A STUDY OF THE RELATIONSHIP BETWEEN INTUITION AND PERCEPTION

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

COLLEGE OF NURSING

BY

MARTHA BLEDSOE SANFORD, B.S.N., M.S.N.

DENTON, TEXAS

MAY, 1985

The Graduate School

Texas Woman's University

Denton, Texas

March 29 19 85

We hereby recommend that the dissertation prepared under our supervision by Martha L. Bledsoe Sanford entitled A Study of the Relationship Between Intuition and Perceptual Accuracy be accepted as fulfilling this part of the requirements for the Degree of Doctor of Philosophy.

Committee:

Chairman

Patricia N. Mahon

Helen A. Bush

Margie N. Johnson

Margaret T. Beard

Accepted:

Leslie M Thompson

Provost of the Graduate School

DEDICATION

To my family who persevered and remained whole.

ACKNOWLEDGEMENTS

My sincere appreciation is extended to the faculty of Texas Woman's University for constructive and helpful critique as this study progressed and to the graduate students who gave their time to participate.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Nurses are called upon to make judgements based on incomplete and uncertain data many times during the course of the work day. Often the judgements call for action on the part of the nurse for which a rationale must be given. Ideally, the rationale will be logically based on scientific principle. But what of the nurse who is unable to state the rationale for a judgement or inference? To cohorts the explanation may be that a "feeling" prompted the action, but in charting the nurse will go back over the situation and find data to support the actions. How did the nurse make such an intuitive inference and was the inference accurate?

Nurses need to examine their decision-making processes in order to understand and validate inferences. Intuition and perception are concepts involved in the inferential process. This study examined the relationship between the concepts of intuition and perception in the assessment of a specific nursing situation.

Problem of Study

What is the relationship between the accurate perception of the patterns and relationships in a complex nursing situation presented on video-tape and the intuition score on the Myers-Briggs Type Indicator of 30 nurses enrolled in a master's level nursing class?

Background and Significance

During the development of nursing as a science intuition was a word to be avoided. Only rational, logical, thinking processes were acceptable. If an idea could not be supported with objective evidence then it was not to be considered. Nurses did not quit using intuition as information but they did not talk about it. One recent study (Smoyak, 1982) lamented the discovery that psychiatric nursing is based more on intuition than science. Gordon (1982) stated that nurses who can't give the rationale for why a judgement or inference is made should recognize this as a signal to attend more closely to cues and cue processing.

This was not always the case. Kelly (1964) quoted a nurse in 1909:

> "If we could be trained to properly use our imagination, many of the commonplace details of work with the sick might be transformed into something inspiring. But minds are rarely characterized by both observation and imagination, observation giving accuracy in

> grasping surface details, while imagination goes to the heart of things and is deep, earnest and serious, and dignifies details. The combination of these two faculties of observation and imagination is rare. She who possessed it would be mistress of the art of nursing." (p.314)

This nurse recognized there was more to nursing than basing judgements on merely surface details. She recognized an unexplainable process that facilitated assessment and decision-making. Nurses since have recognized the importance of intuition as a source of ideas; a process that facilitates prediction, explanation, and synthesis; and a necessary adjunct to analysis.

Bruner (1961) argued strongly for an equal recognition of both intuitive and analytical thinking. He saw them as complementary processes, but pointed out that the lack of recognition of intuitive thinking poses serious problems for our society. Bruner felt that intuition wass important because it provides a tentative ordering of a body of knowledge which then acts as a basis for moving ahead in our testing of reality. Ornstein (1977) concluded that intuition is a right-brain function and to ignore it is to use only half one's resources. Royce, Coward, Egan, Kessel and Mos, (1978) stated that many researchers have studied intuition but the exact processes remain unexplained.

Beveridge (1957) cited numerous examples of scientists describing the importance of intuition to their research. Among those were Darwin, Cannon, Von Hemholtz, and Einstein. Zderad, (1978) cited the importance of intuition in the development of a theory of nursing. Intuition, for her, is integrative and generative. She stated "like a seminal idea it leads to more and more possibilities and more and more questions" (Zderad, 1978, p. 45).

Gordon (1982) stated that nursing diagnoses involves collecting information, interpreting the information, clustering the information, and naming the cluster. Nurses collect data in a logical, systematic manner. While this logical process is going on, the senses are perceiving the evironment. This nonverbal perception can give information that the logical, linear part does not have. Nurses have a foundation, a knowledge base, a fund of information and experience that somehow has to be integrated into the present problem-solving moment of diagnosis. Learning to use or recognize intuition is using that integrative, synthesizing function of the right side of the brain (Ornstein, 1977). This does not replace logical thought but energizes it. Intuition bridges gaps and stimulates action when there is no time for lengthy, time consuming

logical thought processes. Many nursing situations are so complex that rapid systhesis is mandatory.

Pyles and Stern (1983) identified a process they call "the nursing gestalt." It is a synthesizing process that provides the basis for nursing inference. The researchers describe the process as:

> A matrix operation whereby nurses link together basic knowledge, past experiences, identifying cues presented by patients, and sensory clues including what nurses call "gut feelings." Nursing Gestalt is a synergy of logic and intuition involving both conceptual and sensory acts. (p. 52)

The concept of the nursing gestalt was developed from a study that looked at decision-making processes of critical care nurses. The nurses in this study felt that intuition was a significant factor in clinical inference, their own as well the patient's. These nurses claimed that when they had an intuition or "gut feeling" about a patient, most of the time something did happen. Frequently, an explanation for the feelings could not be given by the nurses in this study. The accurate perception and identification of cues, the ability to assign valid meanings to feelings, knowledge, and experience were the vital elements of Nursing Gestalt.

The nurses in the above study believed their intuitions to be valid. Other nurses question "gut

feelings". If intuitions are based on experience, perception, and knowledge then intuition will be limited by those same concepts. Carl Rogers (1977) believed persons should trust this internal experiencing and use it as a guide to behavior. He stated "when a person is functioning in an integrated, unified, effective manner, she has confidence in the directions she unconsciously chooses, and trusts her experiencing, of which, even if she is fortunate, she has only partial glimpses in her awareness (p. 246)."

Other factors place limitations on the effectiveness of intuition. Berne (1977) discussed how intuition is affected by defense mechanisms. When experiences are perceived as painful, certain mental mechanisms are employed to ease the pain and move it out of awareness. Even though the experience is not in awareness it is still there exerting its influence. Berne was much impressed by intuition. He served on the discharge team that processed soldiers out of the service at the end of World War II. He only had three minutes to make a decision about each soldier. He claimed he became so good at assessing soldiers that he was quite accurate in determining characteristics about the soldiers before they told him. He was intrigued by this and tried to determine what cues led to his

assumptions. He also discovered that fatigue limited his skills.

Nursing needs to consider how fatigue affects nursing assessments and judgements. While she did not look at the effects of fatigue, Price (1980) listed three of the most common errors made by nurses in their attempt to diagnose health problems. Any or all of these will be affected by fatigue. The errors include: (a) defining problems based on insufficient data; (b) overlooking a significant cue with high validity; and (c) collecting data based on personal bias or preconceived notions of what ought to be.

Polanyi (1969) pointed out the importance of intuition in discovery. Discovery takes place through tacit knowing and can be seen through observing the interplay of imagination and intuition. For him, intuition is a "skill for guessing with a reasonable chance of guessing right; a skill guided by an innate sensibility to coherence, improved by schooling" (1966, p 89). By imagination, he meant "all thoughts of things that are not yet present--or perhaps never to be present" (1966, p. 89). He suggested that scientific inquiry begins with the selection of a good problem. The ability to select a good problem distinguishes a good scientist. This ability comes from "subsidiary"

awareness of hidden aspects of reality that prompts our imagination to look in a new direction. The first step in scientific discovery is the deliberate act of the imagination looking for the hidden reality suggested by the intuition's subsidiary awareness. The second step is in the spontaneous effort of the creative intuition struggling for integration. Polanyi continued that it is in this way that we gain a knowledge that bears on reality.

This discussion has not meant to imply that nursing should base judgements on intuition at the expense of logical reasoning processes. Nursing needs to define and classify the characteristics of intuition in order to use cognitive processes appropriately, efficiently, and accurately.

Scientists have recognized intuition as a source of creative ideas. Intuition puts things together in a unique way not done previously. An individual is one of a kind. No one can have that individual's intuitions in exactly the same form. The creative ideas mentioned in previous examples have come after a period of intense study followed by a brief respite from concentration on the problem at hand. Suddenly the idea comes into awareness. The field of nursing is ready for the leap of intuition, the surge of creative ideas that will lead

nurses to develop a cogent and coherent theory that specifies dynamic, health producing interventions.

If intuitive nurses perceive nursing situations more accurately then the next step is to determine what cues are perceived in the nursing situation that led to to accurate diagnosis. If invariants can be isolated then these invariants become the bases for teaching novices to make accurate diagnoses regarding the state of the patient.

Intuition plays an important role in mental functioning of individuals. In the future, the phenomenon may be labeled differently but the process will be the same. As a cognitive process, intuition is particularly important in the areas of assessment, nursing diagnosis, and decision-making. It influences research, and is a source for ideas and the integration of knowledge.

Statement of Purpose

The purpose of the study was to extend the knowledge of the way in which ideas arise in the mind. The goal of the study was to determine if nurses who rank high in perceptual accuracy also rank high in intuitive abilities.

Theoretical Framework

The theoretical framework for this study was Bower's (1975) information processing or the computer simulation approach. Information processing derives from the ways computer scientists generally describe what their machines do. Information that is read into the computer includes stimuli, data, and instructions. The information is processed and is read out in some particular end result. Between input and output, the computer is described as performing a series of instructed manipulations on the input data. These manipulations may consist of altering or transforming the mass of data, calculating something from it, comparing it to something else, using the result to search for something previously stored in the computer, evaluating what is found at intermediate stages, making decisions about it, and presenting a readout.

The basic components of an information-processing system are: (a) the sensory receptors that receive inputs from the environment, (b) effector units that produce responses, (c) a memory store that holds data structures or action programs, and (d) a central processsor wherein occur thinking, judging, and decision-making (Bower, 1975). Perception is seen as an input to the system and intuition as an output.

Because of the feedback mechanism intuition in turn influences perception. The concepts of perception and intuition will be further explicated.

Perception

Input to the information processing system is perception. For the purposes of this study, Gibson's (1966) theory of perception will be used. Gibson viewed the process of perception as a continous interactive relationship between the organism and its environment. What is perceived is some degree of adjacent order, some degree of successive order, some component of change, and some component of non-change. The components are not static images, but relationships with the environment over time.

What the organism picks up when it perceives something is the invariance of its structure (Gibson, 1966). Invariance is the information which remains unchanged in a structure over transformations of space-time. Gibson postulated that these invariants occur in the environment and not in the head, i.e. humans do not have to process them. The value or functional utility (affordances) of objects and events for the person is what is directly perceived. Invariants are perceived in constant longitudinal relations picked up by a

continuous process loop. Gibson was not interested in how the information-processing capabilities of the person worked after being presented with information. He was more concerned with how the interaction of the individual and the environment determined what information would be perceived.

Environment is everything that provides opportunities for perception. The organism that picks up variances and invariances in the environment is only picking up critical relationships, or density gradients, in structures. This is opposed to the common theory of perception that proposes that a person picks up everything in the environment and then sorts it all out in the brain through mediators.

Gibson conceived the senses as active and interrelated systems. Sensation, is not a prerequisite for perception, and sense impressions are not the raw data of perception. The anatomic equipment of the body is not divided up among the senses, and perceptual systems do not have exclusive possession of certain organs. The brain does not have to integrate successive visual or other sensations in immediate memory. The invariance of perception with overlapping stimulation of the sound, odor, heat, and light that together conveys the message that logs in the fireplace are burning, for

instance, may be accounted for by invariant information and by a tuning of the entire system to invariant information. The development of this tuning is called education of attention. This education of attention depends on past experience but not on a storage of past experiences. An observer learns with practice to isolate more and more subtle invariants during transformations over time.

Perceptual systems are organized so that there is no hierarchy or central control of power. Gibson envisioned the systems as working in coalitions with each other. There are sub-set solutions where all members are not required to solve a problem. Coalitions may reveal parallel computations, where the same problem can be computed in two places concurrently. The individual is not seen as constructing an awareness of the world but as detecting the world from invariant properties in the flow of events.

Gibson suggested that intuition is a process that extracts information stored in the environment, not in the head. Intuition is only an extreme of the same perceptual continuum at work at any time--except that a part of the information it perceives is tacit, another part explicit. Much of what is perceived at any point in time is tacit, or at least not made explicit to the

intellect. When tacit information from the environment is suddenly made explicit it is called intuition. Therefore, Gibson's theory suggests that the more accurately persons perceive the relationships of the patterns in the environment then the more intuitive is the person.

Intuition

Intuition is seen as the output of the system. In the literature intuition is viewed as a process and an outcome. In the present study it will be seen as an outcome of a cognitive process.

Intuition is a term employed widely and variously in everyday speech and has been described by most major fields of study. The Encyclopedia Americana (1969, p. 324) states intuition is "a way of knowing directly, excluding all inference, discursive reasoning, logic, and the employment of symbols and ideas. It also is a direct acquaintance with oneself that cannot be put into words, or a similar sensitivity to the thoughts and feelings of others." Philosophers--Aristotle, Kant, Bergson, Spinoza--and others adhered to the particular philosophy that intuition was a special way of knowing or apprehending ultimate reality.

Kant (1788, 1952) distinguished two forms of

intuition, that of the apprehension of space and time, that make knowledge possible. Space and time were proposed to derive from an a priori intuition which was independent of experience. He believed that the understanding of moral laws was by a special nonscientific faculty. The Apostle Paul asserted his belief in a moral intuition in Romans 1:19-20 when he stated that all that can be known of God has been known from the beginning of man. The philosophers generally believed that knowledge imparted by this native intuition may be considered more valid than that gained from observation and experience.

The mathematicians have followed Descartes (1629,1952) in believing in a native intuition which postulates that the conception of natural numbers is intuitively given or are natural constructs of the mind. Wilder, (1967,) defines mathematical intuitions as a "psychological quality which stems possibly from a hereditarily derived faculty, but which is, at any given time, principally an accumulation of attitudes derived from one's mathematical experience." He also believes that intuition is greatly influenced, possible wholly formed, by the cultural environment. He states that "the average nonmathematician has no mathematical intuition at all, except that nebulous quality of the

mind which, if nourished by experience with mathematics, would develop into what is called mathematical intuition." (p. 605)

More recently Fishbein (1975) conducted studies with children that showed children used intuitive thinking at an early age to solve probability problems and as the children grew older the problem solving became more rational. As a result of his findings he proposed that intuitions become more rational, i.e. based on reasoning, as a child learns and develops. He proposed that children should be taught probability theory at an early age, preferably in grade school, in order to develop intuitions for mathematical learning. He suggested that it is too late to influence these intuitions after the age of formal operational thought.

Fishbein's definition of intuition is related to action, experience, cognition, intelligence, problem-solving and reasoning. He stated "intuition is the means by which intelligence secures for cognition an immediate control over action...it is an action programme which is partially autonomous within cognition and which is a synthesis of individual experience in a given domain" (p. 20, 58). The feeling of certainty which accompanies intuition is an expression of some previously verified mental organization that has come

about from active contact with reality. He also stated that intuition is "a function of action that provides for continuity...and confers speed, adaptability, and efficiency on appropriate action" (p. 20). Buckminster Fuller (1981) has approached this same idea from a historical framework. He also proposed that children learn math concepts intuitively by coming into direct contact with, and acting upon, the reality of the natural world.

Psychologists generally have described intuition as a special case of inferential thinking and perception of the tacit environment within a framework of consciousness and personality. Intuition is viewed not so much as a way of knowing but as a way of functioning.

Jung (1921, 1971) was the first modern psychologist to deal with intuition in any length. He called intuition "the noblest gift of man" (p. 365). His concept of intuition is understood within a theory of personality. He sees it as a cognitive event which occurs and must be accounted for. It is one of four mental functions constitutionally present in all individuals. These four functions attain different degrees of ascendancy during the life of each individual and, in combination with three levels of consciousness and two general orienting attitudes, determine, to a

great extent, each individual's characteristic behavior.

For Jung, intuition perceives unconsciously. It perceives possibilities, principles, implications, and situations as a whole, at the expense of details. Intuition can operate on all three levels of consciousness and from either an introverted or extroverted attitude. The validity of an intuition depends on its origin. If the intuition arises from the collective unconscious then its contents are powerful, fundamental knowings, truths, and systems of symbolism repeated and developed over generations as basic wisdom about recurrent problems of mankind. The intuitions of the personal unconscious are the undesirable, maladaptive, subliminally perceived, and undeveloped residue of an individual's personal history.

Jung described intuition as both a process and an outcome. He stated it is a basic psychological function that mediates perceptions in an unconscious way. At the same time he stated "In intuition content presents itself whole and complete, without our being able to explain or discover how this content came into existence." (p. 453)

Westcott (1968), in his attempt to formulate a psychology of intuition settled on a definition of intuition that could be objectively measured. He stated

"intuition is reaching a conclusion on the basis of less explicit information than is ordinarily required to reach that conclusion" (p. 67-68). His theoretical position was that intuition was unconcious, rapid inference. As rapid inference it is a process but includes an end result or an outcome.

Ornstein (1977) described intuition in terms of a psychology of consciousness. Two major modes of consciousness exist--rational and arational. The rational mode is the verbal mode and is primarily a method of analysis, testing, and communication. This mode is specialized for analysis; it is linear, looks at parts and sequences. The arational mode is nonlinear, personal in nature, holistic, nonverbal and specialized for synthesis.

These two modes of consciousness are related to the two sides of the brain. Although each hemisphere shares the potential for many functions and both sides participate in most activities, in the majority of individuals the two hemispheres tend to specialize. The left hemisphere is predominantly involved with analytic, logical thinking, especially in verbal and mathematical function. Its mode of operation is primarily linear. This hemisphere seems to process information sequentially (Ornstein, 1977).

The right hemisphere seems specialized for synthesis. Its language ability is limited. This hemisphere is primarily responsible for orientation in space, artistic endeaver, crafts, body image, and recognition of faces. It processes information more diffusely than does the left hemisphere, and its responsibilities demand a ready integration of many inputs at once. The right hemisphere is more holistic and relational, and more simultaneous in its mode of operation. The functioning of the right hemisphere sounds very much like the intuitive type described by Jung.

Inputs into the system are perceived patterns and relationships. The output is information in various forms. An intuition is one form of information. The operations of the system include the synthesizing process. The input is synthesized and influenced by the structure of the brain, experience, learning, and imagination. Intuition is viewed as a product rather than the synthesizing process itself. The output of the system becomes a feedback loop so that the output becomes new input, thus adding to the emerging complexity of human knowing. Figure 1. shows the relationships of the concepts.

Thus, nurses perceive varying degrees of complexity

in nursing situations. The analysis or synthesis of the information derived from the nursing situation is associated with the processing of information. The output of the system is an idea expressed as an inference, judgement, or a decision. This suggests the question "What is the relationship between nurses perception and the inferences they make and can these inferences be related to intuition?

Hypothesis

There will be an inverse relationship between the intuition score of the Myers-Briggs Type Indicator and the perceptual accuracy score on a video-taped scenario of a nursing situation by 30 nurses enrolled in a master's level nursing class.

Definition of Terms

1. Intuition is the ability to reach a conclusion on the basis of less explicit information than is ordinarily required to reach that conclusion (Westcott, 1968).

2. Perception is the formation and detection of invariants in the relationship between the person and the environment (Gibson, 1966).

3. Perceptual accuracy is the ability to make an accurate inference about the state of the patient in a

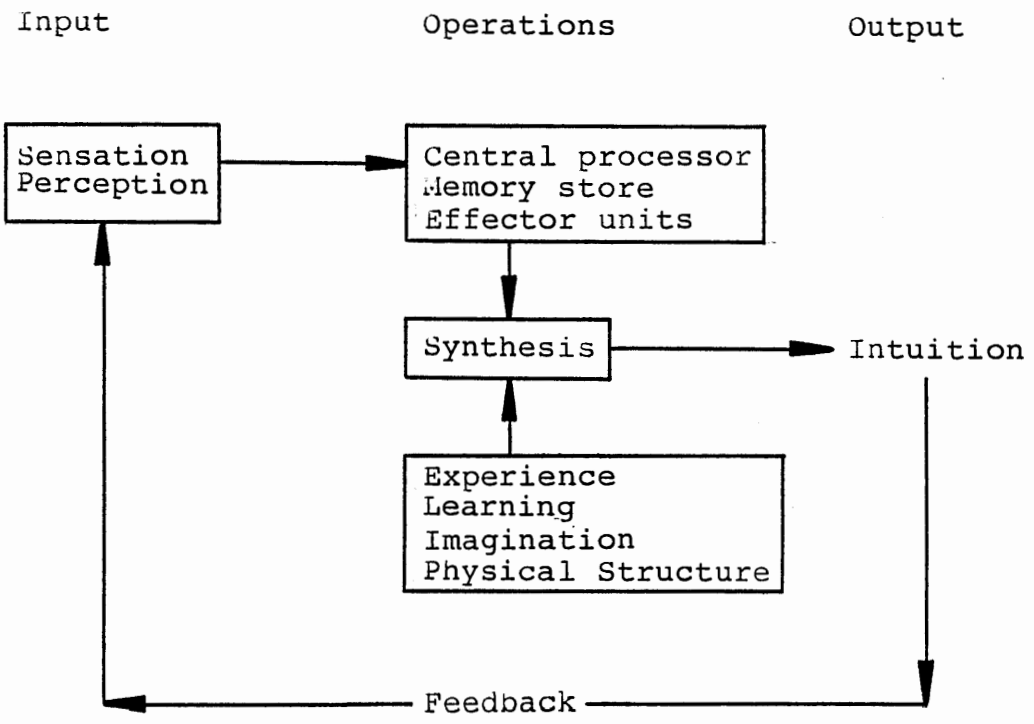
Input
Operations
Output
Sensation
Perception
Central processor
Memory store
Effector units
Synthesis
Intuition
Experience
Learning
Imagination
Physical Structure
Feedback

Figure 1.

video-taped nursing situation based on invariant cues identified in the situation.

Operational Definitions

1. Intuition is measured by a score on the N scale on the Myers-Briggs Type Indicator.

2. Perceptual accuracy is measured by the number of invariant cues presented on a video-taped nursing siutation needed to arrive at a correct diagnosis of the state of the patient.

Limitations

According to Isaac and Michael (1978) the limitations of correlational design are: (1) it only identifies what goes with what--it does not necessarily identify cause-and-effect relationships, (2) it is less rigorous than the experimental approach because it exercises less control over the independent variables, (3) it is prone to identify spurious relational patterns or elements which have little or no reliability or validity, and (4) the relational patterns are often arbitrary and ambiguous.

Limitations imposed by the investigator in the proposed study which have an effect on the generalizability of the findings include: size of sample, setting, regional area of the study, educational

preparation of the subjects, and the explicit nature of the clinical examples in the simulated video-taped situations. The video-taped simulations cannot measure all the variables involved in perceptual accuracy. If senses operate as a system then part of the data are missing. Only sight and sound is available on the video-tapes.

Summary

Chapter one has demonstrated a need for the study and has presented the conceptualization of intuition and perception. The theoretical framework is drawn from Bower's (1975) information processing approach and the concepts of perception and intuition are related to the information processing system.

CHAPTER 2

REVIEW OF THE LITERATURE

The problem of the study was to test the relationship between intuition and the perception of patterns and relationships in a nursing situation. This chapter focuses on the historical development of the concept of intuition in nursing, and the current research involving intuition and its relationship to decision-making, clinical judgement, and prediction.

Historical Development

Intuition has never been a popular concept in nursing. From the beginning, Florence Nightingale discounted the idea in her attempt to objectify nursing. Her emphasis was on observation and being able to describe those observations clearly. She recognized the importance of creativity and imagination but often saw these concepts being used to the disadvantage of patients rather than to their advantage. The following quote by Miss Nightingale seems to exemplify the thinking of nurses concerning intuitive cognitive processes almost to the present day. "I have often seen really good nurses distressed, because they could not

impress the doctor with the real danger of their patient" (Nightingale, 1980, p. 101). Nightingale viewed this as an observational problem. The nurses were not observing their patients closely enough. While this may have been the case, it may also have been that the nurses were indeed observing closely so that they perceived certain patterns outside of awareness that experience and knowledge suggested were danger signs.

Following Miss Nightingale's example, Nursing continued to emphasize observation with careful documentation of observations. Only rational, logical thinking precesses were acceptable. If an idea could not be supported with objective evidence then it was not to be considered. Intuition was a word to be avoided. Nurses did not quit using intuition as information but they did not talk about it. One recent study (Smoyak, 1982) lamented the finding that psychiatric nursing is based more on intuition than science. Based on Gibson's (1966) theory of perception these nurses have merely learned to perceive more complicated patterns of invariants which can no longer be broken up into simpler individual cues.

Gordon (1982) continues the plea for nurses to give the rationale for judgements and inferences by stating that nurses who can't adequately justify inferences

should recognize this as a signal to attend more closely to cues and cue processing. The implication is that if the observer just tries hard enough, looks hard enough, and knows what to look for, i.e. has enough knowledge, then the observer will be able to give a rationale for an inference. While this may be true over time, just the opposite may be true for those judgements and inferences that must be made quickly. The more experience and knowledge the nurse has, the less able she will be to say immediately why she has made the decision because the patterns she perceives are so complex.

Current research

Much of the current research has studied intuition and its relationship to decision-making, clinical judgement, and prediction. There has also been a recent flurry of interest in studying intuition from a philosophical standpoint.

Decision-making

There exists a considerable body of research on analytical problem-solving and recently some work has been done on intuitive problem-solving methods. Analytical problem-solving is conscious and logico-symbolic whereas intuition is unconscious and

behavioral. Westcott (1968) studied intuitive problem-solving using the operational definition of intuition as "the event which occurs when an individual reaches a conclusion on the basis of less explicit information than is ordinarily required to reach that conclusion" (p. 100). He studied students' ability to come to accurate conclusions based on significantly less information than others. It was found that students could be classified along two relevant dimensions--the amount of information students required before attempting solutions to problems, and the success students had in solving the problems. Furthermore, these two dimensions of behavior were essentially independent of each other. A small group of subjects existed that could reach accurate conclusions based on little data. Another small group existed that were able to reach accurate decisions only after requiring much data. The other two dimensions were the "wild guessers" or those who made decisions based on little data and were inaccurate; and those overly cautious subjects whose decisions were inaccurate even after having access to much data. These four groups made up the four classes of extreme scores. The majority of students fell somewhere in between.

Simonton (1975) produced data that showed more creative subjects found intuition more effective for a complex task, and analysis more effective on the simple task. This relation was reversed for the less creative subjects. Generally, the highly creative subjects improved more on the complex task if instructed to intuit, while those less creative improved more on the complex task if instructed to analyze. For the simple task this relationship was virtually reversed, that is, the highly creative subjects improved more if instructed to analyze, whereas those less creative improved more if instructed to intuit. The results tend to support the conclusion that (a) intuition and analysis may indeed be distinctive modes of thought, and (b) the relative effectiveness of each may depend on both the nature of the problem and the cognitive style of the individual.

It has generally been accepted that experts solve problems in their field of expertise considerably faster than novices do. Larkin, et al. (1980) looked at what the expert does differently from the novice to account for this superiority. He suggested that what has been called intuition, talent, imagination, and judgement is definable and explainable. He asserted that although a sizable body of knowledge is prerequisite to expert skill, that knowledge must be indexed by large numbers

of patterns that, on recognition, guide the expert in a fraction of a second to relevant parts of the knowledge store. The knowledge forms complex schemata that can guide a problem's interpretation and solution and that constitutes a large part of what we call intuition. Larkin's, et al (1980) study supports the concept of intuition as pattern perception. Through experience and learning patterns become recognizable as invariants. Variant patterns then aid descrimination.

Myers (1962) showed that among creative men and women more than 95% prefer the intuitive mode over the sensing mode according to Jung's psychological types. In other studies to validate the Myers-Briggs Type Indicator (1962) it was found that accurate, intuitive decision-makers were more likely to be in the higher ranges of intelligence.

Cosier and Aplin (1982), in similar studies, separated upper level business students into groups with high and low intuition depending on the ability to identify cards before actually seeing the cards. Subjects then made a series of simulated managerial decisions. The subjects in the highly intuitive group made significantly better decisions in the simulated decision task than other subjects.

Prediction and Explanation

Khaneman and Tversky (1978) have conducted extensive studies on the relationships of intuition to prediction and explanation. These studies have shown that people rely on simple intuitive heuristics in making judgements. Although these intuitive stratiegies often produce reasonable judgements, they sometives lead to systematic biases and errors. Subjects tended to neglect prior probabilities of population base rates when judging the likelihood that an individual belonged to a given category.

In a similar study Ajzen (1977) reported that in making predictions, people utilize information, including information supplied by population base rates, to the extent that they found it possible to incorporate the information within their intuitive theories of cause and effect. One experiment showed that subjects relied on causal information (when available) and tended to disregard non-causal information even when the non-causal had the stronger empirical relation to the criteria the subjects were trying to predict. These studies also revealed that subjects do not take probability and regression into account when making predictions. Criteria used to base predictions were weighted based on personal values.

Ajzen's student, Daniel Blyth (1981) studied intuitive hypothesis testing. An experimental study was conducted to determine the source of the "confirming error". The confirmatory error is the tencency to use predominately confirming evidence in evaluating the plausibility of a hypothesis. The results suggested that both the retrieval and the interpretation of evidence is affected by the hypothesis, and these effects are to some extent dependent upon the instructions or orientation brought to the judgmental context. If individuals are asked to review the information they consider relevant, there is a tendency to focus more on confirming than disconfirming evidence. Blythe suggested that this tendency arises because the instructions encourage the use of comparison-to-prototype decision strategy, and the prototype is weighted in favor of the hypothesis. Subjects also tended to interpret ambiguous or ambivalent evidence as supportive of the hypothesis.

Meehl (1954) reported that statistical models are more superior in accurately predicting numerical variables than predictions made by expert clinicians. Daws (1979) suggested clinicians should use linear models for decision-making. Methods are available

for reducing clinical variables to numerical values and applying statistical analyses.

Clinical Judgement

Recent studies show the relationship of intuition to judgement. Fraser Watts, (1980) a British psychologist, reviewed recent research in an article looking at clinical training as it relates to clinical judgement. Results of the research showed that clinical judgement was adversely affected by clinical training in psychology. Watts believed that this reflects qualitative changes in modes of clinical listening, modes of inference, and relative weights given to stereotypic and indvidual information. Subjects made judgements and discriminations but what the subjects said they based judgements on (the rational mode) was not what they really based judgements on (the tacit mode). A theoretical discussion of this issue focuses mainly on (a) the hypothesis that training leads to relative high-risk strategies of judgement, and (b) the construct validity of analytic and non-analytic judgement. This implies that clinical training needs to give separate attention to the use of low-risk and of more intuitive styles of clinical judgement, and to consider the judicious combination of these. Watts

gives some practical approaches to both kinds of training.

Borak and Veilleux (1982) designed a study to assess the judgement skills of physicians. The effectiveness of specific training in statistics and decision-making principles upon physicians' judgmental skills was assessed by means of problems of intuitive logical reasoning. The responses of statistically sophisticated physicians were compared to those of practicing physicians, clinical nurses and hospital laborers. On problems evaluating use of faulty heuristics in judgments of conditional probabilities, the statistically sophisticated physicians responses were the most biased. Borak and Veilleux concluded that intensive statistical and decision-making training of physicians is likely to be of only limited value for improving clinicians' judgmental skills.

Bieri, et al (1975) considered a variety of variables affecting clinical judgement such as the nature and complexity of the stimulus, the knowledge and experience level of the judge, cognitive structure, effects of the setting, affect and values. While Bieri did not look at intuition directly (he did not believe it could be measured) he did show the effect of cognitive structure on judgment processes. He assumed

that each person has a system of dimensions which he uses in construing his social environment, and that the characteristics describing the relations among these dimensions refered to a person's cognitive structure. This is similar to Jung's psychological types.

Summary

Intuition is a cognitive process and is subject to individual differences. The experimental literature has shown intuitive reasoning process to be flawed, yet in reality individuals make decisions and manage their affairs with little reliance on mathematical models. The problem with the experimental studies may be methodological. If intuition is nonlinear, holisic, integrative thinking, then to use linear, logical processes that omit much sensory data would not provide valid information about intuition. The nature of the task, the kind of decision, the prediction, or the judgement to be made cannot be separated from the environment and from the individuals involved, including personal values and cognitive and emotional set.

CHAPTER 3

METHODOLOGY

This chapter describes the design of the study and sample selection criteria. In addition, the chapter explains the data collection instruments and procedures and data analysis procedures.

A descriptive correlational design was used in the study keeping in mind the purpose of the study. The purpose was to investigate the extent to which variations in perceptual accuracy correspond with variations in the intuitive ability of nurses making a diagnosis. The study was non-experimental because variables or factors were not manipulated by the investigator. The relationship between the variables was described, and tested.

Describing and testing the relationship between two variables is described as level III research by Dickoff and James (1968) aimed at testing or verifying theory, through stating formal predictions of relationships. Causation is not determined, only that an association between variables occurs. According to Diers (1979), association-testing studies depend on the natural

variation already present in the situation. Data are collected on whatever is going on in a natural situation. The coefficients of correlation describe the degree to which pairs of variables vary concomittantly. The product moment coefficient of correlation describes a direct measure of the amount of variance shared by the variables, in this case, the variables of intuition and perceptual accuracy (Kerlinger, 1973).

Setting

The study was conducted in two state universities in a metropolitan area in the southwestern portion of the United States of America. Both universities have baccalaureate and graduate programs in nursing that attract students from out of state as well as the metropolitan area.

Population and Sample

The target population from which the sample was drawn was limited to registered nurses whose clinical specialty was medical or surgical nursing and enrolled in a master's level nursing course. The population consisted of 59 from one university and 24 from the other university. A homogeneous population was chosen to control for knowledge and experience (Kerlinger,

1973). A non-random sample of 30 volunteer subjects was used for the study.

Protection of Human Subjects

Specific procedures were followed in an attempt to protect the rights of all human subjects participating in this investigation. This research study was exempt from approval from the Human Research Review Committee at Texas Woman's University and from requesting individual subjects to provide written consent to participate in the study, because questionnaires were utilized, the completion of which construed informed consent. Permission was obtained from the administration of each university to conduct the study within the confines of the university school of nursing.

Instruments

Two instruments were used in the collection of the data from the subjects: The Myers-Briggs Type Indicator (Myers, 1976) and the investigator-prepared simulaton exercise using del Bueno's (1983) video-taped nursing situations. The Myers-Briggs Type Indicator is a self-report inventory which was developed to measure the variables in Jung's (1921/1971) personality typology. The Indicator consists of four scales: Extraversion-Introversion (E-I), Sensation-Intuition (S-N), Thinking-

Feeling (T-F), and Judgment-Perception (J-P). The original version was published in 1962 and has been used in more than 400 studies (Carlyn, 1977).

The scale is based on Carl Jung's (1921/1971) theory that there are orderly, basic differences in the way people approach life. The underlying assumption is that every person has a natural preference for one or the other pole on each of four indices. The E-I index measures the person's preferred orientation to life. The S-N index was designed to measure the person's preferred way of perceiving things. The T-F index measures the person's preferred way of making decisions. The J-P index measures the person's way of dealing with the outer world.

The aim of the Indicator is to determine habitual choices between opposites. Each scored item has one answer weighted in favor of one of the eight preferences and the other answer weighted in favor of the opposing preference. Different weights have been assigned to certain answers in an attempt to offset social desirability bias (Myers, 1962, p. 86). While only the Intuition scale was used in this study it was necessary to give the entire test. The items for each scale are mixed throughout the measure and cannot be separated out for reasons of validity.

The Indicator yields two types of scores for each person. It classifies subjects on four dichotomous type categories, and it also produces eight numerical scores which can be transformed into four continuous scores. Carlyn (1977) in an extensive review of intercorrelation studies, reliability studies, and validity studies conducted with the Indicator concluded that it is an adequately reliable self-report inventory.

Stability of scores has been measured by test-retest studies. Carlyn (1977) reports that four studies show in every case the proportion of agreement between the original and the retest type classifications was significantly higher than would be expected by chance. In the retest studies of the continuous scores the Pearson product-moment correlations were all significant at the .01 level.

Myers (1962) recommended that split-half reliabilities be obtained by calculating tetrachoric correlation coefficients and applying the Spearman-Brown prophecy formula. Tetrachoric coefficients have ranged from .66 to .92. For continuous scores Pearson correlations for a split-half procedure was used with reported coefficients ranging from .69 to .87.

The validity of the Indicator is dependent on how well it measures the theoretical constructs of Jung's

typology. Content and construct validity is supported by Myers (1962) and other studies that compared the items on the scale with the constructs of Jung's theory (Carlyn, 1977).

Other tests measure the construct of intuition such as the Singer-Loomis Inventory of Personality (Loomis, 1982) and the Gray-Wheelwright Test (Wheelright, 1964). The Myers-Briggs test was chosen because of the extensiveness of its validation. The Singer-Loomis test is newer (Singer & Loomis, 1980) and validation is in progress. Loomis (1980, 1982) criticized the bipolarity of Jung's constructs and stated that factor analysis indicated the four personality functions were not bipolar but independent of each other. The Singer-Loomis test is also based on the independence of Jung's constructs.

The second instrument consisted of a video-taped nursing situation and a response form. The video-taped situation is from the series developed by del Bueno (1983). The scenarios were originally developed to assess the ability of nurses to make clinical decisions. The video simulations were used as part of a two-year competency-based education project in nursing. Each situation presents the viewer with a set of relevant and irrelevant cues in the same form and sense modality,

such as sight or hearing, as the cues would be received in a live experience. The participants are asked to act on their perceptions and interpretations of these cues. Nurses can describe the choice of actions required by the state of the patient or demonstrate actions in actual practice. Video-taped situations were chosen because this modality more closely resembles the sensory data input of an actual nursing situation.

The scenarios were derived from a survey of head nurses who were asked to list the most common patient problems about which nurses were called upon to make judgments (del Bueno, 1983). Problems were chosen that called for immediate nursing action. The films presented common clinical problems with clearly identifiable signs and symptoms. The signs and symptoms were listed for each situation and compared to the major nursing textbooks. A survey of three major nursing texts supported the signs and symptoms used. The del Bueno (1983) films were viewed by clinical experts (master's and doctorally prepared nurses) to further verify the validity of the cues for each patient problem.

The scenario used for the present study involves a patient with hypoglycemia or insulin shock. This is a situation common to nurses of all levels. The set of

signs and symptoms indicate to a greater or lesser degree the presence of the condition. Nurses's educational preparation and experience correlated with the number of correct decisions made (del Bueno, 1983).

The scenario for the present study was chosen by consensus of a panel of experts based on appropriateness and clarity of the format, and fidelity to the real situation. (See appendix B.) The panel consisted of four clinical specialists, two with a master's degree in nursing and two with a PhD. in nursing.

For the present study the scenario was used only to test perceptual accuracy defined as the correct naming of the patient problem and the cues leading to that diagnosis. Nursing actions were not assessed. Respondents were asked to view the film, make a judgment about the patient's priority problem or the state of the patient, then list all the cues that led to the judgment. Other cues perceived but not actually used in the diagnositc decision were listed as well as irrelevant cues. The number of cues used to make the judgment should relate inversely to the intuition score. That is, if a respondent has a high score on the intuition scale then she should be able to make a judgment based on fewer cues.

The scenario was revalidated for use in this study. Two master's level clinical specialists and two doctoral level nurse educators were asked to review the films to determine the number of cues presented for the patient situation. The instructions and the form used is in Appendix A.

Validation is the process of examinig the accuracy of a specific prediction or inference made from a data source (Cronbach, 1971). Cronbach (1971) sees validation as an ongoing process of investigation and not merely a onetime test of the worth of an instrument. Validation of instruments includes an investigation of the content to see if the content is related to the theory and how well the test samples the class of situations about which conclusions are to be drawn. The instrument or test can be checked against some other observation that serves as a criterion or some external variable considered to provide a direct measure of the characteristic or behavior. The aim of this testing is to accurately predict this criterion. Thorndike and Hagen (1977) state that locating or creating a satisfactory measure of the criterion to be used for test validation is one of the most difficult problems investigators face. del Bueno (1983) discusses the process used for validating the content of the

scenarios. Further content validity was established by the panel of clinical specialists who selected the scenario to be used.

Reliability refers to how accurately a test measures the construct and how consistent the scores will be if the person is tested again (Kerlinger, 1973). The reliability can be established by giving the same test again at a later time, by administering a second equivalent form of the test or by subdividing the test into two or more equivalent fractions. The reliability was established by comparing the scores derived by assessing two scenarios. Cronbach (1971) states that using two parallel test forms provides a sound basis for estimating the precision of a psychological or educational test.

Reliability was measured using the Spearman Brown formula. For this formula a test is divided into two parallel halfs (a and b), each of which is scored separately and correlated. This yields an estimate of the reliability coefficient of the half-test (rab). The reliability coefficient of the whole test then, is estimated to be 2rab/(1+rab). The reliability coefficient obtained using this formula was .859.

Pilot Study

A pilot study was conducted using a non-random sample. The subjects consisted of ten students in a doctoral class in nursing. The subjects viewed two video-taped nursing situations, filled out the questionnaire about the video-tape then took the Myers-Briggs Type Indicator. Following a discussion about the process one of the nursing situations was deleted. The participants felt that the actor had mannerisms that detracted, and some of the cues were inappropriate. Some of the participants did not like the forced choice questions on the Myers-Briggs Type Indicator and it was suggested that subjects be informed prior to filling out the questionnaire that the questions would be forced choice.

Tables 1 and 2 present the data from the pilot study. Table 1 presents the number of cues perceived from the video-taped situation. Table 2 shows the intuition scores, the area of practice, the number of years of practice and the sex of each subject.

The intuition raw score is the score derived from the number of intuition questions answered on the questionnaire. The intuition continuous score is the intuition score plus 100 and the sensation score minus 100. Jung perceived intuition and sensation to be a

bipolar construct. The intuition score is based on the formula 2(N-S)+1 where N = Intuition and S = Sensation. The Sensation score is 2(S-N)-1. This reflects a more accurate range of scores.

Table 1
Perceived Cues

Subject	Diag. Cues	Supp. Cues	Irr. Cues	Tot. Cues
1	1	3	1	5
2	6	4	1	11
3	4	0	0	4
4	6	0	0	6
5	7	0	0	7
6	3	5	0	8
7	5	2	0	7
8	2	0	1	3
9	4	2	1	7
10	4	1	0	5
Mean	4.2	1.7	.4	6.6

Key
Diag. Cues: The number of cues needed to make a diagnosis.
Supp. Cues: The number of cues thought to be relevant to the diagnosis but not used to make the diagnosis.
Irr. Cues: Cues thought to be irrelevant to the diagnosis.
Tot. Cues: Total number of cues perceived.

The coefficient of correlation for the Intuition raw score and the Perceptual Accuracy score (the number of cues used to make a diagnosis) was $r = -.51$. This was not significant since the critical value for .05

level of significance with 8 degrees of freedom is -.63. The correlation between the continuous intuition score and the Perceptual Accuracy score was $\underline{r}$ = -.525. While these coefficients were in the expected direction they did not achieve significance.

Table 2
Intuition Scores and Demographic Data

Subject	I. Score (raw)	I. Score (Cont.)	Area of Practice	No. Yrs. Practice	Age	Sex
1	21	135	MCH	22	44	F
2	3	73	M-S	18	39	F
3	21	141	M-S	20	40	F
4	16	115	MCH	12	33	F
5	13	93	M-S	8	28	F
6	23	145	Psy	9	32	F
7	21	139	Psy	10	32	F
8	19	123	CH	16	39	F
9	7	79	MCH	10	39	F
10	13	109	M-S	15	37	F
Mean	15.7	115.2		14	36.3	

Key: I. Score = Intuition score.

Data Collection Procedure

Brief announcements were made at the beginning or ending of classes of potential students. The purpose and the procedures to be used in the research were explained at this time. Arrangements were made to encourage participation and accommodate the convenience of the potential subjects without interfering with

classes other than for the brief announcement to request a meeting with the students unless the use of class time was offered without request.

Potential subjects were asked to meet at a designated time and place for an explanation of the process and what their taking part in the study would involve. They were given an opportunity to ask questions for clarification of all expectations and rights. Subjects were assured of confidentiality and access to the findings of the study upon its completion. Subjects were informed that participation would be based on voluntary consent and that involvement in the study could be discontinued at any time if they wished to do so. Participants were also informed that each person participating would receive an individual feedback sheet presenting the results of the scoring of the Myers-Briggs Type Indicator.

An oral explanation on the format of the presentation of the video-taped situation and instructions for filling out the response forms was given at the time of administration of the two instruments. The three minute video-taped nursing situation was shown first. A pause of seven minutes was given to fill out the response form for the video-tape. The second portion of the study included completing the

Myer-Briggs Type Indicator which took approximately 30 minutes.

The response forms were collected and scored. Each participant received the Report Form for the Myers-Briggs Type Indicator (1976). The report forms were coded and returned in sealed envelopes to the instructors. The subjects remembered their code numbers and picked up the report forms from their individual instructors.

Treatment of the Data

The purpose of the data analysis was to interpret relationships explored in response to the research question through statistical analysis by summarizing numerical data and comparing results with chance expectations of occurrence, with levels of significance set at the 0.05 level. Interpretations of the data produce statistical inferences which may theoretically be generalized to the population.

The data were analyzed utilizing Pearson's product moment correlation coefficient. This statistical procedure examined the relationship of intuition and perceptual accuracy. According to Glass and Stanley (1970) a correlation describes a relationship between two variables. There are three types of relationships:

(1) positive correlations, (2) negative correlations, and (3) zero correlations. High scores on one variable with high scores on the other variable results in a positive correlation. A negative correlation exists when high scores on one variable coincide with low scores on the other variable. A zero correlation exists when there is no systematic relationship between the variables. A perfect positive correlation is +1.00 and a perfect negative correlation is -1.00. The closer the correlation is to one of these, the stronger the relationship. The results of the analysis are reported in the following chapter.

CHAPTER 4

ANALYSIS OF DATA

A descriptive study was conducted to determine if a significant relationship existed between the perception of the patterns and relationships in a complex nursing situation presented on video-tape and the intuition score on the Myers-Briggs Type Indicator of 30 nurses enrolled in a master's level nursing class. This chapter presents a description of the participants and presentation and analysis of the data.

Description of Sample

The population for the study was the 83 nurses enrolled in master's level classes in nursing in two state universities. These students classified their major area of clinical practice as medical-surgical nursing. The sample consisted of 34 volunteers from the two schools of nursing. This represents a 41 percent response rate. Four subjects failed to identify the patient's primary physiological problem and these four were not included in the sample. Only one subject was male. This represents 3 percent of the sample. Table 3 presents the distribution of subjects by university.

Table 3
Distribution of Subjects by University

University	Tot M-S Students	Subjects	Percent
University A	59	17	29
University B	24	13	54
Total	84	30	36

The age range fell between 25 and 50 years. The mean age of the group was 33 years. The mean, median, and mode fell within the 5-year increment of the 30-34 year group. Table 4 presents the distribution of respondents by age within increments of 5 years.

Table 4
Distribution of Respondents by Age

Age	Frequency	Percent
25-29	9	30
30-34	11	37
35-39	5	16
40-44	2	7
45-49	2	7
50-54	1	3
Total	30	100

Table 5 presents the distribution of respondents by years of practice in 5-year increments. The mean years of practice of respondents was 10 years. The median and the mode fell within the 10-year span of 5-14 years.

Table 5
Distribution By Years of Practice

Years	Frequency	Percent
0-4	5	16.6
5-9	10	33.3
10-14	10	33.3
15-19	1	3.3
20-24	4	13.3
Total	30	100.0

Findings

The hypothesis to be tested was that there would be an inverse relationship between the intuition score of the Myers-Briggs Type Indicator and the number of cues needed to arrive at an accurate diagnosis of a patient problem presented in a video-taped scenario. The analysis was implemented using Pearson's product-moment correlation.

The correlation coefficient of the intuition raw scores and the perceptual accuracy scores was $r = .197$.

The correlation between the intuition continuous scores and the perceptual accuracy scores was r = .155. Neither correlation was significant at the .05 level of significance and was in the opposite direction of what was expected. The critical value of r at the .05 level of significance for 28 degrees of freedom is .361. Therefore the hypothesis was not supported. The data did not support a statistically significant relationship between intuition as identified by the Myers-Briggs Type Indicator and the identification of cues needed to make an accurate diagnosis.

Table 6 presents the perceived cues, the intuition scores and the demographic data. Diagnostic cues are those cues needed to make the diagnosis of the patient problem. Supporting cues are those cues that confirmed the diagnosis and the irrelevant cues are those perceived but did not seem to confirm the diagnosis.

Table 7 presents the range and means of the data presented in table 6. Table 8 presents the cues listed by respondents needed to arrive at an accurate diagnosis of the patient problem. The cues are listed in order of frequency. Table 9 lists the cues cited by the respondents that supported the diagnosis of the patient problem.

TABLE 6
Perceived Cues, Intuition Scores, and Demographic Data

Subj.	Diag. Cues	Supp. Cues	Irrel. Cues	Tot. Cues	Age	Yrs. Pract.	Intu. Raw	Int. Cont.
1	4	3	0	7	29	7	4	63
2	4	5	0	9	42	21	11	99
3	2	2	2	7	25	3	3	65
4	6	0	2	8	46	14	17	115
5	5	0	0	5	25	3	9	93
6	4	0	1	5	32	11	10	97
7	3	3	0	6	43	22	12	105
8	6	1	0	7	37	6	11	83
9	5	1	1	7	25	3	8	95
10	4	5	0	9	37	20	8	85
11	5	2	0	7	37	16	13	107
12	6	3	0	9	32	6	24	145
13	9	0	0	9	30	9	13	105
14	7	0	1	8	25	2	14	115
15	6	0	0	6	30	9	22	143
16	7	0	0	7	33	11	4	67
17	7	0	0	7	31	5	2	51
18	3	2	0	5	29	2	14	103
19	4	5	0	9	35	11	16	119
20	4	2	1	7	29	6	20	135
21	6	2	1	9	32	10	9	87
22	4	3	1	8	31	9	21	141
23	2	5	0	7	32	10	14	113
24	5	1	1	7	47	24	4	65
25	7	2	0	9	50	12	20	133
26	3	4	0	7	35	13	16	119
27	7	1	1	9	28	6	20	137
28	4	2	1	7	28	6	2	55
29	3	2	2	7	34	12	4	67
30	6	0	2	8	34	12	19	129

Table 10 lists the cues cited by the respondents that appeared irrelevant to the diagnosis of the patient problem.

Table 7
Means and Ranges of Scores and Demographic Data

Data	Means	Range
Diagnostic cues	5	2-9
Supporting cues	2	1-5
Irrelevant cues	1	1-2
Total cues	7	5-9
Age of subjects	33	25-50
Years of practice	10	2-24
Intuition score (raw)	12	2-24
Intuition score (continuous)	98	51-145

Table 8
Diagnostic Cues Listed By Respondents

Cue	Frequency
Sweating/diaphoresis	29
Disoriented/confused	25
Insulin administration	21
Food not eaten	17
Restless/thrashing/irritable	16
Sugar-Acetone determination	13
Shakey/jittery	12
Blood sugar value	10
Time of day	7
Clammy	1
Panting	1
Anxiety	1
Knowledge that patient is diabetic	1
Total	154

Table 9
Supporting Cues Listed By Respondents

Cues	Frequency
Disoriented/confused	9
Food not eaten	8
Cold/chills	7
Time of day	6
Insulin administration	6
Blood sugar value	6
Sugar-Acetone Determination	6
Restless/agitation	5
Shakey	2
Diaphoresis	2
Flushed	1
Lying flat in bed	1
Knowledge that patient was diabetic	1
Lack of I. V.	1
Total	61

Table 10
Irrelevant Cues Listed By Respondents

Cues	Frequency
Announcement of visiting hours being over	4
Sugar-Acetone determination	3
Previous days diabetic flow sheet	1
Bandage on arm	1
Agitation	1
Blood sugar value	1
Ticking of clock	1
Patients age and occupation	1
Cold	1
Food not eaten	1
Getting out of bed	1
Total	16

Summary

The hypothesis that there would be an inverse relationship between the intuition scores and the perceptual accuracy scores of 30 medical-surgical nurses enrolled in master's level nursing classes was not supported. The average age of subjects was 33 years. The average length of nursing practice was 10 years. The average number of diagnostic cues listed by respondents was 5. The mean number of total cues listed was 7. The mean intuition raw score was 12 and the mean intuition continuous score was 98.

CHAPTER 5

SUMMARY OF THE STUDY

This chapter presents a summary of the study. The findings are discussed with conclusions and implications. Recommendations for further study conclude the chapter.

Summary

The problem of the study was to determine the relationship between nurses' intuitive abilities and the accurate perception of cues presented in a nursing situation shown on video-tape. Thirty nurses enrolled in master's level nursing classes who identified their clinical area of practice as medical-surgical nursing were given the Myers-Briggs Type Indicator. The subjects also viewed a video-tape of a nursing situation after which the subjects identified the priority physiological problem of the patient and listed those cues needed to arrive at that diagnosis. Subjects also listed other relevant and irrelevant cues perceived.

Pearson's product-moment formula was used to determine the relationship between the intuition scores

and the perceptual accuracy scores. The results of the correlations were not significant at the .05 level.

Discussion of Findings

A negative relationship was expected between the intuition scores and the perceptual accuracy scores. This was based on the definition of intuition, that is, the more intuitive a person is the fewer cues needed to make an inference (Westcott, 1968). Based on Gibson's (1966) theory of perception, as individuals learn they make finer discriminations between patterns and relationships. People perceive invariants from a flux of patterns and relationships. As learning takes place individuals are able to perceive more complex patterns as invariants.

Since no significant relationship was shown to exist between intuition and perception the first concern is whether or not the variables were actually measured. The Myers-Briggs Type Indicator has been repeatedly validated. Individuals identified as intuitive base judgements on intuition as opposed to sensation. This leaves the use of the video-tape as a measure of perception questionable. It may have measured nurses perception of a situation but it did not accurately reflect the number of cues needed to arrive at an

accurate diagnosis of the priority physiological problem of the presented patient.

Subjects viewed the tape, then filled out the questionnaire. They saw a patient experiencing hypoglycemic or insulin shock. The scenario presented all of the relevant cues associated with this problem. This was a problem about which master's level medical-surgical nurses would be very knowledgeable. It is possible that since all the cues were familiar to the subjects they listed more than were actually used to make the diagnosis. According to Gibson, if a complex pattern is perceived wholistically then it would be difficult to break that pattern down into parts. The film lasted only three minutes, and familiar cues were perceived. If these cues were part of a complex pattern for the subjects then they may not have known when the moment of diagnosis was made. If the film had been stopped at set intervals and subjects asked to attempt a diagnosis then the number of cues actually needed to make the diagnosis would have been more accurate. Several times during the viewing of the video-tape a subject would be heard to say "ah ha!" early in the film sequence indicating she thought she knew the diagnosis. However, when the questionnaire was returned she had listed most of the significant indicators of

hypoglycemic shock. From her answers it appeared that she did not make the diagnosis until the end of the tape.

Using only medical-surgical nurses may have limited the number of intuitives in the study. Myers (1962) found that intuitives were more likely to attend college and were found in more than 75 percent of her samples of graduate students. This is explained on the findings that intuitives were more suited for scholarly activities. In the sample for this study only 53 percent of subjects were intuitives. Table 7 shows the mean intuition continuous score to be 98. According to the Myers-Briggs Type Indicator the scores falling below 100 indicate individuals who prefer sensing for perception and those whose scores fall above 100 prefer intuition for perception. There were 16 subjects who were designated as intuitives and 14 as sensors. The extreme scores of sensors pulled the average score down below the 100 mark.

Individuals who prefer the sensing mode tend to grow expert at noticing all the observable facts. They are realistic, practical, observant, fun-loving, and good at remembering a great number of facts and working within them. Individuals who prefer intuition over sensing, make more use of imagination and inspirations,

become good at new ideas, projects and problem-solving. Intuitives are adept at seeing possibilities and solutions. Both modes of perception are used by individuals but one is preferred over the other. The video-taped situation presented facts so that it was biased toward the sensing mode. Had the task been one in which the facts were less obvious the distinction between the two groups may have been more noticeable.

The results of the Myers-Briggs Type Indicator show that 22 out of the 30 subjects preferred the attitude of judging over perceiving. According to Myers (1962) individuals who prefer the judging attitude probably like a planned, orderly way of life better than the flexible, spontaneous way of the perceptive. Preference for judging, along with intuition and introversion, is positively associated with scholastic achievement. However, preference for intuition, introversion and perception is strongly associated with creativity. In this sample only two subjects preferred intuition, introversion and perception.

One of the most interesting findings is the list of diagnostic cues. All but one subject listed diaphoresis as a diagnostic cue. Only one subject listed knowledge that the patient was a diabetic was diagnostic. Diaphoresis is a symptom of apparently high value for

nurses. However, if the nurse did not know the patient was diabetic the meaning of the cue would be ambiguous. It was surprising to find that only one subject listed knowledge that the patient was diabetic as diagnostic. It would seem that knowing the patient was diabetic would add meaning to all the other cues.

Disorientation or confusion was listed as a diagnostic cue by 24 subjects. Knowledge concerning insulin administration was the third most frequently listed cue. Six subjects listed behavioral cues such as diaphoresis, confusion, restlessness, as diagnostic without listing any of the lab values or that they knew the patient was diabetic. Knowing whether the patient was bleeding or was diabetic would be highly significant. This may suggest that nurses give high priority to dramatic behavioral responses of patients. Also suspect is the presentation of the film. As basic patient history was being narrated the viewer saw a restless, diaphoretic man lying in bed. The visual cues generally take precedence over auditory cues (Gibson, 1966) so visual cues were remembered first. It seems reasonable to believe that if nurses could make a diagnosis of insulin shock based on diaphoresis, restlessness, and confusion then those subjects also

were aware that the patient was diabetic even though it was not uppermost in awareness.

One nurse listed cold and clammy as diagnostic cues. The patient said he was freezing but the nurse would have had to touch the patient to know he was clammy. Generally, when nurses describe a patient as cold and clammy they have touched the patient and he feels cold and clammy to the nurse. This was an interesting finding that might be explained on the basis of the perception of invariant patterns. These two cues were part of the pattern of cues the experienced nurse would associate with insulin shock.

Several cues relevant to the diagnosis were listed as irrelevant by subjects. Knowing that the patient had not had sugar or acetone in the urine for two days, that the blood sugar had been decreasing significantly for three days, that the patient had not eaten lunch and that it was late in the afternoon should have had diagnostic value for all the nurses. The fact remains, that 30 out of 34 nurses made the correct diagnosis regardless of the cues used to do so.

Conclusions and Implications

No significant relationship was found between the intuition score on the Myers-Briggs Type Indicator and

the number of cues needed to arrive at an accurate diagnosis of a patient problem. The nurses did arrive at an accurate diagnosis of the problem but the cues used to arrive at the diagnosis was not uniform. It appears that the dramatic behavioral cues have the most value in diagnosing hypoglycemic shock. Whether or not this is actually the case would have to be tested.

What are the invariant cues associated with hypoglycemic shock, or any other patient problem that needs a prompt intervention? What cues are always present, what cues are usually present, what cues are occasionally present, and what cues are rarely present? Nurses, at the very least need to know what is always present for a particular diagnosis. Is it really an individual matter or do nurses generally agree? In this one study many cues associated with hypoglycemic shock were presented but none of the nurses named all of them and most did not include cues with high relevancy.

Since auditory cues were listed infrequently nurses may need to increase their listening skills. Carl Rogers (1951) and others have long emphasized the importance of listening. We implore nurses to be observant, but observant means attentive, hearing as well and seeing.

Recommendations For Further Study

To discover the relationship between perception and intuition the methods would have to be changed. Stopping the tape after a set number of cues would more accurately identify the moment of diagnosis. Using only the intuition scale of the Singer-Loomis test for intuition would involve less time and all subjects would have a specific intuition score instead of a range of scores from sensation to intuition.

This study points to the need to know what cues experts use to make nursing diagnoses. Perhaps we need to ask nurses directly what cues are present every time a particular diagnosis is made. A survey of charts could also be used. This would identify the cues most frequently used, the patterns of cues used, and levels of abstractions. The next step would be validation of the findings. Nurses could be presented with a specific diagnosis and its supporting cues. Each time the nurse made that particular diagnosis she would check which cues were present and which were not present. From these results nurses would discover which cues had the highest value for diagnosis. The cues with the highest value would be the cues taught for the prototypes. The content of nursing education has become so cumbersome

that students are overwhelmed with the amount of information to be learned. Teaching only the cues with the highest value would be an attempt to make learning more relevant for students.

APPENDIX A

INSTRUCTIONS FOR VALIDATORS

INSTRUCTIONS FOR VALIDATORS

The purpose of this study is to look at the relationship between intuition and perception. The instrument for measuring perceptual accuracy is a video-taped patient situation. The problem for you is to determine the actual number of cues that are presented on the film.

Two clinical situations will be presented. You will see a patient experiencing hypoglycemia or hyperinsulinism and another experiencing hypovolemic shock. Each film will last less than five minutes. It is suggested that you view the film once, list all the cues you remember, then view the film again to check your list and add those that were missed the first time. Please view the films as many times as you wish in order to identify the cues for each patient situation.

Situation # 1.	Situation # 2.
_____	_____
_____	_____
_____	_____

APPENDIX B

INSTRUCTIONS FOR VALIDATORS

SELECTION OF SCENARIOS

The purpose of this exercise is to validate a measurement tool by finding two parallel forms of the instrument. The instrument consists of two video-taped nursing situations which will be used to measure perceptual accuracy. The subject will be asked to view the tape, make a diagnosis based on the acute physiological problem, and list the cues that led to this decision. The subject will also be asked to list other cues perceived, both relevant and irrelevant.

Please view all ten taped scenarios and select the two most appropriate situations based on the following criteria.

1. The situations should be common to nursing (incidence and prevalence).
2. The cues should be appropriate to the situation.
3. Were any important cues omitted?
4. Were cues clear?
5. Is the format acceptable?
6. Is there fidelity to real situation?
7. Do you agree with the diagnoses?
8. Other criticisms.

APPENDIX C

SUBJECT RESPONSE FORM FOR VIDEO-TAPE

RESPONSE FORM

Now that you have viewed the video-taped patient situation please answer the following questions.

1. The patient's PRIORITY PHYSIOLOGICAL PROBLEM is (use nursing diagnosis or medical terminology):

_____

2. List the signs, symptoms, and any other information that led you to make the diagnosis. List ONLY the clues that led you to the diagnosis.

_____

_____

_____

_____

3. List any other RELEVANT signs or symptoms you perceived.

_____

_____

_____

4. List any clues that you considered IRRELEVANT to the problem.

_____

_____

5. How many years of nursing experience do you have?___

6. What is your area of clinical practice? _____

7. What is your highest degree held? _____

8. What is your age? _____

References

Ajzen, I. (1977). Intuitive theories of events and the effects of base-rate information on prediction. Journal of Personality and Social Psychology. 35, (5), 303-314.

Berne, E. (1977). Intuition and ego states. New York: Harper and Row.

Beveridge, W.I.B. (1957). The art of scientific investigation. New York: Vintage Books.

Bieri, J., Atkins, A.L., Briar, S., Leaman, R. L., Miller, H., & Tripodi, T. (1975). Clinical and social judgement: The discrimination of behavioral information. New York: Krieger Publishing Compny.

Birnbaum, M.H. (1976). Intuitive numerical prediction. American Journal of Psychology. 89, (3), 417-429.

Blyth, D. (1981). The evidence and mechanisms employed in intuitive hypothesis testing. Dissertation: University of Massachusetts.

Borak, J. & Veilleux, S. (1982). Errors of intuitive logic among physicians. Social Science and Medicine. 16, 1939-1947.

Bower, G. H. (1975). Cognitive psychology, an introduction. In W.K. Estes, ed. Handbook of Learning and Cognitive Processes. Hillsdale, N. J.: Erlbaum.

Bruner, J. S. (1961). The process of education. Cambridge: Harvard University Press.

Campbell, R.J. (1981). Psychiatric dictionary (5th ed.). New York: Oxford University Press.

Carlyn, M., (1977). An assessment of the Myers-Briggs type indicator. Journal of Personality Assessment, 41, (5) 461-473.

Carskadon, T.G., & Knudson, M.L. (1978). Relationships between conceptual systems and psychological types. Psychological Reports, 42, 483-486.

Cosier, R.A., & Aplin, J.C. (1982). Intuition and decision making: some empirical evidence. Psychological Reports, 51, 275-281.

Cronbach, L. J. (1971). Test validation. in R. L. Thorndike (Ed), Educational Measurement, (2nd Ed.). Washington: American Council of Education.

Davis, F. (1978). Inside intuition: What we know about nonverbal communication. New York: McGraw-Hill.

Daws, R.M. (1979). The robust beauty of improper linear models in decision making. American Psychologist. 34, (7), 571-582.

del Bueno, D. J. (1983). Doing the right thing: Nurses' ability to make clinical decisions. Nurse Educator, Autumn, 7-11.

del Bueno, D. J. (1982). Making clinical decisions: Instruction guide. New York: Health Educators.

DesCarte, R. (1629/1962). Rules for the mind. In Hutchins, R. M. (Ed.) W.D. Ross (trans.), Great Books of the Western World. Chicago: Encyclopedia Britanica, Inc.

Dickoff, J., & James, P. (1968). A theory of theories: A position paper, Nursing Research, 17, 197.

Diers, D. (1979). Research in nursing practice. Philadelphia: J. B. Lippincott Company.

Encyclopedia Americana, International Edition. (1959). Vol. 15, New York: Americana Corporation.

Fischbein, E. (1975). The intuitive sources of probabilistic thinking in children. Boston: D. Reidel Publishing Company.

Fuller, R.B. (1981). Critical path. New York: St. Martin's Press.

Giannini, A.J., Daood, J., Giannini, M.C., Boniface, R., & Rhodes, P.G. (1978). Intellect versus intuition--a dichotomy in the reception of nonverbal communication. Journal of General Psychology, 99, 19-24.

Gibson, J.J. (1966). The senses considered as perceptual systems. Boston, Mass: Houghton-Mifflin.

Glass, G. V., & Stanley, J. C. (1970). Statistical methods in education and psychology. New Jersey: Prentice-Hall.

Gordon, M. (1982). Nursing diagnosis: Process and application. New York: McGraw-Hill.

Hamilton, V.L. (1980). Intuitive psychologist or intuitive lawyer? Alternative models of the attribution process. Journal of Personality and Social Psychology, 39, (5), 767-772.

Isaac, S., & Michael, W. B. (1978). Handbook in research and evaluation. San Diego: EdITS.

Jung, C.G. (1921/1971). Psychological types. R.F.C. Hull (Ed.), Princeton: Princeton University Press.

Kahneman, D., & Tversky, A. (1978). On the psychology of prediction. Psychological Review, 80, (4), 237-251.

Kant, I. (1788/1952). The critique of pure reason. In R.M. Hutchins (Ed.), J.M.D. Meiklejohn (trans.), Great Books of the Western World. Chicago: Encyclopedia Britannica.

Kelley, K.J. (1964). An approach to the study of clinical inference in nursing. Nursing Research, 13, 314.

Kerlinger, F.N. (1973). Foundations of behavioral research. 2nd ed. New York: Holt, Rhinehart, and Winston, Inc.

Larkin, J., McDermott, J., Simon, D.P. & Simon, H. A. (1980). Expert and novice performance in solving physics problems. Science, 208, 1335-1342.

Loomis, M. (1982). A new perspective from Jung's typology, Journal of Analytical Psychology, 27, 59-69.

Meehl, P. (1954). Clinical versus statistical prediction: A theoretical analysis and a review of the evidence. Minneapolis: University of Minnesota Press.

Metzner, R. (1980). Correlations between Eysenck's, Jung's, and Sheldon's typologies. Psychological Reports, 47, 343-348.

Myers, I. B. (1962). The Myers-Briggs type indicator manual. Princeton: Educational Testing Service.

_____. (1976). Introduction to type. Gainsville, Florida: AMSA Foundation.

Nightingale, F. (1860). Notes on Nursing: What it is, and what it is not. London: Harrison. Reprinted in Bishop, F.L.A., and Goldie, S. 1962.

Ornstein, R.E. (1977). The psychology of consciousness. (2nd ed.) New York: Harcourt Brace Jovnovich.

Price, M.R. (1980). Nursing diagnosis: Making a concept come alive. American Journal of Nursing, 80, 668-671.

Polanyi, M. (1962). Personal Knowledge. Chicago: University of Chicago Press.

_____(1966). The creative imagination. Chemical and Engineering News, 44, 89.

_____(1969). Knowing and Being. Chicago: University of Chicago Press.

Pyles, S. H., & Stern, P. N. (1983). Discovery of nurisng gestalt in critical care nursing: The importance of the gray gorrilla syndrome. Image. 15, (2), 51-57.

Rogers, C. (1977). Carl Rogers on Personal Power. New York: Delta.

_____. (1951). Client centered therapy. Boston: Houghton Mifflin.

Royce, J. R., Coward, H., Egan, E., Kessel, F. & Mos, L. (1978). Psychological epistemology: A critical review of the empirical literature and the theoretical issues. Genetic Psychology Monographs, 97, 265-353.

Silka, L. (1981) Effects of limited recall of varibility on intuitive judgments of change. Journal of Personality and Social Psychology, 40, (6), 1010-1016.

Singer, J., & Loomis, M. (1980). A new inventory to measure typology. Paper presented at the Eighth Congress, International Association of Analytical Psychology, San Francisco, California.

Simonton, D.K. (1975). Creativity, task complexity, and intuitive versus analytical problem solving. Psychological Reports, 37, 351-354.

Smoyak, S. (1982). Clinical Practice: Intuitive or based on research? Journal of Psychiatric and Mental Health Services, 20, 9-13.

Sperry, R.W. (1964). The great cerebral commisure. Scientific American. Jan. 42-52.

Thorndike, R. L., & Hagen, E. P. (1977). Measurement and evaluation in psychology and education. (4th ed.). New York: John Wiley and Sons.

Watts, F. N. (1980). Clinical judgement and clinical training. British Journal of Medical Psychology, 53, 95-108.

Westcott, M.R. (1968). Toward a contemporary psychology of intuition. New York: Holt Rinehart and Winston.

Wilder, R.L. (1967). The role of intuition. Science, 156, 605-608.

Wheelright, J. B., Wheelright, J. H., & Buehler, J. A. (1964). The Jungian type survey (the Gray-Wheelwright test). San Francisco Society of Jungian Analysts of Northern California.

Zderad, L. T. (1978). From here-and-now to theory: Reflections on "how". In Theory development: What, why, how? NLN, (Pub.No. 15-1708). New York: National League for Nursing.