

**CONCEPT ATTAINMENT AND CUE PERCEPTION
IN NURSING DIAGNOSIS**

A THESIS

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CHAPTER I

INTRODUCTION

A nursing diagnosis should not only identify a health problem, it should also have etiological and therapeutic implications. The cognitive process that would enable the nurse clinician to accurately diagnose should be defined as well as the cue or group of cues that would lead to the making of that diagnosis. Frequently, nurses must make a diagnosis regarding the state of the patient immediately with no interim time for documentation and research.

Each nursing diagnosis is, in essence, a concept. The cognitive process of concept attainment is a learned skill. If nurses are to become skilled in deriving nursing diagnoses, a method of concept attainment should be taught during the nursing educational program. It then follows that if nurses become skilled at concept attainment, the accuracy of their nursing diagnosis will improve and patient care will be positively affected.

Nursing itself is in the throes of change and is seeking to define its function as an independent profession. As an integral part of the nursing process, nursing diagnosis will require definition of the cognitive process involved as well as the clinical criteria for each nursing

diagnosis. In order to provide a basis for teaching nursing diagnosis in the future, it would be desirable to study the relationship between the ability of nurses to deal with abstract concepts and their cue perception in achieving a nursing diagnosis.

STATEMENT OF THE PROBLEM

What is the relationship between concept attainment and cue perception in deriving a nursing diagnosis?

STATEMENT OF PURPOSES

The purposes of this study were to determine whether:

1. The ability to deal with abstract concepts affects cue perception in making a nursing diagnosis
2. There is cue grouping within and across the identified nursing diagnostic categories
3. There is a difference in concept mastery between the Baccalaureate and Master's students
4. There is a difference in cue perception between the Baccalaureate and Master's students

BACKGROUND AND SIGNIFICANCE

Observation is an integral part of nursing function. A significant portion of a text authored by Nightingale was

devoted to observation of the sick with reference to the multiplicity of data available for making an inference about the state of the patient (Nightingale 1922). The process of utilizing cues and cue grouping is not new. However, it is apparent that only in the last twenty-five years have efforts been made to define the process of clinical inference or nursing diagnosis.

Feinstein has stated that all clinicians utilize a distinctive clinical form of reasoning which he calls clinical judgment (Feinstein 1967). He further stated that this judgment has etiological and therapeutic implications and that it is based on a knowledge of patients acquired by clinical experience (Feinstein 1967). Since deriving a nursing diagnosis indicates both etiology and therapeutic intervention and since it is based on knowledge acquired by clinical experience, the terms clinical judgment and nursing diagnosis are considered synonymous by the investigator. Nurses by role definition are clinicians with expertise in those clinical judgments which apply to the scope of nursing. Educators provide nursing students with clinical experience in an effort to aid them in acquiring this skill of clinical judgment or nursing would be taught only from textbooks and simulation laboratories.

It is the opinion of several authors (Hammond 1966; Kelly 1964a; Aspinall 1976; Gordon 1972) that nurses utilize cues or groups of cues in the process of nursing diagnosis. However, the specific cognitive process has not been identified (Hammond et al. 1966a, 1966b). Dincher and Stidger (1976) studied the use of a simulation format to evaluate clinical nursing judgment. The apparent lack of emphasis on cognitive reasoning in nursing texts is cited by Aspinall (1976) as contributing to a nursing practice that is problem oriented without adequate theoretical knowledge.

Studies describing nursing diagnosis have been done (Bircher 1975; Durand and Prince 1966; Gordon 1976) and efforts to develop a taxonomy are in process (Roy 1975; Gebbie and Lanvin 1975). The word diagnosis is defined in the dictionary, but the cognitive process of arriving at a diagnosis has not been identified. The importance of this process is recognized in that diagnosis should precede intervention (Brown 1974).

Concept attainment is considered synonymous with nursing diagnosis in that each nursing diagnosis represents a probabilistic concept attainment task (Gordon 1972). In addition, the attainment of a nursing diagnosis is a disjunctive attainment task. That is, arriving at one diagnostic category does not necessarily rule out other

possibilities. The attainment of a disjunctive concept is considered more difficult than the attainment of other types of concepts (Bruner, Goodnow, and Austin 1956).

Studies have been done which relate clinical expertise to educational preparation (Davis 1972, 1974). As a predictor of the ability to test a hypothesis in order to determine a nursing diagnosis, Gordon (1972) used scores on the Graduate Record Examination and the Miller Analogies. The findings of that study indicate that there was little difference in the ability to hypothesis test between those who scored high and those who scored low. Studies have not been found which specifically measure nurses' ability to deal with concepts and correlate this with their ability to derive a nursing diagnosis.

Concepts or nursing diagnoses are labels describing the dimensions, attributes, or aspects of reality which interest the scientist (Hardy 1974). Nursing diagnosis is an integral part of the nursing process (Carrieri and Stizman 1971). Quality patient care is accomplished by diligent application of the nursing process. It then follows that patient care could be improved if nursing diagnosis were described, identified, and taught to those who practice nursing. A study of the relationship between concept attainment and cue perception might indicate

attributes of the concepts studied as well as methods educators could employ in instructing nurses in the process of nursing diagnosis.

DEFINITION OF TERMS

For the purposes of this study, the definitions of terms were:

1. Nursing Diagnosis -- a complex form of probabilistic concept attainment in which inferential judgments are made about the state of the patient (Gordon 1972)
2. Cues -- information related to the state of the patient which is available to the nurse (Kelly 1964a)
3. Clinical Judgment -- a unique form of reasoning used by the clinician which implies etiology and therapy and is based on a knowledge of patients acquired by clinical experience (Feinstein 1967)
4. State of the Patient -- a covert condition, one which is not directly observable (Kelly 1964)
5. Sign -- an observation about a phenomenon made by the clinician
6. Symptom -- an observation made by the patient
7. Concept -- symbolic or abstract way of referring to an empirical reality (Jacox 1974) or a complex mental image which is derived from individual perceptual experiences

8. Concept Attainment -- the application of a category label to a set of cues (Gordon 1972)

LIMITATIONS

This investigation was subject to the following limitations:

1. The population consisted only of those who consented to participate in the study
2. Each individual had unique knowledge, perception, and attitudes which were not controlled
3. The research process itself may have influenced the respondent's behavior under testing conditions
4. The population was selected with no regard to age, sex, or length of time in nursing

DELIMITATIONS

This investigation was subject to the following delimitations:

1. Both samples in the population were drawn from the same university
2. The undergraduate population were seniors within six months of completing their course of study
3. Master's students were currently enrolled in a clinical course

ASSUMPTIONS

For the purposes of this study, the following assumptions were identified:

1. Through some process of cognitive function, nurses perceive, assign value, and group cues which enable them to make a nursing diagnosis
2. The ability to achieve correct nursing diagnoses will influence the quality of patient care in a positive manner

SUMMARY AND OVERVIEW

The multiple studies done previously on the subject of nursing diagnosis have not completely described the cognitive process involved. Nursing diagnosis can be conceived of as a form of probabilistic concept attainment. A study of the relationship between concept attainment and cue perception in nursing diagnosis might indicate a relation between nurses' ability to deal with abstract ideas and their ability to derive a nursing diagnosis. If such a relationship exists, it could provide a direction in nursing education that will ultimately yield to the nursing profession nurses who are skilled at nursing diagnosis. These nurses will improve the application of the nursing

process and affect the quality of patient care in a positive manner.

Chapter II consists of a review of the literature pertaining to the following subjects: concepts, concept attainment, nursing diagnosis as concept attainment, theoretical basis for nursing diagnosis, historical perspective of nursing diagnosis, research studies involving nursing diagnosis, and trends in education which are aimed at improving the cognitive ability of nurses. Chapter III is a description of the methodology of this study including the development of the tool which identifies the diagnoses under study. Chapter IV presents the analysis of data including both analytical and descriptive statistics. Appropriate tables are included. Chapter V contains a summary of the study with recommendations for further study and the implications for the profession of nursing.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

A review of the literature pertinent to the topics of nursing diagnosis and concept attainment is presented. For the purposes of this research study, these two terms are considered synonymous. The conceptual and theoretical frameworks for nursing diagnosis are reviewed. This includes concepts, concept attainment, nursing diagnosis as concept attainment, and a presentation of possible theoretical frameworks for nursing diagnosis. The literature identifying the development and justification for nursing diagnosis is presented. Research studies designed to investigate the cognitive processes inherent in nursing diagnosis are reviewed. It is theorized that this will contribute to an understanding of the enormous task the profession of nursing faces in defining its area of expertise. Finally, trends in nursing education which are aimed at increasing the cognitive ability of nurses are presented briefly.

Conceptual and Theoretical Frameworks for Nursing Diagnosis

Concepts

The term concept has been defined in several ways. Jacox (1974) states that a concept is a symbolic or abstract

way of referring to an empirical reality. Chinn and Jacobs (1975) define concept as a complex mental image which is derived from individuals' perceptual experiences. Wilson (1963) states that a concept does not necessarily have a mental image associated with it. He specifically cites abstract concepts such as justice as not being attached to any images at all. Bourne (1966) defines concept as a class or category of objects, persons, or events and he further stipulates that the members of the class, category, or event must share common distinguishing features. The many definitions share common characteristics as well as some differences. An investigation of the types of concepts should serve to clarify the aforementioned definitions.

In order to state a concept, one must use words. The use of the term word label is helpful for it implies not just the concept under consideration, but also the individual's perception of the event (Chinn and Jacobs 1975). The defining limits of the terms, words, or symbols used to represent concepts are presented.

Hempel (1952) uses the logical process to distinguish between a "real" definition and a "nominal" definition of a concept. A real definition is conceived of as the "essential characteristics of some entity" (Hempel 1952, p. 2). A nominal definition is described by Hempel

(1952) as a continuum which simply introduces an alternative notation for a given linguistic expression. Furthermore, a nominal definition can be characterized as stipulating that a specific expression is to be synonymous with other expressions whose meaning has already been determined. Hempel (1952) uses the following examples to further clarify his meaning: A real definition is that man can be defined as a rational animal, a nominal definition is describing the term antibiotic as being synonymous with the expression bacteriostatic agent produced by living organisms.

Reynolds (1971) uses the terms primitive and derived rather than nominal and real. "Primitive symbols or terms are those on which there is shared agreement as to their meaning but which cannot be described using other terms" (Reynolds 1971, p. 46). Derived or nominal symbols are those that can be described by the use of primitive terms. Primitive terms can be more difficult to convey to others because these terms cannot be expressed by any other semantic symbols. That is, in order to ensure accurate definition of primitive terms, the meaning can only be expressed by indicating example and non-examples of the concept to which the word refers (Reynolds 1971).

All the types of definitions discussed share the quality of being able to be expressed in the written

language or by mathematical symbols. The terms or symbols used to convey concepts whether defined in the context of real, nominal, primitive, or derived can be expressed within the framework of set theory. A set is a collection of objects or elements having some common defined property and the compliment of a set consists of all the objects in a universe which do not belong to that particular set (Feinstein 1967). Set theory also uses subsets which in themselves form sets. Any set is considered within the framework of a universe; that is, all times or symbols possible for inclusion or non inclusion. Set theory is considered useful by Feinstein (1967) in cataloguing the data for clinical diagnosis and the deliberation used in attaining concepts in clinical diagnosis.

The actual empirical value of a concept can be judged by looking at the empirical value of the statements which contain the concept (Reynolds 1971). A concept can be conceived of as abstract or concrete. An abstract concept is one which is totally independent of a specific time or place while a concrete concept is specific to a time or place (Reynolds 1971). Concrete concepts can then be construed as examples of abstract concepts. The relationship between two or more concepts is an abstraction in itself. The level of abstractness of the relationship will

depend on the level of abstractness of the concepts involved. The level of abstractness of a concept is often determined by the inclusion of a second concept. In this instance, the most general concept is considered the most abstract (Reynolds 1972). A concept which has achieved the highest degree of abstractness is said to be parsimonious. The degree of parsimony of a concept is determined by the degree of abstractness. The higher the degree of parsimony of the concept the more value of that concept to empirical science (Chinn and Jacobs 1975).

In empirical science, the most widely used types of concept formation are classificatory, comparative, and quantitative (Hempel 1953). A classificatory concept represents a characteristic which any object in its domain must either have or lack. A precisely defined classificatory concept divides the domain into two distinct classes. Because this type of concept is useful in describing observational findings, it is often used in science (Hempel 1952). For instance the concept of diabetes can be described in this manner. A person either has or does not have polydipsia, polyuria, or hyperglycemia. This manner of conceptualizing states the defining characteristics but it does not allow for gradation of those characteristics. In making a clinical judgment of diabetes, it is essential

to know not only if the blood sugar is elevated but also the amount of elevation. A quantitative concept expresses the degree of an attribute in quantitative terms, thus attributing to each item in its domain of applicability the value of the quantity for that item. The value is usually expressed in real numbers (Hempel 1952). It may be desirable in some conceptual distinctions to state the value of that concept in relation to all the members of that domain since metrical comparisons are not always applicable. This type of comparative statement designates a comparative concept. For example, the concept of hardness is comparative. The only way a concept can be ordered within the domain of hardness is to express it in relation to other things in the domain. Item A is harder than item B but less hard than item D and E (Hempel 1952).

Comparative and/or quantitative concepts when accurately labeled are considered superior for use in science in that they reflect the actual nature of the subject matter rather than just the classifying characteristics (Hempel 1952). The advantages of using qualitative and quantitative concepts in empirical science include the following. It is possible to differentiate between characteristics which are included in one classification. The relative position of the characteristics of a given concept can be

identified. Since there is greater flexibility in description of the concept, there is greater flexibility in formulating general laws regarding the concept under investigation. If metrical terms are used whenever possible mathematical and statistical methods can be applied for the purposes of testing, predicting, and/or explaining the concept (Hempel 1952).

A theoretical concept is defined by Reynolds (1971) as a concept which is considered to be part of a theory or potentially useful for inclusion in a theory. It is more abstract than an operational definition or procedure for measurement. Theoretical concepts are not restricted to a particular spatial or temporal setting but they can still be measured. Therefore, investigating important scientific questions must not be avoided just because a quantitative or qualitative concept cannot be used (Murphy 1971).

Concept Attainment

Bruner, Goodnow, and Austin (1956) describe the method of combining attributes as determining the type of concept formulated. The types of concepts involved in their research are identified as conjunctive, disjunctive, and relational concepts. The definition of attribute, as formulated by the authors, is any discriminable feature of

an event that is capable of variation from event to event. If the discriminable feature is used as the means of inferring the identity of something, it is called a criterial attribute. A defining attribute is one that is defined in terms of an external statement. Both types of attributes have a wide range of applicability in concept formation but if the degree of applicability or value of the attribute does not change the probability of concept attainment, the attribute is noncritical (Bruner, Goodnow, and Austin 1956). Conversely, if the attribute value affects categorization the attribute is called criterial. Criterial attributes range in value in concept formation from zero to maximum. The range and usefulness of combining cues or attributes in inferring concepts is determined by the type of concept involved. A conjunctive and a disjunctive concept involve an entirely different mode of combining attributes.

A conjunctive concept is determined by the joint presence of the appropriate value of several attributes. A disjunctive concept lacks the joint presence of attributes as well as an apparent relationship between any attributes that can substitute for one another (Bruner, Goodnow, and Austin 1956). A conjunctive concept can be stated as containing X and X attributes while a disjunctive concept can be stated as containing X or X attributes.

A relational concept, by definition, contains specifiable relations between the defining attributes.

The process of concept attainment or formation has been primarily researched by Bruner, Goodnow, and Austin (1956). The goal of their research is

. . . to describe and in a small measure to explain what happens when an intelligent human being seeks to sort the environment into significant classes of events so that he may end by treating discriminably different things as equivalents (p. viii).

This process of thinking can be called either categorization or conceptualization.

In order to attain concepts, decision making strategies are employed. Strategies ensure that a concept will be attained with the maximum amount of certainty regardless of the number of attributes one must test. Strategies enable concept attainment after the minimum encounters with relevant instances. Strategies minimize the amount of strain on inference and memory capabilities while also ensuring that the correct concept will be obtained. Strategies minimize the number of wrong categorizations prior to concept attainment (Bruner, Goodnow, and Austin 1956). A strategy may or may not be a conscious effort by the problem solver but the strategy employed may be inferred from the pattern of decisions observed in the effort at concept attainment. Strategies are not fixed but can be altered

by the demands of the concept attainment task. When concept attainment must be done under time pressure, immediately available cues will be utilized more in the decision making strategy.

Bruner, Goodnow, and Austin (1956) have identified a number of conditions as affecting concept attainment behavior. One is the actual definition of the task or what the individual defines as the objective of his behavior. Is the subject consciously seeking to attain a concept and, if so, what are the expectancies concerning the nature of the concept? Results of the authors' studies indicate that unless the task is clearly defined by the subject, it will be assumed to be a conjunctive concept attainment task. The rationale for this is that most subjects dislike and lack skill in dealing with disjunctive concepts. Another feature of defining the task is that subjects show a predilection for criterial attributes. That is, they will hold on to preferred defining attributes which are essentially useless for the task. The subjects' expectations about what constitutes a successful solution will influence task definition. It is feasible that a concept can be correctly attained but rejected by the subject because it did not meet his expectations about a successful solution, either in quality or in depth of understanding.

The nature of instances encountered is the second factor identified as affecting concept attainment. The larger the number of attributes and the larger the number of discriminable variables, the larger the number of hypotheses that will be entertained. Instances may vary as the kinds of attributes vary. An attribute is judged by its immediacy, familiarity, and its previous status and value in past conceptualizing. The manner and order of encountering instances is another factor affecting concept attainment and a significant one in reducing cognitive strain.

The nature of validation affects concept attainment. This includes the opportunity for validation, the frequency of validation, and the ambiguity of validation. In the process of concept attainment hypotheses must be accepted or rejected. How well this is accomplished is due in part to opportunities for validation.

The anticipated consequences of categorizing include a decision as to which hypotheses to test next and they greatly affect concept attainment. The value of the outcome depends essentially on the objectives of the individual and upon a resolution of expectations about the positive and negative outcomes. The final factor identified by Bruner, Goodnow, and Austin (1956) as affecting concept attainment behavior is the nature of imposed

restrictions. This is defined as the nature of the work conditions and includes such things as the provision of writing material versus visual encounters with the concepts. Whether the concept is abstract or concrete is also considered an imposed restriction.

Selection strategies are utilized in concept attainment. The purposes of selection strategies are three-fold. They give the subject an opportunity to obtain information appropriate to the objective. Strategies increase or decrease the cognitive strain and they control the risk (Bruner, Goodnow, and Austin 1956). Four strategies are identified by the author as being appropriate for attaining conjunctive concepts. Simultaneous scanning is identified as using each instance encountered for the purpose of determining which hypotheses are tenable and which have been terminated. Successive scanning tests a single hypothesis at a time. The subjects' choice is then limited to those instances which provide a test of the hypothesis in question. In conservative focusing, the subject finds a positive instance on which to focus and then tests attribute values to determine whether a positive or negative change ensues. The strategy of focus gambling employs basically the same strategy as conservative focusing except that more than one attribute value is tested at a time.

In a real life situation, such as deriving a nursing diagnosis, the attributes are not as clearly defined for the necessary process of hypothesis testing. Therefore, in concept attainment for everyday life, the most important choice is which and how many hypotheses to test rather than the manner of testing them. Reception strategies determine the manner of hypothesis testing. A good reception strategy consists of being able to alter the hypothesis in the face of positively or negatively confirming or infirming the hypothesis (Bruner, Goodnow, and Austin 1956).

An important factor in concept attainment is that of cognitive strain. When the nature of the concept attainment task imposes a high degree of strain upon the memory and the inferential capability, the strategy employed will be primarily aimed at reducing the cognitive strain. Since the strategy is aimed at reducing cognitive strain, the chances of attaining the correct concept are affected in a negative manner.

The decision sequence in concept attainment was outlined by Bruner (1957). The decision sequence leads to categorization which is synonymous with concept attainment. The decision sequence in concept attainment begins with primitive categorization which perceptually isolates

the event under consideration. A cue search ensues which entails scanning the environment for data in order to determine which cues will permit a precise placement of the event under consideration. A confirmation check occurs after tentative categorization is attained and the cue search is narrowed to additional confirmatory cues.

Finally confirmation is complete and the cue search terminates.

Disjunctive concepts are determined by the manner in which one can use the defining attributes. The attributes of a disjunctive concept possess an either/or effect in categorizing. Therefore, if the attribute in question contains any one or any combination of the defining attributes, it is considered class defining. In disjunctive concept attainment, two attributes which are uniform in terms of the categorization criterion may have no other defining attribute in common. The strategies which are so effective in conjunctive concept attainment because they isolate all features common to a class are totally ineffective in disjunctive concept attainment. For example, the attributes of aspirin and neosynepherine have nothing in common except when categorized as drugs which will relieve cold symptoms.

Because of the cognitive difficulty in attaining a disjunctive concept and because of the inferential strain most people will seek to reduce a disjunctive concept into a conjunctive concept (Bruner, Goodnow, and Austin 1956). Because of the nature of a disjunctive concept, the strategies employed differ markedly from those employed in conjunctive concept attainment. In disjunctive concept attainment, the subject must depend on information which is negatively derived and which is highly probabilistic. The attributes which must be tested share no common characteristics. Conant and Frabasso (1964) designed a study which tested the ability of college students to attain disjunctive and conjunctive concepts. The design utilized a problem of each type of concept attainment. The problems were structurally, perceptually, and informationally equivalent. As predicted by Bruner, Goodnow, and Austin (1956), the students had more difficulty mastering the disjunctive concept attainment problem. A positive focusing strategy was observed in efforts at conjunctive concept attainment and a negative focusing strategy was observed in the disjunctive concept attainment problem.

Most of the concepts dealt with in medicine, sociology, and psychology are disjunctive (Bruner, Goodnow, and Austin 1956). Disjunctive concepts lack an apparent cause

effect relationship. Empirical science depends heavily on such a relationship and this fact is cited by Bruner, Goodnow, and Austin (1956) as the origin of the inability of these disciplines to deal effectively with disjunctive concept attainment.

Probabilistic concepts can be either conjunctive or disjunctive, and are identified as being derived from probabilistic cues. The cues are probabilistic in that there is no certainty of arriving at the correct inference because certain categorical identity cannot be achieved from the cues. There are situations in which the cue search seeks to find attributes that can be used as a basis for categorizing and additionally determining the correspondence between cue criteriality and cue validity. In this instance, the extent to which a cue is used and the extent to which it is predictive is uncertain or based on probability. This uncertainty imposes additional cognitive strain. Probabilistic cues may be considered according to their utility, their nature and availability, the individual's conception of the task, the opportunities for cue validation, and the way the consequences of categorization affect cue usage (Bruner, Goodnow, and Austin 1956). The role and nature of confidence in the subjects' use of probabilistic cues is also identified as an important

factor in categorizing. This highly subjective factor greatly affects concept attainment behavior and can, in fact, lead to total abstention from concept attainment.

Nursing Diagnosis as Concept Attainment

The basis for this study is that deriving a nursing diagnosis is concept attainment. It is theorized that the more adept a nurse is at attaining concepts, the more adept that nurse will be at deriving nursing diagnoses. Terman (1956) states that the ability to function at higher intellectual levels is determined by both the number and variety of concepts at one's command and by the ability to see relationships between them.

Little and Carnevali (1976) state that nursing diagnosis is not a concept label. They perceive concept attainment as a part of nursing diagnosis, but feel that simply stating the concept is not specific enough. Upon close examination of their work it is noted that the authors are describing what constitutes a nursing diagnostic statement. They do not disagree that concept attainment is an integral part of nursing diagnosis. The function of concepts in nursing diagnosis is identified by Little and Carnavali (1976) as an aid in

directing observations and in organizing data as well as providing insight into the dynamics of the situation.

Gordon (1972) studied strategies in probabilistic concept attainment which was identified as deriving nursing diagnoses. Her rationale for the study was that concept attainment is particularly relevant to nursing practice because the nurses' responsibility for accurate nursing diagnosis is now recognized both legally and professionally. Doona (1975) states that modern nursing practice is distinguished from traditional nursing practice primarily by the emphasis on cognition as well as perception and action. Furthermore, the cognitive ability of nurses as reflected in their ability to make judgments and nursing diagnoses is now an expectation of the profession and one for which nurses are legally accountable (Doona 1975; Gordon 1972).

Gordon (1972) identified the cognitive theory of concept attainment as the conceptual framework for her study. The problem identified was to describe information processing strategies employed by nurses in attaining probabilistic concepts. The probabilistic concepts studied were nursing diagnoses. The author states that the modern nurse must assume responsibility for increased skill at diagnosis and that educators must place greater

emphasis on acquisition of this skill. In order for educators to accomplish this, more information is needed about the cognitive strategies necessary in concept attainment (Gordon 1972).

Gordon (1972) states that clinical diagnosis is classified as a disjunctive concept attainment task. Although conjunctive concept attainment is adequate in many concepts describing human behavior in clinical diagnosis, it is never known whether one or more categories will be required to describe the state of the patient. The major difficulty in disjunctive concept attainment, as previously described, is that the application of the rules for conjunctive concept attainment do not apply. Therefore, a high degree of cognitive strain is introduced immediately because of the disjunctive task.

The appropriate intervention selected is contingent upon the attainment of the correct concept regarding the state of the person. This conceptualization may be considered synonymous with nursing diagnosis. The strategy employed in nursing diagnosis which is identified by Gordon (1972) is a mixed one which combines the elements of single and multiple hypothesis testing. It was theorized by the author that subjects who had a higher inferential ability as measured by scores on the Graduate

Record Examination and the Miller Analogies Test would use more multiple hypothesis testing and have a greater accuracy and confidence in the concept attained.

The sample was given two probabilistic concept attainment tasks (nursing diagnoses). The method was similar to the game of twenty questions with the subjects requesting additional information about the case. In this phase the researcher obtained information about the attributes the subject was testing. The subjects were then questioned as to why they desired that particular information in order for the researcher to determine what hypotheses they were testing. Following concept attainment or stating the nursing diagnosis, the subjects were asked to state the percentage level of confidence they had in the attainment of the correct diagnosis.

Gordon's (1972) data indicated that both single and multiple hypothesis testing strategies were employed by most subjects. Multiple hypothesis testing was most frequent in the early phase. The types of attributes tested provided the basis for accuracy versus inaccuracy in concept attainment. Inferential ability as measured by the two standardized tests did not affect the strategy employed.

Information was then restricted in an effort to impose a higher degree of cognitive strain. Under these conditions a significantly higher level of multiple hypothesis testing occurred. It is of note that with the increased cognitive strain the group with the higher inferential ability increased both current state attribute testing as well as multiple hypothesis testing. They were noted to respond differently to the restricted information conditions. However, all groups demonstrated an increased level of confidence in their diagnosis when additional cognitive strain was imposed. The accuracy of the diagnoses also increased. In an actual clinical setting a high degree of cognitive strain is present due to both uncertainty regarding the state of the patient and to the necessity for achieving the correct diagnosis.

Theoretical Frameworks Useful
in Nursing Diagnosis

Feinstein (1967) stated that all clinicians use a distinctive form of clinical reasoning which he calls clinical judgment. This is distinguished from medical diagnostic skill because it depends, not only on a knowledge of disease and etiology of disease, but also on a knowledge of patients. The acquisition of this knowledge requires an intellectual mechanism for organization and

retrieval. Feinstein (1967) refutes those who state that clinical judgment is not amenable to systematic description and is not reproducible. The clinical evidence accumulated from observation is just as measurable as laboratory data. Gordon (1972) has demonstrated that attributes as defined by Bruner, Goodnow and Austin (1956) can be measured.

Feinstein (1967) proposes a precise system of Boolean algebra which is derived from set theory as a measurement basis for clinical diagnosis. Using this theory he proposes a change from the current disease classification which is based upon morbid anatomy to one in which the clinician classifies not only the disease but also the host and the illness. In other words this taxonomy would identify disease, disease etiology, and specific therapy.

Observations would be classified in the following manner: how the disease was detected, the sequence of appearance of manifestations, clustering of manifestation, the timing and duration of each sequence, and the co-existence of illness due to other diseases. Feinstein (1967) admits that classifying observations according to these criteria create a staggering taxonomic problem. He proposes as a solution the use of set theory which will

simplify the taxonomy and can provide for computer storage and retrieval.

Venn diagrams provide graphic illustrations of sets. The principles for designing Venn diagrams are summarized by Feinstein (1967) in the following manner. A large number of patients must be surveyed and all pertinent data classified as well as each shade of gradation of the data. The data properties are then analysed alone or in combination for frequency of appearance. Then a series of properties is chosen to represent the independent sets whose overlap will cover the whole spectrum of the diagnosis. Subsets are then added after the major sets are arranged. The choice of appropriate properties and sets for the diagnosis can then be rearranged to vary with the purpose and application at hand. Diagramming of the sets is left to asthetic decision, that is, various shapes and shading may be selected according to that which provides the most clarity for the subject.

Thigpen (1967) offers an example of the utility of set theory and Venn diagrams for depicting the development of professional nursing care and for pre-professional nursing's indifferent developmental phases, as well as nursing's place among the other health services. Many other functions of and within nursing are diagrammed in this

fashion. The authors conclude that the use of the Venn diagram increases objectivity and has great value as a theoretical framework for depicting abstract relationships in a manner such that all relationships are viewed as a part of the whole. The use of set theory offers nursing an opportunity to view the whole patient and would thus increase the opportunities for the provision of holistic care.

Aspinall (1977) reported on a study which utilized the Bayesian conditional probability model. Basically, this is an inductive means of computing the probability that a given patient has a particular disease. A diagnostic search tree is utilized which contains all the possible diseases suggested by the symptoms. The clinician systematically threads his way through the search tree eliminating possibilities and thus constantly altering probabilities of each diagnosis until the probability of one diagnosis approaches unity and a decision is made.

The author constructed a decision tree for a specific behavior which was detailed in a written case study. The sample which consisted of thirty triads of nurses was given the case study. Group A was given only the case study, group B was given the case study and a list of eighteen possible diagnoses, group C was given the

case study as well as the eighteen possible diagnoses and a decision tree. A panel of experts judged that six of the eighteen diagnoses were correct and these were determined to be the acceptable diagnoses. Group A had a mean number of 1.667 correct diagnoses, group B had a mean of 2.000 correct diagnoses and group C had a mean of 3.800 correct diagnoses.

Aspinall (1977), although acknowledging the disappointing results in the ability of nurses to achieve correct diagnoses under any circumstances, states that if the search tree method of diagnosing were introduced in nursing education, the skill of nurses in diagnosing would improve. Concurrently, a method of classifying nursing diagnoses must be developed with clear cut delineation of signs and symptoms.

Doona (1975) presented in a doctoral dissertation, a thorough study of judgment for use in nursing. In 1976 Doona proposed a judgment paradigm for use in nursing. The types of nursing judgment for which this paradigm is applicable include common sense judgment, speculative judgment, pragmatic judgment, and ideal judgment. An ideal judgment is defined as being multidimensional with interaction between nursing concepts and nursing facts. That is, the concepts act upon the facts and the facts

act upon the concepts until each is changed by the other to approach the existential situation and thus a basis for action is achieved. The paradigm that Doona (1975) presents combines perceptual and conceptual data into judgments which are derived both inductively and deductively. The author states that the use of this judgment theory is rich in application to the nursing profession.

Kozielecki (1972) proposes a model for diagnostic problem solving which bears consideration for nursing diagnosis. The features of diagnostic problems are identified as originating from the environment and from memory. The author states that the diagnostician will tend to rely primarily on knowledge stored in his memory. The diagnostic process consists of belief in a hypothesis, the probability that the hypothesis is confirmed given the data at hand, and the actual diagnostic decision. An operational block is proposed as the core of this diagnostic model. This block or unit receives input from the environmental block and is contained within the short term memory. In the operational block, hypotheses are entertained and probabilities are continually altering. This is a dynamic phase which is never static. Long term memory contains the previously accumulated information of the states of nature and is considered in this model in

terms of a psychoinformation block. The exact method of exchange between the psychoinformation block, the environmental block, and the operational block has not been identified.

Kozielecki (1972) summarizes some general statements made by himself and others regarding the diagnostic problem solving process. People will better utilize positive than negative information in the diagnostic problem solving process. Better use will be made of confirming rather than disproving information in the diagnostic process. People tend to overestimate the value of information gathered early in the diagnostic process, the primacy effect. The system of working hypotheses will be extended early in the process and will be reduced in the final phases. As the diagnostic process proceeds the open system of working hypotheses will close so that no new hypotheses will be entertained. The probability of hypotheses as estimated by the Bayesian theory will tend to be overestimated as opposed to those in the diagnostic problem solving system. Diagnostic conservatism is revealed in some situations when only a few hypotheses are entertained and people tend to be overcautious in their diagnosis. However, in an instance when there is a small set of hypotheses and the data are very informative, the diagnostic threshold is

set higher. That is, the probability needed to achieve the diagnosis is higher.

Nursing Diagnosis

Historical Perspective

One element of the nursing process is nursing diagnosis (Carrieri and Stizman 1971). In 1956 Hornung stated ". . . that it is ethical and acceptable for the nurse to use the term 'nursing diagnosis' (Hornung 1956, p. 29)." She further stated that in order to effectively practice nursing all nurses must at one time or another make a nursing diagnosis. Twenty-two years ago she argued for adoption of the term nursing diagnosis so that vague descriptions of the state of the patient would disappear and nurses would be better able to fulfill their professional functions.

Abdellah (1957) saw the need for the practicing nurse to be able to perceive total patient problems. This was construed as being able to make a nursing diagnosis. The author identified overt nursing problem, an apparent condition, and covert nursing problem, a concealed condition. The problem, in the study conducted by Abdellah (1957), was recognizing the importance of the nurse's ability to perceive covert problems in order to make a nursing diagnosis. The purpose of the study was the

exploration of three methods nurses might use to identify nursing problems of the covert type as a possible indication for revised teaching methods. The three methods were the picture story, the free answer, and the direct questioning method. Results were obtained from comparing the three methods to determine the degree of perception of nursing problems both overt and covert. The picture story method produced more overt problems and the free answer method more problems both overt and covert. Specifically, the free answer method produced more emotional (covert) problems. The direct question method yielded fewer problems of either type than the other two methods. It was noted that patient interviewing was more successful when done in the uniform of a nurse and even more successful when done in conjunction with patient care. Abdellah (1957) strongly recommends, at the conclusion of her paper, that a classification system of nursing problems be developed.

Chambers (1962) stated that the use of a nursing diagnosis will result in improved patient care, better patient rapport, and more efficient use of all the facilities available for the patients welfare. The process of nursing diagnosis as identified by the author involves the steps of observation, communication, testing, use of the

literature, and experience. The facts obtained in this manner are then correlated and the nursing problem identified.

Nursing diagnosis is an investigation of the facts to determine the nature of a nursing problem. It is limited to those activities legally interpreted as being within the realm of the professional nurse. (Chambers 1966, p. 104).

Durand and Prince (1966) define nursing diagnosis as "a statement of conclusions resulting from a recognition of a pattern derived from a nursing investigation of the patient" (Durand and Prince 1966, p. 56). This definition implies both the process of diagnosis and the actual attainment of the diagnosis. The specific process identified by these authors consists of nursing investigation, recognition of an identifiable pattern, and the statement of a conclusion or the making of a nursing diagnosis. This process of nursing diagnosis commences as soon as the patient becomes a recipient of nursing care and continues until the patient is no longer in need of nursing care. The nursing diagnosis is not always clear and may be stated as a tentative nursing diagnosis. If this occurs, the diagnosis then becomes a tentative hypothesis which must be further tested for documenting information. The authors also emphatically state that the major value of nursing diagnosis lies in the fact that the diagnosis

provides a scientific basis for nursing practice. The process of diagnosing necessitates the use of scientific knowledge and requires the relation and application of this knowledge to nursing.

While admitting that the use of the term diagnosis in nursing arouses extreme emotional reactions, Komorita (1963) states that diagnosis is one of the crucial aspects of service rendered by any profession because comprehensive knowledge and an analytical approach are necessary.

Nursing diagnosis should be a conclusion based on scientific determination of an individual's nursing needs, resulting from critical analysis of his behavior, the nature of his illness and numerous other factors which affect his condition. (Komorita 1963, p. 84)

The author discusses various other definitions of nursing diagnosis and concludes that generally nursing diagnosis is construed to mean nursing problem. The importance of accurate nursing diagnosis is that it requires the use of judgment based upon knowledge which is necessary in providing comprehensive nursing care. Comprehensive nursing care is not simply following the doctor's orders; it involves assessment of the patient's total needs and formulation of a plan of care based upon this assessment. Thus, comprehensive nursing care will always involve the use of nursing diagnosis (Komorita 1963). Several advantages of nursing diagnosis identified by the author follow. A thorough

knowledge of the scientific basis for the diagnosis as well as the most desirable measures to alleviate it is necessary. Nurses will be stimulated to think more actively and intelligently about their work. The nursing diagnosis will provide a basis for continuity of care. The process of diagnosing will encourage nurses to know their patients better. The development of nursing diagnosis will stimulate efforts at identifying a body of nursing knowledge and will identify criteria for measuring the quality of nursing care. Finally, nursing diagnoses, when properly derived, are able to be empirically tested and will possess statistical and predictive value which should encourage research.

The First National Conference on the Classification of Nursing Diagnoses was held in 1973. Gebbie and Lavin reported on this conference in an article published in 1974. They stated that the use of the term diagnosis is now more acceptable to the nursing profession since it is, in fact, the end product of nursing assessment. In order to determine what constitutes a legitimate nursing diagnosis, a classification system should be used. The first step in developing a classification system, as identified by these authors, is the identification of all those problems which nurses diagnose in their patients. The second step is

agreement about diagnostic nomenclature. The third step consists of grouping of identified diagnoses into classes and subclasses. After the preceding steps are accomplished, numbers and computer terminology can be substituted so that the classifications are more readily retrievable.

The suggested theoretical framework established at the conference was based on the work of Feinstein (1967) (Gebbie and Lavin 1975). The problem of classifying nursing diagnoses is that the diagnostic categories will overlap as opposed to medical diagnosis where morphological limits are established without overlap. The set theory utilized by Feinstein (1967) allows for description of clustering diagnostic properties as well as the categorical overlapping combinations. Other conceptual and theoretical frameworks suggested for the conference were based upon the works of Maslow and Abdellah. A preliminary list of nursing diagnoses was established, but the defining characteristics of each diagnostic category was not identified.

Roy (1975) identifies the current emphasis on and improved skill in nursing assessment as the rationale for establishing a systematic diagnostic classification. A diagnostic classification system will also simplify communication of data and aid in the development of a nursing science. Roy (1975) states that the standards of practice

published by the American Nurse's Association in 1973 clearly delineates the significance given nursing diagnosis by a professional nursing association. When a typology can be established, many more problems will be amenable to solution. Nursing diagnosis will be clearly distinguished from any other diagnosis within the realm of other health team members. Evaluation of standards for nursing proficiency can be based upon a diagnostic classification system because relevant data for each diagnosis will have been identified. A basis for third party payment for nursing services will be established (Roy 1975). Roy defines nursing diagnosis as "the summary statement or judgment made by the nurse about the data she has gathered in her nursing assessment" (1975, p. 91). Set theory is recommended by this author as the theoretical framework for developing a diagnostic classification system. The criteria for the category sets would be relevancy, completeness, definiteness, usefulness, openness, compatibility with related systems, and a capability for computerization. Both the deductive and inductive methodology of reasoning will be necessary in the establishment of a diagnostic classification system. Roy (1975) addresses the importance of a nursing diagnostic taxonomy to the nurse educator. Not only will the skills of diagnosis need to be taught

along with all the knowledge that implies, but also within the foundations will be found the framework for curriculums. Nursing research will greatly benefit and find an impetus in the establishment of a nursing diagnostic taxonomy.

Monken (1975) adds to the voices calling for acceptance of the term nursing diagnosis. She states that if nurses did not diagnose routinely, they would have to call a doctor every time they took vital signs to discover how to interpret them. A nursing diagnosis must be stated according to the two criteria of being specific and patient centered.

Bloch (1974) prefers the use of the term health rather than nursing as a referent for the term diagnosis. She argues that a diagnosis is related to the health of an individual, not the specific health professional within whose scope the diagnosis falls. Problem definition is equated by Bloch (1974) with nursing diagnosis and is considered to be the second part of the assessment. Specifically, problem definition or diagnosis is the process whereby judgment is rendered through critical analysis of the data and does not involve a plan of action or the stating of a need.

Brown (1974) identifies both identification of a problem and indication of causality as a function of nursing diagnosis. She pleads for an epidemiological approach to the establishment of a nursing diagnostic classification system and identifies criteria for each class.

Bircher (1975, p. 5) states that "a nursing diagnosis includes consideration of the person's needs and concerns in all five realms of human experience and knowledge . . ." Nursing diagnoses provide the professional with a concise summary statement of patient problems and thus make it possible to bring abstract knowledge to bear upon a situation. Because of the wide and varied scope of nursing, it is the opinion of Bircher (1975) that a taxonomy is essential. Furthermore, a taxonomy of nursing diagnoses will provide a foundation and stimulus for advancement in nursing practice, education, and research. This author suggests a theoretical framework based upon the set categorization rules developed by Kerlinger. Maslow's hierarchy of human needs is the proposed conceptual framework.

Norris (1975) sought to define the limits, signs and symptoms of one nursing diagnosis--restlessness. In essence a concept analysis was performed and conclusions drawn about that particular diagnosis. The author pleads for the nurse clinician to begin describing, defining,

categorizing, and identifying nursing phenomena and from this to develop effective nursing interventions. She states that from this base will emerge the practice of nursing as a science.

Mundinger and Jauron (1975) reported on their efforts to define the process of arriving at a nursing diagnosis. This involved an intensive search of the nursing literature, formulation of precise definitions for terms such as assessment, evaluation, and nursing diagnosis with a thorough discussion of the concepts involved. The definition of nursing diagnosis is

. . . nursing diagnosis is the statement of a patient's response which is actually or potentially unhealthful and which nursing intervention can help to change in the direction of health. (Mundinger and Jauron 1975, p. 97)

An additional criterion is that the essential factors related to the unhealthful response be identified.

Campbell (1978) published the first textbook on nursing diagnosis. This extensive work emphasizes the development and identification of nursing diagnoses and lists seven hundred and thirty nursing diagnoses. It is the first nursing textbook that identifies nursing diagnosis rather than medical diagnosis as a basis for nursing practice. The diagnoses and intervention listed are derived from the conceptual framework of Maslow's hierarchy

of human needs. That is, need deprivation results in unhealthy states and nursing interventions resolve, diminish, or "prevent" human needs (Campbell 1978). Other factors considered in the development of this taxonomy were legislation, the health needs of the consumer, the realities of current nursing practice, curricula in nursing schools, the differentiation of nursing and medical interventions, the patient problems previously identified in nursing literature, and the many definitions of nursing diagnosis found in the nursing literature. Campbell (1978) addresses the apparent conflict that occurs when a medical and nursing diagnosis overlap. She states that the duality, rather than being a conflict, reflects a cooperative effort between two professions, both of which are seeking to provide quality health care.

Each nursing diagnosis is listed according to the following format: assessment data including subjective, objective, and related data; possible etiology; the nursing diagnosis, including a definition; planning which includes patient needs and primary nurse-patient goals; health teaching; and finally, the evaluation criteria for each specific goal. Campbell (1978) states that her work is to be considered only the rudiments, the beginning of attempting to classify and list nursing diagnoses.

Research Studies Involving
Nursing Diagnosis

The case for the establishment both of the term and for a classification of nursing diagnosis has been eloquently stated by many nursing scholars and theorists. The process of diagnosing and the factors influencing the attainment of a nursing diagnosis have been studied.

Hammond (1964) identified the Brunswik lens model as being useful in the study of clinical inference in nursing. Basically this model was presented as progressing from an observation of the state of the patient, followed by cue input, followed by an inference or a decision for actions to attain a specific goal. Kelly (1964b) describes a study in which this model was applied. This study was the first of many undertaken by this research group whose work has provided the basis for much of the research into nursing diagnosis. Preliminary findings, applying the lens model, indicated that the information transmitted by one cue is negligible, that nursing inference is a highly probabilistic task, that utilization of textbook cues in a study of that type was highly inappropriate, that nurses have a unique inference system which is highly consistent, and that nurses can cope with patient states despite incomplete data.

Hammond (1966) then studied the cognitive function and the process of inference in nursing diagnosis. He described this inferential process as going beyond the information given. The cognitive process of generalizing from an observation to a conclusion can be based on an empirical or theoretical method. Hammond (1966) stated that intuitive inference in nursing can be described and analyzed. Clinical inference is intuitive inference and it is also uncertainty-gearred inference. The cognitive tasks of nurses identified in this study were logical inference, intuitive inference which includes multiple cue inference, and utilization of information including differential diagnosis. Hammond (1966) further discussed, in this work, the various information seeking strategies nurses use. This work appears to provide additional theoretical basis for the development of a taxonomy of cognitive nursing tasks.

The cognitive tasks representative of nursing problems were analyzed by Hammond et al. (1966a). A survey was conducted in a hospital setting to discover the cognitive tasks, the frequency of occurrence, and the cue characteristics of the most frequently occurring tasks. The results of the survey indicated that the number of cognitive nursing tasks was larger and more varied than

anticipated. A second survey narrowed the cognitive task to nursing care decisions regarding complaints of post operative abdominal pain. This sample also revealed a great degree of complexity both in terms of cues and nursing response.

In order to further study the relation between cues and nursing decisions regarding the state of the patient, a second study was conducted by Hammond et al. (1966b) which sought to discover the information units used in clinical inference. Six nurses were presented with one hundred cases gathered in the previous study and were asked to infer the state of the patient from the cues provided in the case study. The results were analyzed to identify which single cue constituted a message unit and which cue group constituted a message unit. No single cue identified carried more than a trivial amount of information and groups of cues were not found to be related to the inference made regarding the state of the patient. Additional findings were that nurses did not discriminate between the usefulness of cues nor did their confidence in their decisions vary according to cues or cue grouping used.

Kelly (1966) articulated the nurses' viewpoint regarding the studies previously described. She stated

that the diagnostic process is central to nursing practice, therefore it is essential that the practicing nurse understand the inferential process. Although this process has not been fully described, nurse patient inferences have been found to have certain features. Inferences have a high social significance, are based on probabilistic data, are followed by immediate action, and are highly complex.

Baily (1967) analyzed nursing action patterns. The design included the use of both field and experimental nurses. The results indicated that there is little agreement on action patterns between and among groups. The author states that action analysis does have value in the field of nursing whenever an evaluative judgment must be made about the efficiency and accuracy of actions based upon clinical inference.

Hansen and Thomas (1968) studied nurses' ability to prioritize and make decisions. They identify the interacting variables that influence cue selection as situational, contextual, and decision maker variables. The authors describe a schematic framework and research which analyzes the decision making ability of public health nurses.

Verhonick et al. (1968) used fourteen filmed scenarios which depicted patient situations in order to determine what observations are made regarding the patient, what actions would be taken based on the observations, and to discover the rationale for the actions. The sample was drawn from a professional convention and consisted of 1,965 individuals. Observations were recorded by assigning them to five mutually exclusive categories which were signs and symptoms, patient actions, physical characteristics, psychosocial characteristics, and environmental factors. Responses were further classified as relevant, irrelevant, and inappropriate. The actions chosen by the respondents were classified as therapeutic, supportive, call physician, call physician first, call physician only, and inappropriate. Demographic data which was obtained included years of experience, position, clinical area of competence, and highest degree held. Some of the findings reported by Verhonick et al. (1968) are as follows: 1) the relevant observations made were only thirty-four percent of all possible relevant observations, 2) instructors had the largest amount of relevant observations and supervisors the least, and 3) those with thirteen to eighteen years of experience listed the most relevant observations and those with more than thirty

years the least. The frequency of relevant observations increased with the highest degree held and more supportive actions were deemed appropriate to these observations.

Davitz and Pendleton (1969) investigated the factors influencing nurses' inferences of patient suffering. The cultural background of the nurse was found to be a significant factor with Latin American groups inferring the highest degree of suffering and the American Negro the lowest. The clinical specialties of the nurses did not affect the overall inferences of the sample. The diagnosis of the patient greatly affected the degree of inference of suffering. Youthful patients were inferred to have a greater degree of suffering than aged patients. Patients whose socioeconomic status placed them in the upper class were inferred to suffer less than middle or lower class patients. No difference in inferred suffering was noted according to the sex of the patients.

Further investigation of clinical inference of the nursing diagnosis of pain was done. A number of factors were found to influence the nurses' perception of pain. Baer, Davitz, and Lief (1970) studied inferences of physical and psychological suffering in relation to verbal and nonverbal communication. The sample consisted of nurses, doctors, and social workers who were presented

with paired vignettes. In one vignette the patient verbalizes pain, in the other pain is not verbalized but expressed through action. After analysis of the data, the following conclusions were drawn. Nurses and doctors inferred less physical and psychological pain than the social workers. All groups inferred greater physical distress for the verbal item but greater psychological distress for the nonverbal item.

Lenburg, Glass, and Davitz (1970) studied the inference of pain and psychological suffering in relation to the stage of the illness and the occupation of the perceiver. The four occupations studied were nuns, teachers, physicians, and nurses. Vignettes were presented to the sample which detailed the type of illness and the stage of the illness. The results indicated that in relation to these two items, more psychological than physical distress was inferred. The onset phase of an illness elicited the highest inference of both physical and psychological suffering. Once more, the two non-health related professions inferred significantly greater levels of pain and suffering. However, the nurses and doctors maintained a constant level of inference throughout the illness while there was a significant decrease in inference at the later stages of the illness by the nuns and teachers.

Lenburg, Burnside, and Davitz (1970) studied the inference of pain and psychological distress in relation to the length of time in a nursing education program. Two levels of nursing students were presented with vignettes and asked to value the amount of physical and psychological pain for each. A greater degree of psychological distress rather than physical pain was consistently inferred by both levels. However, first year students inferred more physical pain and the second year students more psychological suffering, suggesting that students' perceptions do change as a result of educational preparation.

Educational levels and years of experience are factors that influence nurses' inferential and decision making ability. A study conducted by Jacox and reported by Dodge (1975) found that experience in nursing, personal experience with pain, and the age of the perceiver all influence the nurses' ability to evaluate pain.

Clinical expertise in nursing should include expertise in nursing diagnosis. Davis (1972) studied clinical expertise as a function of educational preparation. The sample consisted of baccalaureate nurses and clinical nurse specialists who were presented with five film sequences which were developed by Verhonick et al.

(1968). Responses were analyzed for observations, proposed actions, and rationale for action. The clinical specialists made significantly more relevant observations and suggested a greater number of relevant actions with more appropriate rationale. However, in both groups there existed a negative correlation between years of experience and actions taken. In other words it appears that the quality and quantity of nursing care decline with increasing years of experience.

Davis (1974) replicated the previous study with a sample consisting of diploma, baccalaureate and master prepared persons. The results again indicated that the quality and quantity of nursing care was increasingly superior from diploma level, to baccalaureate level, to masters level with each group improving over the preceding group. It was again noted that without continuing education the quality and quantity of nursing care declined in all groups.

Dincher and Stidger (1976) developed a written simulation format to measure the ability to make nursing judgments. This format presented a patient situation which requires sequential decisions as to inference and actions taken. The authors feel that this type of instrument, when properly developed and validated, will have great value in measuring clinical nursing judgment. The

authors project the application of this type of tool to nurse education, evaluation, and even to state board examinations.

One component of clinical judgment is diagnosis. Koehne-Kaplan and Tilden (1976) studied the effect of personality type on the process of clinical nursing judgment. After identifying a theoretical framework based on the personality theory of Carl Jung, a survey was conducted of a student population to determine whether particular types of personality groupings occurred. The data were also analysed to determine whether a relationship existed between personality types and the ability to learn the components of clinical judgment. One component of clinical judgment is concept attainment. Grouping of personality types did occur and the authors suggest that this method of personality typing could be used effectively in career counseling. The authors reached the conclusion that with the information available to them they could not measure skill at clinical judgment and thus could not correlate it to personality types.

Grier (1976) identified decision making as a major aspect of the nursing process which is initiated with an inference about a patient's needs. An inference

is concept attainment. The variables which were identified in nursing decision making include all possible nursing actions, the outcome of those actions, and the goal of patient care which the actions should accomplish. The decision making ability of twenty-one nurses was measured. The results indicated that most of the decisions were valid in that the chosen actions were desirable for achieving goals and were consistent with the nurse's value and knowledge of the probable outcome. The author concludes that decision theory is applicable and highly valuable to nursing.

Aspinall (1976) investigated the ability of practicing nurses to make nursing diagnoses. The sample consisted of one hundred eighty-seven practicing hospital nurses who were presented with a written case study in which a patient suddenly develops an impairment of thought process. The sample was asked to list all the possible causes of this impairment based upon information contained in the case study. Twelve possible causes were agreed upon by a panel of experts. The sample listed from one to nine problems with a mean of 3.44. The nurses with a higher educational level identified more problems. Nurses with experience of one to ten years identified more problems than those with experience over ten years.

Twenty-one percent of the respondents failed to identify the most likely problem and thirty-nine percent failed to identify the second most likely problem. These disappointing findings are interpreted by Aspinall (1976) as demonstrating a lack of theoretical knowledge on the part of the majority of nurses and an inability to apply what knowledge they do possess to their nursing practice.

Some Trends in Nursing Education

A frequently repeated theme in the literature has been the responsibility of nursing educators to include concept attainment or nursing diagnosis in nursing curriculums. A review of the educational and nursing literature yielded few publications on the teaching of concepts in nursing.

Educational theorists such as Bruner (1960, 1966) have long studied the problem of how best to teach concepts. Bruner (1966) describes the goal of education as knowledge which can only be attained by thinking, which can only be accomplished by conceptualizing or categorizing. He further states that any learned discipline can be conceived of as a way of thinking about phenomena. Therefore, schools should provide students early opportunities to solve problems and to conjecture just as they would if they were in the heart of the discipline.

Rogers (1973) proposes that conceptual models be developed as a guide to clinical nurse specialization. She theorized that conceptual models properly developed would provide guidelines for the development of pertinent and realistic areas of clinical specialization. If a working model can be developed, a massive reorganization of nursing education will be necessary. The author cites and relates to nursing education changes in the curriculum of the School of Business at the University of Pittsburgh. The changes emphasized the need for high intellectual standards which will provide a focus on broad analytically oriented subjects which developed the students capacity to deal with new problems. In nursing curricula this knowledge would not consist of a tidy program of skills but rather the ability to deal with a variety of situations and to solve abstract as well as practical problems.

O'Kelley and McKinney (1971) describe a curriculum based upon a conceptual model which demonstrates the dynamic interplay of medical/surgical components within and between a level approach to learning. All learning is central to the next highest level and finally to professional nursing practice. The value of this approach is cited as increasing the number, kind, and complexity

of the situational variables the student must consider in their decision making.

Kissinger, Ritzman, and Seymour (1974) described a curriculum revision of a traditional medical/surgical course into teaching of concepts. Seven concepts were identified as central to nursing practice. They are chronicity, mobility, body image, rehabilitation, acuteness, invasiveness, and depression of function. The faculty felt that this method of concept teaching would force the students to focus on nursing roles and interventions and would facilitate the transfer of learning to a broad spectrum of nursing situations. The faculty reported no difficulty in teaching these concepts. It is the consensus of the authors that the use of concepts required a high level of cognition by students and that nursing knowledge, thus organized, will be a step toward the construction of lasting nursing theory.

O'Connell and Bates (1976) cite a successful example of a case method of teaching. They state that the end goal of this method of learning is to achieve the students' ability to transfer problem solving processes from familiar situations to new ones. By analyzing cases the student becomes adept at assessment and judgment making as well as able to defend and verify his decisions.

Conclusion

A review of the literature which included a discussion of the conceptual and theoretical framework for nursing diagnosis has been presented. The development of the terminology and the parallel growth of a profession has been outlined. An overview of the classic research in nursing diagnosis as well as the changing direction of nursing education has added to an understanding of the impact of this topic. The theoretical basis for nursing diagnosis is varied and based upon well validated empirical research. Nursing diagnosis is not a new concept and has been in the literature for twenty years.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

Introduction

This study seeks to determine the relationship between concept attainment and cue perception in nursing diagnosis. Additional purposes identified include determining whether there is cue grouping within and across the diagnoses studied and whether educational level affects concept attainment and cue perception.

Setting

The sample was obtained from the graduate and undergraduate students enrolled in the college of nursing in a large Southwestern university. The university has multiple campuses and the sample was obtained from a campus located in a metropolitan area.

Population

The population consisted of the senior students in the baccalaureate program who were within six months of completion of study, and the graduate students who were currently enrolled in a required clinical course. The

sample consisted of forty-two subjects, eighteen undergraduate senior students, and twenty-four master's students. Students enrolled in any clinical specialty area of study offered in the master's program had an opportunity to be included in the sample.

After obtaining permission for the study from the Human Rights Committee (Appendix A) and the Agency (Appendix B), the students were approached. Participation of the subjects was voluntary and they were informed that they could withdraw at any time. To ensure anonymity, number coding was assigned to the instruments in lieu of obtaining names. The subjects were provided with a summary of the data obtained in this study on request. Form A, written presentation to the subjects, was utilized in conformance with the Human Rights Committee of the researcher's institution. A written explanation of the study was presented to the subjects and a signed consent form was obtained from each participant (Appendix C).

Instruments

The tools which were administered to determine the relationship between concept attainment and cue perception in nursing diagnosis included the Concept Mastery Test (Appendix D) and a case study designed by the researcher

(Appendix E). The Concept Mastery Test was designed to be group administered and is a high level verbal test. It is specifically designed to measure the ability to deal with ideas or concepts. The test is validated for administration to college juniors, seniors, and to graduate students (Terman 1973). It is noted that the mean scores obtained on this test vary considerably even with similar groups.

Correlation of the Concept Mastery Test is much stronger with tests that measure verbal ability which is consistent with its highly verbal content. Strong correlation coefficients have been noted with the College Entrance Examination Board Scholastic Aptitude Test; the Wechsler Adult Intelligence Scale, verbal and full scale intelligence quotient; and the Standford Binet Intelligence Scale, form L-M. Internal reliability of the Concept Mastery Test was determined by comparing the two separate forms of the test (Form A and Form T). Form T was administered in this study.

The case study was constructed by the researcher and portrays the history and progression of a patient with the nursing diagnoses of urinary tract infection and an emotional disturbance. Some difficulty was encountered in ascertaining the appropriate word label for the behavioral

diagnosis since there is no concurrence in nursing textbooks as to the limits and specific cues for behavioral diagnoses. In the case study, it was necessary to accept as correct any word label that implied an emotional disturbance. These included grief, denial of illness, anxiety, and altered body image.

The subjects were asked to validate their diagnosis by listing and assigning value to each cue that enabled them to make that diagnosis. The cues were valued on a Likert scale. If the subjects felt that further information was desirable to validate their diagnosis, they were asked to list it.

The cues identified as valid by the researcher are itemized in Appendix E. They have been validated as appropriate to the diagnosis from selected textbook sources. Because fever was included in the Urinary Tract Diagnosis, it was necessary to accept as correct a diagnostic label implying either urinary tract infection or kidney infection. The case study was further validated for content validity by conducting a pilot study. Two additional cues were identified by the subjects. These cues were then validated by using selected textbooks and added to the accepted list. The case study was left unaltered.

Data Collection

Senior students who would complete their courses of study within six months constituted one group. Master's students who were currently enrolled in a required clinical course constituted the second group. Data were collected during a two week period. Twenty senior students could not be obtained. The Concept Mastery Test was administered first and followed by the case study. The order of administration was reversed in order to control for bias which could be caused by mental fatigue secondary to the sequence of test administration. This sequence of reversal of testing order was continued until all testing was completed. The approximate time for completion of both tools was one hour. Testing was conducted in a quiet, well lighted classroom. The subjects, after signing the consent form, were given written directions with each instrument. Oral questions were not entertained. The demographic data obtained included length of time in nursing, length of time in nursing program, highest degree obtained, current student status, non-nursing degrees held, and the specialty areas of graduate students.

Treatment of Data

The Spearman Rank Order Correlation Coefficient was used to compare the scores of the separate groups on the Concept Mastery Test and the number of selected cues identified by the researcher for each diagnosis. Frequency distributions were constructed. The cue value was determined by constructing a weighted distribution. This was done by calculating the number of times a cue was chosen times the value of the cue, total summed for every cue. The cues were analyzed for grouping within and across the diagnoses and Venn diagrams were constructed. Descriptive statistics were applied to define the contents and limits of the diagnoses studied as well as the word label given to the emotional disturbance diagnosis. The Mann Whitney U Test was applied to determine any difference in cue perception between the educational levels studied.

Summary

The setting and population for this study have been identified. The tools were described and the construction and validation of the case study was explained. The data obtained from this study were analyzed according to the statistical methods described.

CHAPTER IV

ANALYSIS OF DATA

Introduction

The data were analyzed using the Spearman Rank Correlation Coefficient, the Mann Whitney U Test, and weighted frequency distributions. Descriptive statistics were used and tables were constructed to display the information. Venn diagrams were utilized to demonstrate cue grouping.

Description of the Sample

The total sample consisted of forty-two persons, eighteen senior students and twenty-four master's students. The senior students had completed 3 1/2 years of study in the baccalaureate program. One senior student had previously earned an Associate Degree in Arts and Sciences.

The master's students were enrolled in a required clinical course. They had a mean of 6.20 years of nursing practice experience with a range of 1.5 years to 15 years. The declared specialty areas of clinical practice included thirteen persons in Medical Surgical nursing, four persons in Psychiatric Mental Health, two persons in Community Health, and two persons in Maternal-Child Health. Two

persons had bachelor's degrees in fields other than nursing. One had a major in Biology and the other in Hospital Administration.

Overall Tabulations

Concept Mastery Test

The seniors attained a mean score on the Concept Mastery Test of 53.27 with a range of 27 to 139.5. The median score was 43.5. The standard deviation from the mean was 27.15. The mean score identified for this group by Terman (1956) was 101.7 with a standard deviation of 33.0.

The master's students attained a mean score of 66.89 with a range of 15.5 to 106.5. The median score was 68.0. The standard deviation from the mean was 21.88. The mean score identified by Terman (1956) for this group was 119.2 with a standard deviation of 33.0.

The Concept Mastery Test consists of two parts; part 1 synonyms and antonyms, and part 2 analogies. Terman (1956) does not identify separate means for the groups studied. The senior sample attained a mean score of 24.72 on part 1 and 28.55 on part 2. The master's student sample attained a mean score of 35.25 on part 1 and 31.6 on part 2. The mean scores of the total sample on part 1 were 30.73.

The mean score of the total sample on part 2 was 30.32. Terman (1956) identified the mean scores for combined graduate and undergraduate students as 53.3. Table 1 lists the mean scores and standard deviations on the Concept Mastery test.

TABLE 1
MEAN SCORES ON THE CONCEPT MASTERY TEST

Group	N	Mean	SD	Normal Mean	SD
Undergraduates	18	53.27	27.15	101.7	33
Graduates	24	66.89	21.88	119.2	33

Cue Perception

The cues identified by the researcher as appropriate to each diagnosis are listed in Appendix E. For each diagnosis, there are a maximum of ten possible cues. The total sample correctly identified the nursing diagnosis of urinary tract infection. The undergraduate students identified a mean of 6.22 cues for this diagnosis with a range of four to eight. The master's students identified a mean of 6.08 cues with a range from four to nine. The total sample identified a mean number of 6.14 cues with a range of four to nine.

Forty-one subjects identified the nursing diagnosis of emotional disturbance, one subject did not. The mean number of cues identified by the undergraduate sample for this nursing diagnosis was 5.55 with a range of two to nine. The mean number of cues identified by the master's students was 6.12 with a range of two to nine. The mean number of cues identified by the total sample for this nursing diagnosis was 6.02 with a range from two to nine. Table 2 shows the mean number and standard deviation of cues for both nursing diagnoses which were identified by the subjects.

TABLE 2
MEAN NUMBER AND STANDARD DEVIATION OF
CUES IDENTIFIED BY THE SUBJECTS

Group	Urinary Infection			Emotional Disturbance		
	N	Mean	SD	N	Mean	SD
Undergraduates	18	6.22	1.39	17	5.55	1.39
Graduates	24	6.08	1.53	24	6.12	2.11
Total Sample	42	6.14	1.42	41	6.01	2.43

Additional cues from the case study were identified by the subjects. Although the case study was constructed

around cues validated from selected textbooks, the subjects identified as separate cues those which were intended as a unit. These cues when viewed as a unit carry a high information value. When the attributes are separated, the information value decreases as does the cue criteriality. For instance, the cue of chills and a temperature spike contains a high informational value in regard to attaining the concept of systemic infection. However, the cue of chills alone has little informational value in attaining any diagnostic concept. The behavior used to describe the patient's refusal to acknowledge his physical condition was also singled out as the separate cues of talking about football and getting his driver's license. These two cues cannot be criterial for any diagnostic concept except when viewed in the context of refusing to acknowledge a physical condition. In other instances, the cues identified were simply not appropriate to the nursing diagnoses. These included refusal to bathe as a cue for urinary tract infection, and temper tantrum as a cue for emotional disturbance. Table 3 displays the additional cues identified by the subjects for both nursing diagnoses. The data have been rank ordered.

The diagnostic label for the emotional disturbance was not identified by the researcher due to the lack of

TABLE 3

ADDITIONAL CUES IDENTIFIED BY THE SUBJECTS
FOR BOTH NURSING DIAGNOSES

Urinary Tract Infection		Undergraduate	Graduate	Total
Cue				
Chills		8	11	19
Irritable		1	1	2
Bed Ridden		1	1	2
Tenth Day in Hospital		2		2
Negative Other Lab			1	1
Rule Out Pneumonia			1	1
Refused Bath			1	1
Emotional Disturbance		Undergraduate	Graduate	Total
Cue				
Talks football and driving		10	15	25
Refused Bath		9	6	15
Decreased eye contact		1	8	9
Fifteen years old		1	4	5
Not relating feelings			2	2
Refused to cooperate		1		1
Temper Tantrum			1	1
Unrealistic Goals			1	1
Not accepting dependence			1	1
Grieving			1	1
Denial			1	1

concurrence in the textbooks utilized for validation. The predominant label applied by the subjects was denial in some form. The second most prominent was grief. The master's students tended to be more specific in naming

the concept. Table 4 displays the rank ordered diagnostic label listed by the subjects for the emotional disturbance diagnosis.

The subjects were asked to list additional information that would enable them to verify their diagnosis. The information requested for the physical diagnosis of urinary tract infection was, in general, data that would confirm the diagnosis. Two master's students requested a chest x-ray which is an instance of negative attribute testing and reflects an effort at disjunctive concept attainment. There was a difference in the type of information requested by the undergraduate and the graduate subjects. The information requested by the undergraduates for the physical diagnosis tended to have less informational value and at times was inappropriate. The information requested by the graduate students, in general, had a high informational value. This may indicate a greater level of confidence in the attained diagnostic concept. The additional information requested for the urinary tract infection diagnosis has been rank ordered and is displayed in Table 5.

The additional information requested for the emotional disturbance diagnosis varied considerably according to the educational level of the subjects requesting it.

TABLE 4

DIAGNOSTIC LABEL APPLIED BY THE SUBJECTS
TO THE EMOTIONAL DISTURBANCE DIAGNOSIS

Label	Undergraduate	Graduate	Total
Denial	10	6	16
Depression and Denial	3	3	6
Denial/Anger	3	2	5
Anxiety	1	2	3
Grief/ Altered Body Image		3	3
Situational Reaction		3	3
Depression		2	2
Altered Body Image		1	1
Grief over Trauma		1	1
Grief/ Denial		1	1

TABLE 5

ADDITIONAL INFORMATION REQUESTED FOR THE
URINARY TRACT DIAGNOSIS

Information	Undergraduate	Graduate	Total
Laboratory Data	9	9	18
C & S Urine	2	8	10
Intake and Output	2	6	8
Foley Care	2	5	7
Date Catheter Changed	4	2	6
Sterile Technique during Cath	3		3
Other Sources Infection	3		3
Chest x-ray		2	2
Duration Poor Intake		2	2
Current Meds		2	2
Neurological Status	1	1	2
Usual Reliability of Lab		1	1
Pain		1	1
I V's		1	1
Vital Signs		1	1
Duration Infection	1		1
Diet	1		1
Ambulating	1		1
Bladder Distention	1		1
Trauma Bladder	1		1

TABLE 5 (Continued)

Information	Undergraduate	Graduate	Total
<u>Who Catheterized</u>	1		1
<u>Color, Warmth of Penis</u>	1		1
<u>U.T.I. Psychosomatic</u>	1		1
<u>Surgical Procedures Done</u>	1		1
<u>Family Support System</u>	1		1
<u>What has M. D. told him</u>	1		1
<u>No Time for Bowel and Bladder Training</u>	1		1

The undergraduate subjects tended to request documenting information regarding the patient's physical and emotional status or information that had little or no criterial value. The graduate students tended to request information that would be useful in planning interventions. This also is indicative of a greater level of confidence in the diagnosis. This information which was requested also confirms the fact that the attaining of any diagnostic concept implies both a knowledge of etiology and therapy. Table 6 displays the rank ordered additional information requested for the emotional disturbance nursing diagnosis.

TABLE 6

ADDITIONAL INFORMATION REQUESTED FOR THE
EMOTIONAL DISTURBANCE DIAGNOSIS

Information	Undergraduate	Graduate	Total
Family Support System	6	6	6
Peer support	5	5	5
Duration Behavior Change	5	5	5
Interaction with significant others	4	1	5
How does he handle anger		4	4
Prognosis		3	3
View of Self	1	1	2
How met other crises	2		2
Growth and Development	1	1	2
Brain or Spinal Cord Damage	1	1	2
Conversation with Staff	1		1
Attempts to Walk	1		1
What has M.D. Told Him	1		1
Knowledge of Condition	1		1
Circumstances of Accident	1		1
Psychlogical Counseling	1		1
Independence level	1		1
Does he have girlfriend	1		1
Lab Data to determine physical status	1		1
How sees strength/weaknesses		1	1
Personal Goals		1	1
Age staff caring for him		1	1
Previous Activities		1	1
Premorbid Personality		1	1
Help from Nurses		1	1
Is surgery required		1	1

Spearman Rank Correlation Coefficient

To determine the relation between concept mastery and cue perception in nursing diagnosis, the Spearman Rank Correlation Coefficient was calculated. The variables chosen were time in nursing, the correct number of cues identified for the urinary tract diagnosis, the correct number of cues identified for the emotional disturbance diagnosis, and the scores on the concept mastery test. The significance level was $p = .05$. The correlation for the total sample between time in nursing and the scores on the Concept Mastery Test was not assessed since eighteen students, the undergraduate subjects, had no experience in nursing. This correlation was not found to be significant when calculated for the graduate sample. A strong correlation existed between Concept Mastery Test scores and cue perception in the undergraduate subjects while there was no statistically significant correlation of the same variables in the graduate subjects. There was a correlation between cue perception in both diagnoses in the total and graduate samples while the correlation for the same variables approached significance in the undergraduate sample. The Spearman Rank Correlations are listed in Table 7.

TABLE 7

SPEARMAN RANK CORRELATIONS

Total Group N=42

Relation	Correlation Coefficient	Significance
Cues Urinary Infection/ Cues Emotional Disturbance	.394	p = .009
Cues Urinary Infection/ Concept Mastery Test	.394	p = .009

Graduates N=24

Cues Urinary Infection/ Cues Emotional Disturbance	.397	p = .05
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Undergraduate N=18

Cues Urinary Infection/ Cues Emotional Disturbance	.412	p = .08
Cues Urinary Infection/ Score Concept Mastery Test	.713	p = .001
Cues Emotional Disturbance/ Score Concept Mastery Test	.448	p = .05

Cue Grouping

The value of the identified cues to the respondents was indicated on a Likert scale with "one" indicating the most valuable and "five" the least valuable. Frequency distributions of the cues were constructed and the cues were weighted to indicate the total value of each individual cue. In order to weight the cues, the Likert scale order was reversed so that "one" became least valuable and "five" became most valuable. The highest possible weighted score

a cue could have was 210 for the total sample, 120 for the graduate sample, and 90 for the undergraduate sample. The weights were obtained by multiplying the frequency of the cue by the weight of the cue and summing the total for every cue. Table 8 displays the rank ordered weights for each cue for each of the two nursing diagnoses.

Set theory was then applied to the data in order to determine whether cue grouping occurred either within or across the nursing diagnosis studied. The weighted value of the cues was analyzed and the tentative categories were constructed with the labels of historical cues, physical findings, and an unnamed third category. It was clear that the cues contained in the third category were the most valued cues. It was then discovered that when viewed as a set, they were cumulative and additive in information value relative to the diagnostic concept attained. The subjects had defined, by valuing the cues, the criterial attributes of each diagnostic concept. These were the attributes which when viewed as a set enabled the subjects to attain the correct nursing diagnostic label.

The highest possible cue weight for the urinary tract infection diagnosis was 1,067 for the total sample. The criterial cue weights were calculated to be 560, the

TABLE 8

WEIGHTED SCORES OF THE CUES
FOR BOTH NURSING DIAGNOSES

Urinary Tract Infection

Cue	Seniors	Master's	Total
WBC's in Urine	85	106	191
Cloudy Urine	77	93	170
Foul Odor Urine	81	89	170
Temp Spike	62	69	131
Foley Catheter	44	66	110
Chest Clear To P and A	28	69	97
Temp Elevation	27	62	89
Refuses Fluids	27	23	50
No Medication	14	16	30
Paraplegic	21	7	28

Emotional Disturbance

Refuses to Look at Legs	75	104	179
Refuses Bowel and Bladder Train	60	80	140
Refuses acknowledge condition	52	84	136
Threw Water Pitcher	38	84	122
Crying	49	67	116
Refuses to Talk	68	37	105
Wringing Hands	35	57	92
Refuses Food and Fluids	26	52	78
Does not Want to be Baby	22	49	71
Paraplegia	9	19	28

physical cue weights were 401, and the historical cue weights were 106. The highest possible combined cue weights for the emotional disturbance diagnosis for the total sample was 1,066. The set of cues labeled criterial for this diagnosis had a combined weight of 641. The sets labeled physical and historical had weights of 317 and 108 respectively. Table 9 displays the cue grouping within and across both diagnoses. Figures 1 and 2 display this grouping through the use of Venn Diagrams.

Mann Whitney U Test

In order to determine whether there was a difference in cue perception and in concept mastery between the graduate and the undergraduate subjects, the Mann Whitney U Test was applied to the data. There was a significant difference between the two groups on the Concept Mastery Test at the 5 percent level with $U = 117.50$. There was no difference in cue perception on diagnosis of urinary tract infection and the diagnosis of emotional disturbance between the graduate and the undergraduate subjects.

Conclusion

Overall tabulations described the sample and the samples' cue perception in nursing diagnosis as well as

TABLE 9

CUE GROUPING WITHIN AND

ACROSS BOTH DIAGNOSES

Urinary Tract Infection

Historical	Wt.	Physical	Wt.	Criterial	Wt.
Paraplegic	28	Temp 101	89	Urine Odor	170
No Meds	30	Temp 103	131	Cloudy Urine	170
Ref. Fliuds	50	Clear Chest	97	WBC's Urine	191
				Foley Cath	110

Emotional Disturbance

Paraplegic	29	Crying	116	Ref. Talk	105
Ref. Food	78	Wringing Hands	92	Ref. Bowel/ Bladder Train	140
		Threw H ₂ O Pitcher	122	Ref. Acknow- ledge Physical Condition	136
		Doesn't want to be baby	71	Ref. to look at legs	179

the additional information requested. The Spearman Rank Correlation Coefficient was calculated to determine the correlation between concept mastery and cue perception in nursing diagnosis. Weighted frequency distributions were constructed to determine the cue grouping in and across the nursing diagnoses. The Mann Whitney U Test was

applied to the data to determine the difference between concept mastery and cue grouping in the graduate and the undergraduate subjects. Tables have been constructed to display this information.

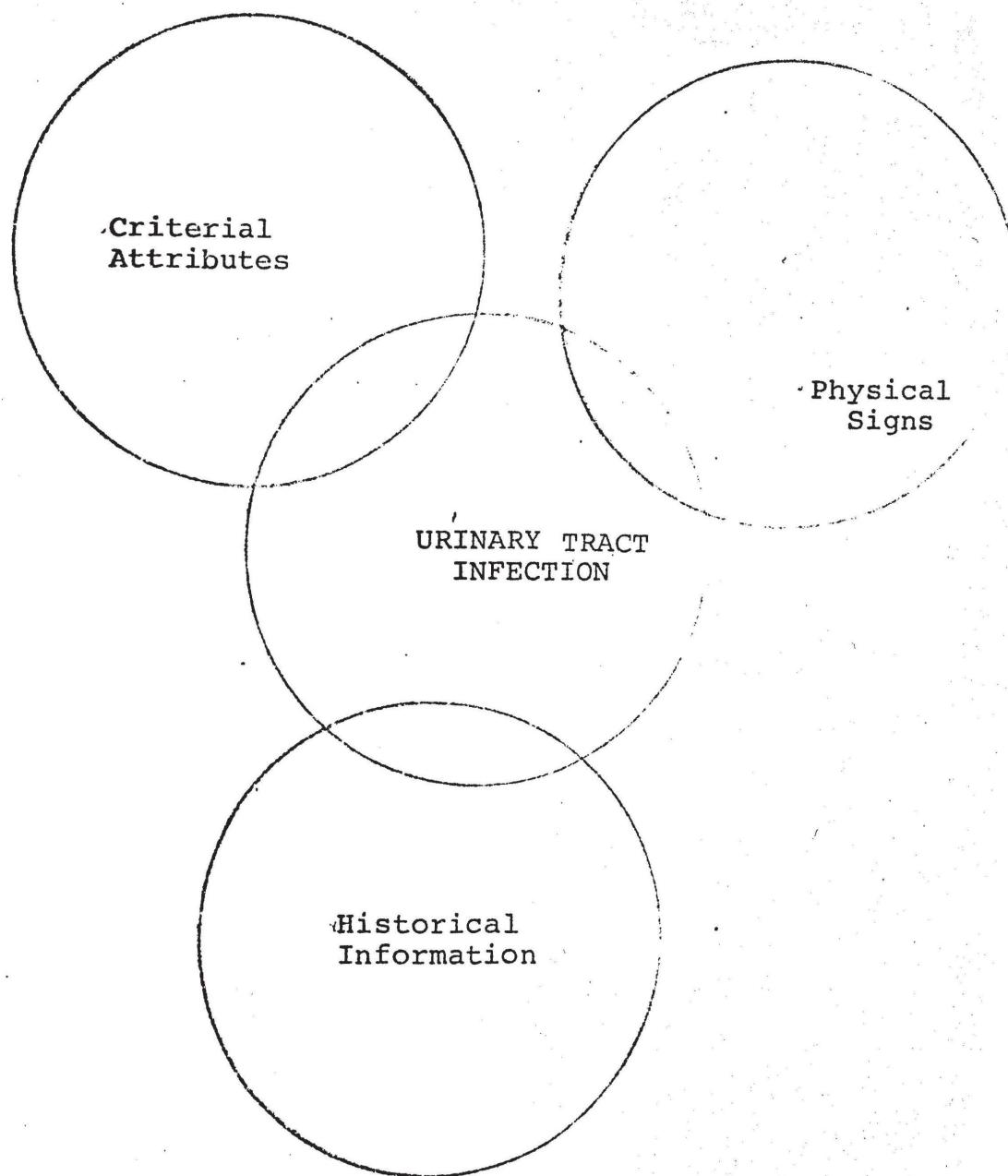


Fig. 1. Venn diagram depicting cue grouping for urinary tract infection diagnosis.

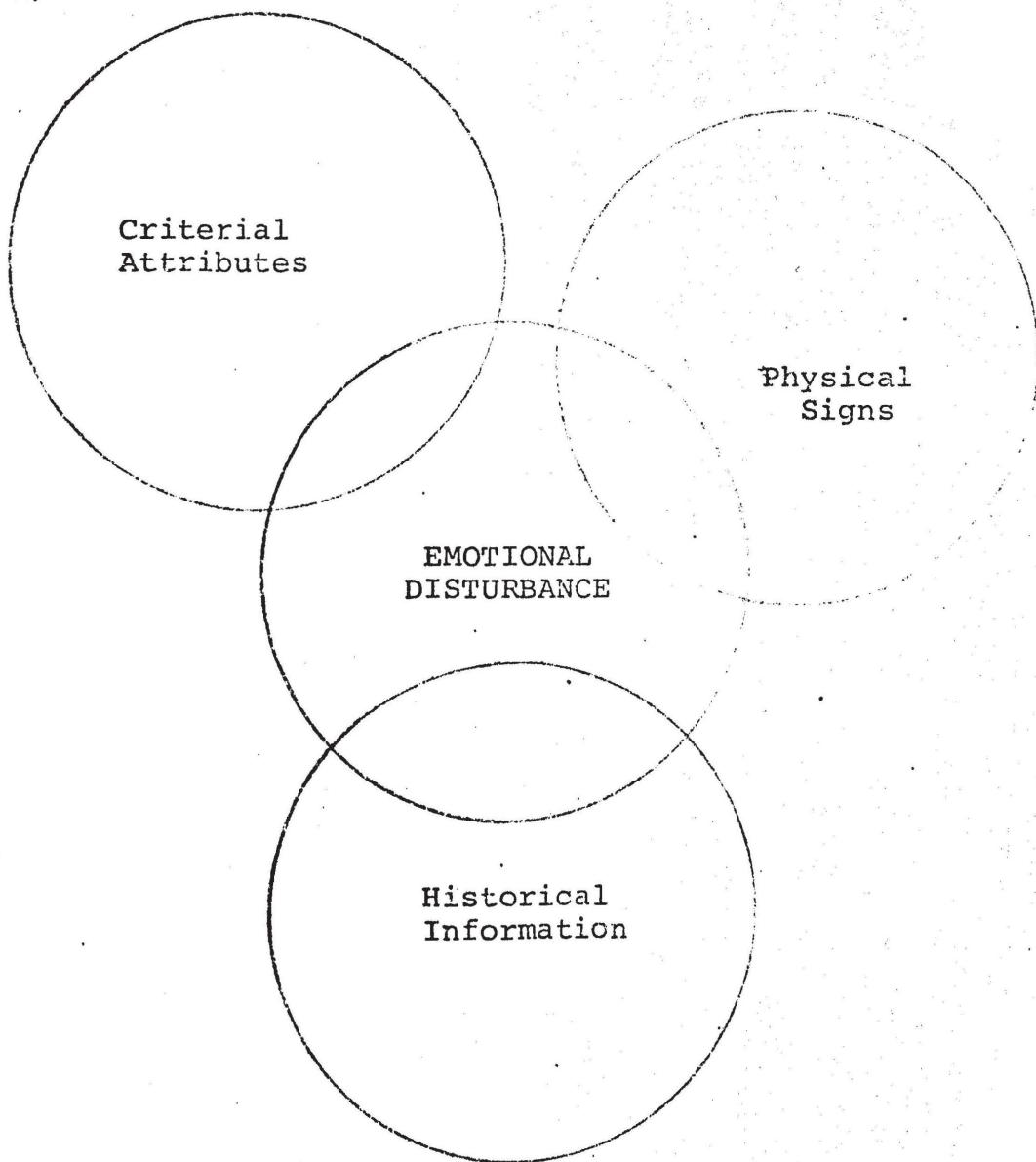


Fig. 2. Venn Diagram depicting cue grouping for the emotional disturbance diagnosis.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Summary

This study determined the relationship between concept attainment and cue perception in nursing diagnosis. Cue grouping in and across the two identified nursing diagnosis was studied. Cue perception and concept mastery was determined for graduate and undergraduate subjects and the differences between the two groups were analyzed. The sample of forty-two persons completed two instruments which were the Concept Mastery Test and a case study designed by the researcher. The educational groups consisted of eighteen undergraduate seniors, who were within six months of completion of a course of study, and twenty-four graduate students who were currently enrolled in a required clinical course. Difficulty was encountered in obtaining the proposed undergraduate sample of twenty persons and only eighteen were obtained.

The Concept Mastery Test Scores for each educational group and for the total sample were much lower than the established norms for similar groups. A review of the testing procedure failed to reveal a technical reason for the low scores. The testing was conducted in a quiet,

Examination. Since a strong correlation exists between the verbal section of the Graduate Record Examination and the Concept Mastery Test as noted by Terman (1956), it can be assumed the scores of this sample on the Graduate Record Examination would be equally as low. Would these students have been accepted for admission into university schools of nursing where admission criteria exist?

However, the subjects were in a university school of nursing completing their clinical courses. These nurses are making judgments about the state of their patients irregardless of their ability to deal with concepts as measured by the Concept Mastery Test. The role of the textbooks should be directly related to concept attainment. There was no concurrence among the textbooks selected to verify the cues for the nursing diagnoses in this study as to what constitutes the diagnostic criteria of each of the diagnoses. If the defining limits of the concepts are not taught, then it is not surprising that nurses do not relate conceptual ability to cue perception in nursing diagnosis. A curriculum that is process oriented should also be concept oriented. Is it possible that process oriented curriculums are really only presenting content?

The case study (Appendix E) was designed by the researcher and identified ten cues for each of the diagnosis. Although each cue was validated from selected textbook sources, additional cues were identified by the sample that were not identified by the researcher. Since this study sought to investigate the cognitive processes of nurses, the additional cues identified provided insight into the attribute testing of the concepts. Since each individual approaches concept attainment in a unique way, the additional cues identified provided the researcher with insight into the varied approaches to concept attainment.

The information value of criteriality of a cue or defined by Bruner (1960) is what determines the selection strategies and the attainment of the correct concept. In general, the additional cues identified by the subjects had little informational value. Bruner (1960) has stated that probabilistic cues vary according to their utility, their nature, the opportunity for validation, and to the individual's conception of the task. Since the additional cues identified by the subjects had little utility, they can be considered as an instance of the subjects holding on to preferred attributes which are essentially useless for the task.

This same instance was noted in the undergraduates' request for further information. It is of note that the undergraduate subjects tended to request information for both nursing diagnosis which had little utility and was, on occasion, inappropriate. The graduate students requested further information on the emotional disturbance diagnosis which had strong connotations of possible nursing interventions.

On the average 60 percent of the possible cues were identified for each diagnosis. Since all but one subject derived the correct diagnosis, the percentage of cues identified should not be considered important. The process of concept attainment involves hypothesis testing and each individual processes the cues or attributes in a different manner. Since a majority of the sample did not identify four cues, it is possible that those cues had a low informational value and utility to the subjects. The level of entry into hypothesis testing in deriving concepts will vary and, therefore, not all attributes must be tested in order to derive a concept.

There was shown to be a significant correlation between cue perception and concept attainment among the undergraduate sample while there was no correlation of these same variables in the graduate sample. The variable

of experience was not correlated in the graduate sample to cue perception and concept attainment. The rationale for this phenomenon is unexplained. Another unidentified variable intervenes after the undergraduate nurse leaves school which affects the method of concept attainment in nursing diagnosis. It is postulated that this has to do with the kind of cues the nurses utilize in deriving a nursing diagnosis and with the informational value of the cues rather than the number of cues.

Cue grouping occurred within and across the sample. The criterial attributes of the concepts were clearly identified. There was a significant difference in concept mastery between the two educational groups and there was no difference in cue perception between the two groups.

Conclusions

Based upon the results of this study, the following conclusions were drawn:

1. There is a relation between concept attainment and cue perception in nursing diagnosis among the undergraduate students

2. There is no relation between concept attainment and cue perception in nursing diagnosis among the graduate students

3. There is a significant difference in concept mastery between the graduate and the undergraduate students

4. There is no difference in cue perception in nursing diagnosis between the graduate and the undergraduate students

5. When confronted with a physical diagnosis, nurses tend to seek confirmatory information

6. When confronted with a behavioral diagnosis, nurses tend to seek information useful in planning care

7. Cue perception in nursing diagnosis is not best determined by tabulating how many cues were selected out of a possible total, but by determining the informational value of each cue

8. When given a number of cues for a specific diagnosis, nurses will group them and weight them according to the criterial value of each individual and each set of cues

9. There is no concurrence among nursing textbooks as to the defining limits of diagnoses of urinary tract infection and emotional disturbance

10. The ability of graduate and undergraduate nurses to deal with abstract concepts as measured by the Concept Mastery Test is considerably less than the established norms

Implications

Based upon the results of this study, the following implications are made:

1. Nursing educators should use a conceptual approach in nursing educations
2. All persons admitted to a graduate school of nursing should be required to prove minimal competency as determined by a set minimum score on a standardized test such as the Graduate Record Examination
3. All students admitted to an undergraduate school of nursing be required to prove minimal competency as determined by a set minimum score on the College Entrance Examination Boards
4. Nursing curriculum be designed so that nursing diagnosis is taught at the beginning level
5. Competence at nursing diagnosis should be a required exit behavior of schools of nursing
6. Nursing educators should teach a way of thinking, not a method of practice

Recommendations

Based upon the results of this study, the following recommendations are made:

1. The Concept Mastery Test be administered to similar groups in other universities which have standar-dized tests such as Graduate Record Examination required for admission control in order to determine whether the low scores are a reflection of the population of graduate and undergraduate nursing students as a whole
2. A nursing course be designed which will aid the beginning nursing students to think in concepts and to take a conceptual approach to practice
3. All nursing diagnoses be empirically validated in a similar manner to determine the criterial attributes of each diagnosis before it is entered into a taxonomy
4. Courses in nursing diagnosis be taught from the beginning level throughout the nursing educational program
5. A study be designed in which the subjects ver-bally relate the cue value and the rationale for cue selection in order to define the criterial cues for each diagnosis as well as the cognitive process utilized in cue selection
6. A study be designed that will determine the type of nursing interventions specific for diagnostic labels

7. A study be designed which will measure the extent of nurses' theoretical knowledge with their ability to make nursing diagnoses

8. A study be designed to determine the difference in cue perception of nurses when the patient situation is presented verbally, pictorially, or by written case study

9. A study be designed that would correlate other variables of practicing nurses with their ability to make nursing diagnoses

10. Further studies be done using the decision tree in deriving a nursing diagnosis which will have the subjects state the probability of the cues at each diagnostic level. This will determine whether this theory is useful in the cognitive training of nurses

11. A wide variety of nursing textbooks be utilized in schools of nursing since there is so little concurrence as to diagnostic criteria

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APPENDIX A

TEXAS WOMAN'S UNIVERSITY

Human Research Committee

Name of Investigator: Alice L. Gaul Center: Dallas

Address: 7505 Spring Valley Road

Dallas, Texas 75240

Dear Ms. Gaul: Concept Attainment and Cue Perception
Your study entitled in Nursing Diagnosis

has been reviewed by a committee of the Human Research Review Committee
and it appears to meet our requirements in regard to protection of the
individual's rights.

Please be reminded that both the University and the Department
of Health, Education and Welfare regulations require that written
consents must be obtained from all human subjects in your studies.
These forms must be kept on file by you.

Furthermore, should your project change, another review by
the Committee is required, according to DHEW regulations.

Sincerely,

Frederick M. Hansen

Chairman, Human Research
Review Committee
at Dallas.

APPENDIX B

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

DALLAS CENTER
1810 Inwood Road
Dallas, Texas 75235

HOUSTON CENTER
1130 M.D. Anderson Blvd.
Houston, Texas 77025

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE _____

GRANTS TO Alice L. Gaul B. S. N.

a student enrolled in a program of nursing leading to a Master's Degree at Texas Woman's University, the privilege of its facilities in order to study the following problem:

Concept Attainment and Cue Perception in Nursing Diagnosis

The conditions mutually agreed upon are as follows:

1. The agency (~~may~~) (may not) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (~~may~~) (may not) be identified in the final report.
3. The agency (~~wants~~) (does not want) a conference with the student when the report is completed.
4. The agency is (willing) (~~unwilling~~) to allow the completed report to be circulated through interlibrary loan.
5. Other: _____

Date 2/17/78

/Signature of Agency Personnel

Alice L. Gaul
Signature of student

Barbara J. Carter
Signature of Faculty Advisor

*Fill out and sign three copies to be distributed as follows: Original -
Student; first copy - agency; second copy - T.W.U. College of Nursing.

APPENDIX C

Nursing diagnosis is considered an integral part of the nursing process. Studies have so far failed to identify the exact cognitive process involved. The act of arriving at a nursing diagnosis is considered a form of concept attainment. This study will determine whether there is a relationship between the ability to deal with abstract ideas and the ability to make nursing diagnoses. In addition, this study seeks to determine if educational level affects cue perception and the ability to make nursing diagnoses. The value of the cues as assigned by the participants may also indicate cue grouping and defining criteria for the diagnoses.

The procedure for the study is as follows. You will be asked to complete two tools. You may withdraw at any time without penalty. A signed consent from will be requested and your participation must be voluntary. Your demographic data such as education, age, and experience as well as your test scores can in no way be correlated with your name. In this way, anonymity is assured.

On the sheet that requests personal data, there will be a number. Use that number to identify yourself on the answer sheets for the Concept Mastery Test and the case study. Demographic data and all answer sheets will be numerically coded. Individual scores on the Concept Mastery

Test or the Case Study will not be given to subjects, but a compilation of data obtained will be made available to them. This will include the range and mean scores on the Concept Mastery Test as well as the cue perception and cue value as determined by the case study. If the subject desires the data, they will be asked to self-address an envelope and the data will be mailed to them.

The risks involved, although provided for, include improper release of data and the risk of personal embarrassment. It is also conceivable that the nature of the tools could cause you to become aware of personal weaknesses either in concept mastery or the ability to make nursing diagnoses.

The major benefit is the opportunity to determine your ability at nursing diagnosis. Your participation could benefit the nursing profession by contributing to a study which will add to the body of research on the cognitive abilities of nurses.

The Concept Mastery Test was designed to measure the ability to deal with abstract ideas. It is an intelligence test and correlates with other intelligence tests. Specific instructions for completion are on the test form. Be sure to put your number on the answer sheet. Estimated time for completion is twenty to forty minutes.

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The case study was designed by the researcher.

Complete instructions are on the front page. Do not forget to put your number on each answer sheet. Estimated time for completion is about thirty minutes. Are there any questions regarding the purposes, procedures, risks, or benefits of this study?

TEXAS WOMAN'S UNIVERSITY

(Form A - Written presentation to subject)

Consent to Act as a Subject for Research and Investigation:

(The following information is to be read to or read by the subject)

Alice L. Gaul

1. I hereby authorize _____ (Name of person(s) who will perform procedure(s) or investigation(s)).
to perform the following procedure(s) or investigation(s):
(Describe in Detail)
2. The procedure of investigation listed in Paragraph 1 has been explained to me by Alice L. Gaul
(Name)
3. I understand that the procedures or investigations described in Paragraph 1 involves the following possible risks or discomforts:
(Describe in detail) Improper release of data, personal embarrassment, confrontation of possible weakness in the ability to make nursing diagnoses and possible difficulty completing Concept Mastery Test
4. I understand that the procedures and investigations described in Paragraph 1 have the following potential benefits to myself and/or others:
The opportunity to determine my ability at nursing diagnosis and to contribute to research on the cognitive abilities of nurses.
5. An offer to answer all of my questions regarding the study has been made. If alternative procedures are more advantageous to me, they have been explained. I understand that I may terminate my participation in the study at any time.

Subject's signature

Date

(If the subject is a minor, or otherwise unable to sign, complete the following)

Subject is a minor (age ____), or is unable to sign because:

Signatures (one required):

Father

Date

Mother

Date

Guardian

Date

APPENDIX D

CONCEPT MASTERY TEST



Form T

Lewis M. Terman

Your answers are to be recorded on a special answer sheet. Please do not make any marks on this test blank. Fill out the heading on the answer sheet before starting the test.

PART I. SYNONYMS AND ANTONYMS

Directions: This test is made up of pairs of words which have either the same or opposite meaning. If two words mean the same or nearly the same, mark the space under S on the answer sheet; if two words mean the opposite or nearly the opposite, mark the space under O on the answer sheet.

For example: In item A below, "hot" and "cold" mean the opposite; so in line A under EXAMPLES, Part I on the answer sheet, the space under O should be blackened.

In item B below, "big" and "large" mean the same, so in line B of the answer sheet the space under S should be blackened.

Be sure that the space you mark on the answer sheet is numbered the same as the question you are answering. Do not mark the test blank. Omit those items that you could answer only by pure guess, but answer all you *think* you know, even if you are not quite certain. Do not study long over any pair.

A. hot.....cold
B. big.....large

- | | |
|--------------------------------|-----------------------------------|
| 1. rigid.....flexible | 16. squeamish.....qualmish |
| 2. competent.....qualified | 17. awkward.....dexterous |
| 3. haven.....refuge | 18. taut.....flaccid |
| 4. cheap.....priceless | 19. assuage.....alleviate |
| 5. tangled.....entangled | 20. dynamic.....static |
| | |
| 6. admiration.....esteem | 21. curtail.....abridge |
| 7. steep.....precipitous | 22. dearth.....scarcity |
| 8. elated.....depressed | 23. cognizant.....unaware |
| 9. choice.....option | 24. callow.....mature |
| 10. impediment.....obstacle | 25. adroit.....clumsy |
| | |
| 11. relinquish.....retain | 26. abeyance.....suspension |
| 12. submissive.....domineering | 27. discernible.....imperceptible |
| 13. brisk.....dilatory | 28. importune.....entreat |
| 14. chasm.....abyss | 29. protest.....acquiesce |
| 15. flaunt.....conceal | 30. offend.....placate |

PART II. ANALOGIES

Directions: Each line in this test can be made a true statement by using one of the three responses in parentheses.

For example: Item X below is read, "Shoe is to Foot as Glove is to (a. Arm b. Elbow c. Hand)."

The correct answer is Hand, because Hand is related to Glove as Foot is related to Shoe. Under EXAMPLES, Part II of the answer sheet, line X, blacken the space under c to show that choice c (Hand) is the correct answer.

In item Y below, the correct answer is b (Cow), so the space under b in line Y of the answer sheet should be blackened.

Read each line and decide which one of the three responses is correct, a, b or c, and mark the space under the corresponding letter on the answer sheet. Be sure for each item that the line on the answer sheet is numbered the same as the question you are answering. Omit those that you would have to answer by pure guess.

X. Shoe : Foot :: Glove : (a. Arm b. Elbow c. Hand)
Y. Kitten : Cat :: Calf : (a. Horse b. Cow c. Lion)

1. Ocean : Pond :: Deep : (a. Shallow b. Well c. Sea)
2. Many : Few :: Often : (a. Frequent b. Seldom c. Never)
3. Scissors : Cloth :: Scythe : (a. Wood b. Steel c. Grass)
4. Fore : Aft :: Bow : (a. Deck b. Boat c. Stern)
5. Circle : Square :: Sphere : (a. Geometry b. Cube c. Ball)

6. Melted : Frozen :: Liquid : (a. Soft b. Water c. Solid)
7. Order : Confusion :: Peace : (a. Treaty b. Enemy c. War)
8. Most : Least :: Best : (a. Good b. Worst c. Poor)
9. Framework : House :: Skeleton : (a. Body b. Bones c. Skull)
10. Wise : Foolish :: Vain : (a. Modest b. Pretty c. Conceited)

11. Aspen : Tree :: Armadillo : (c. Dagger b. Animal c. Shrub)
12. Antlers : Deer :: Antennae : (a. Amoeba b. Starfish c. Grasshopper)
13. Love : Caress :: Anger : (a. Strike b. Patience c. Temper)
14. File : Style :: Fight : (a. Enemy b. Quarrel c. Spite)
15. Whitney : Cotton gin :: Edison : (a. Motion picture b. Telephone c. X-ray)

16. Harrow : Cultivation :: Dray : (a. Painting b. Hauling c. Plumbing)
17. Enough : Excess :: Sufficiency : (a. Surplus b. Adequacy c. Competency)
18. North : South :: Northeast : (a. Southwest b. Southeast c. Northwest)
19. Cat : Carnivorous :: Pony : (a. Horse b. Herbivorous c. Ruminant)
20. Sugar : Meat :: Carbohydrates : (a. Proteins b. Fats c. Vitamins)

21. Newton : Calculus :: Copernicus : (a. Geography b. Archaeology c. Astronomy)
22. Mexico : North America :: Rhodesia : (a. Australia b. Africa c. Europe)
23. Cornea : Eye :: Cochlea : (a. Spine b. Heart c. Ear)
24. Square of 1 : Square of 2 :: 1 : (a. 2 b. 4 c. 8)
25. Backward : Forward :: Ancestry : (a. Lineage b. Progeny c. Prototype)

26. Rabbit : Timid :: Lion : (a. Fierce b. Dangerous c. Bold)
27. English : Australia :: Portuguese : (a. Brazil b. Puerto Rico c. Costa Rica)
28. Optic nerve : Sight :: Olfactory nerve : (a. Hearing b. Smell c. Taste)
29. Labor : Wages :: Capital : (a. Industry b. Stockholder c. Interest)
30. Certify : Attest :: Captivate : (a. Fascinate b. Admire c. Castigate)

- | | |
|---------------------------------|---------------------------------|
| 31. ineffective.....cogent | 76. spoliation.....despoliation |
| 32. blatant.....vociferous | 77. obloquy.....ignominy |
| 33. paucity.....profusion | 78. denunciation....philippic |
| 34. ameliorate.....aggravate | 79. pertinent.....apposite |
| 35. acme.....zenith | 80. baneful.....baleful |
| 36. demeanor.....bearing | 81. condign.....undeserved |
| 37. quell.....subdue | 82. traduce.....vilify |
| 38. profuse.....abundant | 83. ratiocination....intuition |
| 39. intractable.....docile | 84. calumniate.....laud |
| 40. rescind.....abrogate | 85. phlegmatic.....irascible |
| 41. prodigal.....parsimonious | 86. evanescent.....abiding |
| 42. succinct.....verbose | 87. argot.....jargon |
| 43. laconic.....loquacious | 88. perfunctory....meticulous |
| 44. primeval.....primordial | 89. pique.....umbrage |
| 45. affront.....conciliate | 90. affirm.....gainsay |
| 46. ominous.....auspicious | 91. venial.....inexpiable |
| 47. antipathy.....affinity | 92. descant.....expatiate |
| 48. rife.....abounding | 93. expert.....tyro |
| 49. contravene.....sustain | 94. scurrilous.....opprobrious |
| 50. bucolic.....rustic | 95. espy.....descry |
| 51. effrontery.....diffidence | 96. limn.....delineate |
| 52. vapid.....zestful | 97. periphrastic....succinct |
| 53. fatuous.....inane | 98. bowdlerize.....expurgate |
| 54. sanguine.....pessimistic | 99. putative.....certain |
| 55. sycophant.....parasite | 100. terse.....prolix |
| 56. raillery.....badinage | 101. confute.....refute |
| 57. sagacity.....fatuity | 102. contumacious..fractious |
| 58. subjugate.....capitulate | 103. pusillanimous..intrepid |
| 59. perspicuous.....obscure | 104. sophistry.....casuistry |
| 60. redolent.....fragrant | 105. recreant.....apostate |
| 61. concomitant....synchronous | 106. miasma.....effluvium |
| 62. factious.....peaceful | 107. proscribe.....ostracize |
| 63. archetype.....prototype | 108. semipiternal....ephemeral |
| 64. presage.....portend | 109. palliate.....extenuate |
| 65. redoubtable.....feeble | 110. surfeit.....stint |
| 66. splenetic.....rancorous | 111. abstruse.....recondite |
| 67. cursory.....desultory | 112. termagant.....virago |
| 68. crass.....gross | 113. imprecate.....execrate |
| 69. mordant.....mild | 114. disingenuous...artless |
| 70. salubrious.....wholesome | 115. transilient.....saltatory |
| 71. recalcitrant.....refractory | |
| 72. temerity.....timidity | |
| 73. bootless.....vain | |
| 74. inchoate.....rudimentary | |
| 75. chicanery.....probity | |

31. $8\frac{1}{3}$: 100 :: Month : (a. Season b. Year c. Time)
32. Georgians : Russia :: Basques : (a. Italy b. Switzerland c. Spain)
33. $1/3 : 2$:: 10/15 : (a. 6 b. 5 c. 4)
34. Vergil : Aeneid :: Matthew : (a. Psalms b. Mark c. Gospel)
35. Tuberculosis : Tubercular :: Dementia : (a. Demeanor b. Demented c. Dement)

36. Nature : Nurture :: Heredity : (a. Ancestry b. Environment c. Health)
37. Pretentious : Pretension :: Decorous : (a. Decoration b. Decorum c. Deceptive)
38. Cube of 2 : Cube of 3 :: 8 : (a. 12 b. 16 c. 27)
39. Proletarian : Worker :: Brahmin : (a. Bull b. Aristocrat c. India)
40. Bacchus : Revelry :: Ceres : (a. Agriculture b. Love c. Hunting)

41. Ontario : Canada :: Yucatan : (a. Alaska b. Mexico c. Guatemala)
42. Entomologist : Insects :: Philologist : (a. Philosophy b. Logic c. Language)
43. $1/8 : 3/16$:: 10 : (a. 30 b. 15 c. 5)
44. Binocular : Telescope :: Bicameral : (a. Photography b. Legislature c. Dromedary)
45. Atone : Expiate :: Elicit : (a. Evoke b. Illicit c. Exploit)

46. Annual : Perennial :: Deciduous : (a. Floriferous b. Evergreen c. Changeable)
47. Harvey : Circulation :: Lister : (a. Antisepsis b. Vaccination c. Anesthesia)
48. 7 : 11 :: 13 : (a. 15 b. 16 c. 19)
49. T. H. Huxley : Darwin :: Adam Smith : (a. Emerson b. Galton c. Malthus)
50. Rung : Ladder :: Column : (a. Arch b. Coliseum c. Colonnade)

51. 5:00 P.M. : London :: 2:00 A.M. (a. Tokyo b. New York c. Athens)
52. Hieroglyphics : Egyptians :: Cuneiform : (a. Greeks b. Persians c. Hebrews)
53. Whence : Whither :: Origin : (a. Source b. Intention c. Destination)
54. J. Dewey : Philosophy :: T. Veblen : (a. Economics b. Religion c. Medicine)
55. Danube : Black Sea :: Euphrates : (a. Persian Gulf b. Red Sea c. Caspian Sea)

56. Hanging Gardens : Babylon :: Colossus : (a. Olympia b. Rhodes c. Ephesus)
57. Gavotte : Dance :: Filigree : (a. Horse b. Fabric c. Ornament)
58. Optics : Physics :: Dialectics : (a. Logic b. Language c. Mathematics)
59. Martin : Swallow :: Martinet : (a. Skylark b. Metronome c. Disciplinarian)
60. Sat : Set :: Rose : (a. Raised b. Risen c. Rise)

61. Notre Dame : Cathedral :: Nostradamus : (a. Prophet b. Temple c. Nostrum)
62. Combustible : Inflammable :: Volatile : (a. Voluble b. Fligthy c. Inviolate)
63. Toxicology : Poisons :: Numismatics : (a. Coins b. Fossils c. Guns)
64. Noxious : Injurious :: Salacious : (a. Salable b. Delicious c. Obscene)
65. Octet : Octahedron :: Sextet : (a. Cube b. Sexton c. Polyhedron)

66. Hippocrates : Galen :: Aeschylus : (a. Euripides b. Pericles c. Heraclitus)
67. Syntax : Grammar :: Prosody : (a. Versification b. Prose c. Orthography)
68. Marx : Hegel :: Aquinas : (a. Luther b. Aristotle c. Erasmus)
69. Maoris : New Zealand :: Ainu : (a. China b. India c. Japan)
70. Naive : Sophisticated :: Ingenuous : (a. Candid b. Artful c. Inventive)

71. Parquetry : Wood :: Cloisonné : (a. Canvas b. Fretwork c. Enamel)
72. Peculiar : Distinctive :: Untoward : (a. Unfavorable b. Unexpected c. Fortuitous)
73. Taxonomy : Biology :: Etymology : (a. Zoology b. Philology c. Geology)
74. Utopia : Thomas More :: New Atlantis : (a. Mill b. Wells c. Bacon)
75. Earth : Mars :: Saturn : (a. Jupiter b. Uranus c. Neptune)

APPENDIX E

INSTRUCTIONS FOR COMPLETION
OF THE CASE STUDY

Please read the following case study. After you have finished, list the TWO primary nursing diagnoses on the answer sheets provided. Use a separate answer sheet for each diagnosis. After listing the diagnosis, please list the cues which enabled you to derive that diagnosis. Then indicate on the scale following each cue the value of that cue in arriving at the diagnosis. For example, 1 is most helpful, 3 is moderately helpful, and 5 is least helpful. If you feel that more information should be made available to you to validate your diagnosis, then list the additional information you would require in the space provided.

For your convenience, the definitions of the words nursing diagnosis and cues follow:

Nursing Diagnosis -- the process of arriving at a clinical judgment from observed signs and symptoms in a patient's physical or psychological condition

Cues -- information related to the condition of the patient which is available to the nurse

CASE STUDY

J. P. is a fifteen-year-old Caucasian male who sustained an air embolism during a SCUBA diving accident immediately prior to hospitalization. He is paralyzed from level T-12 despite treatment in a recompression chamber. His treatment consists of physical therapy and a foley catheter to straight drainage. He is receiving no medication.

On the tenth day post admission, the night nurse reported that his urine was cloudy with a foul odor. At 5 A.M. he had a shaking chill followed by a temperature spike to 103° F. His chest was noted to be clear to percussion and auscultation. A CBC, urinanalysis, BUN, Creatinine, and electrolytes were done STAT, but the only result available for morning report was the urinalysis. Microscopic examination revealed packed white blood cells in the urine.

When the nurse came in to administer morning care, his temperature was noted as 101° F. He was found crying and wringing his hands. He refused his bath, stating that he was not a baby and did not need to be treated like a baby forever. He then threw his water pitcher at the nurse and refused to talk with any of the staff.

A staff conference was called and the following information elicited about his behavior since admission. He has refused to talk or to listen when attempts are made to discuss bowel or bladder training. In his conversation he refuses to acknowledge items dealing with his physical condition, preferring instead to talk about resuming football practice and finally getting his driver's license as he will be sixteen next month.

The nurses reported that he has been refusing both food and fluids. A note by the physical therapist stated that during therapy he consistently averts his eyes and refuses to look at his legs.

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The most probable Nursing Diagnosis is:

ADDITIONAL INFORMATION REQUIRED:

CUES AS DETERMINED BY RESEARCHER

Nursing Diagnosis: Urinary Tract Infection

- Cues:
1. Foley Catheter
 2. Cloudy Urine
 3. Foul Oder Urine
 4. Temperature spike 103 F
 5. White Blood Cells Urine
 6. Temperature 101 F
 7. Refusing Fluids
 8. Clear Chest
 9. Paraplegia
 10. No Medications

Nursing Diagnosis: Emotional Disturbance

- Cues:
1. Crying
 2. Wringing Hands
 3. Doesn't want to be treated like a baby
 4. Threw water pitcher (hostile)
 5. Refuses to talk
 6. Refuses bowel and bladder training
 7. Refuses to acknowledge physical condition
 8. Refuses food
 9. Refuses to look at legs
 10. Paraplegia