

THE RELATIONSHIP BETWEEN BACCLAUREATE NURSING
ADMISSIONS CRITERIA AND STUDENT OUTCOMES

by

SHELLEY EVELYN FRASER

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Department of

Nursing

The University of British Columbia
Vancouver, Canada

Date

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ABSTRACT

A longitudinal correlational study was conducted to examine the relationship between admissions criteria for direct entry with advanced standing into the third year of the University of British Columbia's Baccalaureate Nursing Program and student outcomes, operationalized as students' academic achievement and perceived ability in clinical practice.

The aim of this study was to determine whether the current admissions process identifies applicants who succeed in their academic studies and clinical practice. A further aim was to determine whether the resource intensive procedure of reviewing and rating supplemental application and interview materials has greater predictive power than that of admission grade point average (GPA) alone.

The findings indicate several correlations between the admissions criteria and the dependent variable of first-term GPA. A significant positive relationship was found between the students' admission GPA and their first-term GPA ($r = .55$). Interestingly, a significant negative relationship was found between the students' supplemental scores and their first-term GPA ($r = -.44$). The relationship between the students' interview ratings and their academic achievement (first-term GPA) was not statistically significant.

The findings indicate one significant correlation between the admissions criteria and the dependent variable of Clinical Skills Self-efficacy Scale scores

(CSSE Scale). A significant negative relationship was found between the students' interview scores and their scores on the CSSE Scale 'later' measure ($r = -.40$). None of the other relationships between the admissions criteria variables and perceived ability in clinical practice (CSSE Scale) was significant. The findings suggest that admission GPA is the strongest predictor of a student's first-term GPA and that the interview and supplemental data added little to the prediction equation.

There is little evidence to recommend valid, non-academic predictors of nursing students' academic achievement. Consequently, admissions committees bent on considering qualities beyond pre-admission GPA remain in uncharted waters.

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CHAPTER I: INTRODUCTION

In 1997, the School of Nursing at the University of British Columbia (UBC) implemented a broad-based admissions process to allow direct entry for students with advanced standing into the third year of the Baccalaureate Nursing Program. The admissions criteria included the applicants' pre-admission grade point average (GPA_{admit}) and submission of supplemental materials. Components of the supplemental materials included a structured resume, a personal statement in which applicants "introduced themselves" to the selection committee, and two confidential assessment letters prepared by individuals familiar with the applicant's qualities (e.g. employers, former teachers or coaches). An Admissions Committee of faculty members from the School of Nursing developed the supplemental application, which was designed to elicit non-academic information from applicants.

The School of Nursing initially utilized a two-step process in evaluating these criteria. The first step included consideration of the applicant's GPA_{admit} and supplemental materials. These components were equally weighted, creating an admissions index that, once rank ordered, served as an initial screening tool in the admissions process. In the spring of 2002, the School of Nursing received more applications than could be accommodated. The admissions index was used by the Admissions Committee to identify the top-ranked applicants, who were then asked to participate in the second step of the admission process, a panel interview with two faculty members.

The panel interviewers collected data on motivation, nursing awareness, problem solving, ability to relate to others, self-perception and communication skills. Faculty from the School of Nursing developed the format of the interview. Each selected applicant participated in a 20-minute interview and was given a score, which was the average of the two panel members' scores. After completion of the interview process, the Admissions Committee reviewed all data and selected the top-ranked applicants who were offered admission into the third year of the Baccalaureate Nursing Program.

The School of Nursing devotes considerable time and resources to rate the supplemental data and to conduct the panel interviews. Because there is little conclusive evidence to support these admission strategies, it was imperative to study the predictive value of these data in terms of students' academic and clinical performance.

Reliable admissions criteria are becoming increasingly important because there are limited seats in nursing schools to accommodate the large pools of applicants. As the country faces a severe nursing shortage, the School of Nursing must strive to maintain a low attrition rate and to admit individuals who have the optimum chance of achieving success in the profession of nursing. Consequently, it becomes critical to employ an admissions process that identifies applicants who are likely to persist and achieve success in their academic studies and clinical practice.

Research Problem

The research problem was one of determining whether the current admissions process identifies applicants who succeed in their academic studies and clinical practice. A further aim was to determine whether the resource intensive procedure of reviewing and rating the supplemental application and interviews has greater predictive power than that of the pre-admission GPA alone.

Purpose of Study

The purpose of this study was to examine the admissions criteria for direct entry with advanced standing into the third year of the University of British Columbia's Baccalaureate Nursing Program and student outcomes to determine whether the criteria are predictive of students' academic achievement and perceived ability in clinical practice.

Research Questions

1. What is the relationship between students' GPA_{admit} and their academic achievement?
2. What is the relationship between students' GPA_{admit} and their perceived ability in clinical practice?
3. What is the relationship between students' supplemental application scores and their academic achievement?
4. What is the relationship between students' supplemental application scores and their perceived ability in clinical practice?

5. What is the relationship between students' interview scores and their academic achievement?
6. What is the relationship between students' interview scores and their perceived ability in clinical practice?
7. Which component of the admissions criteria best predicts academic achievement and perceived ability in clinical practice?
8. Do the supplemental information and interview data add to the prediction of academic achievement and perceived ability in clinical practice after GPA_{admit} is considered?

Definition of Key Terms

The following definitions are provided for key concepts employed in this study:

Admissions Criteria: The combination of academic and non-academic measures utilized in the admissions process to allow direct entry for students with advanced standing into the third year of the Baccalaureate Nursing Program at UBC.

Predictor Variables

Academic Factors: Academic factors are traditional academic measures of a student's mental ability and include pre-admission GPA and standardized tests of ability.

Pre-admission GPA (GPA_{admit}): GPA_{admit} is the average of 48 to 60 credits of post secondary course work completed (excluding high school grades) and is

presented as a percentage. All students' grades, irrespective of grading system (e.g., 4-point alpha-numeric grading systems, 9-point or stanine grading systems) are converted to a percentage by the Admissions Office, Enrolment Services, at UBC. (For a full description of GPA_{admit}, see the Methods section, p. 37).

Non-academic Factors: Non-academic factors are defined as an individual's personal qualities such as motivation, nursing awareness, problem solving, ability to relate, self-perception and communication skills. The supplemental application and interview processes are aimed to collect data within these domains.

Supplemental Application: Components of the supplemental application include a structured resume, a personal statement and two confidential assessment letters. The supplemental application is completed by all individuals who apply for admission with advanced standing into the third year of the Baccalaureate Nursing Program at UBC. (For a full description of the supplemental application, see the Methods section, p. 38).

Admissions Index: Scores obtained on the GPA_{admit} and on the supplemental application are combined to form a single score called the admissions index. The admissions index is used to identify the top-ranked applicants who will be invited to participate in an interview.

Interview: Each selected applicant participates in a 20-minute interview and is given a score, which is the average of the two panel members' scores. (For a full description of the interview, see the Methods section, p. 41).

Outcome Variables

First Term GPA (GPA_{first-term}): GPA_{first-term} is the average grade of all courses taken in the first term of the third year of the Baccalaureate Nursing Program at UBC. Courses include Nursing 310, Nursing 320 and Nursing 330. (For a full description of these courses and the method used to calculate GPA_{first-term}, see the Methods section, p. 42).

Perceived Ability in Clinical Practice: Perceived ability in clinical practice is defined as a student's score on Owen, Froman, and Hand's (2003) *Clinical Skills Self-efficacy Scale* (CSSE). This tool measures individuals' confidence in their ability to succeed in clinical practice. A high self-efficacy score means that an individual is more likely to choose, persevere, and succeed at that behaviour. (For a full description of perceived ability on clinical practice, as measured by the CSSE Scale, see the Methods section, p. 43).

CHAPTER II: LITERATURE REVIEW

A comprehensive computerized search for published literature related to admissions criteria for undergraduate health sciences programs and measures of student success was conducted in the following databases: Comprehensive Index of Nursing and Allied Health Literature (CINAHL), Humanities and Social Sciences Index (HSSI), Medline, Educational Resources Information Center (ERIC), ProQuest Digital Dissertations, and PsycINFO. Searches were limited to English-language materials published in the last 18 years (1985 to 2003). For the purpose of the literature search, the following key words and combinations of key words were used: college academic achievement, academic achievement prediction, admission criteria, school admission criteria, student admission criteria, nursing education, baccalaureate education, nursing students, academic standards, admission (school), predictive variables, predictive measurement, student outcomes, grade point average (GPA), structured interview, clinical competence, success and self-efficacy.

In this literature review, research of the capacity of academic variables to predict student success is examined followed by an examination of the research related to non-academic variables. The review highlights research related to the concept of self-efficacy as an indicator of ability in clinical nursing practice.

Admissions Criteria in North American Universities

There is little published literature that describes the specific admissions criteria used by North American universities. Only one national American

survey of admissions criteria was found and it focused on admissions criteria for the allied health professions, including nurse-midwifery, occupational therapy, physical therapy, and physician assistant programs (Scott et al., 1995). The survey found that GPA, standardized tests of ability, personal interviews, and letters of reference were the traditional admissions standards across America in the selected allied health professions.

Several other research reports describe surveys, in specific geographical regions, that determined current trends in admissions criteria. Of these, only one article focused on baccalaureate nursing programs. Streubert-Speziale (2002) surveyed schools of nursing in the mid-Atlantic region of the United States to describe the admissions criteria and curricula of registered nurse (RN) to master of science in nursing (MSN) programs. The response rate was 57% and a sample of 28 schools' administrators responded. The survey found that 100% utilized letters of reference, 96% used a minimum GPA, 82% sought a personal statement from applicants, 42% required standardized test scores, and a small percentage conducted personal interviews.

There was no published information found regarding specific admissions criteria for schools of nursing in Canada; however, it is fair to state that most universities rely on GPAs and a combination of other academic and non-academic measures in their admissions process. As the following review highlights, there is little conclusive evidence to support these practices.

Academic Variables

The study of academic variables and their predictive power in explaining students' success in university programs has been of great interest, for many years, to researchers from various disciplines. A range of predictors have been studied including pre-admission test scores on the Scholastic Achievement Test (SAT), National League for Nursing (NLN) pre-admission examination, the American College Test Assessment (ACT), and the Watson-Glaser Critical Thinking Appraisal. Generally, the results confirm a relationship between these pre-admission test results and students' performance, operationalized as success within a university program (Jenks, Selekman, Bross, & Paquet, 1989; McClelland, Yang, & Glick, 1992; Yang, Glick, & McClelland, 1987; Younger & Grap, 1992). All of these studies found a significant correlation between pre-admission test scores and academic achievement (magnitude ranging from .42 to .48). However, one of the most highly studied academic variables that is less consistent in predicting students' success is GPA.

In the literature, GPA has been operationalized in several ways. The majority of studies utilize college or pre-nursing GPA as the independent variable. Less frequently, researchers have examined pre-admission biological sciences, chemistry, liberal arts and high school GPAs as predictors of student success (Campbell & Dickson, 1996). Within this body of research, the most frequently used measures of students' success are: (a) success on registered nurse

licensure examinations and (b) academic success within a baccalaureate nursing program.

Because the aim of this study was to evaluate admissions criteria, this literature review does not include a discussion of studies that focused on whether performance while in a nursing program is predictive of subsequent success (e.g., nursing course grades predicting success on licensure examinations). The following sections detail the relevant research.

Pre-admission GPA

During the late 1970s and early 1980s, the majority of educational outcome studies, in nursing, focused on students' GPA, program completion, or success on professional nursing licensure examinations. The trend was to examine the relationship between a single predictor and a selected outcome variable. Marquis and Worth (1992) noted that many of these univariate studies were unable to predict student success. Within this body of research, pre-admission GPA was among the most frequently studied predictors.

The literature is inconclusive as to whether pre-admission GPA is an adequate sole predictor of student success, as measured by achievement in baccalaureate nursing programs and on professional nursing licensure examinations. Three groups of researchers examined the relationship between pre-admission GPA and students' success, operationalized as grades achieved in a baccalaureate nursing program and scores achieved on the National Council Licensure Examination for Registered Nurses (NCLEX-RN) (Jenks et al., 1989;

Lewis & Lewis, 2000; Mills, Sampel, Pohlman, & Becker, 1992). All three studies found weak correlations and concluded that pre-admission GPA alone was a poor predictor of future academic success. The samples were small to adequate ($n = 407, 534, \text{ and } 168$, respectively). The findings were limited because the researchers failed to fully outline how the pre-admission GPA was calculated (i.e., which courses were included) or describe the curriculum within the baccalaureate programs.

Other researchers, in the field of medical education, concluded that pre-admission GPA is a stable predictor of future academic success and clinical ability. Kulatunga-Moruzi and Norman (2002b) suggested that GPA is a sound predictor because it is a measure of an individual's ability over an extended period of time. Since it is an average, it is likely that any variance caused by extraneous variables would be cancelled out. Kulatunga-Moruzi and Norman suggested that the reason why previous researchers have found weak correlations is that their samples were highly homogeneous groups, at the top end of the ability range, and the low correlations reflected the lack of variability within the samples. In Kulatunga-Moruzi and Norman's (2002a) study, the descriptive statistics confirmed this hypothesis; there was a very limited range in the undergraduate GPAs. With such a small amount of variation it may be difficult to detect differences within the sample and associations with other variables.

Other researchers have conducted similar studies to determine the relationship between pre-admission GPA and success on the NCLEX-RN (Horns, Sullivan, & Goodman, 1991; Marquis & Worth, 1992; McClelland et al., 1992; Yang et al., 1987). All four studies found significant correlations, in the range of .40, between the variables. Thus, pre-admission GPA could explain only 16% of the variability in the NCLEX-RN scores. Although the studies reported significant findings, the results might not have much practical significance in assisting schools to select optimum admissions procedures. These published reports are deficient because all of the researchers neglected to describe how the pre-admission GPA was defined and calculated.

Biological Science GPA

There is some evidence to suggest that pre-admission biological or science grades may be better predictors of nursing students' success than cumulative pre-admission GPA. Two studies tested this relationship in baccalaureate nursing students and obtained similar or higher correlation coefficients (.39 and .52, respectively) as compared to cumulative pre-admission GPA (McClelland et al., 1992; Yang et al., 1987). Other disciplines have found similar results. Kulatunga-Moruzi and Norman (2002a) studied 97 medical students and found that success on the medical licensure examination was correlated with undergraduate GPA ($r = .33$) and with science GPA ($r = .45$). Although it is difficult to generalize the findings from these studies (particularly from medical

students to nursing students), the merit of using science or biology GPA as an admissions criterion instead of cumulative GPA warrants further investigation.

High School GPA

Two studies examined the correlation between high school GPA and success operationalized as grades obtained in a baccalaureate nursing program and performance on the Canadian Nurses Association Testing Service Comprehensive Examination (CNATS) for registered nurse licensure (Brennan, Best, & Small, 1996; Carpio, O'Mara, & Hezekiah, 1996). Brennan et al. found high school GPA to be correlated with first year nursing GPA ($r = .51$). Carpio et al. found that marks in high school english and chemistry were correlated with success on the CNATS examination. The lack of comparable grades across high schools in eastern Canada was acknowledged as a shortcoming by the authors of this report.

Building a body of credible research to support GPA (pre-admission, science, or high school) as a valid predictor of success is difficult because most studies use samples of convenience and are conducted at single times and at single sites where the curriculum and manner in which GPA is defined and calculated are unique to the institution. This limits the generalizability of the findings. As Campbell and Dickson (1996) suggested, more collaborative research between comparable settings is needed to begin to build a trustworthy body of knowledge.

The Advantage of a Multivariate Approach

In the early 1990s, nursing school enrolment declined and retention in nursing programs was of concern; consequently, there was greater interest in examining the relationship between admissions criteria and successful student outcomes. Many researchers recognized the need to examine multiple variables, both academic and non-academic, in predicting students' success (Campbell & Dickson, 1996).

Younger and Grap (1992) studied a sample of 388 nursing students and found that course grades in paediatrics, the health needs of women and two medical-surgical courses explained 55% of the variance in the students' NCLEX-RN scores. The researchers found that the explained variance could be raised to 62% with the addition of pre-admission SAT and NLN pre-admission examination scores.

Byrd, Garza, and Nieswiadomy (1999) conducted an ex post facto study of 285 students' records to examine admissions and progression criteria predictive of completion of a nursing program. Their results indicated that high school science GPA, pre-nursing GPA, ethnicity and age predicted graduation in 77.0% of the cases. Further, when the researchers combined ethnicity, age, high school GPA, social science GPA and grades in the first medical-surgical course, graduation was correctly predicted 90.9% of the time. This study reported a strong ability to predict student success (90.9%) and reinforced the need to examine multiple variables, both academic and non-academic, to determine

predictors of success. It is important to note: the use of non-academic variables, such as age and ethnicity, as admissions criteria would be a discriminatory practice and is not suggested by the researcher. The primary limitation of this study is the uniqueness of the school and the curriculum, which limits the generalizability of the findings.

Other researchers support the notion of a combination of academic and non-academic factors in predicting student success (Campbell & Dickson, 1996; Marquis & Worth, 1992; Younger & Grap, 1992). Future research in this area may result in a broader range of predictors that more consistently predict student success.

Non-traditional Students

In the past 15 years, there has been an increasing trend toward the enrolment of non-traditional students. Muse, Teal, Williamson, and Fowler (1993) reported an increasing enrolment of non-traditional students, defined as adults, over the age of 25 years, attending school on a part-time basis, and possibly working while attending school. Although there is some evidence to support the relationship between academic predictors and students' academic success, there is little research that compares and contrasts these predictors for traditional and non-traditional students. It may be that students who seek admission as non-traditional students develop and bring a wealth of other skills, which are not reflected in their high school GPAs.

Hayes, Fiebert, Carroll, and Magill (1997) studied 107 physical therapy students' records to determine if there was a difference between traditional and non-traditional students' academic predictors. The authors operationalized academic success as GPA achieved in the final year of the physical therapy program. The findings suggest that the academic success of traditional students was predicted by their anatomy course grades and their pre-professional GPA (49% and 5% of the variance in GPA, respectively), whereas the success of non-traditional students was predicted by their anatomy grades and interview scores (35% and 8% of the variance in GPA, respectively). It appears that other variables may play a role in predicting academic success and that these variables may be different for traditional and non-traditional students. Brown (1990) suggested that the growing number of non-traditional student applicants may be one reason why GPA alone is an inconsistent predictor of student success. Other researchers have found similar results and raise a question about the need for special enrolment and admissions criteria for non-traditional students (Campbell & Dickson, 1996; Hayes et al., 1997; Muse et al., 1993; Streubert-Speziale, 2002).

Summary

Most of the research undertaken to determine nursing students' achievement is significant for the researchers' specific institutions, however, there is little conclusive evidence to recommend admissions criteria for other institutions. Indeed, some researchers suggest that the best combination of predictors must be determined for individual universities (Campbell & Dickson,

1996). This literature review now presents research that examined the predictive value of non-academic variables.

Non-academic Variables

There is little conclusive evidence to support the capacity of non-academic variables to predict students' success in university nursing programs despite a range of predictors studied. Researchers have investigated constructs such as self-concept, self-esteem, test anxiety, social support, and various demographic variables. Generally, most findings suggest that these variables are weak predictors of students' success on the NCLEX-RN (Campbell & Dickson, 1996). One study, however, utilized a framework of variables and the findings suggest that a combination of non-academic variables may account for a significant proportion of the variation in NCLEX-RN scores.

Kornguth, Frisch, Shovein, and Williams (1994) studied a random sample of 112 nursing students to determine the correlation between non-cognitive variables and academic success. The researchers utilized the Non-cognitive Questionnaire (NCQ) developed by Tracey and Sedlacek (1987) to measure the following eight variables: positive self-concept, realistic self-appraisal, support of academic plans, leadership, long-range goals, community ties, understanding of racism and academic familiarity. The test-retest reliability was reported as adequate and a factor analysis supported the construct validity of the subscales (Tracey & Sedlacek). The tool has been used in medical school and pharmacology education but little within nursing education. The findings suggested that

several groups may be at risk for academic failure or may need additional support: (a) males may need support with academic plans, (b) students who are not familiar with a university environment may need support, and (c) minority students may need assistance to develop community ties. As the study's sample included only 13 males and only 35.5% of the sample were of a non-European or non-American origin, the findings must be interpreted cautiously. Further research into the value of utilizing the NCQ is needed.

Admissions criteria such as the content of an autobiographical letter or performance at a personal interview also have been investigated. Again, the most frequently studied outcome variables are success within the university program and on professional licensure examinations. A brief overview of the relevant research in this field follows.

Personal Interviews

The value of conducting personal interviews as part of an admissions process has been of great debate over the last decade. Not surprisingly, there is little conclusive evidence to support the use of this admissions strategy.

Kulatunga-Moruzi and Norman (2002a) provided some evidence to support the use of interviews. The researchers studied a sample of 97 students admitted to the McMaster Medical School in 1993. The purpose was to determine if select admissions criteria were related to success on the Medical Council of Canada's Licencing Examinations (LMCC). This examination consists of two parts: (a) a 540 question multiple-choice examination that assesses knowledge in

six areas of medicine and (b) a 20 station clinical examination with standardized patients and clinical evaluators. Gaining entrance into the McMaster Medical School is a three-step process. All students are first assessed on their academic performance and a written autobiographical submission. Those ranked highest on these measures are invited to participate in an interview. From a pool of 3,500 applicants, the school admits 100 individuals each year. The research findings suggested that the LMCC Part II communication skills scores were significantly correlated with the pre-admission Medical College Admission Test (MCAT) verbal sub-scores ($r = .43$) and with the personal interview ratings ($r = .24$). This is particularly interesting because the second part of the LMCC and the MCAT verbal sub-score are validated instruments. If the interview is correlated with these measures, it provides some evidence of the interview's criterion-related and construct validity. It is important to note, however, that the correlation ($r = .23$) and sample size ($N = 97$) were small and the reliability of the interview ratings was reported to be inadequate (interrater reliability = .66). The authors suggest that this poor reliability may help to explain why the study did not find a stronger relationship between the variables.

Other researchers, from disciplines outside of nursing, have investigated the relationship between pre-admission interview ratings and students' outcomes, operationalized as academic and clinical success within a university program. None of the studies found a significant correlation between the variables (Kulatunga-Moruzi & Norman, 2002b; Schmalz, Rahr, & Allen, 1990;

Vargo, Madill, & Davidson, 1986). Interestingly, in the Schmalz et al. study, each student participated in a series of three interviews. This counters some of the previous criticisms regarding the validity of a single interview being representative of an applicant's true ability as compared to taking an average of multiple measures (Kulatunga-Moruzi & Norman, 2002b). As a result of Vargo's et al. findings, the University of Alberta, Faculty of Occupational Sciences discontinued the interview as part of their admissions process. It is important to note, however, that Vargo et al. conducted this study over 10 years ago, the admissions process may be significantly different today. Again, these researchers acknowledged that a limitation of their work, and many similar studies, is the inability to study the group of applicants who were refused admission.

In a follow-up study, Kulatunga-Moruzi and Norman (2002b) studied a sample of 214 applicants to the McMaster University Medical School. The researchers included three cohorts: those accepted in the first round, those accepted in the second round and those refused admission but enrolled in another Canadian medical school. This is the only published study found that included individuals refused admission. The purpose was to examine the validity of admissions measures used to assess non-academic variables and to include some students who were refused admission. The studied predictor variables were pre-admission GPA, autobiographical submission ratings, simulated tutorial and personal interview ratings. The outcome variables were LMCC Parts I and II examination marks. The results indicated that although the

scores on each of the admissions tools were significantly higher among the individuals who were accepted into the program as compared to those refused admission (as one would expect), performance on the LMCC was comparable. The question becomes: Why were these differences at point of admission not evident in the licensing examination marks?

The authors suggest that one possible explanation is that the admissions tools were not measuring the intended attributes in a valid or reliable way. Although the effect size for GPA was small to moderate (.39), the effect size for each of the performance-based non-cognitive measures was large (personal interview was 2.37 and simulated tutorial was .79). As previous researchers have suggested, scoring subjective measures such as interviews and autobiographical submissions is difficult and many confounding and situational variables may affect applicants' performance. In addition, research has indicated that the ability to analyze and problem solve is highly context specific (Bandura, 1986). Therefore, it is possible that performance in an admissions interview will not generalize to performance in the context of clinical examinations or professional practice.

Because questionable validity and reliability of interview performance ratings were identified as major limitations within this field of research, several researchers have sought to determine the validity and reliability of their interview process (Buckingham & Mayock, 1994; Youdas, Bogard, & Suman, 1996). Both studies reported poor reliability and validity of the interview

instrument with low interrater reliability. It was suggested that panel members review specific criteria used to rate a skill before the interview process commences each year.

Autobiographical Letter

Many schools of nursing utilize autobiographical letters and interviews as part of their admissions process. This raises the questions of whether these admissions strategies measure different constructs or abilities and, if so, what they are and how they are measured validly and reliably.

Brown, Carpio, and Roberts (1991) found that autobiographical letter scores were not correlated with interview scores, indicating that these admissions strategies assess different non-academic variables. The authors suggested that further qualitative research is warranted to identify the specific constructs and to further validate the pre-admission autobiographical letter assessment.

Two studies supported the use of autobiographical letter assessments as an admissions criterion (Brown et al., 1991; Schmalz et al., 1990). Brown et al. studied the reliability and validity of the autobiographical letter as an admissions criterion at McMaster University, School of Nursing in Hamilton, Ontario. Each applicant's letter was assessed by a 3-member panel, which included a faculty member, a nursing student or alumna, and a community representative. There was a specific procedure and orientation to the process. Different reading teams assessed the letters from applicants to the generic or basic nursing program and

from applicants who already held a registered nurse license. The findings suggested that for both applicants' pools the reliability and validity were acceptable. Interestingly, although the reliability (interrater reliability) was acceptable, the community representative had the poorest agreement over time (compared to the other panel members) and poorer agreement for the applicants holding registered nurse designation. This raises the question of whether non-nursing personnel have the necessary knowledge and skill to sit as panel members. Based on the study results, the authors revised the format of the application letter and each applicant was subsequently given three specific questions to answer. The scoring system was revised to reflect the expectations of each question. The authors suggested that the revised format would assist community members to score the letters more reliably because they may not be familiar with the desired qualities of a registered nurse.

Schmalz et al. (1990) studied 283 allied health students (occupational therapy, physician assistant and physical therapy) to determine the correlation between pre-admission essay assessments and the probability of successfully completing their program. The admissions essay scores were significant predictors of students successfully completing the program. Unfortunately, the researchers failed to describe the reliability or validity of the written essay instrument. Questions regarding the interrater reliability of the individuals scoring the essays and whether the essay truly reflected the ability of the

applicants were unanswered. These threats to validity limit the usefulness of the findings.

In summary, there is a modest amount of research of the predictive power of non-academic pre-admission variables and students' success. The results generally suggest that autobiographical submissions and interview data are of limited value in predicting students' success. However, the reasons for the small correlations are not clear. Many of the researchers failed to fully describe the reliability or validity of their instruments and therefore, it is difficult to judge whether the instruments were measuring the intended constructs in a valid and reliable manner. Further, some researchers suggested that admissions committees grossly overestimate the importance of non-academic variables while underestimating the influence of situational variables (Campbell & Dickson, 1996; Ross & Nisbett, 1991). Again, the findings within this body of research are difficult to generalize because many studies were conducted in single sites, relied on samples of convenience, and the non-academic measures were unique to the institution.

Summary

Predicting students' success is a complex problem. Academic and non-academic factors probably play a role, however situational variables further complicate the prediction equation. To date, there is little conclusive evidence to recommend the best predictor variables. Nonetheless, as Mitchell, Haynes, and Koenig (1994) reported, over 99% of American medical schools utilize interview

measures as part of their admissions procedures and only 47% of schools collect validity data. There are no reported data for schools of nursing, however one can assume that a fair number of nursing schools utilize these tools in their admissions process. Suitable candidates may be turned down and unsuitable candidates may be accepted on false grounds. It becomes an ethical issue for schools to critically examine their admissions procedures.

Self-efficacy

The concept of self-efficacy may be important in addressing the problem of identifying fair and valid predictors of nursing students' success. Although self-efficacy has been studied in a wide range of settings, this literature review is limited to self-efficacy in the educational setting. The concept of self-efficacy has been widely studied. Generally, the literature supports the notion that self-efficacy is a sound characteristic that influences a person's actions, performance, and persistence (Jeffreys, 1998; Pajares & Miller, 1994). A review of the relevant research follows.

Defining Self-efficacy

The concept of self-efficacy was developed by Bandura (1986, 1997) in the late 1970s and is part of a larger, multidimensional, social cognitive theory. Self-efficacy is described as individuals' judgements of their capability to accomplish specific actions. Perceived self-efficacy is not a measure of skill, but rather a measure of belief in what one can do with one's given skills in specific contexts. Bandura (1997) described self-efficacy:

People's beliefs in their efficacy have diverse effects. Such beliefs influence the courses of action people choose to pursue, how much effort they put forth in given endeavours, how long they will persevere in the face of obstacles and failures, their resilience to adversity, whether their thought patterns are self-hindering or self-aiding, how much depression they experience in coping with taxing environmental demands, and the level of accomplishment they realize. (p. 3)

Self-efficacy is believed to be a state rather than a trait because it is context specific (Pajares & Miller, 1994). As such, individuals' self-efficacy in one area will not usually influence their measure of self-efficacy in another. Because self-efficacy is viewed as a state, efficacy is thought to be a construct that can be easily influenced (Bandura, 1997; Schunk, 1996).

There are three cognitive mediating processes in self-efficacy: (a) outcome values, (b) outcome expectancy, and (c) self-efficacy expectancy. Outcome values refer to the value or importance an individual places on achieving the outcome. According to Bandura (1997), outcome values will affect an individual's level of motivation to persevere with a task. Outcome expectancy refers to beliefs surrounding the probability that a certain course of action will result in a particular outcome. Positive outcomes serve as incentives, whereas negative outcomes serve as disincentives (Bandura, 1997). Again, these incentives affect an individual's level of motivation to persevere with a task. In summary, outcome values and outcome expectancy affect motivation. Motivation is believed to be

one component of the third mediating process: self-efficacy expectancy, which is considered the strongest predictor of future performance.

Self-efficacy expectancy is beliefs surrounding the ability to perform a specific task (Maddux, 1991). Measurements of these beliefs appear to be the basis of many predictive studies involving self-efficacy. It is believed that self-efficacy expectancy has the greatest influence on behaviour. Shell, Murphy, and Bruning (1989) confirmed this notion in a study of 153 undergraduate students. The researchers studied the level of self-efficacy expectancy and outcome expectancy in relation to reading and writing achievement. Together, self-efficacy expectancy and outcome expectancy accounted for a third of the variance; however, self-efficacy expectancy was the stronger predictor.

Self-efficacy expectancy can vary along three dimensions: magnitude, strength and generality (Bandura, 1997). Magnitude refers to the point along a continuum of difficulty where individuals believe that they have the ability to successfully perform a task. Strength refers to the level of motivation or confidence individuals express regarding their ability to perform the task. Generality refers to the effect that success or failure will have on an individual's future actions.

According to Bandura (1997), self-efficacy expectancy is influenced by four sources: performance or enactment efficacy, vicarious experience, verbal persuasion and emotional arousal. Performance efficacy is purported to have the greatest influence on self-efficacy. Performance efficacy suggests that if one

succeeds at a given task, a greater sense of efficacy results. Conversely, if one fails at a task, there is a lowered sense of efficacy. One study specifically tested the notion of performance efficacy.

Harvey and McMurray (1994) developed and tested two self-efficacy scales specifically for 306 undergraduate nursing students. One scale was developed to measure nursing academic self-efficacy (NASES) and the second scale measured nursing clinical self-efficacy (NCSES). The Cronbach's alpha scores for the NASES and the NCSES were .94 and .96, respectively. The participants were divided into two groups, based on the presence or absence of prior nursing experience. The scores were significantly higher on the NCSES for the students with prior nursing experience, but no significant group differences were noted on the NASES. This finding supports the notion that self-efficacy expectancy is highly influenced by performance efficacy. In other words, if an individual has prior experience, the individual will have a greater sense of self-efficacy in that context. Further, analysis of variance revealed that NASES was positively correlated with the likelihood of completing an undergraduate nursing program.

There is some debate in the literature, however, as to the merits of performance efficacy affecting all individuals. Several researchers believe that a small percentage of highly efficacious individuals may continually overestimate their abilities, despite their prior experience (Jeffreys, 1998; Owen et al., 2003).

The Mediating Role of Self-efficacy

Several researchers have conducted path analyses to determine the role of self-efficacy in academic performance. Horn, Bruning, Schraw, Curry, and Katkanant (1993) tested a path model to determine if university students' study methods mediate a role between the knowledge they possess, the beliefs they hold, and future academic success. The results suggested that self-efficacy is not directly related to academic performance. Instead, self-efficacy has a direct effect on students' chosen study patterns.

Pajares and Miller (1994) also tested a path model to determine the role of self-efficacy and self-concept in mathematical problem solving. The sample included 350 university students and the findings suggested that self-efficacy is more specific to a particular context as compared to the construct of self-concept, which may be a more general trait. Further, self-efficacy was a better predictor of mathematical problem solving as compared to the construct of self-concept. Interestingly, many studies have used the terms self-efficacy and self-concept synonymously, however, Bandura (1986) argued that the two concepts represent entirely different phenomena.

Self-efficacy as a Predictor of Academic Ability in Nursing Students

Some researchers have examined the construct of self-efficacy in relation to academic achievement in nursing students. Five key studies were identified. All of these studies utilized relatively large samples, which ranged from 124 to 306 students with the exception of Andrew (1998) who studied a relatively small

sample of 81 participants. The settings included an associate degree program, a baccalaureate nursing program, and a three-year bachelor of nursing program.

Holeman (1987) conducted a study to investigate the relationship between self-efficacy and future academic success, operationalized as grades obtained in a nursing program. The findings suggested that the students' level of self-efficacy was a weak predictor of future academic performance. The self-efficacy scale, however, was a general measure of efficacy and may not have accurately reflected the participants' efficacy with specific nursing skills.

Defelice (1989) studied the relationship between students' self-efficacy and academic performance in a nursing program, operationalized as cumulative GPA in first year nursing. The researcher developed a self-efficacy instrument; a 50-item, Likert-type scale that was validated by eight faculty members. The researcher reported high test-retest reliability. Again, the tool was designed to reflect general skills sought in a first year nursing program. The findings suggested that self-efficacy was not a predictor of future academic success. The author speculated that the non-significant findings may have been the result of instrumentation; the self-efficacy scale did not reflect the specific nursing skills taught in the associate degree program. It appears that an accurate assessment of a student's level of efficacy requires a context-specific self-efficacy tool. Therefore, instrument design and evaluation are essential components of self-efficacy studies.

Andrew (1998) conducted a pilot study of 81 students to develop a measure of self-efficacy for science and to determine if the measure was a valid predictor of academic performance in first year science courses within a nursing program. The researcher developed and validated the Self-efficacy for Science Scale (SESF). Cronbach's alpha of the SESF was reported at .90. Principal component factor analysis found that the SESF contained six factors and these six factors could explain 70% of the variance in the students' responses. Further, the author found that the SESF was significantly correlated with academic performance in two first year bioscience courses ($r = .49$ and $r = .43$). The researcher conducted a subsequent study, with a larger sample, to further validate the SESF as a predictor of academic success.

Andrew and Vialle (1998) conducted a study of 303 students to examine the relationships among self-efficacy, learning strategies, and academic performance in science. In this study, the first year students completed the NASES (Harvey & McMurray, 1994) and the SESF (Andrew, 1998). The findings suggested a strong correlation between measures of self-efficacy, the use of a variety of study methods, and the perceived relevance of the science course to nursing education.

Aber and Arathuzik (1996) conducted a descriptive, correlational study to determine the factors associated with student performance in an urban, public university nursing program. Three instruments were used to gather the data: a demographic sheet, the Clinical Skills Self-efficacy Scale (Froman & Owen, 1989),

and the Study Skills Self-efficacy Scale (Zimmerman, 1989). The findings suggested that students with high clinical self-efficacy and high study skills self-efficacy had a higher cumulative GPA and achieved more success in a baccalaureate program. There were significant correlations between cumulative GPA and the students' perceived competencies in performing 9 of 10 clinical skills (magnitude ranging from .23 to .43). Further, there were significant correlations between cumulative GPA and students' competencies in study skills on all 13 measures (magnitude ranging from .22 to .32). Low self-confidence was negatively correlated with cumulative GPA ($r = -.29$).

Owen et al. (2003) have since refined the Clinical Skills Self-efficacy Scale (CSSE) and provided strong evidence that the CSSE tool is a valid and reliable measure of baccalaureate nursing students' perceived ability in clinical practice. Cronbach's alpha values for the total scales were .97 (self-efficacy now) and .98 (future or later self-efficacy). Convergent validity and confirmatory factor analysis evidence were also supportive, as the CSSE *now* scores were correlated with *later* scores ($r = .41$) and with the clinical GPA scores ($r = .22$). The CSSE Scale includes a dual response format that measures *current* clinical self-efficacy and *later* self-efficacy. The *current* and *later* format was developed because Owen et al. found that individuals often exaggerate their abilities, particularly if they are not familiar with the target behaviours. To combat this problem, the authors included the *later* measure to remind students that there is room for growth and development as they proceed through their education.

In summary, researchers of undergraduate students provide some evidence that high levels of self-efficacy are related to academic success. Some studies indicate a direct effect, whereas others indicate an effect on an intervening variable such as study skills, which in turn affects academic achievement.

The instruments used to measure self-efficacy vary; however, it appears that researchers who relied on instruments that measured context-specific nursing skills were more successful in obtaining significant results.

Summary

The research suggests that pre-admission GPA is an inconsistent predictor of students' success and that generally autobiographical submissions and interview data are of limited value in predicting students' success. However, the reasons for the small correlations and inconsistent findings are not clear. Many of the researchers failed to fully describe the reliability or validity of their instruments and therefore, it is difficult to judge whether the instruments were measuring the intended constructs in a valid and reliable manner.

Because of the uniqueness of the admissions procedures, most of the research undertaken to determine nursing students' achievement is significant for the researchers' specific institution, however, there is little conclusive evidence to recommend admissions criteria for other institutions. Consequently, it becomes important for each institution to evaluate their admissions criteria.

CHAPTER THREE: METHODS

Additional research was required to explore the relationship between admissions criteria and student outcomes within the UBC Baccalaureate Nursing Program. Specifically, there was the need to determine whether the current admissions criteria identify applicants who will succeed in their academic studies and clinical practice and to determine whether the resource intensive procedure of reviewing and rating the supplemental application and applicant interviews have greater predictive power than that of pre-admission GPA alone.

Research Design

The study employed a longitudinal correlational design to examine the relationship between admissions criteria and students' outcomes. The nonexperimental study's aim was to determine the correlation between the relevant variables, not to infer a cause and effect relationship.

The predictor variables include the admissions data, which were collected through the admissions process in the spring of 2002. This data set includes the applicants' pre-admission GPA, supplemental application scores and interview scores.

The study utilized two outcome variables: (a) students' academic achievement, as measured by GPA_{first-term} and (b) perceived ability in clinical practice, as measured by the CSSE Scale (Owen et al., 2003). The GPA_{first-term} was collected from the students' educational records in July 2003. The CSSE Scale was administered to the students in July 2003. The subjects also completed a

demographic questionnaire that collected data on gender, ethnic group, age, work outside of school, marital status, number of children and clinical placement.

Population

The study sought the entire population of students who entered the third year of the Baccalaureate Nursing Program in January 2003 (N = 51). Because the entire population was asked to participate in the study, the only criterion for eligibility was that the students consent to participate.

Setting

The study was conducted at the UBC, School of Nursing. The UBC School of Nursing was established in 1919 and is considered a leading provincial, national and international centre for nursing education, research, and practice scholarship. The School is located in the urban centre of Vancouver, in the province of British Columbia. Approximately 50 to 60 students enter the Baccalaureate Nursing Program (with advanced standing) each year.

Recruitment

Because of concern about the feasibility of the study, the principal investigator approached the students in February 2003 regarding possible participation in the study. The students were informed that they were selected to participate because they entered the third year of the Baccalaureate Nursing Program in January 2003. The purpose of the study and expectations of the students were fully disclosed at this meeting. The students were informed that

the study was part of a graduate thesis and that participation in the study would require the following: (a) completion of a survey regarding their perceptions about clinical practice and (b) permission to access their educational records. An anonymous survey was distributed and the students were asked whether they would participate by indicating *yes* or *no*. Overwhelmingly, 94% of students agreed to participate.

Data Collection Plan

The researcher met with the potential participants in July 2003 at the School of Nursing. The meeting took place over the lunch hour so that the students' class time was not disrupted. At the meeting, all aspects of the study were reviewed and the researcher invited all students to participate. Those students that agree to participate signed a consent form (see Appendix A, p. 82). Once the consent form was signed, the students completed the demographic instrument and the CSSE Scale (see Appendices B, p. 84 and C, p. 85). The meeting took approximately 20 minutes. All completed surveys were collected and placed in an envelope. The envelope was sealed and transported to a locked filing cabinet.

The principal investigator transferred the data to a computer Excel file, which was downloaded and saved to a floppy diskette. The floppy diskette was transferred to the School's Admissions Clerk who accessed the students' educational records and entered the remaining data (GPA_{admit}, supplemental application scores, interview scores and GPA_{first-term}). Both data sets were linked

through the student identification number, which was collected as part of the demographic instrument. Once the documents were linked, the admissions clerk assigned a unique code number and the student numbers were removed from the file. Consequently, the linking of the two data files (the students' survey responses and the students' educational records) was done by the admissions clerk and neither the graduate student nor the thesis supervisor had access to the identifying information.

Assessing Data Quality

As mentioned, the study incorporated three predictor variables and two outcome variables. A detailed description of these variables follows.

Predictor Variable: GPA_{admit}

The students' GPA_{admit} was collected from their educational record. GPA_{admit} is the average of the last 60 credits of university or college course work. High school credits are not included in this calculation. If the credits are transferred from another institution, the Admissions Office in Enrolment Services at UBC must deem them transferable and designate them as block credits (credit to no specific course) or as designated credits (credit for a specific course). All credits are provided equal weighting in the calculation, regardless of the type of course or institution where the credit was achieved.

Applicants must have a minimum of 48 credits to be considered for admission. In such cases where there are fewer than 60 credits, the GPA_{admit} is calculated on the number of credits between 48 and 60 credits. In those cases

where there are more than 60 credits, the most recent 60 credits are the basis for the GPA calculation.

The GPA_{admit} is presented as a percentage. All students' grades are evaluated and converted to a percentage by the Admissions Office, Enrolment Services, at UBC. The School of Nursing receives the GPA_{admit} for all applicants directly from the Admissions Office.

Predictor Variable: Supplemental Application

An Admissions Committee of faculty members from the School of Nursing developed the supplemental application, which was designed to elicit non-academic information such as the applicants' leadership ability, service ethic, capacity to work with others, diverse life experience and past experience relevant to nursing. A review of relevant literature and consultation with other Health Science faculties provided support for the final components of the supplemental application. The Admissions Committee was satisfied that the items on the supplemental application reflected the desired attributes of a baccalaureate nursing student. This contributed to the instrument's content validity.

Components of the supplemental application included a structured resume, a personal or autobiographical statement and two confidential assessment letters. The supplemental application is completed by all individuals who apply for admission with advanced standing into the third year of the Baccalaureate Nursing Program.

The Admissions Committee also developed the criteria for scoring the applications. The applications were reviewed and scored by a team of two members; a clinical faculty member and a nursing student. The review team was provided with an orientation to the scoring process and a review of the scoring criteria. During the orientation, each member of the review team was given a sample application to score, discussion ensued and consensus was reached. The review team believed that this process further refined their ability to apply the criteria in a consistent manner. Then, the team members were each given five applications and asked to score the applicants. The scores were compared and found to be consistent (within a range of 0 to 2 points difference). A range within 0 to 3 points difference was considered to be adequate interrater reliability. To ensure interrater reliability during the actual scoring process, the facilitator had the members both review every 20th application to ensure consistency between the ratings. Thirteen files were reviewed by both reviewers and ratings for 11 of the files were in the range of 0-3 points difference, which was considered acceptable. The two files that were rated with a difference of 4 points were subsequently re-rated by another faculty member. The results were acceptable to the Admissions Committee.

Because this is a new process, there is little data on the stability of this instrument as determined by test-retest measures. This might be recommended for the future to further determine the reliability of the tool over time. There is also little information on the internal consistency of the measure. On the

Evaluation of Personal Qualities form, one might question whether the listed items under each sub-section measure the same construct. For example, do the six items listed under the heading of *Service Ethic* all measure this construct (See Figure 1)?

Figure 1. Evaluation of Personal Qualities Form

Service Ethic - reflects commitment to community service, commitment to social justice, characteristics of caring and compassion - can include work experience, coaching, as well as volunteer activity (**max 12 points**)

- Activity in fundraising, tutoring, counseling, etc. (1-2)
- Experience in a service environment with contact with patients/customers (1-2)
- Experience in a service environment, in a professional capacity, e.g., teaching, ministry, social work (1-2)
- Demonstrated committed or intensive service in one area (1-2)
- Demonstrated continuous or prolonged service in more than one area (age-appropriate) (1-2)
- Additional activities for which points awarded: (max. 2)

From "Evaluation of Personal (non-academic) Qualities", University of British Columbia, School of Nursing, June 2002.

Because there is little published evidence to identify relevant non-academic predictors of nursing students' success, it is difficult to judge the criterion-related validity of the non-academic qualities assessed by the

Admissions Committee and little information is available regarding their construct validity. As the literature review revealed, determining the reliability and validity of non-academic admissions processes is difficult and sometimes overlooked by Admissions Committees.

Predictor Variable: Interview Performance

Faculty members from the School of Nursing developed the format of the interview, which was adapted in consultation with the Director of the UBC School of Midwifery. The interview questions were designed to elicit data on motivation, nursing awareness, problem solving, ability to relate to others, self-perception and communication skills. To improve the instrument, the Admissions Committee reviewed the tool and agreed that the interview questions would elicit important information to assist in the selection of desired baccalaureate nursing students.

Faculty members that agreed to serve as interviewers attended a four-hour workshop to prepare for the role. At the workshop, the interview format and criteria were explained. Each member was given an Interviewer's Manual, which assisted the faculty members to conduct the interviews in a fair, non-biased manner. A mock interview was held and all interviewers scored the same candidate. The resulting scores were reported to be fairly consistent across all eight faculty members. This added to the tool's interrater reliability. There was little information on the stability of the interview scoring over time, however, it is acknowledged that this aspect of reliability may be difficult to gauge because

many situational variables play a role in the context of an interview. In other words, it would be difficult to replicate an interview to measure the test-retest reliability.

The internal consistency of the measure is unknown: Do the two items under the heading *Motivation* both measure the construct of motivation? The items are: (a) Why do you want to become a nurse? and (b) Describe the types of experiences you have had which you believe will make you a successful nursing student.

Because there is little published evidence to suggest an ideal format for interviews of applicants entering a baccalaureate nursing program, it is difficult to judge the validity of the interview rating scheme. As the literature review revealed, determining the reliability and validity of an interview process is a difficult task but important to ensure fair access to educational programs.

Outcome Variables: GPA_{first-term}

GPA_{first-term} is the average of three mandatory courses (Nursing 310, Nursing 320, and Nursing 330) taken in the first term of the third year of the Baccalaureate Nursing Program. Nursing 310 introduces key concepts and frameworks that are considered fundamental to the practice of nursing. Nursing 320 is an introduction to nursing competencies and skills and the health promoting and disease preventing roles of the nurse. Nursing 330 is a theory and clinical course that examines acutely ill individuals within the larger context of

community. Each student receives a percentage grade for each course. The average of these three percentages make up the $GPA_{first-term}$.

Outcome Variable: CSSE Scale

Perceived ability in clinical practice is defined as the students' score on the Owen et al. (2003) CSSE Scale (see Appendix C, p. 85). This tool measures students' confidence in their ability to succeed in clinical practice. A high self-efficacy score means that an individual is more likely to choose, persevere, and succeed at a particular behaviour. The Scale includes a dual response format that measures *current* clinical self-efficacy and *later* self-efficacy. The *current* and *later* format was developed because Owen et al. found that individuals often exaggerate their abilities, particularly if they are not familiar with the target behaviours. To combat this problem, the authors included the *later* measure to remind students that there is room for growth and development as they proceed through their education.

As the literature review revealed, an accurate assessment of a student's level of efficacy requires a context-specific self-efficacy tool. The CSSE scale was specifically designed for baccalaureate nursing students as a means of measuring their perceived ability in clinical practice. The majority of clinical skills listed on the CSSE appear to be similar to components taught in the first term of the UBC Nursing Program. As a result, the researcher is fairly confident that the CSSE provides an accurate measure of the participants' perceived efficacy in clinical practice.

Evidence of the reliability and validity of the CSSE has been documented by the authors. Cronbach's alpha values for the total scales were .97 (now) and .98 (later). Convergent validity and confirmatory factor analysis evidence were also supportive; the CSSE *now* scores were correlated with *later* scores ($r = .41$) and with clinical GPA scores ($r = .22$).

Demographic Data

The subjects completed a demographic questionnaire that collected the following information: gender, ethnic group, age, work outside of school, marital status, number of children, clinical placement and student number.

Ethical Considerations

The UBC, Behavioural Research Ethics Board approved the study protocol and consent form. Every effort was made to protect the privacy of the participants and their data. Participants were fully informed of the purpose of the study, that participation in this study was entirely voluntary and that any refusal to participate or withdraw from the study at any time would not jeopardize their class standing. Study participants were provided with a signed, witnessed copy of their consent to participate. Anonymity of the study participants was maintained at all times, all data were organized with subject codes, and all data continues to be stored in a locked filing cabinet and on a computer secured with a password.

This concludes a description of the methods that were employed in the study. The selected methods assisted in answering the research questions to determine whether the current admissions process identifies applicants who succeed in their academic studies and clinical practice.

CHAPTER 4: ANALYSIS AND RESULTS

The literature review revealed that further research was required to explore the relationship between admissions criteria and student outcomes within the UBC Baccalaureate Nursing Program. Specifically, there was a need to: (a) determine whether the current admissions criteria identify applicants who succeed in their academic studies and clinical practice, and (b) determine whether the resource intensive procedure of reviewing and rating the supplemental application and applicant interviews has greater predictive power than that of relying on admission GPA alone.

To answer the research questions, the author utilized statistical procedures to analyze the data, which were completed with the SPSS for Windows software program. The data were transferred from the Excel file to the SPSS program by the principal researcher. The study adopted a .05 level of significance for all statistical tests.

For the study, the researcher sought the entire population of students who entered the third year of the Baccalaureate Nursing Program in January 2003 ($N = 51$). Data collection was successfully completed as planned (see Methods Section, p. 36) and 32 students agreed to participate. Three respondents were deemed ineligible and omitted from the analysis (code number 9, 10 & 21) because the students had not been admitted through the advanced standing stream. Consequently, the total number of eligible students who agreed to participant was $N = 29$.

Screening Data

Prior to conducting the analysis, all variables were examined in SPSS for accuracy of data entry and missing data. The univariate descriptive statistics found all values to be within expected range and the means and standard deviations were plausible. No missing data were found.

Outliers

SPSS boxplots were viewed to identify outliers. Case number 28 (code 31) was identified as an outlier on the CSSE Scale 'now' and CSSE Scale 'later' variables. The researcher reviewed the raw data and confirmed that the participant had reversed the scoring scale on all of the CSSE Scale items. The decision was made to recode the participant's responses by reverse coding her/his responses.

Code 3 was identified as an outlier on the supplemental information variable, Code 26 was identified as an outlier on the interview rating variable, and Code 30 was identified as an outlier on the SENOW variable. The data were checked for accuracy and the values were found to be correct. Because the scores were plausible and not extreme, the decision was made to leave the data untouched.

Characteristics of the Participants

The average age of the participants was 27 years (SD = 6.14, range 20 – 42 years old). The respondents were largely single (82.8%), white (93.1%) and female (93.1%). A majority of respondents reported having no children (89.7%). Of the small percentage who had children, two respondents reported having a

single child and one respondent reported having three children. Of the five children, three were reported as 'school age' and two were reported as 'over 18 years'. All respondents reported that their children were living at home. Other demographic data pertaining to the study's population are included in Table 1.

Table 1
Characteristics of Student Participants

Characteristics	Frequency (%) N = 29
Clinical Placement	
BC Women's Hospital	4 (13.8)
Burnaby Hospital	4 (13.8)
BC Children's Hospital	5 (17.2)
Surrey Memorial Hospital	1 (3.4)
St. Paul's Hospital	4 (13.8)
UBC Hospital	1 (3.4)
Richmond General Hospital	1 (3.4)
Unknown	9 (31.0)
Gainful Employment while Attending School	
Yes	16 (55.2)
No	13 (44.8)
Hours Worked per Week	
0 - 10	11 (37.9)
11 - 20	5 (17.2)
Not applicable (did not work)	13 (44.8)
Type of Employment	
Health-related field	6 (20.7)
Non health-related field	10 (34.5)
Not applicable (did not work)	13 (44.8)
Number Children	
0 children	26 (89.7)
1 child	2 (6.9)
3 children	1 (3.4)

Bivariate Correlations

The following research questions were addressed by examining bivariate correlations (Pearson's product moment correlation) in SPSS:

1. What is the relationship between students' GPA_{admit} and their academic achievement?
2. What is the relationship between students' GPA_{admit} and their perceived ability in clinical practice?
3. What is the relationship between students' supplemental application scores and their academic achievement?
4. What is the relationship between students' supplemental application scores and their perceived ability in clinical practice?
5. What is the relationship between students' interview scores and their academic achievement?
6. What is the relationship between students' interview scores and their perceived ability in clinical practice?

Testing Assumptions

Prior to running the analysis, scatter diagrams were viewed to test the assumptions of linearity and homoscedasticity. All relationships between the predictor variables (GPA_{admit}, supplemental scores and interview) and the dependent variables (GPA_{first-term} and CSSE Scale) were found to be normally distributed, linear, and with equal variability.

Significant Findings

For Research Question 1, the analysis revealed a significant positive relationship between the students' GPA_{admit} and their GPA_{first-term} ($r = .55$, $p = .00$ (2-tailed), $r^2 = .30$). The predictor variable of GPA_{admit} accounted for 30% of the variance in the students' GPA_{first-term}.

For Research Question 3, the analysis revealed a significantly negative relationship between the students' supplemental application scores and their GPA_{first-term} ($r = -.44$, $p = .02$ (2-tailed), $r^2 = .19$). The predictor variable of the supplemental application score accounted for 19% of the variance in the students' GPA_{first-term}.

For Research Question 6, the analysis revealed a significantly negative relationship between the students' interview scores and their score on the CSSE Scale 'later' score ($r = -.40$, $p = .03$ (2-tailed), $r^2 = .16$). The predictor variable of interview rating accounted for 16% of the variance in the students' CSSE Scale 'later' scores.

Insignificant Findings

For Research Questions 2, 4 and 5, there was no relationship found between the students' GPA_{admit} or supplemental scores and their CSSE Scale scores. Nor was there a relationship found between the students' interview scores and their GPA_{first-term}. Table 2 presents a correlation matrix of all results.

Table 2

Correlations between Predictor and Dependent Variables

	GPA _{admit}	Supple- mental score	Interview score	GPA first-term	CSSE Scale (now)	CSSE Scale (later)
Students (N=29)						
GPA _{admit}	--	-.54**	-.31	.55**	.01	.07
Supplemental scores		--	-.25	-.44*	.08	.20
Interview			--	.04	-.30	-.40*
GPA _{first-term}				--	-.22	-.12
CSSE Scale (now)					--	.71**
CSSE Scale (later)						--

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Multiple Linear Regression

The final two research questions were answered by estimating three separate multiple regression equations in SPSS:

7. Which component of the admissions criteria best predicts academic achievement and perceived ability in clinical practice?
8. Do the supplemental information and interview data add to the prediction of academic achievement and perceived ability in clinical practice after GPA_{admit} is considered?

Testing Assumptions

Prior to running the analysis, scatter plots were viewed to test the assumption of linearity. All relationships were found to be normally distributed, linear, and with equal variability. To test the assumption of multicollinearity, the intercorrelations between the independent variables were tested. Results indicated that the assumption of multicollinearity had not been violated, as the magnitude of the intercorrelations ranged from -.54 to .55.

Results

To address the research questions, three multiple regression equations were estimated using the following dependent variables: (a) GPA_{first-term}, (b) CSSE Scale 'now' score and (c) CSSE Scale 'later' score. All independent variables (GPA_{admit}, supplemental scores and interviews scores) were entered into the regression equations simultaneously.

For equation 1, GPA_{first-term} served as the dependent variable. Results indicate that the independent variables did contribute significantly to the explanation of the variance in the dependent measure ($F(3, 25) = 4.74, p = .00$). The correlation between the predicted score and obtained score was $R = .60, R^2 = .36$. However, only one of the independent variables, GPA_{admit}, contributed significantly to the prediction of the students' GPA_{first-term} ($Beta = .57, p = .02$). Altogether, 36% (29% adjusted) of the variability in students' GPA_{first-term} was predicted by knowing the students' GPA_{admit}, supplemental scores and interview scores. Table 3 presents a summary of the regression findings.

Table 3
Multiple Regression: First-term GPA on Admissions Criteria

	Unstandardized Coefficients	Standardized Coefficients	
	B	Beta	<i>p</i>
Variables			
Admission GPA	.51	.57	.01**
Supplemental scores	-.08	-.08	.72
Interview	.13	.20	.32

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

For equation 2, the CSSE Scale 'now' score served as the dependent variable. Results indicate that the independent variables did not significantly contribute to the variance in the dependent measure ($F(3, 25) = .92, p = .45$). The correlation between the predicted score and the obtained score was minimal ($R = .31^a, R^2 = .10$). Altogether, only 9% (< 1% adjusted) of the variability in the students' CSSE Scale 'now' scores was predicted by knowing the students' GPA_{admit}, supplemental scores and interview scores. Table 4 presents a summary of the regression findings.

Table 4
Multiple Regression: Clinical Skills Self-Efficacy Scale Now Scores on Admissions Criteria

	Unstandardized Coefficients	Standardized Coefficients	
	B	Beta	<i>p</i>
IV			
Admission GPA	-.78	-.15	.57
Supplemental scores	-.49	-.09	.74
Interview	-1.34	-.37	.13

For equation 3, the CSSE Scale 'later' scores served as the dependent variable. Results indicate that the independent variables did not significantly contribute to the variance in the dependent measure ($F(3, 25) = 1.69, p = .19$). The correlation between the predicted score and the obtained score was minimal ($R = .41^a, R^2 = .17$). Altogether, only 17% (7% adjusted) of the variability in the

students' CSSE Scale 'later' scores was predicted by knowing the students' GPA_{admit}, supplemental scores and interview scores. Table 5 presents a summary of the regression findings.

Table 5
Multiple Regression: Clinical Skills Self-Efficacy Scale Later Scores on Admissions Criteria

	Unstandardized Coefficients	Standardized Coefficients	
	B	Beta	<i>p</i>
Variables			
Admission GPA	.07	.02	.94
Supplemental scores	.45	.12	.65
Interview	-.92	-.36	.12

Summary

The findings indicate several correlations between the admissions criteria and the dependent variable of GPA_{first-term}. A significant positive relationship was found between the students' GPA_{admit} and their GPA_{first-term}. Interestingly, a significant negative relationship was found between the students' supplemental scores and their GPA_{first-term}. None of the other relationships between the admissions criteria variables and academic achievement (GPA_{first-term}) was statistically significant.

The findings indicate one correlation between the admissions criteria and the dependent variable of CSSE Scale scores. A significantly negative relationship

was found between the students' interview scores and their scores on the CSSE Scale 'later' measure. None of the other relationships between the admissions criteria variables and perceived ability in clinical practice (CSSE Scale) was significant. The findings suggest that GPA_{admit} is the strongest predictor of a student's first-term GPA and that the interview and supplemental data added little to the prediction equation. The final chapter presents a discussion of these findings.

CHAPTER 5: DISCUSSION

Included in this final chapter is a discussion of the study's findings, convergence or divergence with previous research, limitations, implications, and possible future directions for researchers and administrators in schools of nursing.

Research Question #1

For Research Question 1, the analysis revealed a significant positive association between the students' GPA_{admit} and their GPA_{first-term}. The positive association between these variables was expected and is consistent with findings described in the published literature. The strength of the correlation, however, was stronger than anticipated. Previous researchers have found a weak correlation between these variables (Jenks et al., 1989; Lewis & Lewis, 2000; Mills et al., 1992). The strength of the correlation might be explained in several ways: (a) the students' GPA_{admit} is based on 48 – 60 credits of *university* or college course work (rather than high school GPA) and one would expect the students who excelled in pre-nursing *university* course work to excel in nursing *university* course work and (b) it was suggested by Kulatunga-Moruzi and Norman (2002b) that previous researchers have found weak correlations because their samples were highly homogeneous groups, at the top end of the ability range, and the relatively low correlations reflected the lack of variability within the samples. The descriptive statistics within the present study support this theory. There was considerable variation in the students' GPA_{admit} (range = 67.6% – 87.0%) and

students' GPA_{first-term} (range = 74.5% - 88.5%). This variation may help to explain why a stronger relationship was detected.¹

The preceding discussion raises two interesting questions. First, if pre-admission GPA is a significant predictor of future academic success, are there specific courses or combination of courses that provide an even stronger correlation with the students' future academic success? The literature provides some evidence that biology or science GPA may serve as a stronger predictor of nursing students' future academic success (McClelland et al., 1992; Yang et al., 1987). The merit of using science or biology GPA as an admissions criterion instead of cumulative GPA warrants further consideration.

Second, it appears that the students who struggle in their pre-nursing university course work continue to struggle with their nursing university course work. The questions that arise are: (a) should there be a minimum admission GPA for advanced standing students and (b) should the School of Nursing provide assistance, such as study skills workshops, for students who enter the program with a lower admission GPA?

Research Question #2

For Research Question 2, no relationship was found between the students' GPA_{admit} and their perceived ability in clinical practice (the 'now' or 'later'

¹ There was greater variability in this sample's admission GPAs because the students were selected based on their autobiographical details and interview performance in addition to their GPA. This process permitted students with lower GPAs to be admitted to the program.

measure of the Clinical Skills Self-Efficacy Scale). There was no previous research found that examined this relationship.

The result may not be entirely surprising because self-efficacy is believed to be context specific (Bandura, 1997). As such, individuals' self-efficacy in one area will not usually influence their measure of self-efficacy in another. The students' pre-admission GPA reflects a skill set that is possibly very different than the skill set required in clinical nursing practice. If this is indeed the case, it would be expected that there would be no relationship between these constructs, and the result is consistent with the underlying theory of self-efficacy.

Research Question #3

For Research Question 3, the analysis revealed a significant negative relationship between the students' supplemental scores and their GPA_{first-term}.

Because the supplemental application format is unique to the UBC School of Nursing, there was no previous research that examined this relationship.

The significant negative correlation between the students' supplemental application scores and their GPA_{first-term} raises two interesting questions: (a) do the students who apply for admission with lower GPAs try harder on the supplemental application package to compensate for their low GPA? and (b) do the students who focus on academics (obtain higher GPAs) have less time for extracurricular activities, which are heavily weighted on the supplemental application? It is also interesting to note that this finding suggests that the supplemental application (non-academic information) and GPA_{first-term} (academic

information) are tapping into different characteristics of the students. As such, the supplemental scores may reflect characteristics of the students (such as learning styles) that are not revealed in the GPA pre-admission scores.

Interpretation of this result is difficult because the instrument is composed of three components: (a) a structured resume, (b) a personal statement, and (c) two confidential assessment letters. The students are given a single score for all three components. Previous researchers have found a positive relationship between a student's personal statement (autobiographical letter) and their future academic success (Schmalz et al., 1990). Because the UBC applicants received a single score for all components, it is difficult to determine if the study's results support the previous findings. If further research is conducted, it might be suggested to assign the supplemental application three separate scores (resume, personal statement and assessment letters) and to examine their correlations with the outcome variables to determine which component of the supplemental application best predicts academic achievement.

Research Question #4

For Research Question 4, no relationship was found between the students' supplemental application scores and their perceived ability in clinical practice (now or later measure). There was no previous research found that examined this relationship.

The supplemental application score was designed to elicit non-academic information such as the applicants' leadership ability, service ethic, capacity to

work with others, diverse life experience, and past experience related to nursing. Therefore, one might theorize that individuals who scored high on the supplemental application (reflective of leadership, service ethic, capacity to work with others, and nursing experience) would also score high on their perceived ability in clinical practice (as there are many similar attributes). Why, then, was there no evidence of a relationship between these variables? It could be that the selected instruments (supplemental application scores and CSSE Scale) were not measuring the intended constructs in a valid or reliable way (this is further discussed under the Limitations section, p. 64). Until the time that the validity of the instruments can be determined, the findings of this study must be interpreted cautiously.

Research Question #5

For research question 5, no relationship was found between the students' interview scores and their GPA_{first-term}. The students' interview scores are thought to measure non-academic characteristics and GPA_{first-term} is believed to measure academic achievement. Consequently, this finding is not surprising. Some researchers, however, have suggested a possible relationship between these variables for a select group of non-traditional students.

Previous researchers have described a possible correlation between non-traditional students' interview scores and their future academic success (Hayes et al., 1997). Non-traditional students were defined as adults, over the age of 25 years, attending school on a part-time basis, and possibly working while

attending school (Muse et al., 1993). Prior to conducting this study, it was anticipated that the participants would fit the non-traditional student profile; however, this was not the case. About one half of the sample in this study was less than 25 years of age and all attended school on a full-time basis, which may in part explain why an anticipated relationship was not found.

Research Question #6

For Research Question 6, the analysis found no relationship between the students' interview scores and their CSSE Scale 'now' measure. The analysis revealed a significant negative relationship between the students' interview scores and their CSSE Scale 'later' measure. There was no previous research that examined this relationship because the interview format is unique to the UBC School of Nursing.

The finding of no relationship between the interview scores and CSSE Scale 'now' measure is not entirely unexpected. The interview is purported to collect data on an applicant's motivation, nursing awareness, problem solving, ability to relate, self-perception, and communication skills. Previous research has indicated that the ability to analyze and problem solve is highly context specific (Bandura, 1986). Therefore, it is possible that performance in an admissions interview will not generalize to performance in the context of perceived ability in professional practice. This finding is consistent with the underlying theory of self-efficacy.

The finding of a significant negative correlation between the students' interview scores and their CSSE Scale 'later' measure is perplexing and perhaps troubling. The finding suggests that the students who demonstrated the highest levels of motivation and confidence during the interview process were the students who rated their perceived ability in clinical practice the lowest. Why were the interview scores negatively correlated with the students' perceived ability in clinical practice (later measure)? There are many possible explanations for this finding; however, the author acknowledges that the questionable validity of the interview instrument necessitates further effort to validate the tool prior to drawing any firm conclusions surrounding the result.

Research Questions #7 and #8

For Research Questions 7 and 8, the findings suggest that GPA_{admit} is the strongest predictor of students' GPA_{first-term} and that the interview and supplemental data added little to the prediction of students' success. None of the predictor variables significantly predicted the students' perceived ability in clinical practice.

The results are consistent with the literature that suggests that autobiographical submissions and interview data are of limited value in predicting students' success. Some researchers suggest that admissions committees overestimate the importance of non-academic variables (such as interview performance) while underestimating the influence of situational variables (Campbell & Dickson, 1996; Ross & Nisbett, 1991). Situational variables

might include the applicant's performance anxiety or subjective variables such as how the interviewer perceives the applicant. It is feasible that situational variables, such as these, may be equally important in determining the applicants' success as the specific answers the applicant gives on any given question.

Limitations

It is acknowledged that there are limitations inherent in the study's research design, validity, and statistical power. The following commentary explores each limitation. The section begins with a discussion of the practical significance of the findings.

Practical Significance

Although the results revealed a significant correlation between GPA_{admit} and $GPA_{first-term}$, this predictor accounted for only 30% of the variance in the students' $GPA_{first-term}$. Consequently, GPA_{admit} (as a sole predictor) might not have sufficient practical utility to assist admissions committees in selecting the strongest candidates. This is also the case for the significant negative correlation between the students' supplemental application scores and $GPA_{first-term}$. As a predictor, the supplemental application scores accounted for only 19% of the variance in the students' $GPA_{first-term}$. In light of the negative correlation (the applicants thought to have the strongest supplemental dossiers had the poorest nursing academic performance), it is not certain if the desired students are being selected. Consequently, the scores (and the effort required to produce them)

might not have much practical worth in assisting the UBC School of Nursing Admissions Committee to select the strongest applicants.

Research Design

The study employed a longitudinal correlational design to examine the relationship between admissions criteria and students' outcomes. The sample was composed of only students who were successful in gaining admission to the UBC School of Nursing. It must be acknowledged that a limitation of this research, and many similar studies, is the inability to study the group of applicants who were refused or declined admission. Further, those students who were required to leave the program or who voluntarily withdrew were not included in the study sample; consequently we do not know how they were ranked according to the admissions criteria.

Validity

The outcomes of this study are only useful if the researcher is confident that the selected instruments are measuring the intended constructs in a reliable and valid manner. It is acknowledged that there is scant evidence of the reliable and validity of several of the instruments and this is a potential limitation of the research.

CSSE Scale

Evidence of the reliability and validity of the CSSE has been documented by the authors (Owen et al., 2003). Cronbach's alpha for the total scales were .97 (now) and .98 (later). Convergent validity and confirmatory factor analysis

evidence were also supportive; the CSSE *now* scores were correlated with *later* scores ($r = .41$) and with clinical GPA scores ($r = .22$). The CSSE scale was specifically designed for baccalaureate nursing students as a means of measuring their perceived ability in clinical practice. The majority of clinical skills listed on the CSSE appear to be similar to components taught in the first term of the UBC Nursing Program. Several of the items, however, do not coincide with the content delivered to students in the first term. For example, *recognizing life-threatening dysrhythmias in an ECG* is not covered at this point in the program. Several other items may not relate to the framework utilized within the School of Nursing. For example, *nursing diagnoses* are not part of the conceptual underpinnings of the curriculum. Further, the validity of the CSSE Scale was tested in an American university and therefore, one could raise questions of the tool's validity within a Canadian university. Future studies may need to further validate the selected instrument in the context of a Canadian university.

Because the CSSE Scale is a self-report measure, it relies on individuals' perceptions of their ability as an indicator of their behaviour in the clinical setting. There is little other data to substantiate that the measure of efficacy actually corresponds with the direct observation of the students' ability in clinical practice. Students achieve a pass or fail grade for the clinical component of Nursing 330. Consequently, the mark achieved (pass or fail) may be of limited value in validating the students' perceptions because the vast majority of students pass the practicum.

With the CSSE Scale being a self-report instrument, it is also at risk for response bias, particularly social desirability response bias. Students may want to depict a favourable impression, especially with respect to rating clinical skills that may be required by their future profession. To help to ensure accurate responses, the students were assured of their anonymity; however, the use of a self-report measure is recognized as a limitation of this study.

Supplemental Application Score

The UBC School of Nursing has exerted considerable effort to ensure the reliability and validity of the supplemental application tool. The Admissions Committee was satisfied that the items on the supplemental application reflected the desired attributes of a baccalaureate nursing student. This contributed to the instrument's content validity. The Admissions Committee set an extensive review process that ensured adequate interrater reliability. Despite these measures, there are still questions raised regarding the validity and reliability of this tool.

Because there is little published evidence to identify relevant non-academic predictors of nursing students' success, it is difficult to judge the criterion-related validity of the non-academic qualities assessed by the Admissions Committee and little information is available regarding their construct validity. It is difficult to determine if appropriate student qualities are being assessed and if the qualities are being accurately measured. Because the validity of the supplemental application instrument is uncertain, it is difficult to

draw any firm conclusions from this analysis without further research to validate the measure. Until the time that the supplemental application can be established as a reliable and valid instrument, the UBC School of Nursing may need to reconsider the weighting of this measure in their admissions process.

Interview

The UBC School of Nursing has made a considerable effort to ensure the reliability and validity of the interview assessment. To improve the instrument, the Admissions Committee reviewed the tool and agreed that the interview questions would elicit important information to assist in the selection of desirable baccalaureate nursing students. Interviewers attended an extensive orientation and participated in a series of mock interviews to ensure satisfactory inter-rater reliability. Despite these measures, the validity of the interview remains questionable.

The internal consistency of the measure is unknown: Do the two items under the heading *Motivation* both measure the construct of motivation? The items are: (a) "Why do you want to become a nurse?" and (b) "Describe the types of experiences you have had which you believe will make you a successful nursing student." Because there is little published evidence to suggest an ideal format for interviews of applicants entering a baccalaureate nursing program, it is difficult to judge the validity of the interview rating scheme. As the literature review revealed, determining the reliability and validity of an interview process is a difficult task but important to ensure fair access to educational programs.

Until the time that the interview can be established as a reliable and valid instrument, the UBC School of Nursing may need to reconsider the weighting of this measure in their admissions process.

Generalizability

The UBC School of Nursing does not formally keep a database of students' demographic characteristics. This is somewhat problematic, if one wishes to generalize the results of a research study (involving the student population) to other populations. To assist in future research initiatives, the UBC School of Nursing may want to consider the ongoing collection of basic demographic data (such as collected on the demographic instrument). In this way, a database will be established to: (a) quickly identify trends in student demographics, (b) determine any differences in the demographics of the generic and the advanced standing students, (c) determine the generalizability of future research efforts, and (d) determine the applicability of other research reports' findings to the UBC School of Nursing.

As presented in the Analysis and Results section (p. 53), 93% of the participants reported 'white' as their ethnic origin. Although the school does not keep records of students' ethnicity, there appears to be the possibility that the sample was biased toward white participants; from casual observation it appears that the student population is more ethnically diverse. The possibility of bias limits the ability to generalize the findings to the entire group of nursing students (advanced standing) and must be kept in mind if generalizing to other

populations. This is particularly the case if it is discovered that students of various ethnic backgrounds, perhaps because of family values, have different opportunities to engage in extracurricular activities that are deemed important in the evaluation of the supplemental dossiers, and have different communication styles that result in biased interview evaluations.

Analysis and Statistical Power

The researcher acknowledges that small sample size is of concern. The researcher calculated a retrospective power analysis to determine if the study had sufficient power to detect all of the significant correlations. Due to the unique nature of the UBC School of Nursing admissions process, there is no published data available that could reasonably be construed as similar research so the investigator relied on convention to determine the effect size. Using a conservative approach, the researcher estimated the effect size as small (.20). With an alpha of .05 and power of .80, the sample size needed would be 197 (Polit & Hungler, 1999). Because the sample in the study was $N = 29$, replication of these results with a larger sample is recommended; the small sample may have limited the power of the statistics to detect anything but the strongest relationships.

Future Directions for Researchers

From the preceding discussion, several directions emerge for future researchers to continue to build a credible body of knowledge in this field. These directions include: (a) validate instruments, (b) ongoing data collection, and (c)

stronger predictors of academic success. The following section outlines each recommendation.

Validate Instruments

The UBC School of Nursing may want to consider additional research efforts to further validate the interview and supplemental application scores. The research might include qualitative studies to explore the specific attributes of an excellent applicant (reflective of an excellent nurse) and subsequent studies on how these attributes can be accurately measured during the admissions process. With the validity of the supplemental application score and the interview uncertain, the findings of this study must be interpreted cautiously. Until the time that the interview and supplemental application can be established as reliable and valid instruments, the School of Nursing may need to reconsider the resources required to conduct the admissions processes and the weighting of these measures in their admissions process.

Ongoing Data Collection

Building a body of credible research to support admissions criteria as a valid predictor of students' success is difficult because most studies use samples of convenience and are conducted at single times and at single sites where the curriculum and manner in which admissions criteria, such as GPA, are defined and calculated are unique to the institution. This limits the generalizability of the findings. As Campbell and Dickson (1996) suggest, more collaborative research between comparable settings is needed to begin to build a trustworthy body of

knowledge. It might be interesting to explore the possibility of collaborative research with other baccalaureate nursing programs to standardize the admissions criteria tools and to determine their power to predict students' success.

Future research efforts should also include longitudinal studies to explore the correlation between admissions criteria and academic achievement over a longer period of time. Measurement of students' academic achievement at the end of third and fourth year would assist in determining if admissions criteria are predictive of long-term academic achievement and perceived ability in clinical practice. Subsequently, it would be beneficial to follow the students through to graduation and determine if admissions criteria predict the students' achievement on the professional licensure examination.

Stronger Predictors of Academic Success

GPA_{admit} was found to be a significant predictor of a student's future academic success. Other variables, however, may prove to be even stronger correlates of a student's future academic success. Future research efforts may want to explore this possibility. Two measures that are worth considering are standardized test results and biology or science GPA. There is some evidence, as presented in the literature review, that pre-admission test scores on the Scholastic Achievement Test (SAT), National League for Nursing (NLN) pre-admission examination, the American College Test Assessment (ACT), and the Watson-Glaser Critical Thinking Appraisal and biology or science GPA are

strong predictors of a student's future academic success. Generally, the results confirm a relationship between these pre-admission test results and students' performance, operationalized as success within a university program (Jenks et al., 1989; McClelland et al., 1992; Yang et al., 1987; Younger & Grap, 1992). It appears worthwhile to examine the possibility of using these types of measures in the admissions process.

Future Directions for UBC School of Nursing Administrators

From the preceding discussion, several recommendations emerge for administrators at the UBC School of Nursing. These recommendations include: (a) investigate the merit of using science GPA or standardized test results as admissions criteria, (b) explore the possibility of setting a minimum GPA for advanced standing students or consider providing assistance, such as study skills workshops, for students who enter the program with lower pre-admission GPAs, (c) facilitate future research efforts by assigning the supplemental application three separate scores (resume, personal statement and assessment letters), (d) create a database and collect basic demographic data on all students, (e) support further research efforts to validate instruments (supplemental application and interview) and confirm the study's results with a larger sample size, and (f) support further research efforts to explore the specific attributes of an excellent applicant (reflective of an excellent nurse) and subsequent studies on how these attributes can be accurately measured during the admissions process.

With the study's identified limitations (instrument validity and sample size), it is difficult to make specific recommendations regarding the continued use of the current admissions criteria (with the exception of pre-admission GPA). As stated, further research is required to build a case, both for and against, the use of the supplemental application and interview ratings in the admissions process.

It is clear, however, that GPA_{admit} is a strong predictor of a student's future academic success. As such, the students' pre-admission GPA should continue to be part of the admissions criteria and the School of Nursing may want to consider giving pre-admission GPA a higher weighting in the admissions process. This would ensure the selection of candidates who have the optimum chance of success within the Nursing Program.

Conclusion

Predicting students' success is a complex problem. Academic and non-academic factors probably play a role, however situational variables further complicate our ability to predict students' success. It appears GPA_{admit} is a valid predictor of a student's future academic success, which is supported in the published literature. To date, there is little conclusive evidence to recommend the best non-academic predictor variables, and the validity of the current admissions processes (supplemental application score and interview) is uncertain.

The current study has raised several important questions for the School of Nursing to consider: (a) with the validity of the supplemental application and interview data uncertain, does the weighting of these admissions criteria need to

be reconsidered? and (b) with the validity of the supplemental application and interview data uncertain, should the supplemental application and interview continue to be part of the admissions process? The UBC School of Nursing has taken important first steps (including allowing this study) in a process to begin to validate the admissions criteria and to determine the most appropriate admissions procedures.

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Appendix A

Consent Form

The Relationship between Baccalaureate Nursing Program Admission Criteria and Student Outcomes

Principal Investigator: Pamela A. Ratner, PhD, RN
Associate Professor,
School of Nursing, University of British Columbia,
Phone: 604-822-7427
Email: pam.ratner@ubc.ca

Co-Investigator(s): Shelley E. Fraser, BSN, MSN Candidate
School of Nursing, University of British Columbia

Note: This study is being conducted as part of a graduate thesis for Shelley Fraser.

Purpose:

The purpose of this study is to examine the relationship between the admissions criteria for direct entry with advanced standing into the third year of the University of British Columbia Baccalaureate Nursing Program and students' outcomes. The student outcomes that will be examined in this study are academic achievement (your first term grade point average) and perceived ability in clinical practice (Clinical Skills Self-efficacy Survey). You were recruited for this study because you entered the third year of the Baccalaureate Nursing Program in January 2003.

Study Procedures:

Your participation in the study will include the following four items:

1. You will be asked to complete a 48-item survey that will measure your perceived ability in clinical practice. This survey will take approximately 10-15 minutes to complete.
2. You will be asked to complete a demographic survey that will collect data such as gender, ethnic group, age, work outside of school, marital status, number of children and clinical placement. This survey will take approximately 5 minutes to complete.
3. Your first term GPA will be collected from your educational record.
4. Your admission criteria index (admission GPA, supplemental application score and interview score) will be collected from your educational record.

[Consent form: Version two, May 27, 2003]

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Confidentiality:

Your answers on the surveys and all data collected from your educational record will be kept confidential. On the survey, you will be asked to indicate your student identification number. Your student identification number is required in order to link the survey to your educational record. Shelley Fraser will enter your answers to the questionnaire and your student number into a spreadsheet. The undergraduate records clerk will add your admission criteria index to the file and will delete your student number. Consequently, Ms. Fraser and Dr. Ratner will not be able to identify you when they analyze the data. Once the documents have been linked, a code number will be assigned and your student identification number will be removed from all documents. All documents will be kept in a locked filing cabinet. Any reports of the completed study will not identify you by name or by student identification number.

Remuneration/Compensation:

In order to defray the costs of your inconvenience you will receive an honorarium in the amount of a \$5.00 gift certificate to purchase refreshments in the hospital cafeteria.

Contact for information about the study:

If you have any questions or desire further information with respect to this study, you may contact Dr. Pamela Ratner, Associate Professor, University of British Columbia School of Nursing at 604-822-7427. Dr. Pamela Ratner is the supervisor for this graduate thesis.

Contact for information about the rights of research subjects:

If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598.

Consent:

Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without jeopardy to your class standing.

Your signature below indicates that you have received a copy of this consent form for your own records.

Your signature below indicates that you consent to participate in this study.

Subject Signature/ Date

Printed Name

[Consent form: Version two, May 27, 2003]

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Appendix B

Demographic Questionnaire

1. Student Number: _____
- Clinical Placement: _____
- Gender: Male - ☐ Female - ☐
2. Age: _____
3. Ethnic Group: Asian - ☐ Black - ☐ White - ☐ Hispanic - ☐
Other: _____
4. Did you work while in nursing school?
Yes - ☐ No - ☐

If YES, how many hours per week?
0-10 - ☐ 11-20 - ☐ 21-30 - ☐ 31-40 - ☐ More than 40 - ☐

If YES, was the work in a health-related field?
Yes - ☐ No - ☐
5. What is your marital status?
Single (never married) - ☐
Married / Common-law - ☐
Divorced/Separated - ☐
Widowed - ☐
Other - ☐
6. How many children do you have (if any)? _____
7. What are their ages? _____
8. If you have children, do they live in your home?
Yes - ☐
No - ☐
Part-time - ☐

Appendix C


Clinical Skills Self-efficacy Scale


This survey is meant to provide information about your current sense of skill in performing selected nursing activities, and your beliefs about your future skills. There are no right or wrong answers. This information will help us to evaluate our BSN program. Filling out the survey is completely voluntary and confidential. There are no penalties for not participating, and you may quit at any time. However, your responses are very important to us, and we hope that you will complete the survey.

Each behavior is followed by two response scales. On the first scale, you report the confidence you have *now* in performing each skill. The second scale asks about the confidence you *expect* to have after you receive your RN license.

How much **confidence** do you have about doing each of the behaviours listed below?

		<div style="display: flex; justify-content: space-between; width: 100%;"> A B C D E </div> <div style="display: flex; justify-content: space-between; width: 100%;"> ← → </div> <div style="display: flex; justify-content: space-between; width: 100%;"> Quite a lot Moderate Confidence Very little </div>									
		<div style="display: flex; align-items: center;"> ↔ <div style="flex-grow: 1; border-bottom: 1px solid black; position: relative;"> <div style="position: absolute; left: 0; top: -5px;">←</div> <div style="position: absolute; right: 0; top: -5px;">→</div> </div> </div>									
		Confidence Now					Confidence Later				
1.	Obtaining health data through history and interview for all age clients.	A	B	C	D	E	A	B	C	D	E
2.	Assisting a patient with activities of daily living.	A	B	C	D	E	A	B	C	D	E
3.	Collaborating with interdisciplinary team members.	A	B	C	D	E	A	B	C	D	E
4.	Delegating tasks to other health care personnel.	A	B	C	D	E	A	B	C	D	E
5.	Explaining discharge instructions to patients.	A	B	C	D	E	A	B	C	D	E
6.	Administering medications to geriatric clients.	A	B	C	D	E	A	B	C	D	E
7.	Recognizing life-threatening dysrhythmias in an ECG.	A	B	C	D	E	A	B	C	D	E
8.	Making treatment decision based on the patient's respiratory status.	A	B	C	D	E	A	B	C	D	E

		Confidence Now					Confidence Later				
9.	Recognizing normal vital signs of varied age groups.	A	B	C	D	E	A	B	C	D	E
10.	Knowing when a change in patient status requires MD notification.	A	B	C	D	E	A	B	C	D	E
11.	Setting priorities for care based on a patient's health status.	A	B	C	D	E	A	B	C	D	E
12.	Maintaining sterile technique during various procedures.	A	B	C	D	E	A	B	C	D	E
13.	Correctly calculating drug dosages.	A	B	C	D	E	A	B	C	D	E
14.	Recognizing abnormal lab values that require immediate MD notification.	A	B	C	D	E	A	B	C	D	E
15.	Recognizing patients at risk for falls and minimizing fall risk.	A	B	C	D	E	A	B	C	D	E
16.	Providing pre-operative teaching.	A	B	C	D	E	A	B	C	D	E
17.	Understanding the impact of people with chronic illness on health care.	A	B	C	D	E	A	B	C	D	E
18.	Knowing medication actions and interactions.	A	B	C	D	E	A	B	C	D	E
19.	Addressing ethical issues in patient care.	A	B	C	D	E	A	B	C	D	E
20.	Advocating for a patient's right to refuse treatment in any setting.	A	B	C	D	E	A	B	C	D	E
21.	Documenting patient information clearly and concisely.	A	B	C	D	E	A	B	C	D	E
22.	Managing gastrostomy tube feedings.	A	B	C	D	E	A	B	C	D	E
23.	Performing cardio-pulmonary resuscitation on a child.	A	B	C	D	E	A	B	C	D	E
24.	Maintaining universal precautions.	A	B	C	D	E	A	B	C	D	E
25.	Identifying nursing diagnoses for patients.	A	B	C	D	E	A	B	C	D	E
26.	Formulating a nursing plan of care.	A	B	C	D	E	A	B	C	D	E
27.	Knowing the skills a nurse manager needs.	A	B	C	D	E	A	B	C	D	E
28.	Inserting urinary catheters.	A	B	C	D	E	A	B	C	D	E
29.	Changing surgical dressings.	A	B	C	D	E	A	B	C	D	E
30.	Monitoring a patient's response to treatments.	A	B	C	D	E	A	B	C	D	E
31.	Conducting an environmental assessment at a client's home.	A	B	C	D	E	A	B	C	D	E

		Confidence Now					Confidence Later				
32.	Providing nursing interventions that incorporate knowledge about the patient's cultural and belief systems.	A	B	C	D	E	A	B	C	D	E
33.	Knowing the necessary components of a successful community assessment.	A	B	C	D	E	A	B	C	D	E
34.	Reassuring or comforting distressed clients and helping them cope.	A	B	C	D	E	A	B	C	D	E
35.	Recognizing and practicing nursing within practice standards of the RNABC.	A	B	C	D	E	A	B	C	D	E
36.	Communicating with patients about death and dying.	A	B	C	D	E	A	B	C	D	E
37.	Using nursing theory in clinical practice.	A	B	C	D	E	A	B	C	D	E
38.	Discussing problems with a client and helping to find solutions.	A	B	C	D	E	A	B	C	D	E
39.	Knowing assessment parameters for cardiac status.	A	B	C	D	E	A	B	C	D	E
40.	Assessing for signs and symptoms of sepsis in a catheterized surgical patient.	A	B	C	D	E	A	B	C	D	E
41.	Implement nursing measures to prevent sepsis in a paediatric patient.	A	B	C	D	E	A	B	C	D	E
42.	Making a decision to withhold medication based on patient status.	A	B	C	D	E	A	B	C	D	E
43.	Performing newborn assessment.	A	B	C	D	E	A	B	C	D	E
44.	Assessing mental status.	A	B	C	D	E	A	B	C	D	E
45.	Performing CPR on an adult patient.	A	B	C	D	E	A	B	C	D	E
46.	Knowing growth & development patterns for children under eighteen.	A	B	C	D	E	A	B	C	D	E
47.	Recognizing psychotic symptoms in adults.	A	B	C	D	E	A	B	C	D	E
48.	Knowing development stages for older adults.	A	B	C	D	E	A	B	C	D	E

[Clinical Skills Self-efficacy Scale: Version one, February 2003]