in my ability to realize the need to talk with my clinical nursing instructor or the staff nurse about interventions I am considering.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
22. I am _____ self-confident and _____ anxious in my ability to use my knowledge of diagnostic tests, like lab results or x-ray findings, to help create a possible list of decisions I could implement.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
23. I am _____ self-confident and _____ anxious in my ability to recognize the need to talk with my clinical nursing instructor to help sort-out client assessment findings.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
24. I am _____ self-confident and _____ anxious in my ability to correlate the client's diagnostic study results with his or her physical assessment findings.	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6
25. I am _____ self-confident and _____ anxious in my ability to see the full clinical	Self-confident	1	2	3	4	5	6
	Anxious	1	2	3	4	5	6

Item	Response Format	Not at all	Just a little	Somewhat	Mostly	Almost totally	Totally
picture of the client's problem rather than focusing in on one part of it.							
26. I am _____ self-confident and _____ anxious in my ability to recognize the need to review a protocol, procedure, or nursing literature to help me make a clinical decision.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
27. I am _____ self-confident and _____ anxious in my ability to correlate physical assessment findings with the client's nonverbal cues to see if they match or don't match.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
28. I am _____ self-confident and _____ anxious in my ability to remain open to different reasons for the client's problem even though the information I gathered may point to only one reason.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
29. I am _____ self-confident and _____ anxious in my ability to incorporate personal things I know about the client in order to make decisions in his or her best interest.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
30. I am _____ self-confident and _____ anxious in my ability to consider a possible intervention for the client's problem because it 'seems' right, even though there is a lack of	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6

Item	Response Format						
		Not at all	*Just a little*	*Somewhat*	*Mostly*	*Almost totally*	*Totally*
supporting evidence.							
31. I am _____ self-confident and _____ anxious in my ability to easily see important patterns in the information I gathered from the client.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
Domain: Intervening and Reflecting on the decision process (10)							
32. I am _____ self-confident and _____ anxious in my ability to evaluate how successful my clinical decision was in improving the client's physical assessment findings.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
33. I am _____ self-confident and _____ anxious in my ability to implement one accurate intervention if the client is in an emergency situation.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
34. I am _____ self-confident and _____ anxious in my ability to take full responsibility for the clinical decision I made.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
35. I am _____ self-confident and _____ anxious in my ability to implement the 'best' priority decision option for the client's problem.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
36. I am _____ self-confident and _____							

Item	Response Format	Not at all	Just a little	Somewhat	Mostly	Almost totally	Totally
anxious in my ability to evaluate if the clinical decision I made influenced client satisfaction.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
37. I am _____ self-confident and _____ anxious in my ability to evaluate if my clinical decision improved the client's laboratory findings.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
38. I am _____ self-confident and _____ anxious in my ability to evaluate whether the clinical decision I made actually made the client better, worse, or didn't make a difference.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
39. I am _____ self-confident and _____ anxious in my ability to make the final clinical decision after information is gathered, analyzed, and possible interventions are evaluated.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
40. I am _____ self-confident and _____ anxious in my ability to make a clinical decision all by myself to solve the client's problem.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6
41. I am _____ self-confident and _____ anxious in my ability to act on at least one intervention I considered based on my gut-feeling or intuition.	Self-confident Anxious	1 1	2 2	3 3	4 4	5 5	6 6

APPENDIX H

Demographic Questions

1. Gender
   ___ Female
   ___ Male

2. Age
   From the dropdown box, please choose your current age. (< 18, 18… 45, > 45)

3. Ethnicity
   ___ African American
   ___ American Indian
   ___ Asian
   ___ Caucasian
   ___ East Indian
   ___ Hispanic
   Other (please specify)

4. In what type of program are you enrolled?
   ___ Associate degree
   ___ Baccalaureate degree

5. What is the format of your nursing program?
   ___ Accelerated
   ___ Evening/weekend
   ___ Traditional, 2 semesters per academic year
   ___ Year round, 3 semesters per academic year
   Other (please specify)

6. In what semester of NURSING courses are you currently enrolled?
   ___ 3rd
   ___ 4th
   ___ 5th
   ___ 6th
   ___ My school does not follow a semester system
   Other (please specify)

7. In what quarter of NURSING courses are you currently enrolled?
   ___ 4th
   ___ 5th
   ___ 6th
   ___ My school does not follow a quarter system
   Other (please specify)

8. Are you currently licensed as an LPN?
   ___ No
   ___ Yes

9. Do you currently work as a nursing assistant/nurses aid?
___ No
___ Yes

10. How much college experience did you have before beginning your nursing program?
___ 0, I starting my nursing program right out of high school
___ 1 – 2 semesters
___ 3 – 4 semesters
___ > 4 semesters
___ I completed a college degree before starting my nursing program

11. Did you participate in any type of nursing intern/extern program?
___ I am not familiar with this type of program
___ No
___ Yes

12. The content in your clinical nursing course(s) this semester is:
(Check all that apply)
___ Community
___ Critical Care
___ Leadership/Mentorship
___ Medical/Surgical
___ Obstetrics
___ Pediatrics
___ Psych/Mental health
Other (please specify)

13. Please rate the difficulty level of your current CLINICAL NURSING COURSE(s).

Clinical Course	1, Very easy	2, Easy	3, About what I expected	4, Hard	5, Very hard
Clinical Course #1:					
Clinical Course #2:					
Clinical Course #3:					

14. What is your current grade in the CLINICAL NURSING COURSE(s) you are taking?

Clinical Course	A	B	C	D	F
Clinical Course #1:					
Clinical Course #2:					
Clinical Course #3:					

APPENDIX I

General Perceived Self-Efficacy Scale (GSE)

Item	*Not at all true*	*Hardly true*	*Moderately true*	*Exactly true*
1. I can always manage to solve difficult problems if I try hard enough.	1	2	3	4
2. If someone opposes me, I can find means and ways to get what I want.	1	2	3	4
3. I am certain that I can accomplish my goals.	1	2	3	4
4. I am confident that I could deal efficiently with unexpected events.	1	2	3	4
5. Thanks to my resourcefulness, I can handle unforeseen situations.	1	2	3	4
6. I can solve most problems if I invest the necessary effort.	1	2	3	4
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	1	2	3	4
8. When I am confronted with a problem, I can find several solutions.	1	2	3	4
9. If I am in trouble, I can think of something to do.	1	2	3	4
10. I can handle whatever comes my way.	1	2	3	4

Reproduced with permission from European Journal of Psychological Assessment, Vol, 18, (3), 2002

GSE Permission

Dear Ms. White,
Thank you very much for your permission request to use from our *European Journal of Psychological Assessment, Vol. 18* (3) 2002 the item - The General Perceived Self-Efficacy Scale on p. 251 from the Appendix of the article - Is General Self-Efficacy a Universal Construct? Psychometric Findings from 25 Countries by Urte Scholz, Benicio Gutierrez Dona, Shonali Sud, and Ralf Schwarzer, pp. 242-251.

We are happy to grant you permission to use The General Perceived Self-Efficacy Scale as outlined in your request.
Please make sure that the following copyright line will appear:

Reproduced with permission from European Journal of Psychological Assessment, Vol.18, (3), 2002
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Kind regards,
Gitta Bloier
Permissions

Hogrefe & Huber Publishers GmbH
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www.hogrefe.com
CEO: Dr. G.-Juergen Hogrefe
Registered: Amtsgericht Goettingen, HRB 2224
VAT# DE115303194

-----Original Message-----
From: whitek32@unlv.nevada.edu [mailto:whitek32@unlv.nevada.edu]
Sent: Sunday, January 17, 2010 1:04 PM
To: customerservice@hogrefe-publishing.com
Subject: Permission for use of GSE scale

Dear Ms. Bloier -- I am a doctoral student in the School of Nursing at the University of Nevada, Las Vegas (UNLV) and am working on my dissertation. My research focus is quantitative instrument development and my work is entitled Self-Confidence and Anxiety of Nursing Students While Making Clinical Decisions: A Study to Develop and Test a Research Instrument. In order to establish psychometric properties for my newly designed instrument, I will have undergraduate nursing students complete not only my own instrument but also two existing instruments with sound psychometrics.

Hence, I am seeking permission to use the General Perceived Self-Efficacy scale as found in Scholz, U., Gutierrez-Dona, B., Sud, S. & Schwarzer R. (2002). Is general self-efficacy a universal construct? Psychometric findings in 25 countries. *European Journal of Psychological Assessment, 18*(3), 242-251.

If you need any additional information, please let me know. Thank you so much for attending to this request.

Sincerely,
Krista A. White RN, MSN, CCRN, PhD student UNLV
Email: whitek32@unlv.nevada.edu
Phone: XXXXX

APPENDIX J

Generalized Anxiety Disorder – 7 Scale (GAD-7)

Over the last 2 weeks, how often have you been bothered by the following problems?	*Not at all*	*Several days*	*More than half the days*	*Nearly every day*
1. Feeling nervous, anxious, or on edge.	0	1	2	3
2. Not being able to stop or control worrying.	0	1	2	3
3. Worrying too much about different things.	0	1	2	3
4. Having trouble relaxing.	0	1	2	3
5. Being so restless that it is hard to sit still.	0	1	2	3
6. Becoming easily annoyed or irritable.	0	1	2	3
7. Feeling afraid as if something awful might happen.	0	1	2	3

(Kroenke et al., 2007, p. 326)

AMERICAN COLLEGE OF PHYSICIANS
INTERNAL MEDICINE | *Doctors for Adults*

ROA1016499

February 20, 2010

UNLV
York, PA 17406

Dear Ms. White:

Thank you for your request for print format of the following from *Annals of Internal Medicine:*

Appendix figure: Kroenke, K., et al, (2007). Anxiety disorders in primary care: Prevalence, impairment, comorbidity, and detection, Annals of Internal Medicine, 146

Permission is granted for the preceding material with the understanding that you will give appropriate credit to *Annals of Internal Medicine* as the original source of the material. **Any translated version must carry a disclaimer stating that the American College of Physicians is not responsible for the accuracy of the translation.** This permission grants non-exclusive, worldwide rights for this edition in print format only. ACP does not grant permission to reproduce entire articles or chapters on the Internet. This letter represents the agreement between ACP and Krista A. White RN, MSN, CCRN, PhD for request ROA1016499 and supersedes all prior terms from the requestor.

Thank you for your interest in *Annals of Internal Medicine.* If you have any further questions or would like to discuss the matter further, please contact me at 856-489-8555 or fax 856-489-4999.

Sincerely,
Gina Brown
Permissions Coordinator

Dear Krista,

Thank you for your email.
Pfizer is pleased to give permission for the requested use. Please use the following notice:

GAD-7 Copyright Pfizer Inc. all rights reserved; used with permission.

Best regards,
Rosalba Oliveri
Trademark Specialist
Pfizer Inc. --Trademark Department
Mail Stop: 150/2/112
150 East 42nd Street, New York, NY 10017
direct 212.733.1120 | fax 212.573.2273
rosalba.oliveri@pfizer.com

-----**Original Message-----**
From: whitek32@unlv.nevada.edu [mailto:whitek32@unlv.nevada.edu]
Sent: Tuesday, February 02, 2010 8:13 PM
To: Customer Response; Request For Permissions
Subject: request to use GAD-7 scale

To whom it may concern -- I am a doctoral student in the School of Nursing at the University of Nevada, Las Vegas (UNLV) and am working on my dissertation.
My research focus is quantitative instrument development and my work is entitled Self-Confidence and Anxiety of Nursing Students While Making Clinical Decisions:
A Study to Develop and Test a Research Instrument. In order to establish psychometric properties for my newly designed instrument, I will have undergraduate nursing students complete not only my own instrument but also two existing instruments with sound psychometrics.
Hence, I am seeking permission to use the Generalized Anxiety Disorder-7 scale.
The 7-item GAD-7 scale was developed by K. Kroenke, R. Spitzer, et al. approximately 2006 and I believe it was developed with grant money from Pfizer Inc. I have located a copy of the GAD-7 in the Annals of Internal Medicine, 146(5), p, 326 or W-77 and have received permission from this journal to use the scale in my dissertation work.
If you need any additional information, please let me know. Thank you so much for attending to this request. I am in need of permission by February 20, 2010.

Sincerely,
Krista A. White RN, MSN, CCRN, PhD student UNLV
Email: whitek32@unlv.nevada.edu
Phone: XXXXX

GAD-7 Permission

Yes, you have permission. Attached is a document with information on the PHQ family of scales including the GAD-7

Kurt Kroenke, MD
Professor of Medicine, Indiana University
Regenstrief Institute, 5th Floor
1050 Wishard Blvd
Indianapolis, IN 46202
Phone: 317-630-7447 (Donna Burgett)
Fax: 317-630-6611
E-mail: kkroenke@regenstrief.org

-----Original Message-----
From: whitek32@unlv.nevada.edu [mailto:whitek32@unlv.nevada.edu]
Sent: Wednesday, February 03, 2010 4:08 PM
To: kkroenke@regenstrief.org
Subject: GAD-7 permission

Dear Dr. Kroenke -- I am a doctoral student in the School of Nursing at the University of Nevada, Las Vegas (UNLV) and am working on my dissertation. My research focus is quantitative instrument development and my work is entitled Self-Confidence and Anxiety of Nursing Students While Making Clinical Decisions: A Study to Develop and Test a Research Instrument. In order to establish psychometric properties for my newly designed instrument, I will have undergraduate nursing students complete not only my own instrument but also two existing instruments with sound psychometrics.

Hence, I am seeking permission to use the Generalized Anxiety Disorder-7 scale as found in the article by Kroenke, K., Spitzer, R., Williams, J., Monahan, P., and Lowe, B. (2007). Anxiety disorders in primary care: Prevalence, impairment, comorbidity, and detection, Annals of Internal Medicine, 146(5), 317-325. The scale appears as an Appendix figure on page W-77 at the end of the article.

At the present time I have secured permissions from both Pfizer and the Annals of Internal Medicine to reproduce the scale.
If you need any additional information, please let me know. Thank you so much for attending to this request. I am excited to use your instrument to support my own research.

Sincerely,
Krista A. White RN, MSN, CCRN, PhD student UNLV
Email: whitek32@unlv.nevada.edu
Phone: XXXXX

APPENDIX K

IRB Approval from UNLV and Informed Consent

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

UNLV IRB
Approved
JUN 14 2010
Expires CE

Biomedical IRB – Exempt Review
Determined to be Exempt

DATE: June 28, 2010

TO: **Dr. Cheryl Bowles,** Physiological Nursing

FROM: Office of Research Integrity – Human Subjects

RE: Notification of IRB Action by Dr. John Mercer, Chair JM/CE
Protocol Title: **The Development and Validation of a Tool to Measure Self-confidence and Anxiety in Nursing Students While Making Clinical Decisions**
Protocol # 1006-3487

This memorandum is notification that the project referenced above has been reviewed by the UNLV Biomedical Institutional Review Board (IRB) as indicated in Federal regulatory statutes 45CFR46.

The protocol has been reviewed and deemed exempt from IRB review. It is not in need of further review or approval by the IRB.

PLEASE NOTE:
Attached to this approval notice is the **official Informed Consent/Assent (IC/A) Form** for this study. The IC/A contains an official approval stamp. Only copies of this official IC/A form may be used when obtaining consent. Please keep the original for your records.

Any changes to the exempt protocol may cause this project to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**.

If you have questions or require any assistance, please contact the Office of Research Integrity – Human Subjects at IRB@unlv.edu or call 895-2794.

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

UNLV IRB Approved JUL 19 2010 Expires CE

Biomedical IRB – Exempt Review
Modification Approved

NOTICE TO ALL RESEARCHERS:

Please be aware that a protocol violation (e.g., failure to submit a modification for any change) of an IRB approved protocol may result in mandatory remedial education, additional audits, re-consenting subjects, researcher probation suspension of any research protocol at issue, suspension of additional existing research protocols, invalidation of all research conducted under the research protocol at issue, and further appropriate consequences as determined by the IRB and the Institutional Officer.

DATE: July 19, 2010

TO: **Dr. Cheryl Bowles**, Physiological Nursing

FROM: Office of Research Integrity – Human Subjects

RE: Notification of IRB Action by Cindy Lee-Tataseo, BS, CIP, CIM CLT/CE
Protocol Title: **The Development and Validation of a Tool to Measure Self-confidence and Anxiety in Nursing Students While Making Clinical Decisions**
Protocol #: 1006-3487

The modification of the protocol named above has been reviewed and approved.

Modifications reviewed for this action include:

- Revised the current wording from "university" to "institutions" in the Voluntary Participation section of the Informed Consent.

This IRB action does not change your exempt status.

PLEASE NOTE:
Attached to this approval notice is the **official Informed Consent/Assent (IC/A) Form** for this study. The IC/A contains an official approval stamp. Only copies of this official IC/A form may be used when obtaining consent. Please keep the original for your records.

Should there be *any* change to the protocol, it will be necessary to submit a **Modification Form** through ORI - Human Subjects. No changes may be made to the existing protocol until modifications have been approved by the IRB.

If you have questions or require any assistance, please contact the Office of Research Integrity – Human Subjects at IRB@unlv.edu or call 895-2794.

RECEIVED
JUL 19 2010

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

UNLV IRB Approved JUL 19 2010 Expires

THIS APPEARS AS PAGE 1 IN SURVEY MONKEY

Informed Consent

School of Nursing

TITLE OF STUDY: The development and validation of a tool to measure self-confidence and anxiety in nursing students while making clinical decisions

INVESTIGATOR(S): Dr. Cheryl Bowles EdD, RN, CNE, and Ms. Krista A. White MSN, RN, CCRN, PhD (candidate)

CONTACT PHONE NUMBER: 702-895-3360

Dear Undergraduate Nursing Student:
You are invited to participate in a research study entitled: *The development and validation of a tool to measure self-confidence and anxiety in nursing students while making clinical decisions*

Purpose of the Study
The purpose of this study is develop and test a newly designed assessment tool that examines the self-confidence and anxiety reported by undergraduate nursing students during the clinical decision making process.

Participants
You are being asked to participate in the study because you are an undergraduate student enrolled in either an accredited associate or baccalaureate nursing program, are in one of your final two clinical semesters of nursing, and are at least 18 years of age. Your participation in the study will be valuable in learning more about this important topic of how nursing students feel while making decisions in the clinical setting.

Procedures
If you volunteer to participate in this study, you will be asked to do the following:
(1) Complete the 78-item survey package which includes 3 assessment tools (the *Nursing Anxiety and Self-Confidence with Clinical Decision Making*, the *General Perceived Self-Efficacy*, and the *Generalized Anxiety Disorder-7*) and a demographic questionnaire. It should take you about 20 minutes to complete the entire survey package.
(2) Click the submit button at the end of the survey package.

Benefits of Participation
There may not be direct benefits to you as a participant in this study except the satisfaction of knowing you were able to participate in research that affects nursing students. However, from the data collected, we hope to have a tool which nursing instructors can use to help student nurses learn the clinical decision making process better.

Risks of Participation
There are risks involved in all research studies. This study may include only minimal risks such as you may be uncomfortable when answering some questions on the assessment tools.

Cost /Compensation
There will not be financial cost to you to participate in this study. You will not be compensated for your time. The completion of the study package will take about 20 minutes of your time.

Contact Information
If you have any questions or concerns about the study, you may contact Dr. Cheryl Bowles at 702-895-3360 or Ms. Krista White at 717-252-0727. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office for the Protection of Research Subjects at 702-895-2794.**

Voluntary Participation
Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. Your agreement to participate or not participate in the study will have no effect on your progress or success in any of the nursing courses in which you are currently enrolled. You may choose not to answer an item and may withdraw at any time (by clicking the "**Exit this Survey**" phrase at the top right of the survey screen) without prejudice to your relations with the institution. You are encouraged to ask questions about this study at the beginning or any time during or after the research study.

Confidentiality
All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. Only the principal investigator and student investigator will have access to the data. All data will be reported as grouped data. All records will be stored on a password-protected computer in a locked facility at UNLV for 3 years after completion of the study. After the storage time, the information gathered will be destroyed.

Participant Consent:
You have read the above information and agree to participate in this study. You are at least 18 years of age. You understand you may ask questions about the study before, during or after you complete the survey package. A copy of this form may be printed for your records. By clicking the word NEXT and completing the assessment tools and questionnaire, you indicate that you have read the above information and agree to participate in the study.

Thank you so much for your time and participation.
Please click NEXT to enter the survey package.

APPENDIX L

Contact Letter for Faculty-Contact

Dear **____** (Name will be placed here) -- I am a PhD candidate in the School of Nursing at the University of Nevada, Las Vegas (UNLV) and am working on my dissertation research. My research focus is quantitative instrument development and my work is entitled: **The Development and Validation of a Tool to Measure Self-Confidence and Anxiety in Nursing Students While Making Clinical Decisions**.

I am writing to ask for your assistance with the *student recruitment* and *data collection* phase of my study. Your name was given to me by your Dean/Direction as a possible contact person and I am excited to work with you. If you agree with help with the study, here is all that you would be asked to do: (1) announce the intent of the study to your class; (2) email a student recruitment flyer to your students and post it in your classroom; (3) describe to the students that they are being invited to voluntarily complete an online survey by May 6, 2011; and (4) answer questions students may have about the study. Additionally, you would be asked to verbally remind your students to complete the survey and send them an email reminder with the survey link one week and three weeks after initial deployment of the survey. I will ensure that you have all the necessary information about the study prior to the discussion with your class! I will also send you the two follow-up reminder emails.

If permission is granted and schedules allow, I would like to visit your campus and talk to your class in person. During my visit I would present the intent of the study, let students know their role, and answer questions. Data collection will not occur during my campus visit. You would still be asked to deploy the survey link and invite students to voluntarily complete the survey.

If you have any questions at all or would like additional information, please let me know. Thank you in advance for your assistance with my PhD dissertation research. I look forward to working with you and your students.

Sincerely,
Krista A. White MSN, RN, CCRN, PhD(c)
Email: whitek32@unlv.nevada.edu
Phone: XXXXX

APPENDIX M

Student Recruitment Flyer

Have you ever felt anxious in clinical or lacked confidence in clinical??

Are you at least 18 years old and enrolled in one of your last two clinical semesters of nursing school?
If so, you may be eligible to participate in a research study.

Purpose of the study: To gather information about a new survey that measures how anxious and confident students feel while making decisions in clinical.

What will I do?: Complete an on-line survey and click "Submit". The survey-link will be emailed to you by one of your professors.

What kinds of questions will I be asked?: You will be asked questions about background information and how you feel while making decisions in clinical. You will also be asked to complete two short surveys that include questions about your usual levels of confidence and anxiety outside of school.

How long will it take to complete the survey?: It takes about **15-20 minutes** to complete and your responses are important to the study results.

When will I complete the survey?: Anytime before **Friday, May 6, 2011**.

Will my information be kept confidential?: YES. Confidentiality will always be maintained. Your responses to the survey are anonymous. The researchers will NOT have access to your name or individual email address. The only people who will have access to your survey responses are the Principal Investigator and Student Investigator of the study. Participation is voluntary.

Why should I participate?: Your information will help teachers see how students feel while making clinical decisions. If nurse educators know this information, they can help students learn the process better.

Who do I contact if I have questions?:
Principal Investigator: Dr. Cheryl Bowles, University of Nevada, Las Vegas, Nursing Department; (702) 892-3082; cheryl.bowles@unlv.edu
Student Investigator: Krista White, MSN, RN, CCRN, PhD Candidate, University of Nevada, Las Vegas, Nursing Department; Phone: XXXXX; whitek32@unlv.nevada.edu

APPENDIX N

Initial Email Sent to Student by Faculty-Contact

If you've ever felt anxious or lacked confidence in clinical, here is a chance for you to make a difference!!

Dear Student – Recently one of your professors talked to you about volunteering to participate in a research study. As a nursing student, I know your time is precious so I do appreciate your participation. **This is an opportunity for you to help other nursing students and faculty members learn more about how students feel about their confidence level and anxiety level while making decisions in the clinical setting. For my PhD research study, I am designing a new survey about this topic and you can help test it!**

Contained at the end of this email is a link to an online survey. All you have to do is click on the link, complete the survey and click submit. It will take you **about 20 minutes** but the information you provide is very important to my study results. So, please consider completing the survey!! Participation is voluntary.

The deadline for completion of the online survey is **Friday, May 6, 2011**. Your responses to the survey are completely anonymous and all your information will be kept confidential. Only I and one of my professors will have access to your information.

If you have any questions or would like additional information prior to entering the survey, please let me know. Thank you in advance for completing the survey and helping with my PhD dissertation research. Your time is very much appreciated.

Sincerely,
Krista A. White MSN, RN, CCRN, PhD(c)
Email: whitek32@unlv.nevada.edu
Phone: XXXXX

<<< LINK TO SURVEY PACKAGE GOES HERE >>>

APPENDIX O

Faculty-Contact and Student Follow-up Emails

Faculty-Contact Follow-up Email

Dear ___ (Name will be placed here) – About one week ago (or this will read three weeks ago for the second follow-up) you forwarded an email, sent from me, to your students inviting them to voluntarily participate in a research study. **This message is being sent to ask that you verbally remind your students about the study and invite them to complete the online survey.** If you have any questions or would like additional information please let me know. Thank you so much.

I am asking that you remind your students using this scripted message:
"A week ago you received an email inviting you to complete an online survey about your confidence and anxiety levels while making decisions in clinical. This is an opportunity for you to participate in a research study and make a difference for nursing students. The researcher is designing a new survey and you can help test it! Thank you if you who have already completed the survey.

If you think you may be interested in completing the survey, see the flyer on the bulletin board in our classroom for more information. If you have not already completed the survey and are interested in participating, be sure to check your email because I will be forwarding a reminder (sent to me by the researcher) with the link to enter the survey. The deadline for completion is Friday, May 6, 2011.
Just a reminder, please complete the survey only ONCE. If you've already filled it out, don't complete it again. The researcher would like to thank you all for your time and help with her research study."

Sincerely,
Krista A. White MSN, RN, CCRN, PhD(c)
Email: whitek32@unlv.nevada.edu
Phone: XXXXX

Student Follow-up Email

If you've ever felt anxious or lacked confidence in clinical, here is a chance for you to make a difference!!

Dear Student – About one week ago (or this will read three weeks ago for the second follow-up) one of your professors sent you an email inviting you to voluntarily participate in a research study. If you have completed the survey, thank you so much for your time!! **If you have not completed the online survey, this message is being sent to remind you of the study and invite you to complete the online survey attached to this email.** Please complete the survey only ONCE.

For my PhD research study, I am designing a new survey and you can help test it!! This is an exciting opportunity for you to help other nursing students and faculty members learn more about how students feel about their confidence level and anxiety level while making decisions in the clinical setting!

Contained at the end of this email is a link to an online survey. All you have to do is click on the link, complete the survey and click submit. It will take you **about 20 minutes** but the information you provide is very important to my study results. So, please consider completing the survey!! Participation is voluntary.

The deadline for completion of the online survey is **Friday, May 6, 2011**. Your responses to the survey are completely anonymous and all your information will be kept confidential. Only I and one of my professors will have access to your information.

If you have any questions or would like additional information prior to entering the survey, please let me know. Thank you in advance for completing the survey and helping with my PhD dissertation research. Your time is very much appreciated.

Sincerely,
Krista A. White MSN, RN, CCRN, PhD(c)
Email: whitek32@unlv.nevada.edu
Phone: XXXXX

<<< *LINK TO SURVEY PACKAGE GOES HERE* >>>

APPENDIX P

Characteristics and Comparisons of the Sample, Pilot

N = 349

Demographic Questions	**Complete Surveys (n = 303)**	**Incomplete Surveys (n = 46)**	**Statistic**
Gender			
Female	283 (93.4%)	44 (95.7%)	*Fisher's Exact*,
Male	20 (6.6%)	2 (4.3%)	p = .75
Age (M, ± SD)	29.16 ± 7.50*	27.67 ± 7.04*	t = -1.30, p = .20
Ethnicity	*	*	
African American	13 (4.4%)	6 (13.6%)	
American Indian	1 (0.3%)	0	
Asian	13 (4.4%)	2 (4.5%)	*LR* = 5.14,
Caucasian	257 (86.5%)	34 (77.4%)	p = .27
East Indian	0	0	
Hispanic	13 (4.4%)	2 (4.5%)	
Other	---	---	
African	1 (0.3%)	1 (2.2%)	
Arab	1 (0.3%)	0	
Caucasian & Hispanic	2 (1.7%)	0	
Hawaiian	1 (0.3%)	1 (2.2%)	
Program type			
Associate degree	192 (63.4%)	17 (37%)	X^2 = 11.59 **
Baccalaureate degree	111 (36.6%)	29 (63%)	
Program format	*	*	
Accelerated	18 (6%)	8 (17.8%)	
Evening/weekend	66 (21.9%)	8 (17.8%)	X^2 = 11.40 **
Traditional, 2 semesters per academic year	141 (46.7%)	22 (53.3%)	
Year round, 3 semesters per academic year	77 (25.5%)	5 (11.1%)	
Other	0	0	

Demographic Questions	Complete Surveys (n = 303)	Incomplete Surveys (n = 46)	Statistic
Current nursing semester	*	*	
3rd	106 (42.9%)	9 (25.7%)	
4th	63 (25.5%)	8 (22.9%)	
5th	40 (16.2%)	14 (40%)	X^2 = 11.70 **
6th	38 (15.4%)	4 (11.4%)	
My school does not follow a semester system	0	0	
Other	---	---	
7th	14 (4.6%)	5 (10.9%)	
8th and final semester	37 (2.2%)	6 (13%)	
Current nursing quarter	*		
4th	0	0	
5th	0	0	
6th	0	0	
My school does not follow a quarter system	292 (96.4%)	46 (100%)	
Other	0	0	
Currently working as nursing assistant	*		
No	207 (68.3%)	30 (65.2%)	X^2 = .20,
Yes	95 (31.4%)	16 (34.8%)	p = .65
College experience before nursing school	*		
I started my nursing program right out of high school	45 (15.1%)	10 (21.7%)	
1 to 2 semesters	30 (10%)	5 (10.9%)	*LR* = 8.60,
3 to 4 semesters	53 (17.7%)	9 (19.6%)	p = .07
> 4 semesters	79 (26.4%)	4 (7.8%)	
I completed a college degree before starting my nursing program	92 (30.8%)	18 (39.1%)	
Participation in nursing intern/extern program			
No	236 (77.9%)	34 (73.9%)	*LR* = .56,
Yes	52 (17.2%)	10 (21.7%)	p = .76
I am not familiar with this type of program	15 (5%)	2 (4.3%)	

Demographic Questions	Complete Surveys (n = 303)	Incomplete Surveys (n = 46)	Statistic
Content of current clinical nursing course(s) *(Choose all that apply)*			
Community	107 (35.3%)	10 (21.7%)	
Critical Care	120 (39.6%)	14 (30.4%)	
Medical/Surgical	200 (66%)	23 (50%)	
Obstetrics	60 (19.8%)	9 (19.6%)	
Pediatrics	97 (32%)	15 (32.6%)	
Psych/mental health	136 (44.9%)	13 (28.3%)	
Other	---	---	
Cardiac telemetry	6 (2%)	0	
Day surgery	1 (0.3%)	0	
Emergency department	10 (3.3%)	0	
Geriatrics	1 (0.3%)	1 (2.2%)	
Leadership/mentorship	7 (2.3%)	2 (4.3%)	
Long-term care	1 (0.3%)	0	
Oncology	7 (2.3%)	0	
Operating room	2 (0.6%)	0	
Orthopedics	4 (1.3%)	0	
Rehabilitation	1 (0.3%0	0	

Note. *t* = independent samples *t*-test; *LR* = likelihood ratio; X^2 = chi square for independence
* Indicates some missing values
** $p < .01$ (2-tailed)

Course Difficulty with Course Grade for Complete Survey Group (n = 303)

Difficulty Level of Clinical Nursing Course # 1	**Grade A**	**Grade B**	**Grade C**	**Grade D**	**Grade F**
Very easy	2	1			
Easy	17	4			
About what I expected	66	74	10	2	
Hard	18	47	20	9	1
Very hard	5	6	14	3	

Spearman *rho* correlation *rho* = .44(297), p <.001¥

Difficulty Level of Clinical Nursing Course # 2	**Grade A**	**Grade B**	**Grade C**	**Grade D**	**Grade F**
Very easy	1				
Easy	2	2			
About what I expected	35	40	12	2	
Hard	13	37	16	2	1
Very hard	4	7	8	2	

Spearman *rho* correlation *rho* = .29(182), p < .001¥

Difficulty Level of Clinical Nursing Course # 3	**Grade A**	**Grade B**	**Grade C**	**Grade D**	**Grade F**
Very easy	1				
Easy	1	2			
About what I expected	18	22	9	2	
Hard	7	26	11	1	1
Very hard	2	8	4		

Spearman *rho* correlation *rho* = .21(113), p = .02¥

Difficulty Level of Clinical Nursing Course # 4	**Grade A**	**Grade B**	**Grade C**	**Grade D**	**Grade F**
Very easy					
Easy	2	1			
About what I expected	12	14	5	1	
Hard	7	13	5	1	
Very hard	3	6	4		

Spearman *rho* correlation *rho* = -.18(72), p = .12

¥ Indicates statistical significance

Course Difficulty with Course Grade for Incomplete Survey Group (n = 46)

Difficulty Level of Clinical Nursing Course # 1	Grade A	Grade B	Grade C	Grade D	Grade F
Very easy	1				
Easy	1	1			
About what I expected	11	11	1		
Hard		8	8		
Very hard	2			1	

Spearman *rho* correlation *rho* = .50(43), p < .001[¥]

Difficulty Level of Clinical Nursing Course # 2	Grade A	Grade B	Grade C	Grade D	Grade F
Very easy					
Easy	1	1			
About what I expected	5	4	1		
Hard		2	1		
Very hard		1		1	

Spearman *rho* correlation *rho* = .51(15), p = .04[¥]

Difficulty Level of Clinical Nursing Course # 3	Grade A	Grade B	Grade C	Grade D	Grade F
Very easy					
Easy	1				
About what I expected	2	1			
Hard	1		2		
Very hard					

Spearman *rho* correlation *rho* = .57(5), p = .17

Difficulty Level of Clinical Nursing Course # 4	Grade A	Grade B	Grade C	Grade D	Grade F
Very easy					
Easy					
About what I expected			1		
Hard	1	3	2		
Very hard					

Spearman *rho* correlation *rho* = -.44(5), p = .32

[¥] Indicates statistical significance

APPENDIX Q

Factor Analysis Results for Self-Confidence Subscale, Pilot

n = 268

Factor	**Initial eigenvalue**			**Rotation sums of squared loadings**		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
I	**25.52** [a]	**62.25**	**62.25**	**9.51**	**22.20**	**23.20**
II	**1.75**	**4. 26**	**66.51**	**9.21**	**22.47**	**45.67**
III	**1.17**	**2.86**	**69.37**	**6.84**	**16.68**	**62.35**
IV	**1.01**	**2.46**	**71.83**	**3.88**	**9.47**	**71.83**
V	.77					

Initial run: Principal component analysis with varimax rotation
a, **Bold** numbering indicates the four factors retained

Question # for Self-confidence Sub-scale	**Descriptor**	**Factors** [a, b]				h^{2} [c]
		I	**II**	**III**	**IV**	
Q13	Use of resources – faculty/staff	**.911** [d]	.071	-.316	.136	.667
Q32	Use of resources –faculty/staff	**.905**	.023	-.158	-.008	.640
Q35	Gathering information from family	**.626**	.005	.242	-.039	.655
Q34	Remain open to reasons for problem	**.614**	.072	.190	-.034	.651
Q16	Use of resources – protocol or literature	**.607**	.072	-.044	.191	.565
Q22	Recognize information from report	**.601**	.244	.066	-.032	.691
Q24	Gather more specific information from patient	**.596**	-.034	.251	.116	.731
Q17	Importance of information from others	**.547**	.034	.183	.210	.752
Q36	Evaluation of decision on patient satisfaction	**.544**	-.058	.383	.050	.742
Q40	Gather more information through more assessment	**.486**	.263	.173	.022	.742
Q15	Assess nonverbals	**.449**	-.138	.275	.377	.738

Question # for Self-confidence Sub-scale	**Descriptor**	**Factors [a, b]**				**h^{2} [c]**
		I	**II**	**III**	**IV**	
Q21 [e]	*Evaluation of decision on patient condition*	*.443*	*.089*	*.384*	*.035*	.763
Q5	See the full clinical picture	-.074	**.811**	-.031	.172	.701
Q10	Interpret meaning of findings	.127	**.725**	.012	.009	.698
Q4	Identify relevant information	.033	**.707**	-.088	.308	.753
Q3	See patterns in the information	-.088	**.697**	-.010	.318	.700
Q7	Recall past learned knowledge	.014	**.648**	.101	.085	.621
Q33	*Correlate test findings with assessment findings*	*.447*	*.641*	*-.068*	*-.159*	.750
Q11	Evaluation of decision on lab findings	.239	**.627**	.015	-.059	.632
Q31	Use knowledge to create list of decision options	.148	**.605**	.254	-.173	.711
Q18	Use knowledge to interpret information	.246	**.570**	.100	-.082	.646
Q8	*Recognize problem by reading the chart*	*.089*	*.479*	*.014*	*.195*	.628
Q2	Make the final decision to act	-.303	**.474**	**.417**	.291	.656
Q9	Implement the 'best' decision option	-.068	**.461**	**.426**	.067	.671
Q30	Implement decision in emergent situation	.100	**.411**	.375	-.082	.598
Q39	Consider an intervention because it 'seems' right	-.257	.235	**.791**	.056	.602
Q37	*Gather information because something 'feels' wrong*	*.324*	*-.105*	*.671*	*.019*	.768
Q19	Implement decision based on intuition	.131	-.027	**.670**	.158	.735
Q23	Independently make the decision	.148	.440	**.623**	-.042	.742
Q38	Make the decision based on patient knowledge	.335	.029	**.517**	-.015	.671
Q20	Analyze risk of interventions	.163	.263	**.478**	.051	.751
Q27	Use past knowledge to help interpret information	.334	.169	**.419**	-.042	.680
Q25	*Know when enough information is gathered*	*.211*	*.296*	*.408*	*.040*	.748
Q29	Correlate assessment with nonverbals	.307	.126	**.407**	.154	.774
Q1	Listen carefully to the patient	.164	.118	-.058	**.588**	.537
Q6	Detect when verbal and nonverbal don't match	.204	.040	.151	**.532**	.655

Question # for Self-confidence Sub-scale	Descriptor	Factors [a, b]				h^{2} [c]
		I	**II**	**III**	**IV**	
Q14	Use active listening to gather information	**.624**	.017	-.137	**.412**	.692
Q12	*Evaluation of decision on patient assessment*	*No loading > .40 on any factor*				.718
Q26	*Identify irrelevant information*	*No loading > .40 on any factor*				.732
Q28	*Change my assessment of the patient problem*	*No loading > .40 on any factor*				.741
Q41	*Take full responsibility for decision made*	*No loading > .40 on any factor*				.517
Initial eigenvalue [f]		25.52	1.75	1.17	1.01	
Rotation sums of squared loadings [g]		21.37	20.65	21.09	11.94	

Alpha factoring with promax rotation. Rotation converged in 14 iterations.

a, Factor labels: (I) using resources to gather information; (II) using information to see the big picture; (III) knowing and acting; (IV) listening fully
b, Substantial loading is > .40
c, Communality is the variance per item across factors = *row* sums of squared loadings
d, **Bold** font indicates substantial loading on corresponding factor
e, *Italicized* questions were reduced from the pilot version of the scale
f, Eigenvalue is the variance per factor across items = *column* sums of squared loadings
g, When factors are correlated, sums of squared loadings cannot be added to obtain a total variance

Factor Correlation Matrix [a]

Factor	I	II	III	IV
I	**1.00**			
II	.717	**1.00**		
III	.777	.758	**1.00**	
IV	.568	.534	.568	**1.00**

a, Correlations of > .40 indicate inter-related factors

APPENDIX R

Factor Analysis Results for Anxiety Subscale, Pilot

n = 258

Factor	**Initial eigenvalue**			**Rotation sums of squared loadings**		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
I	**24.24** [a]	**59.12**	**59.12**	**12.83**	**31.29**	**31.29**
II	**1.85**	**4. 52**	**63.64**	**7.67**	**18.71**	**50.00**
III	**1.20**	**2.93**	**66.57**	**6.79**	**16.57**	**66.57**
IV	.94					

Initial run: Principal component analysis with varimax rotation
a, **Bold** numbering indicates the three factors retained

Question # for Anxiety Sub-scale	**Descriptor**	**Factors** [a, b]			***h*^{2}** [c]
		I	**II**	**III**	
Q15	Assess nonverbals	**.915** [d]	-.085	-.021	.701
Q14	Use active listening to gather information	**.883**	-.150	.058	.670
Q17	Importance of information from others	**.855**	-.095	.053	.682
Q24	Gather more specific information from patient	**.800**	.034	.001	.680
Q36	Evaluation of decision on patient satisfaction	**.790**	.111	-.048	.707
Q16	Use of resources – protocol or literature	**.764**	-.127	.158	.630
Q32	Use of resources –faculty/staff	**.730**	.059	.007	.610
Q38	Make the decision based on patient knowledge	**.708**	.241	-.079	.712
Q29	Correlate assessment with nonverbals	**.699**	.183	.007	.723
Q34	Remain open to reasons for problem	**.651**	.037	.125	.606
Q13	Use of resources – faculty/staff	**.647**	-.129	.143	.442
Q6	Detect when verbal and nonverbal don’t match	**.643**	-.153	.246	.532

Question # for Anxiety Sub-scale	Descriptor	Factors [a, b]			h^{2} [c]
		I	**II**	**III**	
Q27	Use past knowledge to help interpret information	**.635**	.140	.078	.653
Q35	Gathering information from family	**.629**	.049	.115	574
Q26 [e]	*Identify irrelevant information*	*.626*	*.159*	*.099*	.593
Q1	Listen carefully to the patient	**.626**	-.204	.252	.467
Q37	*Gather information because something 'feels' wrong*	*.582*	*.434*	*-.219*	.684
Q40	Gather more information through more assessment	**.569**	.146	.169	.677
Q21	*Evaluation of decision on patient condition*	*.558*	*.391*	*-.062*	.712
Q25	*Know when enough information is gathered*	*.539*	*.289*	*.093*	.728
Q28	*Change my assessment of the patient problem*	*.504*	*.400*	*.118*	.729
Q22	Recognize information from report	**.459**	.230	.112	.550
Q33	*Correlate test findings with assessment findings*	*.432*	*.149*	*.303*	.659
Q12	*Evaluation of decision on patient assessment*	*.418*	*.143*	*.399*	.697
Q30	Implement decision in emergent situation	-.274	**.849**	.193	.635
Q41	*Take full responsibility for decision made*	*-.169*	*.800*	*.123*	.588
Q23	Independently make the decision	-.050	**.798**	.089	.680
Q39	Consider an intervention because it 'seems' right	.143	**.786**	-.171	.610
Q20	Analyze risk of interventions	.189	**.624**	.104	.712
Q19	Implement decision based on intuition	.307	**.599**	-.063	.652
Q9	Implement the 'best' decision option	.007	**.521**	.299	.590
Q2	Make the final decision to act	-.190	**.450**	**.469**	.494
Q5	See the full clinical picture	.081	.025	**.736**	.667
Q4	Identify relevant information	.321	-.010	**.677**	.751
Q7	Recall past learned knowledge	.005	.150	**.602**	.519
Q3	See patterns in the information	.241	.063	**.543**	.624
Q10	Interpret meaning of findings	.233	.166	**.524**	.720
Q31	Use knowledge to create list of decision options	.125	.341	**.431**	.671

Question # for Anxiety Sub-scale	Descriptor	Factors [a, b]			h^2 [c]
		I	II	III	
Q18	Use knowledge to interpret information	.178	.261	**.431**	.630
Q11	Evaluation of decision on lab findings	.244	.170	**.426**	.591
Q8	*Recognize problem by reading the chart*	*No loading > .40 on any factor*			.530
Initial eigenvalue [f]		24.24	1.85	1.20	
Rotation sums of squared loadings [g]		22.13	18.73	18.15	

Alpha factoring with promax rotation. Rotation converged in 9 iterations.

a, Factor labels: (I) using resources to gathering information and listening fully; (II) knowing and acting; (III) using information to see the big picture
b, Substantial loading is > .40
c, Communality is the variance per item across factors = *row* sums of squared loadings
d, **Bold** font indicates substantial loading on corresponding factor
e, *Italicized* questions were reduced from the pilot version of the scale
f, Eigenvalue is the variance per factor across items = *column* sums of squared loadings
g, When factors are correlated, sums of squared loadings cannot be added to obtain a total variance

Factor Correlation Matrix [a]

Factor	I	II	III
I	**1.00**		
II	.755	**1.00**	
III	.749	.709	**1.00**

a, Correlations of > .40 indicate inter-related factors

APPENDIX S

Overlapping Items among NASC-CDM Subscales, Pilot

Factor Number	Self-Confidence *	Factor Number	Anxiety *
I	Q13	I	Q13
	Q32		Q32
	Q35		Q35
	Q34		Q34
	Q16		Q16
	Q22		Q22
	Q24		Q24
	Q17		Q17
	Q36		Q36
	Q40		Q40
	Q15		Q15
IV	Q1		Q1
	Q6		Q6
	Q14		Q14
	------		Q27
	------		Q29
	------		Q38
II	Q5	III	Q5
	Q10		Q10
	Q4		Q4
	Q3		Q3
	Q7		Q7
	Q11		Q11
	Q31		Q31
	Q18		Q18
III	Q2	II	Q2
	Q9		Q9
	Q30		Q30
	Q39		Q39
	Q19		Q19
	Q23		Q23
	Q20		Q20
	Q27		------
	Q29		------
	Q38		------

* Includes the 32 items remaining on the scale after the reduction of 9 items.

APPENDIX T

Reliability Results of Subscales, Pilot

Reliability Results for the NASC-CDM, SC & NASC-CDM, A;
Pilot Version

Subscale Name	**Number of Items**	**Scoring Range (1 – 6 Likert)**	**Cronbach's Alpha**	**Mean Inter-Item Correlation (Minimum/Maximum)**	**Mean Score and (SD)**
NASC-CDM, SC (n = 291)	41	41- 246	.98[a]	.56 (.26/.79)	161.42 (± 36.73)
NASC-CDM, A (n = 293)	41	41- 246	.98[a]	.52 (.26/.76)	106.24 (± 32.72)

a, No change in Cronbach's alpha was noted with the deletion of any item.

Reliability Results for the NASC-CDM, SC & NASC-CDM, A;
After Nine Item Reduction, Pilot

Subscale Name	**Number of Items**	**Scoring Range (1 – 6 Likert)**	**Cronbach's Alpha**	**Mean Inter-Item Correlation (Minimum/Maximum)**	**Mean Score and (SD)**
NASC-CDM, SC (n = 291)	32	32 - 192	.97[a]	.54 (.26/.74)	125.99 (± 28.25)
NASC-CDM, A (n = 293)	32	32 - 192	.97[a]	.51 (.26/.76)	82.95 (± 25.36)

a, No change in Cronbach's alpha was noted with the deletion of any item.

APPENDIX U

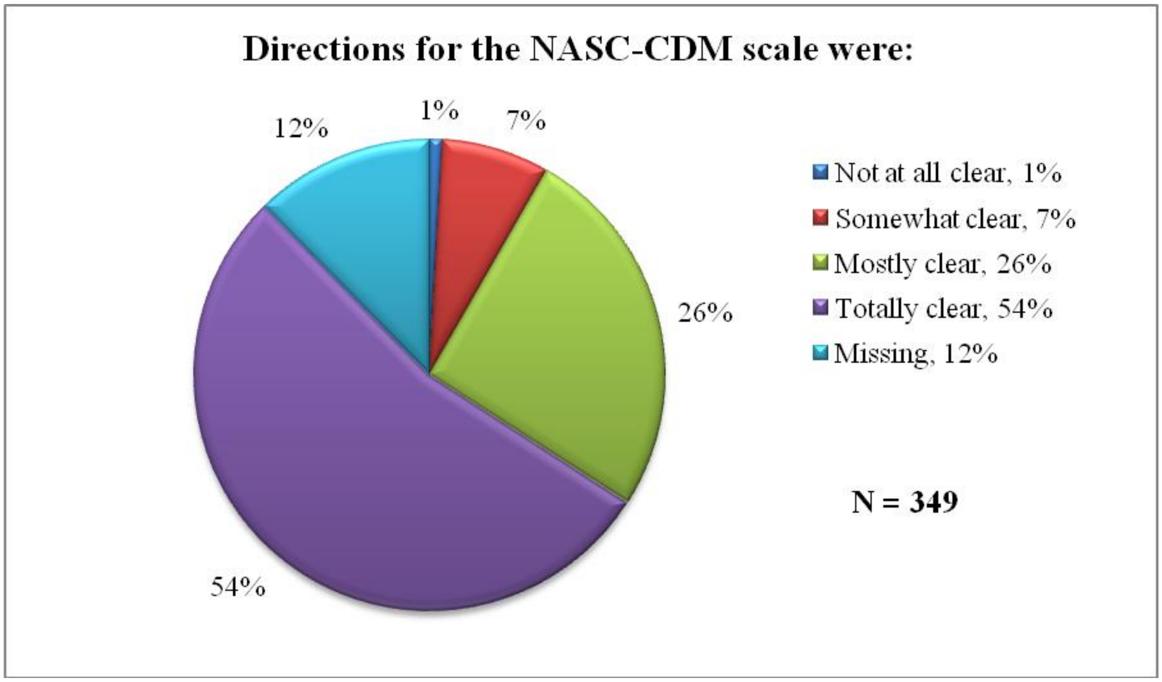
Results of Independent Samples *t*-tests, Pilot

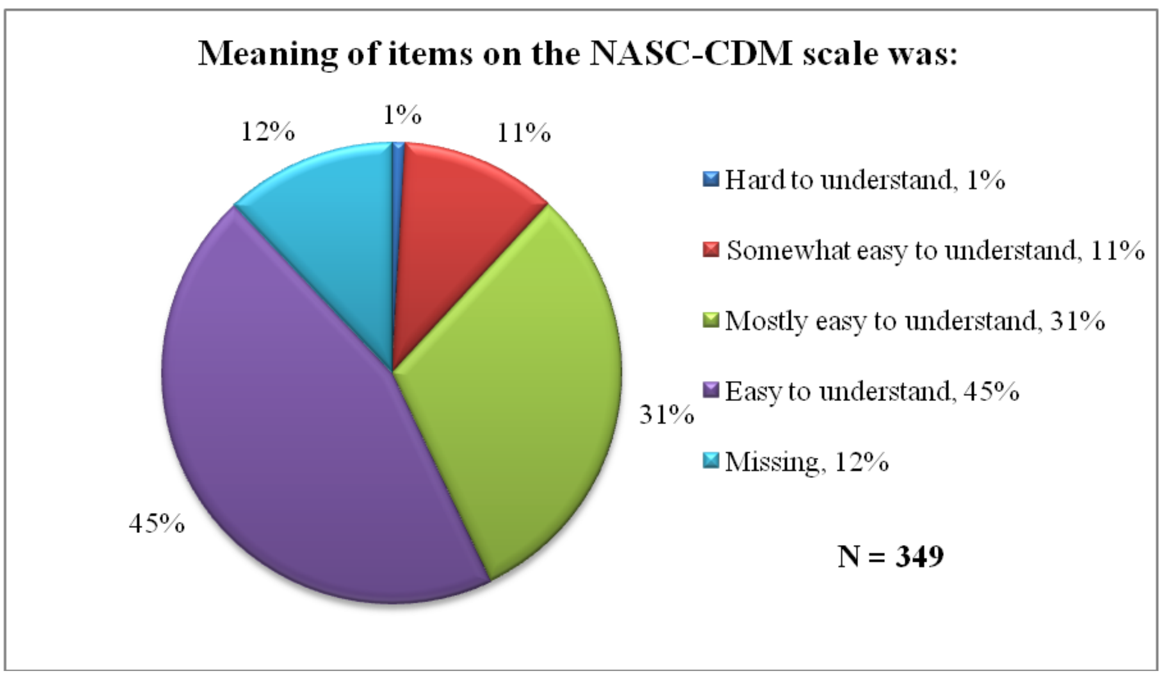
NASC-CDM Subscale	IV	Levels of IV	Mean ± SD	n	*t(df)*	*p*[a]
Self-Confidence	Gender	Male Female	176.79 ± 33.05 160.36 ± 36.75	19 272	-1.09(289)	.06
Anxiety	Gender	Male Female	80.93 ± 19.92 106.68 ± 31.71	14 240	4.50(252)	< .001[¥]
Self-Confidence	Program type	Associate Baccalaureate	158.97 ± 37.92 165.75 ± 34.20	185 106	1.52(289)	.13
Anxiety	Program type	Associate Baccalaureate	105.18 ± 32.72 105.43 ± 29.35	179 75	-.06(252)	.96
Self-Confidence	Externship participation	Yes No	163.33 ± 31.57 160.86 ± 38.44	51 225	-.43(274)	.67
Anxiety	Externship participation	Yes No	104.65 ± 30.17 105.62 ± 32.54	32 207	.16(237)	.88
Self-Confidence	Nursing assistant employment	Yes No	158.90 ± 34.06 161.71 ± 38.83	31 205	.38(236)	.70
Anxiety	Nursing assistant employment	Yes No	100.92 ± 30.35 107.16 ± 32.25	76 177	1.44(251)	.15

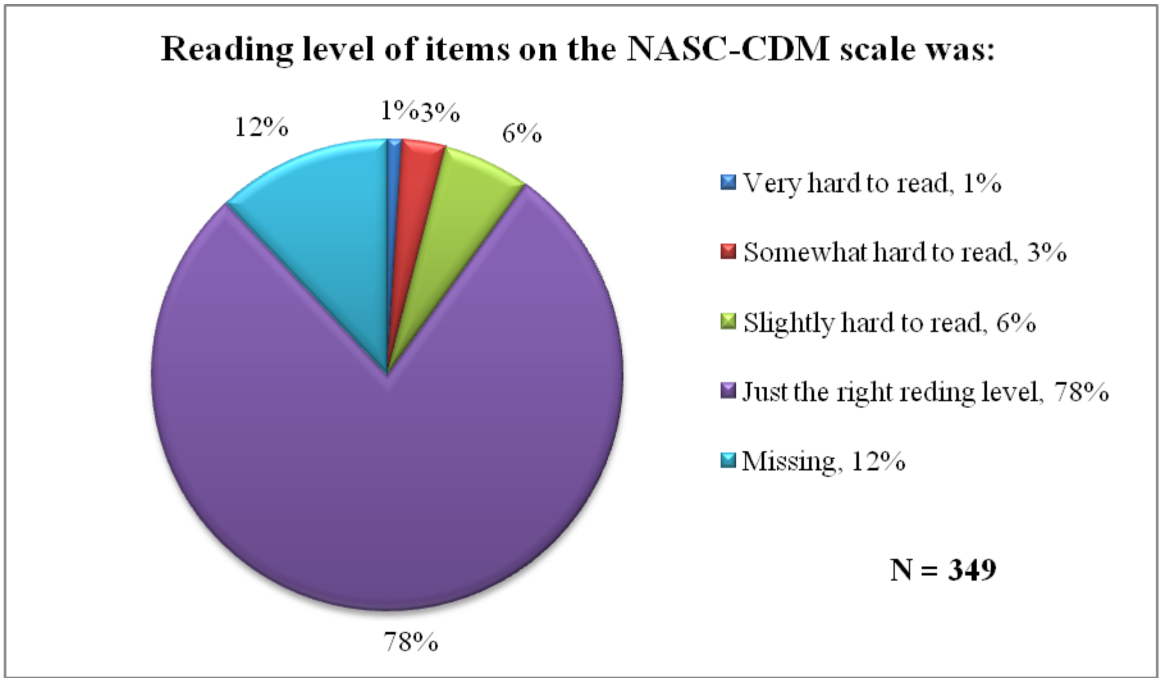
Note. IV = independent variable; SD = standard deviation
a, (2-tailed); ¥, statistically significant

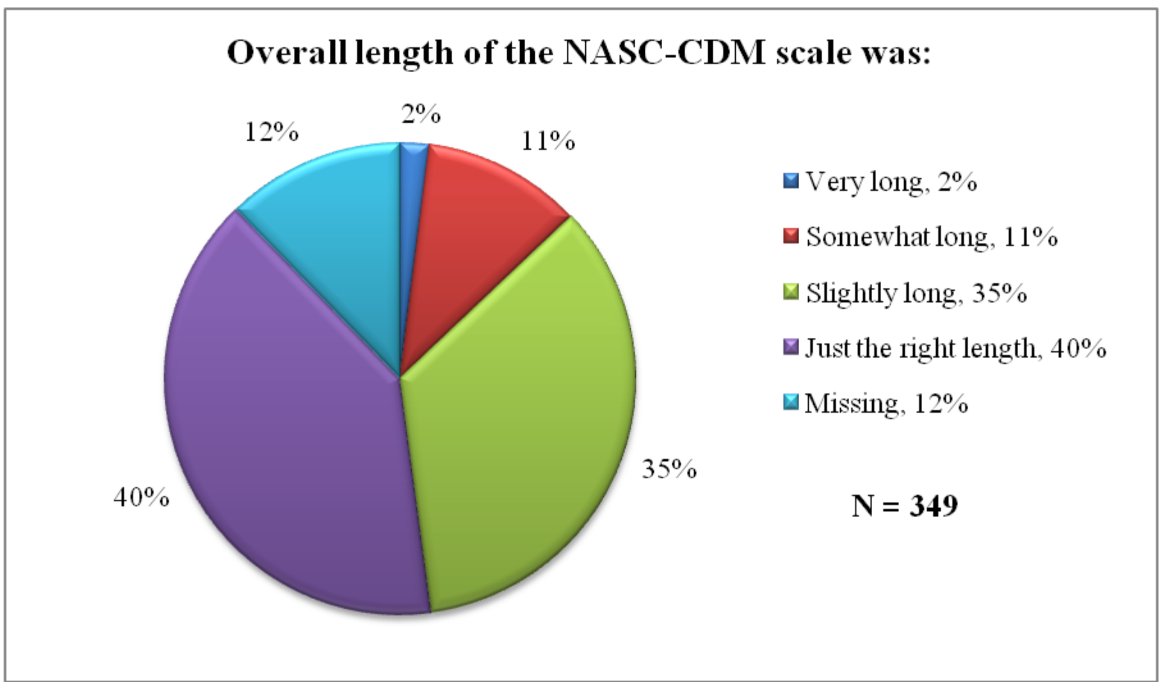
APPENDIX V

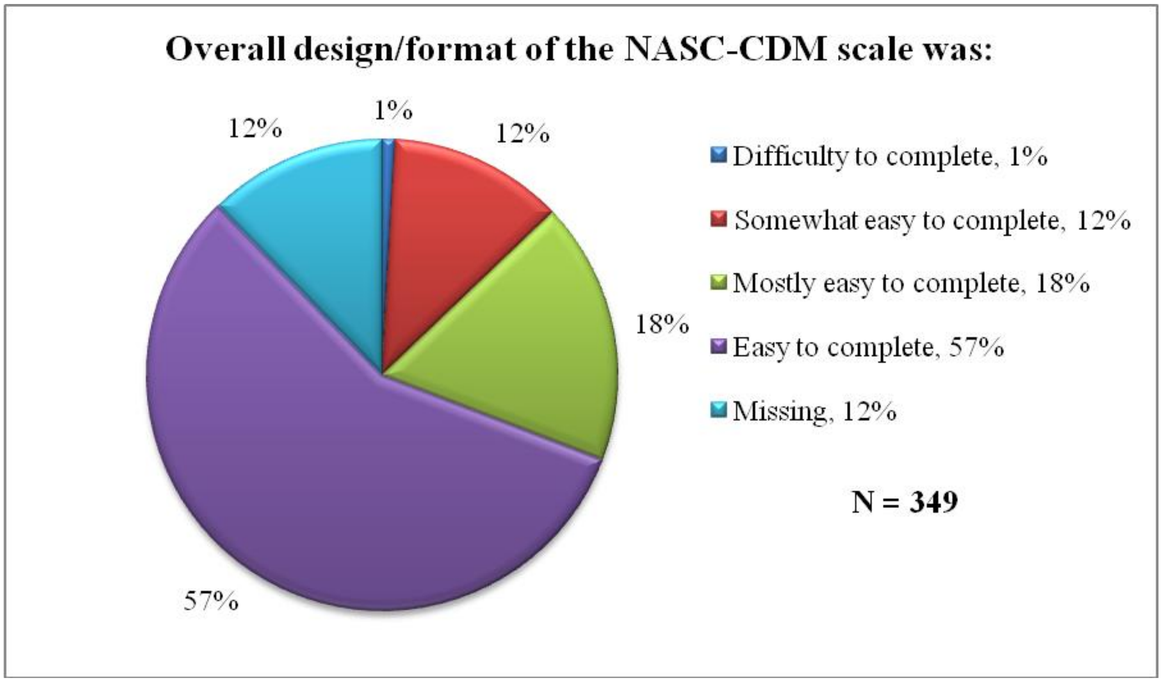
Five Questions Related to the NASC-CDM Scale, Pilot






Reading level of items on the NASC-CDM scale was:
1%
3%
6%
12%
78%
Very hard to read, 1%
Somewhat hard to read, 3%
Slightly hard to read, 6%
Just the right reding level, 78%
Missing, 12%
N = 349


Overall length of the NASC-CDM scale was:
2%
11%
12%
35%
40%
Very long, 2%
Somewhat long, 11%
Slightly long, 35%
Just the right length, 40%
Missing, 12%
N = 349


Overall design/format of the NASC-CDM scale was:
1%
12%
18%
57%
12%
Difficulty to complete, 1%
Somewhat easy to complete, 12%
Mostly easy to complete, 18%
Easy to complete, 57%
Missing, 12%
N = 349

APPENDIX W

Content Analysis for Open-Ended Question Related to the NASC-CDM Scale, Pilot

n = 72

Comment Type	Topic or Comment	Number of Responses
Positive	Good length; easy to follow.	2
	I really had to concentrate.	2
	"It was interesting how there were similar questions phrased differently each time – the wording made me really think it through – well structured survey."	1
	Very straight forward survey.	1
	Brought my attention to my strengths and weaknesses.	1
	Made me realize how I've grown in my education.	1
	Survey is excellent.	1
	"I enjoyed the statements because most of them are what I think about during clinical. The questions were very applicable to nursing students' situations."	1
Negative	Redundant items.	4
	Too long.	4
	Some situations I have not encountered.	3
	Boring.	2
	A bit too wordy.	1
Format of scale	Separate the two subscales.	6
	Start each question with the content not the part about the self-confidence and anxiety sentence completion.	5
	Format was cumbersome.	4
	Answer choices made it seem like self-confidence and anxiety had to be opposites.	2
	Put self-confidence and anxiety on opposite ends of a scale.	1
	Need more than six answer choices.	1
	Background color was distracting.	1
Unrelated to scale	The nursing instructor has a large influence on students' levels of self-confidence and anxiety during clinical.	9
	Students all have some anxiety about the decisions they make.	2
	Self-confidence and anxiety are influenced by the number of clinical hours and experiences.	1
	"I would have liked to see questions on how fatigued, stressed SNs [student nurses] are going into the clinical site… this really has affected my ability for recall, applying new knowledge, and overall performance. This decreases my self-confidence and anxiety tenfold!"	1

APPENDIX X

Characteristics and Comparisons of Sample, Main

N = 275

Demographic Questions	**Complete Surveys (n = 242)**	**Incomplete Surveys (n = 33)**	**Statistic**
Gender			
Female	226 (93.4%)	32 (97%)	*Fisher's Exact*,
Male	16 (6.6%)	1 (3%)	p = .70
Age (M, $\pm$ SD)	25.19 $\pm$ 5.67*	27. 52 $\pm$ 8.10*	*Mann-Whitney U* = 2,825, p = .29
Ethnicity			
African American	18 (7.4%)	3 (9.1%)	
American Indian	1 (0.4%)	0	
Asian	7 (2.9%)	4 (12.1%)	*LR* = 6.16,
Caucasian	207 (85.5%)	25 (75.8%)	p = .41
East Indian	1 (0.4%)	0	
Hispanic	5 (2.1%)	1 (3%)	
Other	---	---	
African	2 (0.8%)	0	
Jamaican	1 (0.4%)	0	
Program type			
Associate degree	74 (30.6%)	14 (42.2%)	X^2 = 1.87,
Baccalaureate degree	168 (69.4%)	19 (57.6%)	p = .17
Program format			
Accelerated	13 (5.4%)	3 (9.1%)	
Evening/weekend	5 (2.1%)	0	*LR* = 2.01,
Traditional, 2 semesters per academic year	219 (90.5%)	29 (87.9%)	p = .57
Year round, 3 semesters per academic year	5 (2.1%)	1 (3%)	
Other	0	0	
Current nursing semester			
3rd	10 (4.1%)	0	
4th	129 (53.3%)	20 (60.6%)	
5th	15 (6.2%)	1 (3%)	*LR* = 7.65,
6th	52 (21.5%)	4 (12.1%)	p = .18
My school does not follow a semester system	19 (7.9%)	6 (18.2%)	
Other	---	---	

Demographic Questions	Complete Surveys (n = 242)	Incomplete Surveys (n = 33)	Statistic
Don't know what you are asking	1 (0.4%)	0	
Last semester	6 (2.5%)	1 (3%)	
8th of 8 total	10 (4.1%)	1 (3%)	
Current nursing quarter		*	
4th	7 (2.9%)	2 (6.3%)	
5th	0	0	
6th	2 (0.8%)	0	*LR* = 1.90,
My school does not follow a quarter system	230 (95%)	29 (90.6%)	*p* = .60
Other	---	---	
3rd of 4	2 (0.8%)	1 (3%)	
8th of 8	1 (0.4%)	0	
Currently working as nursing assistant	*		
No	120 (49.6%)	20 (60.6%)	X^2 = 1.36,
Yes	121 (50%)	13 (39.4%)	*p* = .24
College experience before nursing school	*		
I started my nursing program right out of high school	74 (30.6%)	11 (33.3%)	
1 to 2 semesters	36 (14.9%)	4 (12.1%)	*LR* = .48,
3 to 4 semesters	51 (21.1%)	6 (18.2%)	*p* = .97
> 4 semesters	31 (12.8%)	5 (15.2%)	
I completed a college degree before starting my nursing program	49 (20.2%)	7 (21.2%)	
Participation in nursing intern/extern program	*		
No	159 (65.7%)	25 (75.8%)	*LR* = 2.28,
Yes	79 (32.6%)	7 (21.2%)	*p* = .32
I am not familiar with this type of program	3 (1.2%)	1 (3%)	
Content of current clinical nursing course(s) *(Choose all that apply)*			
Community	96 (39.7%)	15 (45.5%)	
Critical Care	98 (40.5%)	13 (39.4%)	
Leadership/mentorship	145 (59.9%)	18 (54.5%)	
Medical/Surgical	133 (55%)	19 (57.6%)	
Obstetrics	24 (9.9%)	6 (18.2%)	

Demographic Questions	Complete Surveys (n = 242)	Incomplete Surveys (n = 33)	Statistic
Pediatrics	30 (12.4%)	7 (21.2%)	
Psych/mental health	76 (31.4%)	13 (39.4)	
Other	---	---	
Cardiac telemetry	1 (0.4%)	0	
Geriatrics	9 (3.7%)	3 (9.1%	
Long-term care	3 (1.2%)	0	
Neonatal intensive care	1 (0.4%)	0	
Oncology	8 (3.3%)	2 (6.1%)	
Senior seminar	4 (1.7%)	1 (3%)	

Note. *LR* = likelihood ratio; X^2 = chi square for independence
* Indicates some missing values
** Statistically significant at $p < .01$ (2-tailed)

Course Difficulty with Course Grade for Complete Survey Group (n = 242)

Difficulty Level of Clinical Nursing Course # 1	**Grade A**	**Grade B**	**Grade C**	**Grade D**	**Grade F**
Very easy	5	1			
Easy	14	4	1		
About what I expected	61	67	10		
Hard	21	32	9		
Very hard	4	8	5		

Spearman *rho* correlation, *rho* = .25, *p* < .001**

Difficulty Level of Clinical Nursing Course # 2	**Grade A**	**Grade B**	**Grade C**	**Grade D**	**Grade F**
Very easy	3	1	1	1	
Easy	9	5	2		
About what I expected	54	54	11	1	
Hard	18	27	6		
Very hard		9	4		

Spearman *rho* correlation, *rho* = .18, *p* = .01**

Difficulty Level of Clinical Nursing Course # 3	**Grade A**	**Grade B**	**Grade C**	**Grade D**	**Grade F**
Very easy					
Easy		2	4		
About what I expected	20	21	6	1	
Hard	7	14	1		
Very hard	4	4			

Spearman *rho* correlation, *rho* = -.03, *p* = .75

****** Indicates statistical significance

Course Difficulty with Course Grade for Incomplete Survey Group (n = 33)

Difficulty Level of Clinical Nursing Course # 1	Grade A	Grade B	Grade C	Grade D	Grade F
Very easy	2	1			
Easy		2	1		
About what I expected	7	6	1		
Hard	4	4	1		
Very hard		1	1		

Spearman *rho* correlation, *rho* = .19, *p* = .29

Difficulty Level of Clinical Nursing Course # 2	Grade A	Grade B	Grade C	Grade D	Grade F
Very easy	1	1			
Easy	3	1			
About what I expected	5	6	1		
Hard	4	2	3		
Very hard				1	

Spearman *rho* correlation, *rho* = .32, *p* = .10

Difficulty Level of Clinical Nursing Course # 3	Grade A	Grade B	Grade C	Grade D	Grade F
Very easy					
Easy					
About what I expected	5	3	2		
Hard	1	1			
Very hard					1

Spearman *rho* correlation, *rho* = .26, *p* = .39

****** Indicates statistical significance

APPENDIX Y

Factor Analysis Results for Self-Confidence Subscale, Main

n = 223

Factor	**Initial eigenvalue**			**Rotation sums of squared loadings**		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
I	**19.70** [a]	**61.55**	**61.55**	**8.27**	**25.86**	**25.86**
II	**1.51**	**4. 71**	**66.26**	**8.20**	**25.63**	**51.49**
III	**1.04**	**3.25**	**69.51**	**5.76**	**18.02**	**69.51**
IV	.78					

Initial run: Principal component analysis with varimax rotation
a, **Bold** numbering indicates the three factors retained

Question # for Self-confidence Sub-scale	**Descriptor**	**Factors** [a, b]			***h***^{2} [c]
		I	**II**	**III**	
Q13	Use of resources – faculty/staff	**.884** [d]	.246	-.352	.680
Q32	Use of resources –faculty/staff	**.857**	.022	-.042	.708
Q35	Gathering information from family	**.802**	-.323	.326	.715
Q24	Gather more specific information from patient	**.754**	.018	.094	.630
Q14	Use active listening to gather information	**.732**	.158	.002	.736
Q22	Recognize information from report	**.551**	.213	.111	.665
Q17	Importance of information from others	**.519**	.234	.127	.685
Q16	Use of resources – protocol or literature	**.499**	.144	.166	.568
Q34	Remain open to reasons for problem	**.484**	-.027	.351	.593
Q15	Assess nonverbals	**.440**	.202	.251	.675
Q36	Evaluation of decision on patient satisfaction	**.403**	-.133	**.512**	.732
Q38	Make the decision based on patient knowledge	**.405**	-.082	**.565**	.723

Question # for Self-confidence Sub-scale	Descriptor	Factors [a, b]			h^{2} [c]
		I	**II**	**III**	
Q1 [e]	*Listen carefully to the patient*	*.401*	*.389*	*.010*	.563
Q27	*Use past knowledge to help interpret information*	*No loading > .40 on any factor*			.743
Q40	*Gather more information through more assessment*	*No loading > .40 on any factor*			.685
Q7	Recall past learned knowledge	.063	**.835**	-.128	.622
Q5	See the full clinical picture	-.028	**.786**	.098	.707
Q4	Identify relevant information	.057	**.736**	.026	.638
Q18	Use knowledge to interpret information	.144	**.729**	-.044	.650
Q10	Interpret meaning of findings	.078	**.717**	.052	.668
Q9	Implement the ‘best’ decision option	-.082	**.697**	.233	.675
Q3	See patterns in the information	.052	**.628**	.172	.649
Q2	*Make the final decision to act*	*-.076*	*.576*	*.336*	.605
Q23	Independently make the decision	-.083	**.562**	.353	.630
Q11	Evaluation of decision on lab findings	.221	**.532**	.109	.641
Q6	*Detect when verbal and nonverbal don’t match*	*No loading > .40 on any factor*			.618
Q39	Consider an intervention because it ‘seems’ right	-.161	.137	**.735**	.521
Q19	Implement decision based on intuition	-.062	.275	**.672**	.645
Q20	Analyze risk of interventions	.134	.194	**.625**	.795
Q30	Implement decision in urgent situation	.188	.124	**.542**	.635
Q31	Use knowledge to create list of decision options	.073	.282	**.515**	.656
Q29	Correlate assessment with nonverbals	.302	.120	**.469**	.675
Initial eigenvalue [f]		19.70	1.51	1.04	
Rotation sums of squared loadings [g]		16.40	16.55	15.97	

Alpha factoring with promax rotation. Rotation converged in 10 iterations.

a, Factor labels: (I) using resources to gather information and listening fully; (II) using information to see the big picture; (III) knowing and acting
b, Substantial loading is > .40
c, Communality is the variance per item across factors = *row* sums of squared loadings
d, **Bold** font indicates substantial loading on corresponding factor
e, *Italicized* questions were reduced from the revised version of the scale
f, Eigenvalue is the variance per factor across items = *column* sums of squared loadings
g, When factors are correlated, sums of squared loadings cannot be added to obtain a total variance

Factor Correlation Matrix [a]

Factor	I	II	III
I	**1.00**		
II	.740	**1.00**	
III	.747	.769	**1.00**

a, Correlations of > .40 indicate inter-related factors

APPENDIX Z

Factor Analysis Results for Anxiety Subscale, Main

n = 215

Factor	**Initial eigenvalue**			**Rotation sums of squared loadings**		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
I	**17.38** [a]	**54.30**	**54.30**	**8.46**	**26.43**	**26.43**
II	**1.83**	**5.72**	**60.02**	**6.41**	**20.03**	**46.46**
III	**1.08**	**3.37**	**63.39**	**5.42**	**16.93**	**63.39**
IV	.94					

Initial run: Principal component analysis with varimax rotation

a, **Bold** numbering indicates the three factors retained

Question # for Anxiety Sub-scale	**Descriptor**	**Factors** [a, b]			***h***^{2} [c]
		I	**II**	**III**	
Q14	Use active listening to gather information	**.884** [d]	-.145	.033	.661
Q32	Use of resources –faculty/staff	**.866**	.010	-.133	.606
Q24	Gather more specific information from patient	**.793**	-.008	.031	.657
Q35	Gathering information from family	**.721**	.259	-.198	.598
Q17	Importance of information from others	**.709**	-.100	.222	.665
Q15	Assess nonverbals	**.692**	-.103	.255	.677
Q36	Evaluation of decision on patient satisfaction	**.686**	.212	-.056	.647
Q13	Use of resources – faculty/staff	**.654**	-.065	.078	.447
Q38	Make the decision based on patient knowledge	**.651**	.336	-.143	.651
Q34	Remain open to reasons for problem	**.649**	.102	.077	.615
Q29	Correlate assessment with nonverbals	**.527**	.154	.124	.554
Q6 [e]	*Detect when verbal and nonverbal don't match*	***.509***	*-.008*	*.329*	.601

Question # for Anxiety Sub-scale	**Descriptor**	**Factors [a, b]**			***h*² [c]**
		I	**II**	**III**	
Q27	*Use past knowledge to help interpret information*	***.462***	*-.052*	***.444***	.649
Q16	Use of resources – protocol or literature	**.449**	.040	.252	.477
Q22	Recognize information from report	**.440**	.130	.213	.514
Q1	*Listen carefully to the patient*	*No loading > .40 on any factor*			.407
Q40	*Gather more information through more assessment*	*No loading > .40 on any factor*			.548
Q39	Consider an intervention because it ‘seems’ right	.026	**.711**	.040	.578
Q30	Implement decision in urgent situation	.020	**.691**	.080	.588
Q19	Implement decision based on intuition	.132	**.679**	-.063	.530
Q23	Independently make the decision	-.081	**.648**	.253	.633
Q20	Analyze risk of interventions	.212	**.618**	.019	.633
Q9	Implement the ‘best’ decision option	-.047	**.523**	.361	.634
Q31	Use knowledge to create list of decision options	-.041	**.404**	**.489**	.649
Q2	*Make the final decision to act*	*.120*	***.494***	***.427***	.499
Q7	Recall past learned knowledge	.031	-.008	**.724**	.549
Q10	Interpret meaning of findings	.035	.110	**.714**	.684
Q4	Identify relevant information	.068	.060	**.712**	.657
Q3	See patterns in the information	-.118	.218	**.682**	.595
Q11	Evaluation of decision on lab findings	.172	.016	**.644**	.629
Q5	See the full clinical picture	.102	.125	**.616**	.632
Q18	Use knowledge to interpret information	.205	-.002	**.572**	.539
Initial eigenvalue [f]		17.38	1.83	1.08	
Rotation sums of squared loadings [g]		14.77	14.28	13.07	

Alpha factoring with promax rotation. Rotation converged in 9 iterations.

a, Factor labels: (I) using resources to gathering information and listening fully; (II) knowing and acting; (III) using information to see the big picture
b, Substantial loading is > .40
c, Communality is the variance per item across factors = *row* sums of squared loadings
d, **Bold** font indicates substantial loading on corresponding factor
e, *Italicized* questions were reduced from the revised version of the scale
f, Eigenvalue is the variance per factor across items = *column* sums of squared loadings
g, When factors are correlated, sums of squared loadings cannot be added to obtain a total variance

Factor Correlation Matrix [a]

Factor	**I**	**II**	**III**
I	**1.00**		
II	.739	**1.00**	
III	.695	.752	**1.00**

a, Correlations of > .40 indicate inter-related factors

APPENDIX AA

Overlapping Items among NASC-CDM Subscales, Main

Factor Number	Self-Confidence *	Factor Number	Anxiety *
I	Q13	I	Q13
	Q32		Q32
	Q35		Q35
	Q34		Q34
	Q16		Q16
	Q22		Q22
	Q24		Q24
	Q17		Q17
	Q36		Q36
	Q15		Q15
	Q14		Q14
	Q38		Q38
	------		Q29
II	Q5	III	Q5
	Q10		Q10
	Q4		Q4
	Q3		Q3
	Q7		Q7
	Q11		Q11
	Q18		Q18
	Q9		-----
	Q23		-----
III	Q20	II	Q20
	Q30		Q30
	Q39		Q39
	Q19		Q19
	Q31		Q31
	-----		Q9
	-----		Q23
	Q29		-----

* Includes the 27 items remaining on the scale after the reduction of 5 items.

APPENDIX BB

Reliability Result of Subscales, Main

Reliability Results for the NASC-CDM, SC & NASC-CDM, A;
Revised Version

Subscale Name	Number of Items	Scoring Range (1 – 6 Likert)	Cronbach's Alpha	Mean Inter-Item Correlation (Minimum/Maximum)	Mean Score and (SD)
NASC-CDM, SC (n = 242)	32	32 - 192	.98[a]	.56 (.29/.78)	126.88 (± 27.40)
NASC-CDM, A (n = 242)	32	32 - 192	.97[a]	.50 (.31/.71)	78.48 (± 23.01)

a, No change in Cronbach's alpha was noted with the deletion of any item.

Reliability Results for the NASC-CDM, SC & NASC-CDM, A;
After Five Item Reduction, Main

Subscale Name	Number of Items	Scoring Range (1 – 6 Likert)	Cronbach's Alpha	Mean Inter-Item Correlation (Minimum/Maximum)	Mean Score and (SD)
NASC-CDM, SC (n = 242)	27	27 - 162	.97[a]	.55 (.29/.72)	106.85 (± 23.13)
NASC-CDM, A (n = 242)	27	27 - 162	.96[a]	.49 (.31/.71)	66.47 (± 19.68)

a, No change in Cronbach's alpha was noted with the deletion of any item.

APPENDIX CC

Results of Independent Samples *t*-tests, Main

NASC-CDM Subscale	IV	Levels of IV	Mean ± SD	n	*t(df)*	p^a
Self-Confidence	Gender	Male Female	130.18 ± 20.35 126.65 ± 27.35	16 226	-.50(240)	.62
Anxiety	Gender	Male Female	72.31 ± 20.01 78.92 ± 23.18	16 226	1.11(240)	.27
Self-Confidence	Program type	Associate Baccalaureate	131.66 ± 27.82 124.77 ± 27.03	74 168	1.81(240)	.07
Anxiety	Program type	Associate Baccalaureate	75.11 ± 22.57 79.96 ± 23.11	74 168	-1.52(240)	.13
Self-Confidence	Externship participation	Yes No	132.44 ± 27.42 124.38 ± 27.29	79 159	-2.14(236)	.03[¥]
Anxiety	Externship participation	Yes No	73.56 ± 19.87 80.67 ± 25.26	79 159	2.41(236)	.02[¥]
Self-Confidence	Nursing assistant employment	Yes No	130.07 ± 28.41 123.92 ± 26.06	121 120	-1.75(239)	.08
Anxiety	Nursing assistant employment	Yes No	76.49 ± 22.10 80.33 ± 23.86	121 120	1.29(239)	.20

Self-Confidence	Age	18 to 31 years 32 to > 45 years	126.86 ± 26.85 126.49 ± 29.73	190 39	.08(227)	.94
Anxiety	Age	18 to 31 years 32 to > 45 year	79.08 ± 23.04 79.41 ± 22.78	190 39	1.16(227)	.26

Note. IV = independent variable; SD = standard deviation
a, (2-tailed); ¥, statistically significant

APPENDIX DD

Characteristics and Comparisons of Pilot and Main Samples

N = 545

Demographic Questions	Fall 2010 Sample (n = 303)	Spring 2011 Sample (n = 242)	Statistic
Gender			
Female	283 (93.4%)	226 (93.4%)	$X^2 = 0$
Male	20 (6.6%)	16 (6.6%)	$p = 1$
Age (M, $\pm$ SD)	29.16 $\pm$ 7.5*	25.19 $\pm$ 5.67*	$t = 6.71$**
Ethnicity	*		
African American	13 (4.4%)	18 (7.4%)	
American Indian	1 (0.3%)	1 (0.4%)	
Asian	13 (4.4%)	7 (2.9%)	$LR = 11.64$,
Caucasian	257 (86.5%)	207 (85.5%)	$p = .07$
East Indian	0	1 (0.4%)	
Hispanic	13 (4.4%)	5 (2.1%)	
Other	---	---	
African	1 (0.3%)	2 (0.8%)	
Arab	1 (0.3%)	0	
Caucasian & Hispanic	2 (1.7)	0	
Hawaiian	1 (0.3%)	0	
Jamaican	0	1 (0.4%)	
Program type			
Associate degree	192 (63.4%)	74 (30.6%)	$X^2 = 57.89$**
Baccalaureate degree	111 (36.6%)	168 (69.4%)	
Program format			
Accelerated	18 (6%)	13 (5.4%)	
Evening/weekend	66 (21.9%)	5 (2.1%)	$X^2 = 128.28$**
Traditional, 2 semesters per academic year	141 (46.7%)	219 (90.5%)	
Year round, 3 semesters per academic year	77 (25.5%)	5 (2.1%)	
Other	0	0	
Currently working as nursing assistant	*	*	
No	207 (68.3%)	120 (49.6%)	$X^2 = 19.67$**
Yes	95 (31.4%)	121 (50%)	

Demographic Questions	Fall 2010 Sample (n = 303)	Spring 2011 Sample (n = 242)	Statistic
College experience before	*	*	
nursing school	45 (15.1%)	74 (30.6%)	
I started my nursing program right out of high school	30 (10%)	36 (14.9%)	$X^2 = 35.89$**
1 to 2 semesters	53 (17.7%)	51 (21.1%)	
3 to 4 semesters	79 (26.4%)	31 (12.8%)	
> 4 semesters	92 (30.8%)	49 (20.2%)	
I completed a college degree before starting my nursing program			
Participation in nursing intern/extern program		*	
No	236 (77.9%)	159 (65.7%)	$X^2 = 21.79$**
Yes	52 (17.2%)	79 (32.6%)	
I am not familiar with this type of program	15 (5%)	3 (1.2%)	

Note. X^2 = chi square for independence; t = independent samples t-test; LR = likelihood ratio

* Indicates some missing values

** Statistically significant at $p < .01$ (2-tailed)

APPENDIX EE

Overlap of Factor Structures and Content Domains

Pilot Sample

Factor	Content Domain*	Self-Confidence **	Factor	Content Domain*	Anxiety **
Using resources to gather information (I)	3	Q13	Using resources to gather information and listening fully (I)	3	Q13
	3	Q32		3	Q32
	1	Q35		1	Q35
	3	Q34		3	Q34
	3	Q16		3	Q16
	1	Q22		1	Q22
	2	Q24		2	Q24
	2	Q17		2	Q17
	4	Q36		4	Q36
	1	Q40		1	Q40
	1	Q15		1	Q15
Listening fully (IV)	1	Q1		1	Q1
	2	Q6		2	Q6
	1	Q14		1	Q14
		------		2	Q27
		------		3	Q29
		------		3	Q38
Using information to see the big picture (II)	3	Q5	Using information to see the big picture (III)	3	Q5
	2	Q10		2	Q10
	2	Q4		2	Q4
	3	Q3		3	Q3
	2	Q7		2	Q7
	4	Q11		4	Q11
	3	Q31		3	Q31
	2	Q18		2	Q18
Knowing and acting (III)	4	Q2	Knowing and acting (II)	4	Q2
	4	Q9		4	Q9
	4	Q30		4	Q30
	3	Q39		3	Q39
	4	Q19		4	Q19
	4	Q23		4	Q23
	3	Q20		3	Q20
	2	Q27			------
	3	Q29			------
	3	Q38			------

* Content domains: 1 – investigating information and cues; 2 – interpreting information and meanings; 3 – integrating findings and illuminating options; 4 – intervening and reflecting.

** Includes the 32 items remaining on the scale after the reduction of 9 items.

Main Sample

Factor	Content Domain*	Self-Confidence **	Factor	Content Domain*	Anxiety **
Using resources to gather information and listening fully (I)	3	Q13	Using resources to gather information and listening fully (I)	3	Q13
	3	Q32		3	Q32
	1	Q35		1	Q35
	3	Q34		3	Q34
	3	Q16		3	Q16
	1	Q22		1	Q22
	2	Q24		2	Q24
	2	Q17		2	Q17
	4	Q36		4	Q36
	1	Q15		1	Q15
	1	Q14		1	Q14
	3	Q38		3	Q38
		------		3	Q29
Using information to see the big picture (II)	3	Q5	Using information to see the big picture (III)	3	Q5
	2	Q10		2	Q10
	2	Q4		2	Q4
	3	Q3		3	Q3
	2	Q7		2	Q7
	4	Q11		4	Q11
	2	Q18		2	Q18
	4	Q9			-----
	4	Q23			-----
Knowing and acting (III)	3	Q20	Knowing and acting (II)	3	Q20
	4	Q30		4	Q30
	3	Q39		3	Q39
	4	Q19		4	Q19
	3	Q31		3	Q31
		-----		4	Q9
		-----		4	Q23
	3	Q29			-----

* Content domains: 1 – investigating information and cues; 2 – interpreting information and meanings; 3 – integrating findings and illuminating options; 4 – intervening and reflecting.

** Includes the 27 items remaining on the scale after the reduction of 5 items.

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Dissertation Title

The Development and Validation of a Tool to Measure Self-Confidence and Anxiety in Nursing Students While Making Clinical Decisions

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