

Graduate Critical Thinking Skills:  
A Comparison Using National Norms

by

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A thesis submitted to the faculty of  
Gardner-Webb University School of Nursing  
in partial fulfillment of the requirements for the  
Degree of Master of Science in Nursing

Boiling Springs

2004

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## Abstract

The purpose of this quantitative study was to compare critical thinking skills of graduate students at the exit point of their masters program to the national norms. Patricia Benner's Novice to Expert theory was used to guide this study. The California Critical Thinking Skills Test (CCTST) was used to measure critical thinking. The sample ( $n = 30$ ) consisted of the entire graduate nursing student population at the exit point of their program from 2002 and 2003 at a private university in North Carolina. A single sample  $t$  test compared the scores of the sample group to the national average for graduate students. The results indicated that total critical thinking scores were significantly higher for the subjects than the national norms ( $t = 2.37$ ,  $df = 29$ ,  $p < .05$ ). Subsets of critical thinking as defined by the CCTST were also examined. Implications for nursing are related to educational strategies, curriculum management, and continued reevaluation of nursing programs.

## Acknowledgements

This thesis is the result of the support and guidance offered to me from many people. I would like to express my appreciation to Rebecca Beck-Little RN, PhD for her unlimited patience and encouragement.

I am also grateful to all of the graduate instructors at Gardner-Webb University who have so well prepared me for this culmination project.

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## Chapter I

### Introduction of the Problem

According to a study by Stone, et. al. (2001) “Critical-thinking skills are essential to the nursing profession, and the development of critical-thinking skills is often a significant component of nursing education programs.” (p 72) With the varying legal, educational, and professional problems that confront them daily, nurses require more than rote memory skills, rather, the ability to utilize cognitive skills of interpretation, analysis and evaluation in daily decision making. There are many factors, according to the literature, believed to influence critical thinking ranging from nursing program and curriculum designs to clinical opportunities and amount of experience. Whatever these factors may be it is undeniable that critical thinking is a construct that has proven to be difficult to define and difficult to measure over the years. There are many general critical thinking measurement tools available, but there are conflicting research as to whether these tools accurately measure critical thinking in nursing.

The skill of critically thinking is an expected competency of all nurses at all levels of education. Accrediting bodies, such as the National League for Nursing Accrediting Commission (NLNAC), Commission on Collegiate Nursing Education (CCNE), and the American Association of Colleges of Nursing (AACN) have delineated guidelines that require incorporating critical thinking outcomes in nursing programs in order to achieve accreditation status.

#### Background

The term critical thinking has been a phrase used by many different professions describing a trait desired of professionals. While this trait may be desired, there has been

no clear definition of critical thinking until the American Philosophical Society (APA) conducted a Delphi study to define critical thinking. The resulting definition of critical thinking from this study was described in a report by Spelic et al (2001) as, “The process of purposeful, self-regulatory judgment that includes the cognitive skills of interpretation, analysis, evaluation, inference, explanation, and self-regulation.” (p. 27)

The National League for Nursing (NLN) further defined critical thinking in the year 2000. Nurse experts from across the country formed a “think tank” to operationally define critical thinking for nursing. The results of this group effort were 21 clearly delineated attributes of critical thinking that were grouped into 5 main categories including the ability to: interpret, analyze, evaluate, infer, and explain.

Critical thinking skills as defined by both the APA and NLN are essential in nursing and are one of the most important issues facing nursing education today. This study compares critical thinking skills of nurses at the graduate level of education to the national average.

### Theoretical Framework

Because critical thinking skills are necessary in nursing, and because they are thought to develop over time, Patricia Benner’s “Novice to Expert” theory was chosen to guide this research study. This theory uses phenomenology to explain knowledge and skill acquisition in nursing. Benner (1984) describes this skill acquisition through experience in her book stating,

“Experience does not refer to the mere passage of time or longevity. Rather, it is the refinement of preconceived notions and theory through encounters with many or actual practical situations that add nuances or shades of differences to theory. Theory offers what can be made explicit and formalized, but clinical practice is always more complete and presents many more realities than can be captured by theory alone.” (p 36)

Benner developed her theory from qualitative research with peer interviewing, where themes of 5 stages of expertise emerged. She went on to further define and delineate these stages of expertise based upon levels of experience and critical thinking qualities. These levels of expertise acquisition include: novice, advanced beginner, competent practitioner, proficient practitioner and expert. Benner believes that the level of expertise must be measured by using narratives and examining the internal and external criterion apparent in these narratives. Internal criterion is the mental processes that characterize each stage while external criterion is the criterion of performance when faced with a situation and having to judge and make decisions.

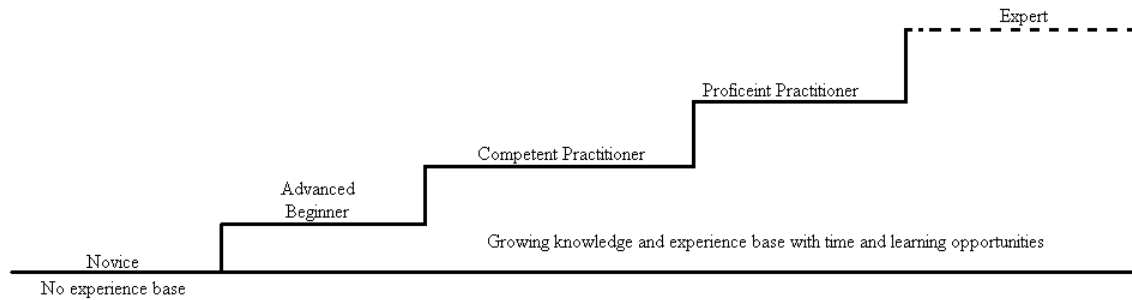
According to Benner, the novice nurse is a beginner with no prior clinical experience in the area they are to perform, such as a nursing student. This nurse is taught objective characteristics that they can measure and rules to govern them in the tasks they are to perform. Novices cannot see the big picture with things in context of the big picture. The advanced beginner is a nurse who can demonstrate a minimally acceptable level of performance. This nurse has had just enough experience to begin to recognize meaningful aspects of situations. This nurse is then able to put into context these attributes of the situation. The competent practitioner, similarly to the advanced beginner, can now take the aspects of the situation in context and see nursing actions in terms of long-range goals. This nurse develops a plan after contemplating the problem. The proficient nurse takes a further step and sees the situation as a whole. This nurse has speed and flexibility while developing a plan. The previous levels of expertise were guided heavily by rules, but the proficient nurse is now guided by maxims. These maxims, coupled with experience, allow the proficient nurse to holistically care for the



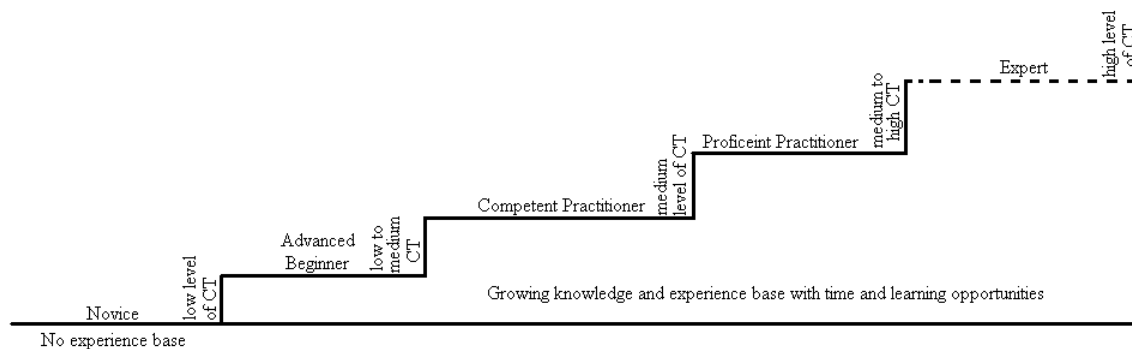
patient. The last stage, expert nurse, is no longer guided by rules or maxims. The experiential background of the expert guides intuition which aids in the development of strategies to deal with a problem. The expert uses “gut feelings” and intuitive judgment to guide nursing care. This intuition occurs after a broad knowledge base has been established.

Figure 1 illustrates Benner’s conceptual model which provided the framework for this study. Figure 2 illustrates the conceptual theoretical empirical linkage fro the study of the critical thinking skills of graduate nursing students utilizing the CCTST.

**Figure 1**  
Benner’s Novice to Expert Theory



**Figure 2**  
Middle-range  
Theory



## Purpose and Rationale

This study will compare the critical thinking scores of graduate nursing students at the exit point of their program to the national average established by a study conducted by Facione and Facione (1997) in their book, *Critical Thinking in Nursing Education Programs*. The purpose of this study's comparison of critical thinking scores is to enable nursing faculty at the selected school to evaluate the graduate nursing program and its promotion of critical thinking skills. Nursing faculty in every nursing program need to constantly reevaluate the effectiveness of the programs' promotion of critical thinking skills. The changing face of nursing today demands that nursing programs continue to evolve to promote critical thinking.

For the purpose of this study, key terms are defined as follows:

1. Critical thinking is defined per the Delphi report in an article by Spelic et al (2001) as, "The process of purposeful, self-regulatory judgment that includes the cognitive skills of interpretation, analysis, evaluation, inference, explanation, and self-regulation." (p. 27) Critical Thinking will be measured by the California Critical Thinking Skills Test.
2. Novice nurse is defined as a beginning nurse with no prior experience who relies upon rules and tasks which govern performance. In this study the novice nurse will be defined as a nurse with less than 1 year of experience.
3. Advanced beginner is defined as a nurse who demonstrates a minimally acceptable level of performance beginning to recognize aspects of situations. In this study the advanced beginner will be defined as a nurse with 1-2 years of experience.

4. Competent practitioner is defined as a nurse who takes aspects, contemplates upon them and creates a plan of action with long-term goals in mind. In this study the competent practitioner will be defined as a nurse with 3-5 years of experience.
5. Proficient practitioner is defined as a nurse who uses maxims and experience to holistically care for patients. In this study the proficient practitioner will be defined as a nurse with 6-10 years of experience.
6. Expert is defined as a nurse who uses a broad knowledge and experiential base to make intuitive judgments to care for patients. In this study the expert will be defined as a nurse with more than 10 years of experience.

## Chapter II

### Literature Review

A thorough literature review on the topic critical thinking revealed many research articles that examined critical thinking skills. While many of the articles examined critical thinking skills for undergraduate nursing students, few examined critical thinking skills of graduate nursing students. Several themes arose throughout the review process and the following section presents a review of the current literature regarding critical thinking.

Alverson, Brown, and Pepa (2001), conducted a descriptive, quantitative study examining the changes in critical thinking among different program tracks in a baccalaureate degree nursing program. In this study the researchers used the Watson-Glaser Critical Thinking Appraisal (WGCTA) to measure critical thinking abilities of each group upon entering and exiting from the program. A convenience sample (N = 123) of three groups of baccalaureate students was used including: a traditional group (n = 45), an RN-BSN group (n = 35), and an accelerated group (n = 43). The traditional group began in a fall semester and completed nursing courses in 32 months. The RN-BSN group already had an associate degree in nursing and it was unclear in the article how long this group took to complete the nursing courses. The accelerated group completed nursing courses in 18 months. The findings indicated that there was a significant increase in critical thinking as evidenced by changes between pre- and post-test scores of the traditional ( $t = -2.84, p = .007$ ) and RN-BSN group ( $t = -2.28, p = .029$ ). There was no significant difference in scores for the accelerated group ( $t = -1.65, p = .107$ ). According to the researchers the length of the accelerated program may have

had an effect on critical thinking scores, because critical thinking develops over time. They also suggested that the presence of liberal art courses in the program design for traditional and RN-BSN tracks may have had an influence in the students developing critical thinking, indicating that the reason the accelerated program did not significantly affect critical thinking skills was related to the deficit of liberal art courses. The study did not cite any limitations, but the fact that only one nursing program was represented presents limitations. According to the authors, the studies conducted prior have also produced conflicting results. The research report concludes by recommending further research regarding the combination of nursing coursework and liberal art coursework to promote the development of critical thinking.

Beckie, Lowry, and Barnett (2001), also assessed critical thinking in baccalaureate nursing students after a change in curriculum using a longitudinal experimental study. Baccalaureate nursing students took the California Critical Thinking Skills Test (CCTST) at program entry, midpoint, and exit. The sample consisted of 3 groups of students: group 1 (n = 55) was the first group prior to the curriculum revision, group 2 (n = 55) and group 3 (n = 73) were the first 2 classes after the revised curriculum was put into place. There were significantly higher critical thinking scores between group 2 and group 1 ( $F = 10.04, p < .001$ ), with group 2 also improving at all 3 of the points in the program. Group 3 did not improve in critical thinking over time. This article points out the reasons group 3 may have not changed could be related to life transitions and other factors related to the students' desires to complete the CCTST. The researchers related the limitations to the use of a standardized test to measure critical thinking skills. Beckie, Lowry, and Barnett (2001) stated, "The use of a standardized test

is best supplemented with other evaluation methods to assess student's critical thinking. A discipline-specific critical thinking instrument would better capture the true critical thinking skills of students." The researchers concluded the article by recommending further studies be done to develop a tool to measure critical thinking in nursing students.

Daly (2001) studied the development of an alternative method to assess critical thinking as an outcome of nursing education. The purpose of this study was to explore and create an alternative domain-specific way to evaluate critical thinking in nursing students. This longitudinal quantitative and qualitative study used the Watson and Glaser Critical Thinking Appraisal test (WGCTA) and a "think aloud" technique designed by the researcher that used videotaped client simulation. The convenience sample consisted of an entering student class (N = 43) and a random selection of this group was used for the qualitative data sample (n = 12). There were 4 phases in the study: phase 1 and phase 4 used the WGCTA, and phase 2 and phase 3 used the "think aloud" technique to evaluate critical thinking. The researcher developed a scale of argument/epistemological complexity to rank level of critical thinking for the "think aloud" technique. The results for phase 1 and 4 were not significant according to the WGCTA and the results for the "think aloud" technique were deemed insignificant by the researcher. The researcher continued to elaborate extensively on the levels of critical thinking and the use of the think aloud technique to measure components of critical thinking. Limitations of the study were clearly addressed and included the sample size and single simulated topic. The researcher concluded by recommending that educators develop their own unique ways to evaluate students' critical thinking skills in the classroom.

Giro (2000) conducted a study examining whether graduate nurses are better at critical thinking than non-graduate nurses. The two hypotheses tested in this study examined critical thinking skills in graduate versus nongraduate nurses and the influence of decision-making in clinical practice in relation to graduate status.

The two tools used in this study were the Watson and Glaser Critical Thinking Appraisal (WGCTA) and the Jenkins' Clinical Decision Making in Nursing Scale (CDMNS). The CDMNS measures nurses' perceptions about their own critical thinking skills using a Likert scale. This quasi-experimental study used a convenience sample of practicing nurses (N = 83) divided into 4 groups. The first group, Group P, served as the control group. It was comprised of first year undergraduate students (n = 32) in the first few months of the program with no prior clinical experience. Group Q (n = 19) contained students from the final year of the program and Group R (n = 17) represented mature graduate practitioners who had recently completed the program and had significant clinical experience. The final group, Group S (n = 15), was composed of practitioners who had completed a study skills program and were returning to academia as experienced practitioners.

There was no significant difference found in relation to the development of critical thinking across the four groups. The highest average scoring group was from group P: those new students beginning their degree. The researcher implies that the development of critical thinking had already begun prior to this group entering the program and rejects the first hypothesis. There was a highly significant difference for the scores of the CDMNS among the three groups of practicing nurses studied ( $F = 17.709, p < .0000001$ ). According to Giro (2001) "The significance lay between groups

S and Q, and S and R, i.e. between the experienced non-academics and both the 4<sup>th</sup> year degree students and experienced graduates.” (p. 292). She further suggests that these results imply that those exposed to academia are better decision-makers than those who are not. The researcher concludes the report by reiterating the fact that all of the studies on critical thinking have produced mixed findings just as this one has produced. She discusses that when graduate status is combined with years of experience, critical thinking is more developed than when the two are isolated. Recommendations are made regarding further research to develop tools to measure critical thinking in nursing and research about how critical thinking applies to practice; and to further examine the decision-making process in nursing and how educators can facilitate developing those decision-making skills.

In a study by Swindells and Sasisthorm (2003) the value of graduate education was examined in advanced practice nursing, particularly that of degree vs. diploma education. This experimental study examined samples of nursing and midwifery graduates and diplomates. The experimental group (group with degree education) consisted of a total of 274 graduates: nursing graduates (n = 209) and midwifery graduates (n = 65). The control group consisted of a total of 174 diplomates: nursing diplomates (n = 132) and midwifery diplomates (n = 42). The researchers developed an assessment tool based upon the literature to assess a range of attributes and skills using a 4-point Likert scale; they also utilized structured interviews to gather data. The results indicated that the degree graduates scored significantly higher ( $p < .05$ ) than the diplomates on 21 of the 42 items of the assessment tool. Swindells and Sasisthorm (2003) conclude by stating that, “The findings of this study would seem to provide evidence to



support current thinking that degree education adds value to practice.” (p. 1103). The researchers did not clearly state any limitations to this study, nor did they discuss the reliability or validity of the tool they developed.

Stone, et. al. (2001) examined the use of a general test of critical thinking to measure nursing students’ critical-thinking abilities. The purpose of this study was to examine the extent to which the California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Disposition Inventory (CCTDI) measures critical thinking in relation to nursing. It also was to examine how consistent critical-thinking scores were with other outcomes reflecting critical thinking. Stone, et. al. (2001), developed a survey which examined the skills and dispositions of the CCTST and CCTDI and respondents were to indicate which elements they believed were critical to practice nursing competently using a 4-point Likert scale. Respondents were also asked to report the five most important traits of competent nurses and how critical-thinking skills should be measured for nursing.

The sample consisted of 338 nursing programs including: associate degree programs, baccalaureate degree programs, RN completion programs, master degree programs, and doctoral degree programs. Each program was instructed to choose one respondent (faculty member) who was most responsible for incorporating critical thinking into the curriculum. The authors stated, “The results indicated that the critical thinking skills being measured by the items are not viewed as being measured in a way that reflects the critical thinking relevant to nursing.” (p. 70). The study by Stone, et al. also compared critical thinking scores with other scores that reflect critical thinking. This sample consisted of senior BSN students (n = 238 ). Scores from the CCTDI and CCTST

were compared with verbal and math SAT scores, cumulative grade point averages and clinical course grade point averages. Significant correlations ( $p < .01$ ) were reported among these scores and the CCTST scores. No significant correlations were found with the CCTDI. Stone, et. al. (2001) concluded by stating, “Nearly all respondents believed the skills and traits [included in the CCTST and CCTDI] were ‘essential’ or ‘absolutely essential’ to practice nursing competently.” (p. 72). The authors believe that the results of this study support the use of general tests of critical thinking to support measuring nursing students’ critical thinking abilities. Recommendations are made regarding the need for a reexamining of nursing programs’ evaluation strategies of critical thinking and the need for accrediting bodies to develop alternative ways for nursing programs to meet the relevant standards.

Paley (1996) discussed opposing views regarding Patricia Benner’s novice to expert theory and how this theory relates to critical thinking. One particular view pertains to the inadequacy of a phenomenological model to measure a scientific practice—that of nursing. This view calls for definitive criterion to measure expertise. The constructs of novice and expert are loosely defined and subjectively measured by peer reviews. The opposing view is that of the entirely phenomenological model. This view purports that the art of nursing must be measured using a subjective system of measurement that can be adapted to each particular facet of level of expertise. Both views use an analogy related to chess masters to describe expertise. The phenomenologic model sees this as clearly exemplifying expertise because of the use of intuition to guide chess masters play. The opposing view makes a valid argument, however, in that chess masters are evaluated by their ability to win consistently as opposed to subjective peer

evaluation. In conclusion of the article, the author, cautions the reader not to be whisked away by either ideologies but rather allow current philosophy of science to guide his research.

## Chapter III

### Method

#### Subjects, Setting, and Sampling

The setting for this study of critical thinking skills of graduate nursing students was a private university in Western North Carolina. The students were to return to campus after graduation and complete the CCTST according to protocol with a proctor. The graduate nursing program at this university has been in existence for two years and had received initial NLN accreditation. This program offers the Master of Science in Nursing program with three programs of study: Nursing Education, Nursing Administration and Parish Nursing. This is the first study that will compare critical thinking scores of this program to national norms/averages. Inclusion criteria included being a graduate of the selected program.

The subjects of this study were graduate nursing students at a selected university at the exit point of their programs for the years 2002 and 2003. A convenience sample (N = 30) of the entire population was chosen due to the small class sizes. The demographics information obtained about the subjects included gender, race, length of years of experience in nursing, and certification status. This population is composed of mostly female subjects (n = 29) and one male subject (n = 1). The primary ethnicity was Anglo American, Caucasian (n = 28). The length of years of experience in nursing was categorized into groups using Benner's Novice to Expert theory in relation to amount of clinical experience including: 1-2 years (n = 1), 3-5 years (n = 2), 6-10 years (n = 6), and more than 10 years experience (n = 21). All of the subjects participating in the study were registered nurses (n = 30), because admission criteria for the program included

licensure in nursing. None of the subjects held any other advanced practice certifications.

The national norms/averages used in this study were established by Facione and Facione (1997) through their research in national norms for graduate students on the California Critical Thinking Skills Test (CCTST). Data were collected and analyzed from the CCTST and CCTDI using standardized academic achievement indicators. These scores were used to establish mean differences between national averages on the CCTST and results of the scores of the graduate nursing students utilizing a one sample t test.

#### Instrument

Subjects' critical thinking skills were examined using the California Critical Thinking Skills Test. (CCTST). The CCTST is used by community colleges, undergraduate, graduate, and professional schools to assess an individual's or group's critical thinking and reasoning skills. It can also gather data for program evaluation and for research on critical thinking skills development. The format of the test is multiple choice questions. These questions cause the test taker to use inferential, interpretive and analytical strategies to identify and evaluate answers. There are three forms of the test: Form 2000, Form A and Form B, and these forms are resubmitted to the company upon completion for scoring. According to Facione (1997) possible total score on the CCTST is from 1-34. Subscale scores on the instrument can range as follows: analysis 1-9, evaluation 1-14, inference 1-11, deductive reasoning 1-16, and inductive reasoning 1-14. The sum of these Delphi construct scores-analysis, evaluation, and inference-is equal to the total scores. (pg 13)

The test results provide overall critical thinking scores and also provide subsets of critical thinking scores including: analysis, inference, evaluation, inductive and deductive reasoning scores.

Content validity for the California Critical Thinking Skills Test was reported by Facione and Facione on their website. Concurrent validity has been established with the Graduate Record Examination, Watson-Glaser Critical Thinking Appraisal, SAT verbal and SAT math scores, Nelson-Denny Reading Test and with college GPA scores.

Construct validity has been established by the National Expert Consensus Statement on Critical Thinking (1990), known as the Delphi Report, and a replication research study at Penn State University. Reliability and internal consistency has been established for the three different forms. Form 2000 has KR-20 Alphas ranging from 0.78 to 0.84 depending on test context; Form A and Form B have KR-20 Alphas ranging from 0.70 to 0.75 and these forms are designed to be statistically equivalent to each other.

## Procedures

### Ethics

The identity of the participating university remained confidential and the identity of participating students was anonymous; student identification numbers were used to allow anonymity. There were no foreseen risks to the subjects and the scores were obtained from the university's records after the subjects had exited from the graduate program for 1-2 years. Institutional Review Board approval was obtained from the MSN Institutional Review Board.

### Data Collection

Data were collected from the computer printout of the university's database of CCTST scores along with the capscore sheet provided by the CCTST. Demographics were provided for the subjects in the database.

### Data Analysis Procedures

The CCTST quantitative data including the total critical thinking scores and the subset scores, were entered into a personal computer. Data were then analyzed using the Statistical Package for the Social Sciences (SPSS) software Version 11.

## Chapter IV

### Results

#### Statistical Presentation

One sample *t* Tests were performed comparing the total scores as well as the subset scores of the CCTST. The resulting comparison of the total scores between the subjects' mean score ( $M = 19.3$ ) and the national average mean score ( $M = 17.3$ ) indicated that the subjects' total scores were significantly higher than the national average ( $t = 2.37$ ,  $df = 29$ ,  $p < .05$ ). There was no significant difference ( $t = .81$ ,  $df = 29$ ,  $p > .05$ ) for the subset analysis between the subjects' mean score ( $M = 5.17$ ) and the national average mean score ( $M = 4.98$ ). A significance at the .01 level was found for the inferential subset between the subjects' mean score ( $M = 8.6$ ) and the national average mean score ( $M = 6.0$ ) ( $t = 5.35$ ,  $df = 29$ ,  $p < .01$ ). For the evaluation subset the subjects' mean score ( $M = 5.53$ ) was significantly lower than the national average mean score ( $M = 6.58$ ) ( $t = -2.6$ ,  $df = 29$ ,  $p < .05$ ). A significance at the .01 level was found for the inductive reasoning subset between the subjects' mean score ( $M = 11.53$ ) and the national average mean score ( $M = 7.69$ ) ( $t = 9.15$ ,  $df = 29$ ,  $p < .01$ ). There was no significant difference ( $t = -.53$ ,  $df = 29$ ,  $p > .05$ ) for the deductive reasoning subset between the subjects' mean score ( $M = 7.77$ ) and the national average mean score ( $M = 8.06$ ). Table 1 shows the mean total scores and subsets scores for the subjects and the national average.



Table 1  
CCTST Results

Group	Total Scores	Analysis Subset	Inferential Subset	Evaluation Subset	Inductive Reasoning	Deductive Reasoning
Subjects	19.3*	5.17	8.6**	5.53	11.53**	7.77
National Graduate Average	17.3	4.98	6.0	6.58*	7.69	8.06
Standard Deviation	4.6	1.3	2.7	2.1	2.3	3.1

\*P <.05

\*\*P <.01

## Chapter V

### Discussion

#### Interpretation of Findings

The overall total scores of the CCTST were significantly higher for the study subjects indicating that the subjects had higher critical thinking skills than the national averages established by Facione (1997). This finding could indicate that the selected nursing program promotes a higher level of development of critical thinking skills than other nursing programs across the nation.

According to Benner's theory of Novice to Expert critical thinking skills are higher in those who have more experience. Of the subjects of this study, 70% (n = 20) had 10 or more years of experience in nursing. The higher level of critical thinking could also be attributed to a high amount of experience in nursing. The years of experience data was not available for the national average group.

According to Facione (1984) in the CCTST information material, analysis as measured by the CCTST means "to comprehend and express the meaning or significance of a variety of materials, situations, expressions, etc. and to identify the intended and actual inferential relationships among statements, questions, concepts, beliefs or judgments." (p. 6). While there was no statistical significance, the subjects' mean score for the analysis subset was higher.

Evaluation according to the CCTST means "to assess the credibility of statements and the logical strength of inferential relationships and to be able to justify one's reasoning by reference relevant to evidence, contexts, or standards." (p. 6) The subjects mean score was significantly lower in the evaluation subset than the national average.

Inference according to the CCTST means to “identify and secure elements needed to draw reasonable conclusions, to form conjectures and hypotheses, to consider relevant information, and to educe the most reasonable consequences which follow either most probably, or necessarily from those elements.” (p. 7). The inferential skills of the subjects were significantly higher than those of the national average. The traditional measurements of critical thinking were those of deductive and inductive reasoning. Deductive reasoning per the CCTST means “that the assumed truth of the information provided necessitates the truth of the inference drawn.” (p. 7). This type of reasoning is viewed from the general to the specific. Inductive reasoning per the CCTST means “that an argument’s conclusion is purportedly warranted, but not necessitated, by the assumed truth of its premises.” (p. 7). This type of reasoning is from specific to general.

#### Implications for Nursing

Because the promotion of critical thinking skills are vital in nursing today it is necessary to keep nursing education programs up-to-date with the educational strategies that promote critical thinking skills. While this study has shown that the selected program produces graduates that have higher levels of critical thinking, the educators and leaders in this nursing program should strive to improve upon the current curriculum to continue producing the best results possible especially those falling statistically below the national average.

#### Implications for Further Research

Should a curricular intervention be implemented to improve the promotion of critical thinking in the selected program, this study should be repeated using a pretest-posttest format. The scores used for this study in addition to the national norms could be

utilized to compare to future critical thinking skills tests. Continued monitoring of critical thinking skills should be ongoing to ensure the program is continuing to promote critical thinking.

#### Limitations

Limitations of this study could be related to the small sample size impairing the generalizability of the data. The data used for comparison for national averages also came from a small sample size and may not be an accurate reflection of national graduate student averages.

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