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Specifying The Psychomotor Domain of the Construct of Nursing Competence

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SPECIFYING THE PSYCHOMOTOR DOMAIN OF THE CONSTRUCT OF NURSING COMPETENCE

by

Joni L. Jones

A Dissertation
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in partial fulfillment of the
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The measurement of an individual's predicted performance in his/her field is a requirement of many professions. The NCLEX-RN® is the measurement tool used to determine whether or not new graduates of registered nursing programs are competent to enter the profession. Although there are three domains of learning in nursing (cognitive, affective, and psychomotor) the only domain tested for licensure is the cognitive. Many factors contribute to the lack of testing in the psychomotor area. One of the major impediments is that the entry-level psychomotor domain for registered nursing has yet to be defined. The purpose of this study was to identify the psychomotor skills that entry-level nurses should possess as a requirement for licensure. thus moving toward the identification of the boundaries of this domain.

Six semi-structured interviews of nursing faculty dyads from six educational institutions (three community colleges and three universities) were conducted focusing on the perceptions of what psychomotor skills constitute entry-level nursing. Curricular documents, including course syllabi and objectives from each nursing program were obtained. Interview data were analyzed by utilizing the five-step process recommended by Marshall and Rossman (1994). Syllabi and program/course
objectives were subjected to content analysis and a list was compiled of the psychomotor skills specified in the documents, including the number of times each was found. A comparison of the consistency between the interview data and the curricula data in terms of psychomotor skills was also made.

Two families of skills were believed to fall into the entry-level psychomotor domain, medication administration and physical assessment. The results also included one discrete skill—Foley catheter insertion and care. The content analysis of the curricular materials showed that these two families of skills were also the most frequently specified skills in the curricula of these programs. Additionally, due to the openness of the interview format, faculty frequently engaged in discussions regarding the advisability of testing for licensure in the psychomotor domain of nursing. Perceived benefits and barriers to such testing are included in the study’s findings.
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CHAPTER I

INTRODUCTION

Measurement and evaluation are essential to sound decision making. The assessment of individual performance is of major concern in almost all areas of human endeavor (Swezey, 1981). The role of measurement is to provide accurate and relevant information to decision makers so they can determine the value, merit or worth of something; in other words, so they can evaluate it (Scriven, 1991). Measurement is usually achieved through the process of testing. As a result of an individual’s performance on a particular test or tool, one obtains a measure of a characteristic of that person (Mehrens & Lehman, 1991). Therefore it is critical that the test or tool, used ultimately to formulate evaluative judgments on something, be developed carefully in order that it may possess the highest degree of validity and reliability possible.

Measurement of an individual’s actual performance or predicted performance in his/her field is a requirement of many professions. The type of testing that is done usually measures what the individual knows or can do, compared to what he must know or be able to do, in order to successfully perform in his/her field. The individual’s performance is compared to an external criterion or performance standard.
The purpose of this chapter is to provide the reader with an overview of what is involved in the process of test construction, (specifically, the phases of domain specification, building the table of specifications, and item generation) and to describe some of the difficulties associated with using this process to develop tests measuring competence in a professional field (in this study, nursing). The chapter concludes with the statement of the problem, which provides the focus for this research.

Test Construction

The process of test construction begins with the identification of the construct to be tested and is followed by defining the behaviors that represent this construct (Popham, 1984; Crocker & Algina, 1986). Defining the domain or universe of behaviors is extremely important because, without this, determining what the score represents is not possible (Mehrens & Lehman, 1991; Berk, 1984). Once the domain has been adequately established and defined, the test developer can build the table of specifications or the “blueprint” of the test. This determines what the test itself will look like by describing how the domain will be sampled for the test. The next step in the construction process is the development of an item pool for the test. Items are developed, using the table of specifications as a framework. Once the test items have been generated, they must undergo a process of review that will identify structural flaws and determine whether the items “behave” consistently with the purposes for which they were constructed (Berk, 1984). Additionally, administration and scoring
procedures for the test must be established and must be sufficiently clear that others can administer and score the test reliably and with minimal measurement error (Swezey, 1981). Figure 1 illustrates the basic process of test construction.

![Flow Chart for Test Development](image)

Figure 1. Flow Chart for Test Development.

**Domain Specification**

The Joint Committee on Standards for Educational and Psychological Testing in its *Standards for Educational and Psychological Testing* (American Education Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 1999) stated that the definition of a universe or domain of the construct to be tested must be stated clearly. Further, the utility and adequacy of test interpretation is contingent upon the clarity and rigor with which the domain to be tested has been defined (AERA et al.; Fleishman, 1982). It is the clear and accurate domain specification that allows for the delineation of the boundaries or scope of behaviors to be tested (Crocker & Algina, 1986). A clear description of the domain serves two purposes. First, it will constrain item writers so that they can produce congruent items for the test. Second, it communicates clearly to those who must interpret examinee's test performances.
Domains are defined differently for different types of tests. Specifying the domain for a classroom examination can be as easy as stating which text chapters or which curricular objectives are to be covered (Nunnally & Bernstein, 1994). Defining the domain for tests designed for employment purposes is more difficult than it may first appear. There often is not a uniformly agreed upon content domain that reflects sufficiently the knowledge, skills and abilities that job or profession demand. There are a variety of methods for deriving domains for a particular job, occupation or profession (Fleishman & Quaintance, 1984; Murphy, 1989; Tannenbaum & Rosenfeld, 1994). Some of the methods are primarily judgmental or qualitative, while others rely on quantitative procedures. (A more thorough discussion of domain specification procedures is provided in Chapter II of this dissertation.)

Building the Table of Specifications

The domain provides the variety of relevant tasks or behaviors from which the test developer will sample (Mehrens & Lehman, 1991). Once the content of the domain has been specified the test developer can use this information to build a table of specifications. The purpose of the table of specifications is to relate the domain to the test content and to construct a balanced test (Mehrens & Lehman, 1991). A properly constructed table of specifications helps to ensure that the sampling of test items chosen to be used is representative of the domain of behaviors and that no important content area is inadvertently omitted (Linn & Gronlund, 1995). In essence,
the table of specifications provides the framework from which the actual test can be developed, ensuring proper proportional representation of items to adequately measure the construct of interest.

Item Generation

While the table of specifications provides a plan for the test, generating a pool of items provides evidence that the measure truly can be developed. A good plan provides only the intention to construct a good test, but unless the test items are skillfully written, the plan will not materialize (Nunnally & Bernstein, 1994).

Swezey (1981) states that it is advisable to create at least twice as many test items as are planned for the final test. Three basic reasons are cited for creating an item pool of this size. First, some items will undoubtedly be discarded by test reviewers or for practical reasons during the development process. Second, items may be rejected by statistical item analysis techniques. Third, in a number of situations, it is appropriate to create alternate item pools, or even alternate or parallel forms of the criterion-referenced test, so that simultaneous testing can occur.

In addition to the content of the items to be included, the format of each item is also decided upon during this phase. Hands-on performance items, simulated performance items, multiple-choice items, matching items, fill-in-the-blank items, true-false items, recall measures, job simulations and supervisor ratings are various possible item formats (Swezey, 1981).
Measuring Professional Competence

The construct of professional competence and its measurement has received a great deal of attention in both theoretical and research literature (Benner & Benner, 1979; Bolin & Hogle, 1984; Brumback & Howell, 1972; Gonella & Hojat, 1983; Morgan & Irby, 1978). Webster’s New Twentieth Century Dictionary (1983, p. 370) defines competence as “having ability or capacity; duly qualified.” The practice of professionals in service fields is comprised of clinical judgments that have been derived from theories, laws, knowledge and principles with the subsequent application of specialized skills (Reilly & Oermann, 1992). Professionals provide a service, usually of great value, to society through their possession of a specific body of knowledge and domain of expertise by which they are able to serve specific needs of designated clients. These individuals occupy positions in our society where, if competent, they can and do benefit clients. Conversely, however, when these individuals are not competent within their professional field they have the potential to cause harm. It is therefore essential that the public be protected, particularly with regard to those professional fields where mistakes due to a lack of competence may irreparably harm an individual. Licensure and certification examinations serve to protect the public by assuring that individuals who work in an occupation or profession are at least minimally competent (AERA et al., 1999). These examinations involve a professional organization or a governmental agency applying a set standard for competence. This paper will focus on the testing of the construct of
The discipline of nursing integrates cognitive, affective and psychomotor skills (Benner, Tanner & Chesla, 1996). All three of these domains are represented in the educational objectives of nursing curricula throughout the country. One domain is not considered to be more or less important than the others. The vast majority of nurses, as early as entry-level, will be called upon to utilize skills from each of these domains. They will be required to make critically important clinical decisions (cognitive), to interact with clients and families in a caring and empathetic manner (affective), and to implement complex manual and technological skills (psychomotor). Despite the integration of all of these domains into the practice of professional nursing, the cognitive domain is the only area that is currently tested in graduates of nursing programs seeking licensure as registered nurses (Reilly & Oermann, 1992).

The NCLEX-RN® is the licensure examination given to graduates of programs of nursing (Oermann & Gaberson, 1998). It is a high stakes test in that it is used to determine whether or not the examinee is competent to practice nursing, thus either allowing or preventing entry into the profession. While success on the NCLEX-RN® is said to assure the public of the entry-level registered nurse’s

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competence to practice nursing, in reality it currently can only assure the public of the
graduate's cognitive competence—not psychomotor competence.

Psychomotor skills in nursing are purposeful and complex actions that are
based upon principles. Although they involve cognitive skills in decision making and
judgment relative to their use and desired effect, they are not cognitive skills. Rather,
they involve the "doing"—the efficient performance of a specific action that requires
neuromuscular coordination (Singer, 1975). Psychomotor skills, although obviously
a vital component of the practice of nursing, are not currently evaluated as a
requirement for licensure.

The lack of evaluation of psychomotor competence may pose a greater
potential threat to the public now and in the future than it has in the past.
Historically, the development and improvement of psychomotor skills has occurred as
a consequence of experience with clinical environments where there are opportunities
to analyze and reflect upon the nature of the experiences (Copeland, 1989). However,
the role of the traditional site for clinical instruction, the hospital, has changed. The
American Hospital Association reported that between 1960 and 1991 the number of
hospitals in the United States declined by 3.5 percent despite the fact that the
population grew by 39 percent (U.S. Congressional Budget Office, 1993).
Additionally, it is projected that, as we move into this new century, there will be
closure of as many as one-half of the nation’s hospitals (Pew Health Professions
Commission, 1991). This has resulted in significantly fewer clinical sites in acute-
care institutions for nursing students to develop and master these skills, under the
close supervision of their instructors. Clinical training opportunities for undergraduate nurses have decreased in recent years due to the overall reduction in the number of hospital beds and the competition for these primary care opportunities with graduate nurses and medical students (Salsburg, Wing & Brewer, 1998).

Students may graduate from accredited programs in nursing without having had sufficient experience to develop psychomotor skills, such as performing sterile dressing changes, starting intravenous infusions, administering medications—including injections, suctioning, performing tracheostomy care, performing urinary catheterizations, administering feedings via a nasogastric or gastrostomy tube, etc.

To compound this problem, hospitals and other health care facilities have, over the last decade, drastically reduced or even eliminated their nursing education departments in response to financial concerns (Leslie & Churilla, 1998). This has resulted in a reduction of new graduates’ orientation time, which, in the past, had been used for further development of these skills under close supervision. The resulting potential lack of psychomotor competence among new graduates of registered nursing programs places patients at significant risk in today’s health care settings.

**Reasons for Lack of Psychomotor Testing**

The lack of evaluation of the psychomotor skills of graduate nurses is likely due to a variety of factors. There are significant problems inherent with performance-based assessment. These include such practical constraints as the amount of time
required for the testing of individuals, the labor intensity, the cost of observation and
the scoring. Additionally, this type of assessment generates concern regarding the
fidelity (or degree of realism) of the testing situation and the lack of availability of
equipment and/or facilities necessary for the testing (Swezey, 1981; Mehrens &
Lehman, 1991). All of these factors tend to create complexity and difficulty in
measuring an examinee’s performance.

Posing an even greater problem for testing of psychomotor skills in entry-level
nurses is the fact that a clear description of the domain does not exist. A taxonomy
for the psychomotor domain of learning has not been developed to the sophistication
and utility that is found both in the cognitive and affective domains (Reilly, 1980).
Since the process of test construction begins with specification of the domain to be
tested, this presents a rather difficult problem for a test developer. There are
undoubtedly reasons why the psychomotor domain of entry-level nursing has not
been defined.

Specifying a domain as a prerequisite to the construction of a math test would
most likely not create much contention among mathematicians, test developers and
other measurement experts. There would generally be strong agreement concerning
the domain of such a test because the basic arithmetic operations are known and are
finite—addition, subtraction, multiplication and division. On the other hand, defining
a domain in the affective area of learning potentially creates considerably more
debate among these same experts. For example, in constructing an attitude survey it
is necessary to refer to theoretical and research literature related to the construct to be
measured in order to define the domain. Naturally, it is more likely that there could be a fair amount of disagreement among content experts in this situation than would occur during the development of the math test. Theoretical and research literature is subject to differing perspectives and opinions by different individuals.

Stipulating the psychomotor domain for the construct of nursing competence is an even greater challenge and more difficult than specifying the domain for an attitude instrument. There is an absence of theoretical literature in this area and very little research literature, which discusses what psychomotor skills graduates from registered nursing programs should be able to perform. The literature that does exist in this area consists primarily of discussions concerning the differences in perceptions of what the domain should be comprised of between nursing educators and nursing service personnel (Sweeney, Regan, O'Malley & Hedstrom, 1980; Neighbors, Eldred & Sullivan, 1991). Thus, one could say that there is no agreement at this point concerning the boundaries of this particular domain.

It is likely that a major factor in the absence of psychomotor domain specification in nursing is that it encompasses such a broad range of nursing skills and environments. Critical care nurses practice in highly technical environments with great demand for psychomotor abilities. School nurses practice in an environment where basic assessment skills and knowledge of community resources for referral purposes is key. Psychiatric nurses must develop excellent communication and affective skills, with much less emphasis on the psychomotor area. These are just a few examples of the variance in practice and specialty areas for registered nurses, but
it is illustrative of the potential for disagreement from nurse experts in these fields concerning defining the psychomotor domain of nursing. However, it is important to keep in mind that, despite the fact that there are also cognitive differences in entry-level practice environments, the cognitive domain for entry-level competence in nursing has been defined as reflected in the NCLEX–RN® (National Council of State Boards of Nursing, 2000) Test Plan. In essence, entry-level behavior is entry-level behavior, despite the environment in which a new R.N. may practice. This fact lends support to an effort toward defining the psychomotor domain.

Statement of the Problem

The formal testing for competence prior to entry into a profession offers a level of protection to the public. This should also hold true for the profession of nursing. Nursing is comprised of the cognitive, affective and psychomotor domains of learning. Each of these is critical to safe practice and ultimately to the protection of the health-care consumer. Therefore, it follows that each of these areas should be evaluated prior to being granted entry into the profession. The scope and boundaries for the psychomotor domain for entry-level nurses, however, has yet to be defined and, as such, any high-stakes testing in this area as a requirement for licensure would be troublesome ethically and possibly legally. If nursing is to consider testing psychomotor skills as a part of the licensure examination in the future first the domain must be defined. This was the focus of the research in this dissertation. The domain was to be defined from the analysis of faculty perspectives and curricular information.
as opposed to a job analysis. If the domain could be defined, future research may be
directed toward identifying the structure of the domain from which a table of
specifications can be developed, followed by a generation of a pool of items/skills to
be tested.

Specifically, the question to be addressed in this study was, as follows:

What are the critical psychomotor skills that entry-level registered
nurses should possess as a requirement for licensure in the opinion of
nurse experts? (Can the boundaries of the domain be identified?)
CHAPTER II

LITERATURE REVIEW

This chapter presents the review of literature, which provides a context and rationale for the study. It is anticipated that there will be two types of readers or consumers of this dissertation: nurses and measurement professionals. Therefore this chapter is comprised of two major sections: (1) background on the psychomotor domain of nursing, and (2) the process of test development. The first section, while likely to be of interest to readers who are nurses, is intended also to provide the non-nurse measurement person an overview of what nursing is, specifically with respect to psychomotor skills. On the other hand, the second section is intended to provide the nurse who does not have a background in measurement, a better understanding of what is involved with the initial stages in the process of test development.

The Psychomotor Domain of Nursing

The word nursing is derived from the Latin term nutricia, which means to nurture or to nourish. Nursing is often thought of as the youngest of the sciences, but the oldest of the arts. This “art” of nurturing incorporates the systematic application of both knowledge and skills (Lindberg, Hunter & Kruszewski, 1998). The nursing process, which requires both knowledge and skills, provides the framework for the nurse in her role as nurturer (Reilly & Oermann, 1985). It is a systematic and rational
method for planning and providing care. The goal of the process is to identify a
client's health status, including actual or potential health problems, to establish plans
to meet the identified needs and to deliver the specific nursing interventions
determined to most likely meet these needs (Kozier, Erb & Olivieri, 1991). The
process is cyclical in nature and includes the phases of assessment, diagnosis,
planning, implementation, and evaluation. Nursing students learn to utilize this
process as the basis for their practice.

Currently, there are three educational options for entry into the profession of
registered nursing. The oldest option is the diploma nursing program that began
during the days of Florence Nightingale. These programs are closely associated with
hospitals and have drastically declined in numbers over the past two decades
(Lindberg, Hunter & Kruszewski, 1998). In the early 1900s the first university school
of nursing opened in Minnesota, thus beginning the baccalaureate (B.S.N.) route to
becoming a registered nurse. Finally, during the 1950s two-year Associate Degree in
Nursing (A.D.N.) programs were developed (Montag, 1951). Regardless of the type
of program, the basic framework used for the education of students is the nursing
process (Gordon, 1982). After completion of the program, graduates are required to
be licensed in order to practice nursing. In order to receive a license, the prospective
nurse must take and successfully pass the licensure examination, known as NCLEX-
RN®.

Nursing students, as with students in other fields of study, are engaged in a
holistic process of learning that integrates the cognitive, affective and psychomotor
domains. Although these domains are interrelated, educators often find it useful to consider them separately for instruction and evaluation purposes (Reilly & Oermann, 1985). The focus of this research is on the psychomotor domain of nursing.

**Nursing Education**

The psychomotor domain of learning involves activities that are movement-oriented, requiring some degree of physical coordination. This domain, in nursing, most often involves the development of motor skills and competency in the use of equipment and technology (Oermann & Gaberson, 1998). Oermann (1991) states that psychomotor learning has both a cognitive foundation (the principles relative to the performance of the skill) and an affective dimension (the values and attitudes of the nurse while carrying out the skill).

Psychomotor skills are integral to the practice of nursing in most health-care settings. These skills are used during the assessment phase, the implementation phase and the evaluation phase of the nursing process. They constitute a significant portion of nursing interventions. Therefore, it is critical that nursing education programs focus as much attention on this area of learning and development as they do on the cognitive and affective domains. Lack of competency in these skills on the part of new graduates has been, and continues to be, the subject of considerable criticism of nursing education, which frequently is of such vehemence that “it takes on a pervasive quality as an indictment of all of nursing education” (Reilly & Oermann, 1985, p. 177).
Historically, when nursing education was hospital-sponsored and controlled, it heavily emphasized the practice element, possibly even more than theoretical content. Manual techniques and skills were the primary focus (Sweeney, Regan, O’Malley & Hedstrom, 1980). Educational practice, however, has gradually changed in response to societal and health care trends; particularly in baccalaureate settings where the focus of learning shifted from performance to a broader application of cognitive skills (Lindeman, 1989).

The literature on this subject suggests that the severe criticism that nursing education has taken may be justified. Despite the fact that baccalaureate graduates of nursing programs have an adequate theoretical base, many lack competence in the clinical practice setting (Scheetz, 1990). One of the ways in which this lack of competence is manifested is in the awkwardness displayed during the performance of psychomotor skills (Goldsberry, 1977; Hammerstand, Johnson & Land, 1977; Shamian & Inhaber, 1985). Individuals in hospitals and other service agencies agree that new graduates are deficient in technical skills, and that educational institutions, especially the associate and baccalaureate programs, must again emphasize clinical skills and competencies so that entry-level nurses can be ready to practice nursing competently after graduation (Boyle, 1977; Ford, 1977).

**Concepts Related to Psychomotor Skill Development**

Psychomotor skills in nursing involve those areas of nursing practice that require the ability to behave efficiently in an action situation requiring neuromuscular
coordination (Singer, 1975). These are purposeful and complex actions that are, as stated previously, based upon principles and involve cognitive skills in decision-making as well as judgment concerning their use and desired effect (Reilly & Oermann, 1985). However, psychomotor skills are not cognitive skills. Instead they are the "doing" portions of this interrelationship. Harrow (1972) states that the psychomotor domain assumes learning in the cognitive and affective domains as a requisite to the correct performance of a technical skill.

Certain concepts are essential to the full appreciation of psychomotor skills. These include the concepts of performance, learning, skill and ability.

Performance is a visible action in response to specific cues within a given situation, whereas learning is generally of a more immutable nature, resulting from repeated practice or past experience that is stored in the individual's memory and is able to be retrieved on cue (Kerr, 1982). The degree of learning is often inferred from the demonstrated performance.

Similarly, ability and skill are not the same concepts. Skills can be defined as the efficient execution of a specific task. It is the outwardly demonstrable phenomena here, whereas, ability refers to the generality of a trait that the learner possesses, which is influenced by heredity and learning. Ability implies that skill exists over a variety of tasks that are related to the observed task (Kerr, 1982). When an instructor views the skill of a nursing student on one or more psychomotor tasks, an inference of the student's ability is often forthcoming.
Evaluation of the Psychomotor Domain

Clearly, students who have graduated from nursing programs and have reached the entry-level of their profession should possess a level of psychomotor ability that assures the protection of the health-care consumer. Nursing education programs include clinical evaluations of their students, typically, throughout the program. However, these clinical evaluations are usually based upon the clinical objectives that are unique to that particular program, rather than on a set of entry-level psychomotor skills that nurses should possess upon completion of the program (Benner & Benner, 1975). Additionally, there have been numerous difficulties even with the program-specific clinical evaluations most often due to the utilization of inadequate methods (Jackson, Mead & Moore, 1984; Stecchi, Woltman, Wall-Hass, Haggstad & Zier, 1983). Most evaluation methods of students' clinical psychomotor performance rely on subjective judgments by a clinical teacher observing in the clinical setting, or on objective scores based upon paper and pencil tests of either the short answer or multiple choice question type (Wooley, 1977). Both of these method types have serious weaknesses. Clinical evaluation of psychomotor skills based upon direct observation is subjective and inherently biased, which hinders reliability. Pencil and paper tests have problems with validity and relevance in comparison to actual performance. Overall, there is a significant dearth in the research literature relative to valid and reliable methods of evaluating the psychomotor abilities of nursing students.
Research Literature Concerning Evaluation of the Psychomotor Domain

Unlike cognitive ability, which is tested via the NCLEX-RN®, there currently is no measurement tool utilized to determine psychomotor competence prior to the licensure of graduate nurses. There is no clear reason specified for this in the related literature. One might conclude that it has resulted from the difficulties inherent within the development of performance-based tools. Mehrens & Lehman (1991) cite two primary reasons for this. The first is that measuring performance tends to be much more subjective than measuring cognitive achievement. The second is that, due to the inherent complexity of performance measurement, such tests tend to be difficult to administer (i.e., time intensive, labor intensive), to score and to interpret. Performance assessments can also present a number of validity problems, which are difficult to handle using traditional approaches and criteria (Moss, 1992).

Despite these difficulties a number of research studies have been undertaken in nursing and other health-care professions in an effort to develop a method by which to systematically measure clinical skills, including psychomotor abilities. For example, the Objective Structured Clinical Examination (OSCE) is a tool that has been used to assess the clinical competence of medical students at the University of Ottawa. In 1984 the nursing faculty at McMaster University developed and implemented a nursing version of the OSCE to assess primary skills of students who were in their final year of a baccalaureate program in nursing (Ross, Carroll, Knight, Chamberlain, Fothergill-Bourbonnais & Linton, 1988). Sixty-nine students

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participated in the study. The mean scores on the OSCE were compared to mean scores on a multiple-choice test of knowledge. This revealed significant differences between the mean scores of the tests. Additionally, a Pearson-Product Moment Correlation yielded no evidence to support the existence of a relationship between students' scores on the OSCE and their tests of knowledge. This raises a question as to the OSCE's concurrent validity, since one could reasonably assume that there should be a correlation between a student nurse's knowledge and related clinical performance, which includes psychomotor skills.

Bondy, Jenkins, Seymour, Lancaster and Ishee (1997) developed and tested a competency-focused psychiatric nursing clinical evaluation instrument, called the Psychiatric Nursing Performance Appraisal Instrument (PsychNPAI). Pilot testing of the instrument generated an overall alpha of 0.96 with subscale alphas ranging from 0.82 to 0.92. The correlation of the clinical subscale of "Knowledge" with the didactic (cognitive) content of the course \( r = 0.41 \) was found to be significant \( p < 0.05 \). Interestingly, the authors did not report the results of the correlation of the other clinical subscales (which included a "Nursing Interventions" subscale) with didactic content. Since clinical performance is conceived to be comprised of much more than just the possession of a knowledge base, if significant correlations do not exist on the other scales, then it is likely that this is an ineffective tool for measurement of this construct.

The struggle to effectively evaluate clinical performance including psychomotor ability is not unique to the nursing profession. Keck and Arnold (1979)
describe the development and validation of an instrument to assess the clinical
performance of medical residents. The Resident Evaluation Form (REF) contains 33
rating scales that measure the performance of a resident in nine categories.
Assessments in four substantive areas of a medical resident's clinical performance
were obtained by combining relevant items from the nine categories. These areas
include: (1) Interpersonal Ability, (2) Professional Attributes, (3) Clinical Skills, and
(4) Cognitive Ability. The study participants included a total of 106 physicians who
had graduated from the University of Missouri at Kansas City Medical School and
who were still in residency training or who had not yet entered residency training.
Scores on the REF were correlated with other measures hypothesized as being related
to physicians' clinical performance. These measures included such things as all three
parts of the National Board of Medical Examiners Examinations, which are nationally
recognized comprehensive examinations used for physician accreditation.
Instructors' evaluations of students' performance were also used. These evaluations
occurred in the fourth year internal medicine rotation, fifth or sixth year elective
rotation relevant to the specialty of the graduate's program, and sixth year internal
medicine rotation. The study revealed moderate correlations between scores on the
REF and all of the hypothesized related measures. Statistically significant (p < 0.05)
except for NBME–Part I (p = 0.06 and 0.05). The strength of the correlations ranged
from $r = 0.21$ to $r = 0.52$. The strongest correlation of the REF was with the NBME–
Part III ($r = 0.52, p = 0.001$). The NBME–Part III is an examination of clinical
competence in medicine. It is taken during the first post-graduate year. Since
reliability and validity of the NBME has long ago been confirmed and is well documented (Hubbard. 1978), the fact that the clinical competence portion of this examination correlates strongly with the REF suggests that the REF is a valid tool for the measurement of clinical performance. The REF also demonstrated reliability evidence in the area of internal-consistency with coefficient alphas in the four substantive areas being 0.98, 0.92, 0.97, and 0.93. Although the REF was designed to measure medical school graduates’ clinical performance, which includes more than psychomotor ability, it does include this within the Clinical Skills area of the test.

Perhaps the most compelling reason for the absence of psychomotor skills testing as a requisite to licensure is the lack of consensus among nurse experts regarding what should be included in this domain for entry-level nurses. In one of the earliest studies investigating this area Shields (1952) surveyed nurses in various sites, such as schools of nursing, pediatric units, institutions specializing in the care of patients with tuberculosis and public health agencies, to determine the kind of skills a nurse should be able to perform after graduating from a basic nursing program. Respondents to the survey placed manual skills as the first ability a graduate should have.

In a similar study, Bailey (1956) investigated the beliefs of the medical team (e.g. doctors, head nurses and clinical instructors) and of patients regarding the behaviors needed by effective professional staff nurses. Head nurses and clinical instructors ranked the demonstration of manipulative skills and technical competence highest, while physicians chose efficient performance in emergency situations as
most important. Patients selected the provision of emotional support as being the most important. Although this study identified over 400 behaviors, only a few included specific psychomotor skills. It should be emphasized here that both the Bailey (1956) study and the Shields (1952) study were conducted at a time when nursing’s scope of practice and definition were much different than they are today. Nursing was then defined as “not only the care of the sick, the aged, the helpless and the handicapped but the promotion of health vigor in those who are well…” (Dock & Stewart, 1938, pp. 4–5). However, rapid advances in the care of the ill overshadowed the concern for the healthy. This tended to further reinforce nursing’s primary role as care of the sick, which necessarily involves numerous physical and manual care activities (Lindberg, Hunter & Kruszewski, 1998).

Similarly, Gorham (1962) conducted a study to determine explicitly the general staff nurse’s role as perceived by general staff nurses, supervisors, physicians and patients. Once again, of the 120 physical behaviors identified there were very few specific examples of psychomotor skills.

A more recent study investigating the essential skills for baccalaureate graduates (Sweeney, Regan, O’Malley & Hedstrom, 1980) yielded similar results to those of previous studies. The perceptions of 15 faculty from an NLN-accredited (National League for Nursing) baccalaureate program and 15 nursing service personnel from a medical-surgical hospital setting concerning importance of psychomotor skills were studied. A compiled list of 291 psychomotor skills was generated and each skill was individually printed on a set of index cards that were
used in a modified Q-sort procedure. Participants were asked to place each skill card in one of four categories: essential (needs to know), bonus (would be nice, but is not essential), graduate (requires more guidance and practice than can be provided in undergraduate programs), and non-nursing (procedure should be performed by other personnel). After the participants in each group had completed the task, the researchers met with each group to review the decisions and utilized a Delphi round to encourage the formation of group consensus. Nursing service personnel viewed many more skills as essential than did nursing faculty. For approximately half of the skills on the list, faculty and nursing service personnel achieved no consensus regarding whether undergraduate nursing students should be expected to learn them prior to graduation.

Alavi, Hoh and Reilly (1991) presented the experience of a faculty in an Australian School of Nursing investigating two important questions: (1) what psychomotor skills should be included in the curriculum, and (2) to what degree of competence should each skill be achieved. Faculty gained input from nursing service personnel in 57 different agencies where students had clinical practice as to the relevance and frequency of use of a list of skills in their agencies. Using a frequency rating of 65 percent for each skill, the faculty developed a list of skills to be taught. This approach meant that some of the skills that had previously been thought to be essential for practice were removed from the curriculum since they were found to be no longer relevant to practice. Again, this research illustrated the difference in perceptions between faculty and nursing service personnel as to which psychomotor
skills are essential to entry-level practice. Both the Sweeney et al. (1980) study and the Alavi et al. (1991) study utilize lengthy lists of skills. Lists of skills are helpful but do not alone help to develop the limits of a domain.

Despite the importance placed on developing competence in psychomotor skills, nurses in various settings show little agreement on this subject with the greatest divergence appearing to exist between nursing service and nursing educators (Ford, 1977).

The Process of Test Development

Educational testing has the potential to have a significant impact on the individual taking the test as well as on our society as a whole. Thus, in addition to having a process for developing the most reliable and valid test possible, it is also important that there exist a solid rationale for its use. The next sections of this literature review chapter describe the basis for competency assessment (specifically related to health care workers), discuss the “high-stakes” nature of licensure and certification examinations, and describe some of what is involved in domain specification and the development of the table of specifications for the test.

Rationale for Psychomotor Competency Assessment

The past two decades have witnessed a proliferation of attempts to develop valid and reliable methods for assessing the clinical competence of health care workers, including their psychomotor competence (Stillman & Gillers, 1986).
Medical school faculties, faculty from other health-related areas, as well as certification and licensing boards are assessing what is being taught and how it is being evaluated (Egan, 1976).

In medicine, a standard educational system lent itself well to a standardized mechanism for professional evaluation. Hence, the formation of the National Board of Medical Examiners (NBME) in 1915 and the inauguration of an examination process (Parts I, II and III) sequenced so that it would coincide with the medical students’ education in the basic sciences, clinical sciences and an internship, respectively (McGaghie, 1980). Sociologists have discussed similar trends toward standardized modes of education and evaluation in other health professions—for example, dentistry, occupational therapy, pharmacy, social work, and veterinary medicine (Pavalko, 1971; Wilensky, 1964). They suggest that the development of a relatively fixed system of pre-professional training, along with a standardized method for certifying or licensing individual practitioners are two of the milestones that emerging professions pass as they become established.

The profession of nursing has followed the lead and has attempted to standardize their pre-professional curriculums and have also standardized their licensing examination across the United States. Baccalaureate nursing education programs prepare students through specific curricular offerings, delineated by the American Association of Colleges of Nursing (1986) in its publication, Essentials of College and University Education for Professional Nursing. Baccalaureate education encompasses complex, less stable and poorly defined health and illness problems. It
includes the combination of liberal arts, research and scientific content, social and organizational content, community health content and leadership content. The didactic as well as the experiential nature of this educational process enables the nurse to work effectively in both structured environments and in those with a greater degree of uncertainty (Fralic, 1998). In contrast, Associate Degree graduates (sometimes referred to as "technical nurses") are caregivers for patients who have more well-defined health or illness problems. The curriculum in these programs is intended to prepare the nurse to focus on problem-solving with usual or more common and stable health problems in a very structured environment (National Commission on Nursing Implementation, 1990).

Despite the differences in the focus of the curriculum between the two programs, graduates from each take the same licensure examination. The NCLEX–RN®, as stated previously in Chapter I of this dissertation, does not provide for the testing of psychomotor skills.

**Licensure and Certification**

The *Standards for Educational and Psychological Testing* (AERA et al., 1999) presents a set of standards designed to guide test developers and test users. Included in these standards are guidelines for the development and use of testing in employment and credentialing. Licensure and certification in health professions are forms of credentialing. Tests used in the process of credentialing focus on "the applicant’s current skill or competency in a specified domain" (AERA et al., 1999, p.
In many occupations, including nursing, persons must be licensed by governmental agencies in order to participate in their chosen field (D’Costa, 1986). The purpose of licensure is to protect the public by assuring that those who gain entry into the profession have met minimum (entry-level) standards of competency (National Commission for Health Certifying Agencies, 1979). Licensing examinations, therefore, are considered high-stakes tests because they can effectively prevent individuals from gaining employment in their field. Thus, it is imperative that these examinations be developed with the highest degree of validity (measuring what they are intended to measure) and reliability (consistency of the measurement) as possible.

**Domain Specification**

Standard 14.14 of the *Standards for Educational and Psychological Testing* (AERA et al., 1999, p. 161) states the following:

> The content domain to be covered by a credentialing test should be defined clearly and justified in terms of the importance of the content for credential-worthy performance in an occupation or profession. A rationale should be provided to support a claim that the knowledge or skills being assessed are required for credential-worthy performance in an occupation and are consistent with the purpose for which the licensing or certification program was instituted.

Thus, to be consistent with its purpose, a licensure examination must be job related. The job relatedness of a credentialing exam is typically assured by
developing the test specifications, which have been based on a job analysis (Raymond, 1995).

**Job Analysis**

Many measurement experts advocate job analysis for the development of credentialing examinations (D’Costa, 1986; Kane, 1982; Shimberg, 1981; Smith & Hambleton, 1990). Additionally, it has been supported by the courts and federal guidelines (Equal Employment Opportunity Commission, Civil Service Commission, Department of Labor & Department of Justice, 1978; Kuehn, Stallings & Holland, 1990; Thompson & Thompson, 1982). Some form of a job analysis can provide the primary basis for defining the content domain.

Job analysis for a credentialing examination can be conducted using a variety of data collection and analysis procedures commonly used in the social sciences. One of the most common approaches to job analysis is to administer a survey to determine those job activities considered important for a particular occupation (Gael, 1988). Shimberg (1990) commented on the significant diversity in the methods used for conducting a job analysis and called for standards to provide formal guidance for this procedure in order to produce valid test specifications. Nelson (1994) discusses this variation in job analysis. He studied the job analyses and test plans developed by two different state jurisdictions for the same occupation. The two test plans had only 50% in common in terms of content (Nelson, 1994, p.32). An explanation given for the differences was the fact that the subject matter experts (SMEs) within each state who
were responsible for the test specifications had very different views of the knowledge, skills and abilities required to assure public protection. Perhaps this was due to factors unique to each particular state. The results of Nelson's (1994) study parallel the Alavi et al. (1991) and Sweeney et al. (1980) nursing studies discussed earlier. Although nursing faculty and nursing service personnel could be considered subject matter experts concerning psychomotor skills in nursing, the two groups have differing views concerning which skills constitute the entry-level domain of nursing practice.

Data about a job, occupation or profession can be obtained from individuals familiar with the job or from existing documents and records. Many job analyses published in the personnel psychology literature make use of job data obtained from a wide variety of individuals, including actual practitioners, supervisors, managers, job analysts, and subject matter experts. Most job analyses rely on multiple sources of information (Raymond, 1995). Written documentation in the form of job descriptions, patient charts, quality control analyses or curricular material may also be helpful.

In evaluating the literature, it is important to consider how job analysis for licensure and certification examinations differs from job analysis in the general area of personnel psychology. The major difference is that job analysis for licensure and certification testing usually requires a broader sampling plan than job analysis conducted in business and industry. Job analysis projects for credentialing exams are most often national in scope, and cover a multitude of settings. Since licensed or
certified individuals, by way of their credential, are to be considered qualified for a variety of positions, it is necessary for the job analysis for a credentialing exam to include multiple jobs. (Raymond, 1995). Another major difference is that there is a singularity of purpose for the job analysis with a credentialing examination—the development of test specifications.

Group interviews of subject matter experts and content analysis of curricular material such as textbooks and course syllabi are two methods that can be utilized in a job analysis. A discussion of each of these methods follows.

**Group Interviews**

Field research is often employed for the initial or exploratory phase of a research project. During this phase the researcher is typically looking at a social context that is unfamiliar or new. Blumer (1969) recommends bringing together several knowledgeable observers who are familiar with the social situation under investigation into a discussion or resource group. The use of small group interviews or focus groups has been used by social scientists to facilitate questionnaire development (Desvousges & Frey, 1989). Interviews may be structured, semi-structured or unstructured based upon the degree to which the interviewer controls the direction and flow of the conversation (Bailey, 1994). Gordon (1975) suggests that the unstructured interview can be more valid than the highly structured interview in cases where the universe of discourse may vary from respondent to respondent.
Content Analysis

Researchers interested in the more traditionally quantitative methods may choose to utilize content analysis during a job analysis. The basic goal of content analysis is to take a non-quantitative document and transform it into quantitative data. The results of content analysis can generally be presented in tables containing frequencies or percentages, similar to survey data (Weber, 1985). For example, content analysis of a textbook or course syllabus would be designed to reduce many words into a certain number of content categories. Each category or recording unit may consist of one or several words or other units presumed to have similar meanings (Holsti, 1969). Content analysis and interviews can be used in the process of job analysis as a means of triangulating the information received.

Table of Specifications

After a thorough job analysis has been completed thus helping to define the domain to be measured, the data must be transformed into test specifications. Since the table of specifications for the test is where the test items will be generated, it is essential that these specifications be developed carefully.

Lunz, Stahl & James (1989) describe a process for linking job analysis data to test specifications. They utilized a Rasch rating scale analysis to order the ratings of importance assigned to task and content items by practicing laboratory managers. The ordering produced variables that represented the range of task and content items from most to least important. The variables also provided an objective frame of
reference for review of the data by the experts. The Rasch calibrations for each task and content item was transformed to percentages and these percentages were used to develop test specifications for a certification examination in laboratory management that reflected practice patterns in this field.

Summary

This chapter has provided a review of literature pertinent to the psychomotor domain of nursing and the process of test development. It establishes that, although research has been done in the area of entry-level psychomotor domain specification, the boundaries of this domain have yet to be clearly delineated. Consensus, particularly between nursing faculty and nursing service personnel, has not been reached as to what psychomotor skills entry-level registered nurses should be able to perform. A prerequisite to any test development is the clear definition of the domain to be examined.

The purpose of this research is to attempt to establish the boundaries of this domain, as perceived by subject matter experts who are nursing faculty, in order to move one step further toward the development of testing in the psychomotor area of entry-level nursing.
CHAPTER III

METHODOLOGY

Overview

The research study involved one of the preliminary processes that is a part of the construction of any measurement instrument. As described in Chapter II, the nursing profession has used the abstract construct of psychomotor skills and has indicated some of the individual concrete skills belonging to this construct, but has never systematically defined the domain. This study will attempt to define the domain (i.e. the boundaries) of entry-level psychomotor skills for registered nurses. If this can be done, future research may be directed toward explicating the structure of this domain and developing a table of specifications from which items can be written to measure the skills within the domain. It should be emphasized at the outset that the ability to proceed toward the development of a table of specifications and ultimately in the direction of developing a licensure examination for psychomotor skills is totally dependent upon the ability of this type of initial research to establish the boundaries of this domain. If the boundaries cannot be clearly established, then it will not be possible to establish a structure of the psychomotor domain for entry-level nursing. Therefore, this research study will focus solely on the prerequisite to any test construction—identification of the domain’s boundaries.
The schematic presented as Figure 2 is intended to provide the reader an overview of the research study. This study involved conducting interviews of nursing faculty and analyzing curricular documents from Associate Degree and Baccalaureate Degree Programs in Nursing. The completed analysis of the information obtained from these data-gathering methods was hoped to establish or begin the process of establishing the boundaries of the domain. If the domain’s boundaries can be established, the process of identifying the domain’s structure can proceed. However, if the domain’s boundaries are unclear and cannot be established, this should lead the profession of nursing to an increased awareness of the need to focus on the psychomotor domain of learning and to begin professional discourse in this area.

Figure 2. An Overview of the Research Study.

Design

The study involved the eliciting of information concerning which psychomotor skills should be required of entry-level registered nurses. There were
two components to the study design: a component of faculty dyad interviews and a component involving content analysis of curricular documents. The gathering of these two forms of data was important for several reasons. First, the flexibility inherent within the interactive process of an interview allows for the gathering of rich information and allows for areas of exploration to emerge that may not have initially been planned by the researcher. Flexibility is a major advantage of the interview as a data-gathering method (Bailey, 1994). In the case of this research, interviewing faculty dyads (each of whom taught a different area of nursing) fostered the sharing of what sometimes proved to be different perspectives on the subject of entry-level psychomotor skills for registered nurses. The faculty interaction, by its very nature, led into other areas related to identifying the boundaries of this domain, such as the advisability of pursuing this type of testing in the future and what it might mean to the profession. Due to its exploratory nature, the researcher focused on maintaining openness so that all possible researcher bias could be minimized and all information and ideas surrounding the entry-level psychomotor domain for registered nurses would be allowed in. Second, the content analysis of the curricular documents, although not possessing the quality of interactivity, provided a wider range of information in that syllabi and objectives for three major content areas of the nursing curriculum (medical/surgical, maternal/child, and psychiatric) were included. The use of both of these methods provided for a degree of protection due to the fact that if a faculty interview was weak in eliciting specific information, for example, the curricular documents may have been detailed and strong with respect to that
information and vice versa. The two forms of data could be used to supplement each other. Additionally, this facilitated triangulation, which is the act of bringing more than one source of data to bear on a single point (Marshall & Rossman, 1994). Data from different sources can be used to corroborate, elaborate or illuminate the research in question and enhances the study's generalizability (Rossman & Wilson, 1984). While exploratory interviews open the way to further research, triangulation helps to provide a larger database, assists in the de-coding and interpretation of data, and adds methodological rigor to the study (Frey & Fontana, 1991; Denzin, 1989).

Sample

The sampling done for this study was not from a single population and there is no definition of a population provided, as the goal was not to generalize the study's findings. Instead, two non-random samples were obtained, one of educational institutions offering nursing programs and the other of nursing faculty within these institutions. The methods and rationale for the sampling is described in the following sections.

Educational Institutions

A purposeful sample of educational institutions (n = 6) was used for the study, three universities and three community colleges. Community colleges that have registered nursing programs typically offer a two-year curriculum that culminates in an Associate Degree in Nursing (A.D.N.) for entry into the profession. Universities
typically offer a four-year curriculum that culminates in a Bachelor of Science Degree in Nursing (B.S.N.), the means of entering the profession. The use of faculty from these two different types of degree programs was necessary because it is conceivable that there are differences in perspectives as to what constitutes necessary entry-level psychomotor skills between the two groups (Waters, 1989) and because both groups take the same licensure exam in order to enter the profession of registered nursing. Programs for A.D.N. students tend to address clinical decisions relating to the overt and covert needs of clients in those areas of care where prescriptive nursing measures are already described for nursing management. In contrast, programs for B.S.N. students tend to address clinical decisions relating to the overt and covert needs of clients, not only where prescriptive nursing exists, but also where nursing decisions entail developing new modes of nursing management based on analysis of nursing and supportive theories (Reilly & Oermann, 1992). Thus, clinical practice sites for employment opportunities after graduation may differ between the graduates from B.S.N. and A.D.N. programs. A.D.N. graduates often find employment in hospitals and clinics, while B.S.N. graduates enjoy expanded employment opportunities in more varied and independent settings such as home health care (Hiscott, 1998).

Two of the three selected community colleges and two of the three selected universities were located in the same state where the researcher resides. The remaining institutions were located in an adjacent state. It was important that the researcher be fully involved in the interview and data collection process. As such, it was necessary to utilize institutions that were within a reasonable driving distance.
Of the three community colleges, one was selected from a highly populated urban area and two were from moderately populated cities. Likewise, of the three universities, one was selected from a highly populated urban area and two were from moderately populated cities. Urban areas offer larger populations, hence larger and more numerous health-care settings. These areas therefore are less restrictive in their clinical placement sites for nursing students as compared to smaller, rural, or suburban settings.

Faculty

Two faculty members (a dyad) from each of the six educational institutions were selected for the interview (n = 12). Additionally, one of the participants in each dyad interviewed at each of the educational institutions was an instructor in the medical/surgical portion of the curriculum in their particular institution. The other participant from each pair was an instructor in either the maternal/child or psychiatric nursing components of their respective programs. Entry-level registered nurses overwhelmingly seek and gain initial employment after graduation in a medical-surgical area in an acute care institution, with an estimated 60% of all registered nurses being employed by hospitals (Coffman, Blick & Wong, 1998). Also, the quantity of psychomotor skills to be learned tends to be inherently much greater in the medical/surgical component of the curriculum than in the other areas. Therefore, it was essential that this area of nursing be well represented in the discussions. However, it was also recognized that the other specialty areas would bring their own
unique perspectives to the discussion and must also, therefore, be a part of the interview process.

**Curricular Documents**

Course syllabi and objectives from the medical/surgical courses, maternal/child courses, and psychiatric courses of each program were collected from faculty members at each institution during the time of the interview. Thus, while each interview consistently involved two faculty members, the number of curricular documents obtained from each institution was always greater than two because course syllabi from each medical-surgical, psychiatric and maternal-child course was obtained. The number of curricular documents obtained from each institution also varied, because some had combined psychiatric and medical-surgical courses while others had separate courses. Additionally, some had two medical-surgical courses, while others had three. Program and course objectives were specified in separate documents by some of the institutions, while others incorporated the objectives into their syllabi. The total number of curricular documents (n = 22) and their contents thus represented possibly a greater breadth of information than did the interviews alone, since all areas of content within the curriculum were represented.

Researchers frequently supplement the group interview with the gathering and analyzing of documents (Marshall & Rossman, 1994). This usually involves a specialized approach referred to as content analysis. Traditional content analysis allows for an objective description of the content of various documents and facilitates
the drawing of valid inferences from data to their context (Berelson, 1952; Krippendorff, 1980). One of the purposes for which content analysis can be applied is to reveal the focus of individual, group or societal attention (Weber, 1985). The content analysis of the curricular documents in this study was used to discern the attention given to psychomotor skill development and evaluation in a variety of registered nursing programs.

Procedures and Instrumentation

Initiating Contact

After receiving HSIRB approval for the study (see Appendix A), and selecting regional educational institutions offering registered nursing programs, prospective participants were identified via each college or university’s web site. Each was then contacted by telephone and asked to participate. They were provided with a verbal explanation of the study including a basic explanation of the interview process and the gathering of certain curricular material (see Appendix B). After gaining initial agreement over the telephone, a letter confirming initial intent to participate, including the date and time of the impending meeting was mailed to each participant. An informed consent document (see Appendix C) was given to and signed by each participant prior to initiating the interview.
Faculty Interviews

The researcher conducted a total of six interviews, each with two faculty members from the three identified universities and the three identified community colleges. The researcher traveled to the respective program sites for the data collection process. Prior to beginning the interview, the study and the faculty’s potential participation were again explained after which informed consent was obtained. A short demographic inventory was completed by each of the participants (see Appendix D) while the researcher set up the tape-recorders in the private, closed room. No other persons besides the researcher and two faculty members were present during the interview process. A semi-structured, open-ended interview format was utilized. The semi-structured interview uses topics selected in advance, although the actual questions may not be precisely specified (Bailey, 1994). In this case, an interview protocol (see Appendix E) was used to guide the interview as necessary. However, it was understood that the participants had the latitude to elaborate and redirect the discussion as they saw fit as the interview evolved. The NCLEX-RN® Test Plan was also used to facilitate discussion and serve as a guide when and if necessary (see Appendix F). Interview guides are frequently used in semi-structured interviews in order to set forth the major areas of inquiry for the data to be obtained in the interview (Merton, Fiske, & Kendall, 1956.) The focus of the discussion was on the participants’ perceptions of what psychomotor skills entry-level registered nurses should possess or, in essence, what psychomotor skills students graduating from registered nursing programs should possess upon graduation. Each interview was
audiotaped and did not exceed 60 minutes. The average interview time was 52 minutes. Identifying information recorded on the audiotape included only the institutional type (i.e., community college or university).

**Curricular Documents**

Faculty members participating in the interviews were asked to provide the researcher curricular material from their respective programs, including syllabi from the medical/surgical (adult health), maternal/child (pediatrics, obstetrics) and psychiatric courses in their curriculum as well as their program objectives. Even if, for example, the dyad consisted of a medical/surgical and psychiatric faculty member not only were those two content area syllabi and objectives collected but also collected was the maternal/child syllabus and objectives. Thus, the data collected via the documents was broader in contrast to the interview data, which brought together the faculty perspectives of only two content areas in nursing. The researcher analyzed this written material after the interviews had concluded, to further elucidate psychomotor skills that may be explicitly stated or implied by this written information. This information was identified only by institutional type. Any reference to the institutional name within the documents was rendered unreadable through the use of a “white-out” product. Only the institutional type was noted through coding (i.e., IA, IB, IC, IIA, IIB, IIC).
Data Analysis

Faculty Interviews

The content of the audiotaped recordings of the six interview sessions was transcribed and analyzed by the researcher. No identifiers were used in the transcript. Any inadvertent use of a first name was “whited-out” on the hard copy after the audiotapes were transcribed. Processing this qualitative data involved the task of categorizing information (Lincoln & Guba, 1985). It is the process of categorizing through the development and use of coding that brings together units or pieces of information into some type of relationship (Miles & Huberman, 1994).

The analytic process used followed a similar course described and recommended by Marshall and Rossman (1994): (a) organize the data; (b) generate categories, themes and patterns; (c) test emerging hypotheses or assimilations against the data; (d) search for alternate explanations of the data; and (e) write the report.

First, the data were organized by developing a matrix of responses to the interview questions by faculty members from each institution. This helped the researcher by placing the data in a user-friendly format where responses were easily summarized and compared.

Second, the researcher attempted to generate categories, themes and patterns from the information. The data generated by interviews and other qualitative methods is voluminous (Patton, 1990). Reading and re-reading the data numerous times was a requirement for the researcher to be able to identify salient themes.
recurrent ideas or patterns of belief. Although there was a set of interview questions used as a guide, there was, without exception, much discussion that delved deeper into the subject of nurses’ psychomotor skills and testing in this area. These discussions and responses to the questions created categories of information that are presented in Chapter IV of this dissertation. A variety of computer software packages exist to facilitate the organization and analysis of qualitative data. However, with the vast amount of information received during the interviews and the many directions that the discussions took as a result of the dynamic interaction between the faculty members, the choice was made to analyze the qualitative data myself in order to minimize the potential for the loss of any of this rich data.

Third, the researcher tested the emerging themes and patterns against the data itself. One of the ways this was achieved was by searching through the data for consistency of response by individual faculty members. Did the faculty member appear to hold the same view on a particular issue or area of inquiry throughout the interview? Does the curricular material submitted reflect those beliefs? Additionally, during this phase a determination had to be made as to whether or not the data acquired actually helped in answering the original research question: “What are the critical psychomotor skills that entry-level registered nurses should possess as a requirement for licensure, in the opinion of nurse experts?” (i.e. Can the boundaries of the domain be identified?) Determining whether the data are useful in illuminating the question being explored and whether or not the information is central to the
The unfolding story is a key component to this part of data analysis (Marshall & Rossman, 1994).

The fourth step in the analytic process was to search for alternative explanations of the data. As themes and patterns emerge within the data it is imperative that the researcher engage in challenging the linkages among them (Marshall & Rossman, 1994). This was done by reading through the interviews again and actively seeking other possible meanings for what was being expressed by each participant.

The final step in data analysis was writing the report. The approach used for this phase was to present the participants' perspectives (along with the respective curricular material from each institution), as if telling a story. The perspective of the participants and their respective institutions provides the structural framework for the report and is one of the models suggested and elaborated upon by Taylor and Bogdan (1984) for this type of reporting.

Curricular Documents

Similarly, the content of the syllabi and program objectives (n = 22) from each institution was analyzed following the completion of all of the interviews. Content analysis enables analysis of a large volume of written information in terms of what words or concepts are actually used or implied (Carley, 1993). It was anticipated that, at least in some of the syllabi and program objectives received from the six institutions, the psychomotor skills required as exit outcomes from a specific course
or from the program itself would be explicitly stated. The researcher systematically reviewed the content of the medical/surgical (adult health), maternal/child (pediatrics, obstetrics) and psychiatric syllabi of each of the educational institutions curricula. Each psychomotor skill listed within the objectives or within any other portion of the syllabi was recorded for each institution in a listing format, including the number of times in each document the specific skill was stated. It is important to note that the level of detail between syllabi varied greatly between institutions and even between courses at the same institution. Several of the syllabi were over 150 pages in length whereas others were 20 pages or less. Some provided detailed description of the content presented in each lecture and lab session whereas others provided a general overview of the content areas to be covered in lecture and lab sessions over the semester.

Synthesis

The purpose of this study was to attempt to establish the boundaries of the domain of psychomotor skills for entry-level registered nurses. The coding and analysis of both the interview data and the curricular material were believed to lead the researcher to what the themes are and facilitate future research into this area of test development. Basically, the question to be answered, at this point was: Is there consensus regarding what constitutes the domain boundaries for entry-level psychomotor skills for registered nurses? The answer to this research question was to be determined through the analysis of faculty interview data and the curricular
material provided by the faculty. If the themes were found to be clear and agreed upon by the faculty (i.e., boundaries of the domain were identified), then future research could proceed toward identifying the structure of the domain and developing a table of specifications. If, on the other hand, the themes were ambiguous or there was not consensus among the faculty interviewed and the curricular materials gathered (i.e., boundaries of the domain were not identified) then research could not proceed in that direction.

Another question that emerged as a result of the discussions among the faculty dyads and was ultimately explored through this study was: Should psychomotor skills testing be a requirement for licensure of registered nurses?
CHAPTER IV

RESULTS

Overview

This study examined the domain of psychomotor skills for entry-level nurses, specifically undertaking the task of identifying the boundaries of this domain as conceived of by faculty experts. Secondarily, the study looked at perceptions among faculty experts as to whether or not testing, as a requirement for licensure, should be done in this domain of learning.

The purpose of this chapter is to provide the reader with a description of the findings. Using the findings, the research questions are answered. This chapter is organized by first presenting a description of the sample, then the results of the two major areas of inquiry: (1) consensus regarding the boundaries of the domain, and (2) faculty perceptions regarding the possibility of testing in this area in the future. One could conceptualize the first area as being the "Could we?" portion of inquiry and the last area as the "Should we?" portion of inquiry for the study. That is, "could we" develop a test—meaning we are dependent upon first delimiting the domain. If we could define the domain and establish its boundaries then, yes, we could. And "should we" develop a test for licensure in this area—meaning what are the benefits and barriers to doing so. As with any high-stakes test, this is controversial. If the
perceived benefits were to outweigh the barriers then, one could make the argument that, yes, we should.

Description of Sample

A total of 12 nursing faculty, two each from six different educational institutions were interviewed for the study. Three of the educational institutions were community colleges and three were universities. The average number of graduates annually from each program varied. One program was relatively small, three were moderate in size and two were very large.

Of the 12 faculty members, six had responsibility for teaching the medical/surgical content in the curriculum. three taught the maternal/child content and three taught the psychiatric content. It should be noted that the names of the nursing courses within each program most often were not designated "medical/surgical," "maternal/child," or "psychiatric" nursing. Instead course titles such as "Nursing Care of the Person with Mental Illness Across the Lifespan," "Integrative Care of the Perinatal Family,” or "Nursing Care Related to Health Deviations in Adults” were found in the syllabi obtained. For the purposes of this study, these courses were categorized based on their content as psychiatric, maternal/child, or medical/surgical nursing courses.

All of the interviewees had over 20 years of experience in nursing and all had earned M.S.N. degrees with one interviewee having completed a Ph.D. With respect to experience in teaching nursing, one faculty was relatively new to teaching, while
six of the faculty were very experienced with over 20 years experience. The high level of experience as well as the differences in areas of clinical expertise among the faculty served to improve the depth and breadth of information obtained during each interview. The faculty members in each dyad often posed questions to each other and even to me during the interview. Although there were questions used to guide the interview, often the faculty members engaged each other independent of the question. Discussion diverged into the problems experienced in teaching psychomotor skills and the advisability of proceeding toward testing in this domain. In areas of agreement the faculty members often helped to clarify and further elaborate upon points made by the other and in areas of disagreement they would not hesitate to argue their point. This interaction added greatly to the richness of the information gathered.

Consensus Regarding Boundaries of Domain ("Could We?")

Psychomotor Domain—Interactively Defined

There were three questions that were posed during the interviews to each faculty dyad that related directly to their perceptions regarding the boundaries of the domain of entry-level psychomotor skills for registered nurses. These were as follows:

1. Does a well-defined domain currently exist?

2. What specific psychomotor skills do you believe are critical for entry-level nurses to have?
3. What skills should NOT be included in the domain?

However, due to the inherent interactivity of this type of data collection method, faculty members frequently brought in their own questions or initiated new directions to the discussion. In fact, it was faculty participants who initiated the “should we” portion of the inquiry when they voiced concerns during the interviews regarding possible problems related to testing in the psychomotor domain.

Of the 12 faculty members, four did not believe that a well-defined domain exists, seven were unsure and one did not respond to the question. The responses to the questions that followed concerning what they would consider to be within the domain of entry-level skills and what would fall outside of it yielded some similarities among faculty, but also a fair amount of divergence of views. A list of skills to select from was not provided to the faculty members, as it was the intent of the researcher to allow for complete openness and free flow of thought and discussion without the restriction that a listing of skills might have imposed. (The coding system used to categorize skills and a list of the skills specified by the faculty interviewees are found in Appendix G and Appendix H, respectively.)

The results showed consensus among faculty on two general areas or “families” of psychomotor skills, regardless of the type of program or content area that the faculty member teaches. These families of skills included basic physical assessment and medication administration. Basic physical assessment skills, which included observation, auscultation, palpation and vital signs, was specified by all 12 faculty members during the interviews as being requisite to entry-level practice in
nursing. Medication administration, including oral, sublingual, subcutaneous, intramuscular, intravenous, otic and ophthalmic, was specified by 11 of the 12 faculty experts. The next most consistently mentioned skill was Foley catheter insertion and care, with seven faculty members believing that this skill is a part of the domain. It was discussed as a discrete skill, rather than being placed in the context of other related skills. The remaining skills cited were specified by fewer than 6 of the 12 faculty members, which is less than the 65% frequency rating for retaining skills in the Alavi, Hoh & Reilly (1991) study. Therefore, these skills were not considered to be within the entry-level domain.

Concerning what psychomotor skills, although important to the overall practice of nursing, fall outside of the domain of entry-level practice, faculty tended to hesitate in their responses and listed far fewer skills. However, there were two families of skills cited here that also deserve further attention. These included critical care skills and specific machinery or equipment. Critical care skills, including such things as cardiac monitors, ventilators, arterial lines and hemodynamic monitors were cited by five faculty members as definitely falling outside of the boundaries of the entry-level domain. Three faculty members also believed it important that specific machinery or equipment that may be unique to a certain hospital environment or location should not be included in the domain. The skills perceived by the faculty as falling within and outside of the psychomotor domain of entry-level nursing are shown in Table 1.
Interestingly, four faculty interviewees believed that the skill of venipuncture, including IV starts and blood draws, falls outside of the domain while another four thought it fell within the domain. Another interesting finding, in reviewing the responses, was that two of the three psychiatric nursing faculty (one from a community college and one from a university) stated that interpersonal communication skills are necessary to entry-level practice and are a part of the psychomotor domain. There was some degree of disagreement from the medical/surgical faculty counterpart of the dyads. An example follows from one of the community college interviews:

**Psychiatric Faculty:** "I would also include—let’s say assessment that has to do with the affective and emotional aspects of the client in terms of dealing with the mental assessment...You have to communicate well."

**Medical/Surgical Faculty:** "I don’t see that as a psychomotor skill."

**Psychiatric Faculty:** "I do. I’m sure that there are some we will just disagree on."

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**Table 1**

Faculty Specified Entry-Level Skills

<table>
<thead>
<tr>
<th>Skills Within the Domain</th>
<th>Skills Outside the Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication administration family</td>
<td>Critical care skills family</td>
</tr>
<tr>
<td>Physical assessment family</td>
<td>Machinery/equipment family</td>
</tr>
<tr>
<td>Foley catheter insertion and care</td>
<td></td>
</tr>
</tbody>
</table>

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Another example of this type of interaction occurred at a university:

Psychiatric Faculty: "But the communication takes on a slightly different aspect going beyond, say, patient or family education. It is our major therapeutics tool—is communication with the patients—so it takes on a little more prominence for us."

Medical/Surgical Faculty: "Is that psychomotor though?"

None of the medical/surgical or maternal/child faculty members interviewed specified communication skills as a psychomotor skill, either within the domain or outside of it. It appeared that the psychiatric faculty was aware that if this type of research eventually were to lead to testing, the psychomotor domain would inevitably become very important in nursing curricula and they wanted to be sure that the development of communication skills did not ultimately lose out. Clearly they had a vested interest in registering their perception as to the importance of communication to the profession of nursing.

During the analysis of the responses, the researcher attempted to determine how the skills specified by faculty could be logically categorized to make sense of what clearly seemed to be within the domain of entry-level psychomotor skills for nurses (e.g., physical assessment and medication administration) and what clearly seemed to be outside of the domain (e.g., critical care skills). Since the NCLEX-RN® Test Plan (see Appendix F) had been used to facilitate discussion it was believed that it might be utilized as a framework for these skills. The four broad categories of the NCLEX-RN® Test Plan are: (1) Safe, Effective Care Environment; (2) Health
Promotion and Maintenance; (3) Psychosocial Integrity; and (4) Physiological Integrity, with subcategories under each of these. The skills specified by faculty as being within the domain and those specified as being outside of the domain all fell under the category of Physiological Integrity. Therefore, the application of this type of framework did little to explicate why some skills were chosen to be in and others out. In further analysis, it was determined that those skills that fell within the domain were skills that entry-level nurses would be called upon to perform early and frequently in their careers as nurses. It appeared that the criticality of a skill had less to do with it being perceived as falling within the entry-level domain than the frequency upon which one would be required to utilize it. It is reasonable to expect that the majority of patients or clients, regardless of health-care setting, will require a physical assessment as well as some type of medication administration during their time in that setting. Likewise, Foley catheters continue to be commonly used, particularly in acute health-care settings. In contrast, it is a minority of the overall patient/client population in almost any health-care setting that will require more complex procedures, such as tracheostomy care, chest tube maintenance and hemodynamic monitoring. Several faculty members from different educational institutions made statements that supported such a determination:

Clinical practice has changed so much and continues to change. It's difficult to know what skills to include. I learned to do things when I was in school that are not done any longer. We need to be concerned with teaching those skills that are done frequently now.

There are so many important psychomotor skills. We should try to have students responsible for performing those that they will be doing the most, wherever they might practice when they graduate.
Psychomotor Domain—Document Defined

Syllabi (n = 22) from the medical/surgical, maternal/child and psychiatric courses, including course and program objectives, were collected from each of institution. This represented literally volumes of information from the various educational institutions. The syllabi length and level of detail varied greatly between institutions and even between courses within the same institution. Some were over 150 pages in length and others were less than 20 pages. Some provided explicit detail into each lecture and lab session’s content and objectives, while others merely provided an overview of the content areas to be covered in the course. The curricular data set was obviously not interactive, unlike the interview data. Nevertheless, by its very nature, this data set was able to provide a greater breadth of information since it included information on the content covered in each of the medical/surgical, maternal/child and psychiatric nursing courses of all six of the educational institutions in the study.

The researcher, reading each syllabus page by page, looked for psychomotor skills to be learned in each course. The same coding scheme used for analysis of interview data was used for this analysis also (see Appendix G). The researcher developed a listing for each program by course as to the psychomotor skill cited in the syllabi and objectives and then tallied the number of times it was presented throughout that particular program’s courses. The frequency was deemed important, as it was believed to be a fair representation of the value placed upon learning that
particular skill by the faculty of that program. (The psychomotor skills specified in the curricular documents for each institution are presented in Appendix I.)

The psychomotor skills that clearly predominated the course syllabi and program objectives were physical assessment and medication administration. These are the same two families of skills that were also cited during faculty interviews as falling within the entry-level psychomotor domain. Physical assessment and medication administration were contained in the learning objectives in all of the educational programs with the exception of one university, which did not specify any psychomotor objectives whatsoever in its syllabi or objectives. Not only were the skills of physical assessment and medication administration cited, they were specified with much greater frequency than any of the other skills within the syllabi and objectives. Intravenous fluid administration and application of principles of sterile technique were contained in three of the six program’s syllabi and objectives. Again, this reaffirms that the faculty and directors/deans of these nursing programs tend to value and therefore include in their curricula those psychomotor skills that have a greater frequency of performance rather than those skills with greater criticality but infrequent performance.

One educational institution did not specifically address the psychomotor area of learning in its course syllabi whatsoever. Learning objectives were all cognitive or affective in nature. The closest this nursing program came to specifying a psychomotor objective was to use vague and ambiguous terms, such as: (a) Safely
implements prescribed regimen of care, and (b) Performs psychomotor skills in a safe and effective way.

Neither of these statements allows for understanding of just which psychomotor skills the student is to learn during their education at that particular institution, nor were any such skills described in the course syllabi.

The number of skills or categories of skills specified by the institutions ranged between three and seven, with three of the six institutions listing only three skills.

**Consistency Between Data Sets**

The purpose of gathering and analyzing both interview data and curricular data for this study was to provide as complete information as possible and as a means for triangulation of the information received. Triangulation, in this case the use of more than one data gathering method, serves to bring more than one source of data to bear on a single point. As such, it helps to corroborate or further illuminate the research question (Marshall & Rossman, 1995).

The findings of the interview data analysis compared to the findings of the curricular information analysis are similar with respect to the psychomotor skills of physical assessment and medication administration. Both sources—faculty and syllabi/objectives—place emphasis on these skills. Not only do faculty believe that they are critical to entry-level practice for registered nurses, but the skills are prominent within the course syllabi and objectives of their respective programs. This information from the curricular documents helps to triangulate the data thus
increasing the validity of the findings. Interestingly, however, the next most frequently specified skill by faculty members was Foley catheter insertion and care, yet only two of the seven programs include this in any of their course objectives or syllabi. This information is presented in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Skills:</th>
<th>Medication Administration Family</th>
<th>Physical Assessment Family</th>
<th>Foley Catheter Insertion &amp; Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1</td>
<td>Mat./Child</td>
<td>Mat./Child</td>
<td>Ø</td>
</tr>
<tr>
<td>#2</td>
<td>Mat./Child</td>
<td>Mat./Child</td>
<td>Med./Surg.</td>
</tr>
<tr>
<td>#3</td>
<td>Mat./Child</td>
<td>Mat./Child</td>
<td>Med./Surg.</td>
</tr>
<tr>
<td>#4</td>
<td>Mat./Child</td>
<td>Mat./Child</td>
<td>Ø</td>
</tr>
<tr>
<td>#5</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>#6</td>
<td>Mat./Child</td>
<td>Mat./Child</td>
<td>Ø</td>
</tr>
</tbody>
</table>
It also appears that despite the fact that a variety of skills or categories of skills are perceived by some of the faculty members as being critical to entry-level practice for registered nurses, only a few of these mentioned skills are being incorporated into the learning objectives of these programs. For example, one of the faculty dyads interviewed stated that oxygen administration (via nasal cannula and mask) should definitely be included in the entry-level psychomotor domain yet a content analysis of all of this institution’s curricular documents yielded no evidence of this skill in the learning objectives or content to be presented. Similarly, a dyad from another institution discussed the importance of nasogastric tube insertion and feeding being included in the entry-level psychomotor domain, yet this skill was not presented in that particular institution’s curricular material. It is quite possible, however, that some of these skills are not explicitly specified in the syllabus yet are an implicit expectation for the students within the program. Clearly, most students acquire knowledge, skills and abilities in the psychomotor domain beyond that which is formally written in the syllabi just as they do in the cognitive and affective domains of learning.

Perceptions Regarding Psychomotor Testing for Licensure ("Should We?")

During the first two interviews of faculty dyads, discussions evolved regarding what testing in the entry-level psychomotor domain as a requirement for licensure might mean for the profession of nursing. The faculty being interviewed initiated this area of discussion. In subsequent interviews, if the faculty did not
initiate the subject, the researcher would broadly query with the following: What are your thoughts and beliefs regarding the possibility of testing psychomotor skills as a requirement for licensure?

Additionally, three other questions were posed in an attempt to promote further exploration on this subject. These questions are as follows:

1. Do you believe in general that registered nursing programs spend enough time developing psychomotor skills in their students?

2. Do you believe that registered nursing programs are already testing/evaluating these (psychomotor) skills sufficiently in their students prior to graduation?

3. Imagine yourself as a health care consumer. You are hospitalized and a new nurse who graduated about three months ago is assigned to your care. Knowing what you know as a faculty member about the preparation and competency of graduating nurses, how comfortable and confident are you as the patient in this type of situation?

Benefits and Barriers to Testing

In response to the first question, the perception of the nursing faculty interviewed was that it would be a good idea to do psychomotor testing as a requirement for licensure, but would be difficult to implement. They cited numerous problems with instituting such testing. Faculty who taught psychiatric nursing each expressed concern that it would likely negate, to some extent, the importance of the affective domain of learning.
Perceived barriers specified by the faculty in proceeding toward this type of testing included: labor intensity, cost, logistics, variances in how procedures can be performed correctly, and difficulty in establishing which skills should be included (i.e., defining the domain and its boundaries) due to the ever-changing nature of health care in our society. Perceived benefits specified by the faculty to proceeding toward testing included: (a) increased focus by faculty on teaching psychomotor skills, (b) increased incentive by the students to practice and learn psychomotor skills while in school, and (c) better understanding by faculty, students and employers as to what graduates of registered nursing programs should be able to do upon entering the nursing profession.

**Themes Related to Clinical Preparation of Students**

Some of the other issues brought up and discussed by the faculty dyads centered on the belief that graduates from nursing programs are less clinically prepared for actual nursing practice than they had been in the past. Exploration of the causes and contributing factors to this unfortunate educational outcome elicited five themes from the faculty. Figure 3 presents a condensed version of these factors and their outcomes, as perceived by the interviewed faculty.

The five themes that emerged during the interviews are shown on the left of the diagram in Figure 3. Although they are not directly related to the research question, they were of interest because they may have had an impact on how the faculty members developed their beliefs regarding what skills fall within and what
Faculty spends decreased time on psychomotor
Lack of consistency in availability of skills
Other educational demands on time
Minimal evaluation of psychomotor development
No testing of psychomotor for licensure

Students spend less time learning psychomotor skills

Graduates less clinically prepared
Decreased confidence in nursing care by health care consumers

Figure 3. Themes Expressed by Faculty Related to Current Status of Psychomotor Preparation and Evaluation of Nursing Students.

Skills fall outside of the entry-level psychomotor domain. There was general agreement that there is less time spent now in teaching psychomotor skills to student nurses than in the past, with only one of the interview dyads stating that their faculty is spending more time in this area. All agreed that, in comparison to cognitive learning, there is much less time spent on the evaluation of the psychomotor development of their students. Discussion ensued in all of the groups regarding the other demands on instructional time and the lack of any real consistency in the availability of skills for students at clinical sites. All of these factors lead to students spending less time learning psychomotor skills while in their respective nursing programs. The faculty interviewed believed that all of these things lead to graduates from nursing programs being less clinically prepared to practice nursing, particularly in acute care settings such as hospitals. This ultimately results in a decreased level of confidence in nursing care by health care consumers. The following paragraphs describe in greater detail the views of the faculty interviewed.
Several faculty members stated that formal check-offs (of psychomotor skills) have been removed from their curricula with the exception of their beginning level courses (i.e. Fundamentals of Nursing). None of the schools were doing formal evaluation or testing of psychomotor skills as students exited the programs. Various reasons were cited for this, all generally related to a lack of time for such skill evaluation due to other competing educational demands on faculty and student time. Some of the statements made concerning this include:

It seems there continues to be more and more to cover in lecture on theory. The actual clinical component takes a hit.

Graduates are not as prepared clinically as they were in the past. There seems to be less emphasis on this area by faculty and therefore it's less valued also by our students.

If it were a part of testing for licensure, we’d spend more time on it— I’m sure of that!

Faculty also discussed the overall decrease in the number of acute care hospital beds. The result has been fewer inpatients and those that are hospitalized are actually more acutely ill than in the past. Thus, the availability of skills for students in these settings has also decreased. Many of the faculty expressed concern that ultimately the psychomotor development of a nursing student is really dependent upon where they happen to have been placed for their clinical rotations during their education.

The entire medical/surgical and maternal/child faculty believed that there was less time spent and fewer opportunities now to develop psychomotor skills, for the
reasons described in Figure 3. However, not only did the psychiatric faculty list fewer skills as being critical to entry-level practice than did medical/surgical or maternal/child faculty, they also expressed greater concern over the possibility of future testing in this area. Some of their statements follow:

For me, the whole psychomotor area is a bit blurry...I think what gets the short shrift is the affective area.

I think we just have to trust the schools. (regarding students’ psychomotor preparation)

I would be very concerned that it not be too focused on equipment.

I don’t think we should be focusing so much on psychomotor skills. Other health care workers can do those.

Summary

There was definite agreement among faculty that basic physical assessment and medication administration is within the domain of entry-level psychomotor skills for registered nurses. The rest of the skills cited were expressed by seven or less faculty members and thus, were not designated by the researcher as being within the domain’s boundaries at this point.

Analysis of course syllabi and program objectives validated the placement of basic physical assessment and medication administration within the domain, as these were clearly specified as learning objectives in all but one program’s curricular material.
Faculty also discussed, at great length, their beliefs regarding current psychomotor preparation and evaluation of students along with what this has meant to their own confidence in the nursing care they would likely receive if hospitalized. Overwhelmingly, the faculty (with the exception of two of the three psychiatric faculty) believe that programs spend less time and place less emphasis on this area of learning now than in the past. All faculty expressed concern that the level of preparation of new graduates is not such that they would feel confident about receiving care from one if hospitalized. Several faculty also expressed the belief that if formal testing of psychomotor skills was introduced, either at the program level or as part of testing for licensure, then more faculty would see the value in spending more time and effort in this area, as would students. As one university medical/surgical faculty interviewee expressed, currently there seems to be no impetus for students to learn the psychomotor skills because they are not held accountable at the program level or at the professional entry-level via the licensure examination. The majority of faculty expressed belief that there is so little vigilance now with respect to some of these skills that potentially serious mistakes are occurring that place health-care consumers at significant risk.
The purpose of this chapter is to discuss the implications of the study's findings, the limitations of the study and finally to present recommendations for future research. In essence, the intent of this chapter is to discuss what the findings of the study mean for the profession of nursing.

Importance of "Could We" Findings

Faculty Agreement

The psychomotor skills of physical assessment and medication administration clearly achieved the consensus of faculty participants as being within the domain of entry-level psychomotor skills for registered nurses. This finding was also validated by systematic content analysis of course syllabi and objectives. The overwhelming agreement about these two families of psychomotor skills among faculty in this study is consistent with previous research in this area (Alavi et al., 1991; Sweeney et al., 1980) where skills from these families were also found to be important to entry-level practice. Skills that fall into the family of physical assessment and the family of medication administration were found to be essential for graduates to have prior to entering the profession. Of the 54 psychomotor skills specified in these studies, 17 of
them can readily be placed into one of the families of skills that emerged in this study (see Appendix J). One must keep in mind that in both the Alavi et al. and Sweeney et al. studies, participants included both faculty and nursing service personnel. This could account for the greater number of skills being perceived as falling within the entry-level psychomotor domain. In both studies, nursing service personnel tended to view many more skills as essential than did the faculty.

The faculty agreement in this study lends support to the idea that there are skills which faculty can and will agree upon as being a part of the domain, despite the type of program in which they teach (A.D.N. or B.S.N.) or their specialty area. These identified skills have the common characteristic of being some of the most frequently performed skills of nurses regardless of the practice setting. Even though other skills such as central venous line dressing changes, chest tube maintenance or tracheostomy care undoubtedly have a greater potential for inflicting harm if done improperly (i.e., higher criticality) there was not agreement among the faculty that these skills are part of the entry-level psychomotor domain.

Faculty Disagreement

As expected, there also was some difference in how faculty from different specialty areas viewed the whole focus on psychomotor skills and testing. Faculty members who taught the psychiatric portion of the curriculum were less inclined to agree that psychomotor testing was necessary. This most likely stems from the fact that the practice of psychiatric nursing itself requires far fewer psychomotor skills
than medical/surgical or maternal/child nursing. This finding suggests that if further research is directed this way (i.e., toward establishing the domain and its boundaries) and there is movement toward inclusion of psychomotor skills in licensure testing, there is likely to be a continued divergence of views, particularly among psychiatric nursing faculty. However, it will be wise for all involved to remain cognizant of the fact that all nurses entering the profession, regardless of where they will ultimately practice nursing, must take the same licensure examination.

Consistency Between Data Sets

As stated previously, there was consistency between the faculty interview data and the content analysis of the curricular data concerning the psychomotor skills of medication administration and physical assessment as being within the domain of entry-level psychomotor skills for registered nurses. These two sets or “families” of skills clearly represent a portion of the psychomotor domain for entry-level nurses, at least as agreed upon by faculty subject matter experts.

Implications of “Should We” Findings

Impact on Curriculum

The fact that many of the faculty believed that if, indeed, there was testing of psychomotor skills for licensure there would then be greater emphasis placed upon instruction in this area by faculty suggests that testing drives the curriculum. Many of the medical/surgical faculty believed that this would create an incentive for change.
which would benefit the students and ultimately health care consumers. For some it may be uncomfortable to believe that, as a profession, nursing would not independently structure their educational curricula to reflect the extreme importance of the psychomotor domain of learning, without the threat of testing. However, with all of the other demands on educational time that have gradually moved into educational programs, an outside force such as licensure testing may provide a strong impetus for change in this area.

**Beginning a Professional Dialogue**

One of this study's possible results may be to begin opening up a dialogue among nursing faculty and nursing service personnel as to what psychomotor skills students graduating from registered nursing programs at community colleges or universities should have in order to provide care for their patients. Assumptions need to be challenged and many questions need to be addressed. Can we as a profession agree on what constitutes the entry-level psychomotor domain for all registered nurses? Isn't it important that we do this, in the interest of protecting the public? Indeed, are we not morally and ethically bound to do so? Can we continue to pretend that the NCLEX-RN®, as it exists now, fully tests all domains of learning—cognitive, affective and psychomotor—each of which is critically important to the practice of nursing? If we are to be accountable for our own profession, then we must begin to consider and discuss these issues as professionals.
Limitations

There were limitations to the study in several areas including sampling methods, instrumentation and researcher effect. These are presented in the following paragraphs.

A methodological limitation of the study was not only the non-random, small number of faculty participants but also the fact that there were only six educational institutions represented from a regionally confined area of the United States. Although the intent of this research was not to generalize the findings, a larger sample from more institutions of higher learning that were selected from more geographically diverse regions would have likely improved the representativeness of the data obtained.

An interview protocol that was developed by the researcher was used as a general guide for the collection of faculty perception data. The interview questions, although reviewed by one of the researcher's nursing faculty colleagues for content validity, had not been formally tested for reliability and validity. However, since the study was intended primarily for exploratory purposes and as preliminary work for more descriptive pursuits in the future, this was not seen as a major flaw.

It is possible that because the faculty members were not provided with a list of skills to select from during the interview that this affected the results obtained. Faculty may have indeed believed, for example, that wound care (including dressing changes, suture/staple removal and wound irrigation) should fall within the domain but simply did not think of that skill during the time of the interview. However, this
did not appear to affect the results when compared to previous studies where lists of skills were provided (Alavi et al., 1991; Sweeney et al., 1980).

As with any study, there was potential for the researcher's presence to affect the data collected—particularly during the interviews. The researcher may, especially initially, create behavior or responses in participants that would not have occurred ordinarily (Miles & Huberman, 1994). The potential for this effect was minimized by having first contacted each participant by telephone to explain the study and to establish an initial relationship. Making sure that the researcher's intentions are unequivocal for informants helps to avoid biases that stem from researcher effects on the site (Miles & Huberman, 1994).

Also, there was potential for researcher bias in the analysis of interview data since human beings always bring their own lenses through which they view and interpret information they receive. I maintained awareness throughout the interview process, as well as the analysis that I hold strong views with regard to the subject of testing the psychomotor skills of nurses. My bias is that, as a profession, we are accountable for the competence of nurses entering the field—not only in the cognitive and affective domains but also, and with equal importance, in the psychomotor domain. While my interest and beliefs in this area had the real potential to affect the interactions that occurred within the interviews as well as how I analyzed the transcript data, it also served to keep me interested and engaged in the research I was conducting. Triangulating the data helped to minimize the possibility of my bias affecting the results. In addition to the interview data collected regarding faculty
perceptions of what skills constitute the psychomotor domain for entry-level nurses. Actual objective data in the form of course syllabi and objectives were collected to determine if these same identified skills were also present within this separate data source. The analysis of this data used a more objective approach to analysis in that the frequency of the listing of each specified skill within each course in each program was determined and recorded. This triangulation helped to corroborate the findings of the interview data, thus decreasing the possibility that researcher bias had a major effect on this analysis.

Recommendations for Future Research

The current study should encourage preliminary discussion among nursing professionals concerning the establishment of the boundaries for the psychomotor domain of entry-level skills for registered nurses. Future research should focus on studies that confirm or refute the psychomotor skills of physical assessment and medication administration as existing within this domain. Also, the other skills perceived by some faculty as existing within the domain but that did not achieve consensus within this particular study should be explored further. A larger sample of nursing faculty from all regions of the country would also add to the credibility of future research findings. Including nursing service personnel as subject matter experts outside of academia in future research would also contribute an additional perspective concerning what constitutes this domain. Additionally, future research should also involve systematic observation of job performance of entry-level nurses.
in a wide variety of health-care settings such as hospitals, clinics, physicians' offices, schools, home-health agencies and industry.

Research should not only continue to focus upon defining the domain, but also on exploring nursing professional's beliefs regarding the advisability of proceeding toward such testing as a requirement for licensure. Exploring this area would help to elucidate possible pitfalls to any future implementation of this type of testing. This research should involve not only those professionals who hold faculty positions in nursing but also those who are in nursing service. Some skills that faculty believe to be essential for practice may be viewed by nursing service personnel as no longer relevant to practice (Reilly & Oermann, 1992). Thus, it is important that nurses who are actually "at the bedside" have a major voice in future research. Considering the fact that it is most often a job or practice analysis that provides the primary means by which a content domain is defined (AERA et al., 1999), it is logical to fully utilize nurses who are actually providing nursing care – instead of relying solely on nursing educators.

If future research is able to uncover more fully the boundaries of the domain, the process of test development can proceed. The next step will be to identify the major dimensions of the skills that are in the domain so that the structure can be defined through a process of survey research, factor analysis and the building of the table of specifications.

Since the purpose of licensure is to protect the public, it is my belief that it is not only desirable but also necessary that any licensure examination emphasize
activities that would pose a serious threat to clients if they were omitted or done improperly (Kane, Kingsbury, Colton & Estes, 1989). It follows then that the psychomotor domain should have a prominent place within the nursing licensure examination. However if, as a profession, nursing does not move toward testing (either because the entry-level domain of psychomotor skills cannot be defined or because the perceived barriers are deemed to outweigh the perceived benefits), then there likely will continue to be no common standard across nursing programs of what should be taught in the psychomotor area of the curricula. Clearly, this is not an acceptable position in which nursing should remain.

Considering the rather dramatic changes that managed care has created in hospital and other health care settings such as an overall increase in the complexity of care required by more acutely ill hospitalized patients, the decreased length of hospital stays and the decreased reimbursement for services, it would appear that it is now more essential than ever before that consumers be assured that entry-level nurses possess the necessary skills—cognitive, affective and psychomotor to practice safely and effectively in today’s health care environments.
Appendix A

Human Subjects Institutional Review Board Approval
Date: April 19, 2001

To: Mary Anne Bunda, Principal Investigator
   Joni Jones, Student Investigator for dissertation

From: Michael S. Pritchard, Interim Chair

Re: HSIRB Project Number: 01-03-13

This letter will serve as confirmation that your research project entitled "Specifying the Psychomotor Domain of the Construct of Nursing Competence: Phase One" has been approved under the expedited category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: April 19, 2002
Appendix B

Phone Script for Initial Contact of Prospective Faculty Participants
Hello, my name is Joni Jones and I am a Ph.D. candidate in the department of Educational Studies at Western Michigan University. I am also an R.N., M.S.N. I am conducting a research study for my dissertation that investigates the psychomotor domain of entry-level nursing competence. The first phase of my research will involve attempting to determine the boundaries of this domain by interviewing nursing faculty from three B.S.N. programs and three A.D.N. programs and by collecting curricular material of these programs from those faculty interviewed. I have selected (name of institution) to be included and would like to know if you would be interested in participating. Participation in the study would involve a 60-minute interview with you and one of your colleagues in the nursing department at your institution. The interview would focus on your beliefs and perceptions concerning what comprises necessary entry-level psychomotor skills for registered nurses. It would also involve providing me with program objectives and course syllabi for the medical-surgical, maternal-child and psychiatric components of your program. Of course, confidentiality of your responses and the curricular material that you provide would be maintained.

Do you think that you would be interested in participating in the study?

What would be a convenient date and time for me to come to (name of institution) to provide you with additional information concerning the project and to review the consent form with you. If you do consent to participate, I would like to conduct the interview at this time also.

Thank you so much for your time and your willingness to consider participating in this research project. I will send you a letter within the next several days confirming our phone conversation, as well as the date and time that I will meet with you. Please feel free to contact me either via e-mail (jonesj@kellogg.cc.mi.us) or phone (616-964-1257) if you have any questions or concerns.
Appendix C

Informed Consent Document
I have been invited to participate in a research project entitled "Specifying the Psychomotor Domain of the Construct of Nursing Competence." This research is intended to investigate which psychomotor skills graduates of registered nursing programs should possess as a requirement for licensure and subsequent entry into the profession. This research is Joni Jones' dissertation project.

My agreement to participate in the study involves taking part in a one-hour interview with the student investigator (serving as facilitator), a nursing faculty colleague from my educational institution and me. This will take place here at ___________________. The focus of the interview will be on my beliefs and perceptions concerning what comprises necessary entry-level psychomotor skills for graduates of nursing programs who are entering the profession. The interview, in its entirety, will be audiotaped and the researcher will transcribe this audiotape at a later date. I will be asked to provide curricular material from the nursing program in which I teach, including program objectives and syllabi from the medical-surgical, maternal-child and psychiatric components of the program.

As in all research, there may be unforeseen risks to the participant. If an accidental injury occurs, appropriate emergency measures will be taken; however, no compensation or treatment will be made available to me.

One way in which I may benefit from this research is that I will have the opportunity to discuss my beliefs concerning psychomotor skills with respect to entry-level nurses. The discussion of this topic in a small group interview format may help me to clarify and further develop my views on this subject. Additionally, the nursing profession may ultimately benefit from the knowledge gained through this research.

All of the information collected from me (interview and curricular material) is confidential. This means that my name and the name of the educational institution

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that employs me will not appear on any papers on which this information is recorded. (Faculty and institutional names will be deleted from curricular material provided by using "white-out" or a similar product.) Transcribed data will use codes to identify the institution and faculty members, and Joni L. Jones will maintain a separate master list with the names of the participants and their institution and corresponding code numbers. Once the data has been collected and analyzed the master list will be destroyed. All other data will be retained for at least three years in a locked storage unit in the office of the principal investigator.

I may refuse to participate or quit at any time during the interview or collection of curricular material without prejudice or penalty. If I have any questions or concerns about this study, I may contact either Joni L. Jones at (616) 964-1257 or Dr. Mary Anne Bunda at (616) 387-3886. I also may contact the chair of the Human Subjects Institutional Review Board at Western Michigan University at (616) 387-8293 with any concerns that I have.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board, as indicated by the stamped date and signature of the board chair in the upper right corner. Subjects should not sign this document if the corner does not have a stamped date and signature.

My signature below indicates that I have read and/or had explained to me the purpose and requirements of the study and that I agree to participate.

_________________________   __________________
Signature                      Date

Consent obtained by: ________________________   __________________
Initals of researcher           Date
Appendix D

Demographic Inventory
Demographic Inventory

Educational Institution: _____________________ (Please leave blank. Researcher will code.)

Please circle the appropriate response to the following:

Educational Program: ADN BSN

1. How many years have you been a nurse?
   a. 1 – 5 years
   b. 6 – 10 years
   c. 11 – 15 years
   d. 16 – 20 years
   e. > 20 years

2. What is your highest degree earned?
   a. Bachelors (non-nursing)
   b. B.S.N.
   c. M.S.N.
   e. Other (please specify) — ________________

3. How many years have you been teaching nursing?
   a. 1 – 5 years
   b. 6 – 10 years
   c. 11 – 15 years
   d. 16 – 20 years
   e. > 20 years

4. What is your major content area of instruction?
   a. Medical/Surgical (Adult Health)
   b. Psychiatric
   c. Maternal/Child (Obstetrics, Pediatrics)

5. What is the average approximate number of graduates from your program on a yearly basis?
   a. < 25
   b. 26 - 50
   c. 51 - 75
   d. 76 - 100
   e. >100

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Appendix E

Interview Protocol
Interview Protocol

1. Introduction and further explanation of the study.

2. Explanation of the Informed Consent Form.

3. Explanation of the audiotaping and transcription procedures.

QUESTIONS:

1. Do you believe that there is currently a well-defined domain of entry-level psychomotor skills for registered nurses? If so, what are these skills?

2. What specific psychomotor skills do you believe to be critical for entry-level nurses to possess?

3. Do you believe that registered nursing programs do a good job of testing/evaluating psychomotor skills?

4. Do you believe that nursing schools in general spend enough time on psychomotor learning and development of these skills in students?

5. Looking at the NCLEX-RN® Test Plan, do you believe there are psychomotor skills that would logically fit into each of these categories?

6. What skills should definitely NOT be included as mandatory entry-level psychomotor skills?

7. Imagine yourself as a health care consumer. You are hospitalized and a new nurse who graduated about three months ago is assigned to your care. Knowing what you know as a faculty member about the preparation and competency of graduating nurses, how comfortable and confident are you as the patient in this type of situation?

8. What are your thoughts and beliefs concerning psychomotor testing for entry-level nurses as a requirement for licensure?
Appendix F

NCLEX–RN® Test Plan Content
**Distribution of Content for NCLEX-RN Test Plan**

The percentage of test questions assigned to each Client Needs subcategory in the NCLEX-RN® Test Plan is listed below and is based upon a 1999 job analysis and expert judgment provided by members of the National Council's Examination Committee and the 1999 Practice Analysis Panel of Experts.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Percentage of Test Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Safe, Effective Care Environment</strong></td>
<td></td>
</tr>
<tr>
<td>1. Management of Care</td>
<td>7 – 13%</td>
</tr>
<tr>
<td>2. Safety and Infection Control</td>
<td>5 – 11%</td>
</tr>
<tr>
<td><strong>B. Health Promotion &amp; Maintenance</strong></td>
<td></td>
</tr>
<tr>
<td>3. Growth &amp; Development Through the Life Span</td>
<td>7 – 13%</td>
</tr>
<tr>
<td>4. Prevention &amp; Early Detection of Disease</td>
<td>5 – 11%</td>
</tr>
<tr>
<td><strong>C. Psychosocial Integrity</strong></td>
<td></td>
</tr>
<tr>
<td>5. Coping &amp; Adaptation</td>
<td>5 – 11%</td>
</tr>
<tr>
<td>6. Psychosocial Adaptation</td>
<td>5 – 11%</td>
</tr>
<tr>
<td><strong>D. Physiological Integrity</strong></td>
<td></td>
</tr>
<tr>
<td>7. Basic Care &amp; Comfort</td>
<td>7 – 13%</td>
</tr>
<tr>
<td>8. Pharmacological and Parenteral Therapies</td>
<td>5 – 11%</td>
</tr>
<tr>
<td>9. Reduction of Risk Potential</td>
<td>12 – 18%</td>
</tr>
<tr>
<td>10. Physiological Adaptation</td>
<td>12 – 18%</td>
</tr>
</tbody>
</table>
Overview of Content for NCLEX-RN Test Plan

A. Safe, Effective Care Environment –

1. Management of Care: provision of integrated, cost-effective care to clients through the coordination, supervision and collaboration with members of the interdisciplinary health care team.

2. Safety & Infection Control: protection of clients and health care personnel from environmental risks and hazards.

B. Health Promotion & Maintenance –

3. Growth & Development Through the Life Span: assisting the client and significant others through the normal expected stages of growth & development from conception through advanced age.

4. Prevention & Early Detection of Disease: assisting clients in recognizing alterations in health and in developing health practices that promote and support wellness.

C. Psychosocial Integrity –

5. Coping & Adaptation: promotion of the client’s or significant other’s ability to cope, adapt and/or problem solve through situations related to illnesses, disabilities or stressful events.

6. Psychosocial Adaptation: management and provision of care for clients with acute or chronic mental illnesses, as well as maladaptive behaviors.

D. Physiological Integrity –


8. Pharmacological and Parenteral Therapies: managing and providing care related to the administration of medications and parenteral therapies.

9. Reduction of Risk Potential: reduction of the likelihood that clients will develop complications or health problems related to existing conditions, treatments and/or procedures.

10. Physiological Adaptation: management and provision of care for clients with acute, chronic or life threatening physical health conditions.
Appendix G

Coding System for Psychomotor Skills
Coding System for Psychomotor Skills

ADPHYS ⇒ Physical Assessment (including basic physical assessment, plus deep palpation and percussion)
CHES ⇒ Chest tube set-up and care (including maintaining water-seal chamber level and hooking up to suction)
COMM ⇒ Interpersonal communication (including eye contact, body language and positioning)
CRIT ⇒ Critical Care Skills (including ventilators, hemodynamic monitoring, arterial lines, cardiac monitors)
FOLIC ⇒ Foley Catheter Insertion and Care (including preparation for insertion and bag drainage procedure)
IVFA ⇒ Intravenous Fluid Administration (including spiking of bags, priming of lines and setting drip rates)
LRES ⇒ Leather Restraint Application (including maintenance and release)
MACH ⇒ Machinery or Specific Equipment (including IV pumps, monitors, glucometers)
MEDS ⇒ Medication Administration (including oral, sublingual, subcutaneous, intramuscular, intravenous, ophthalmic, otic)
NGIF ⇒ Nasogastric tube insertion and feeding
OXYG ⇒ Oxygen administration via nasal cannula or mask
PHYS ⇒ Basic Physical Assessment (including vital signs, auscultation, light palpation)
ROM ⇒ Range of Motion (including positioning and transfers)
STER ⇒ Application of Sterile Technique Principles (including setting up sterile field, gloving)
TRCH ⇒ Tracheostomy Care (including suctioning)
VENI ⇒ Venipuncture (including IV starts and blood draws)
WNDC ⇒ Wound Care (including irrigation, suture/staple removal, dressing change)
Appendix H

Faculty Perceptions of Skills Within & Outside Entry-Level Domain
## Faculty Perceptions of Skills Within and Outside of Entry-Level Domain

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Entry-Level Skills</th>
<th>Not Entry-Level Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-A</td>
<td>PHYS MEDS WNDC OXYG TRCH FOLIC</td>
<td>MACH</td>
</tr>
<tr>
<td>1-B</td>
<td>PHYS MEDS WNDC OXYG TRCH FOLIC</td>
<td>MACH VENI</td>
</tr>
<tr>
<td>(M/C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-A</td>
<td>PHYS MEDS FOLIC VENI</td>
<td>ADPHYS</td>
</tr>
<tr>
<td>2-B</td>
<td>PHYS MEDS STER COMM</td>
<td>LRES</td>
</tr>
<tr>
<td>(Psych)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-A</td>
<td>PHYS MEDS WNDC TRCH FOLIC VENI ROM</td>
<td>CRIT</td>
</tr>
<tr>
<td>3-B</td>
<td>PHYS MEDS STER</td>
<td>CRIT</td>
</tr>
<tr>
<td>(M/C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-A</td>
<td>PHYS MEDS WNDC TRCH FOLIC VENI STER</td>
<td>CRIT</td>
</tr>
<tr>
<td>4-B</td>
<td>PHYS WNDC STER</td>
<td>MACH</td>
</tr>
<tr>
<td>(Psych)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-A</td>
<td>PHYS MEDS VENI</td>
<td>(No response)</td>
</tr>
<tr>
<td>5-B</td>
<td>PHYS MEDS COMM</td>
<td>(No response)</td>
</tr>
<tr>
<td>(Psych)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-A</td>
<td>PHYS</td>
<td>MEDS</td>
</tr>
<tr>
<td>-----</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>6-B (M/C)</td>
<td>PHYS</td>
<td>MEDS</td>
</tr>
</tbody>
</table>

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Appendix I

Tally of Psychomotor Skills Listed in Curricular Documents
<table>
<thead>
<tr>
<th>Educational Institution</th>
<th>Psychomotor Skills Specified</th>
<th># of Times Specified in Curricular Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PHYS</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>MEDS</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>IVFA</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>PHYS</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>MEDS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>FOLIC</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>PHYS</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>MEDS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>IVFA</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>STER</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>NGIF</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>VENI</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>FOLIC</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>PHYS</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MEDS</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>STER</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td><em>(None specified)</em></td>
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</tr>
<tr>
<td>6</td>
<td>PHYS</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MEDS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>IVFA</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>STER</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ROM</td>
<td>1</td>
</tr>
</tbody>
</table>
Appendix J

Psychomotor Skills List from Previous Research Studies
Psychomotor Skills List from Previous Research Studies
(Sweeney, Regan, O'Malley & Hedstrom, 1980; Alavi, Hoh & Reilly, 1991)

1. Mobilization
2. Range of motion
3. Bed bath
4. Mouth care
5. Hair care
6. Back rub
7. Positioning
8. Feeding a patient
9. Occupied bed-making
10. Temperature – oral, rectal*
11. Pulse – radial, apical, carotid*
12. Blood Pressure*
13. Weight/Height*
14. Assist w/bedpan, urinal
15. Body mechanics
16. Auscultation of heart sounds*
17. Auscultation of lung sounds*
18. Neurologic – reflexes, etc.*
19. Ear/Nose/Throat exam*
20. Specimen collection
21. Palpation*
22. Care of skin – prevention
23. Sterile dressings
24. Bandage application
25. Sterile gloving
26. Use of instruments in a sterile field
27. Precaution technique (isolation)
28. Wound irrigation
29. Change IV bottles*
30. Remove IV needles*
31. Administration of oral medications*
32. Administration of topical medications*
33. Administration of intramuscular medications*
34. Administration of subcutaneous medications*
35. Draping a patient
36. Cleansing enema
37. Assisting w/ cough & deep breathing exercises
38. Catheterization*
39. Urine tests
40. Bottle feeding
41. Fetal heart reading
42. Assist w/postural drainage
43. Respiratory suction
44. Tracheostomy suction
45. Nasogastric tube
46. Ileostomy care
47. Colostomy care
48. Traction
49. Oxygen therapy
50. Maintenance of chest drainage
51. Vision testing
52. Eye drops*
53. Measure central venous pressure
54. Change total parenteral nutrition lines via volumetric pump

* Indicates those skills which fit into one of the families of psychomotor skills in this study.
BIBLIOGRAPHY


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meeting of the National Council on Measurement in Education, San Francisco, CA.


