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**Learning Styles of Baccalaureate Nursing Students
and Attitudes towards Theory-based Nursing Practice:
A Validation Study of Kolb's Experiential Learning Theory**

by

Heather Kathleen Laschinger

A thesis
presented to the University of Ottawa
in fulfillment of the
thesis requirement for the degree of
Doctor of Philosophy
in
Education

Ottawa, Ontario, 1987



Heather K. Laschinger, Ottawa, Canada, 1987.

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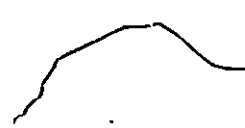
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INTRODUCTION

David Kolb (1978) has proposed a theory of experiential learning which is potentially useful for nurse educators. In the theory, Kolb (1984) describes a four stage cycle of learning by which individuals learn from experience. This model seems particularly appropriate for use in nursing education programs where practical experience in actual nursing settings is an important component of the process of learning to nurse. However, it is important to test aspects of the theory to determine its validity within the nursing population before it is used in planning nursing curricula. The purpose of this study is to test aspects of Experiential Learning Theory in the nursing population.

In the theory, Kolb (1984) suggests that the structure of knowledge of a discipline exerts a characteristic learning press or set of learning demands on the learner which reflects a particular view of reality and the method of inquiry used to create knowledge. Members of a discipline develop particular ways of dealing with the world and come to emphasize learning competencies most effective in acquiring knowledge of the discipline. These competencies cluster around different modes of learning posited in the theory and result in what Kolb refers to as preferred learning styles. Kolb (1984) maintains that members of different disciplines develop learning styles which reflect the nature of knowledge of that discipline as a result of repeated person-environment interactions in both professional education programs and actual job roles.

In the past decade, nurse educators have emphasized the need to develop a unique body of nursing knowledge as a basis for nursing practice. Nursing authors have described traditional nursing knowledge as an accumulation of rituals, superstitions and speculations



about unrationalized experience. Nursing scholars have developed various theories for nursing practice. This theory-based approach represents a change from past task-oriented approaches to nursing and has been resisted by many nurse practitioners. The value of practice based on an explicit theoretical framework is a current issue in the nursing profession. It is suggested in this study that constructs and propositions from Experiential Learning Theory may be useful in understanding this phenomenon.

In this study, Experiential Learning Theory is the theoretical framework from which learning styles of nursing students and their perceptions of the learning demands of nursing learning environments are examined. Predictions from the theory regarding the relationships among learning styles of nursing students, their perceptions of the learning demands of nursing learning environments (environmental press) and attitudes towards theory-based nursing are tested. In addition, theoretical predictions regarding the relationships between learning style and preferred theory for practice and preferred method of learning nursing theory are tested. Finally, the relationship between person-environment match/mismatch and satisfaction with nursing is explored.

The report is divided into three chapters followed by a summary and conclusions. In the first chapter, an overview of research in cognitive style is presented. This is followed by a detailed presentation of Experiential Learning Theory together with a review of studies based on the theory. This is followed by a critique of the theory. The concept of theory-based nursing is then discussed. In the second chapter, the research subjects are described and the measuring instruments discussed. Following is an elaboration of the data collection procedures. In the third chapter, the results of the study are presented and discussed and suggestions for future research are provided. The report concludes with a summary and conclusions.

CHAPTER I

THEORETICAL FRAMEWORK OF THE STUDY

In this chapter, an overview of cognitive style research is presented leading to the rationale for the selection of Experiential Learning Theory as the theoretical framework for this study. An overview of David Kolb's theory of experiential learning is then presented. Recent studies based on Experiential Learning Theory are then reviewed followed by a brief critique of the theory. An overview of the development and current status of the concept of theory-based nursing practice is then presented. Two nursing theories relevant to this study are briefly described. This is followed by the statement of the problem and the purpose of the study. The chapter concludes with the statement of the research hypotheses.

1. Overview of cognitive style research

In the past thirty years, theorists interested in understanding the nature of individual differences in human learning have proposed theories of cognitive styles as possible explanations for this phenomenon. Cognitive styles are defined as characteristic ways of perceiving and thinking (Kogan, 1971). Early work on cognitive style theory evolved from research on perception. (Witkin, 1949; Kagan, 1966). In the past fifteen years, concepts from cognitive science have been incorporated into theories of cognitive style (Myers, 1962; Royce, 1964; Kolb, 1978). Consequently, cognitive style theories have become more holistic in focus. Cognitive style includes notions of perception, learning, personality, intelligence and attitude (Nelson, 1974). It is this holistic representation of learning and

knowing which makes cognitive style theory attractive to educators who are aware from their practice of the interaction between the emotional and cognitive aspects of learning. However, due to the variety of available instruments posited to measure learning style, educators face a difficult task in choosing among them. Grasha (1983) notes that of the 30-40 instruments he evaluated, relatively few are grounded in theories of human learning. He maintains that theory-based instruments provide a better basis for assessing learning styles since it is possible to relate findings to explicit factors of individual differences in learning. Grasha (1983) mentions the Myers-Briggs Type Indicator (Myers, 1962), the Embedded Figures Test (Witkin, 1967), Kolb's Learning Style Inventory (Kolb, 1978) and Schmeck et al.'s (1977) Inventory of Learning Preferences as examples of instruments based on explicit learning theory.

In reviewing these theories, it was noted that many appeared to be value laden in that implicit in the descriptions of the different styles was the suggestion that one style was superior to another, e.g. reflective style better than impulsive style (Kagan, 1966). Also, most theories reviewed did not address a developmental aspect of style. Styles were considered to be relatively stable over a person's lifetime with little likelihood for change. Finally, the theories reviewed were not related to a model of learning which had practical applications for teaching-learning situations.

In reviewing the constructs and propositions of Experiential Learning Theory, these concerns appeared to have been addressed and Kolb's theory was selected as the theoretical framework for the study. Experiential Learning Theory as described by David Kolb (1984) is based on a model of learning which describes how individuals learn from experience. People develop particular learning styles as a result of the way in which they perceive and transform experience into knowledge. Individuals tend to develop one of four styles as a result of their educational and work experiences. However, Kolb suggests that

in mid-life, there is a tendency towards integration of the four styles of learning. In this way, Kolb's theory differs from those of others who do not include a developmental component of learning style.

The model of learning from experience described in Kolb's theory seems most appropriate for use in nursing education and was an important factor in the choice of Experiential Learning Theory as the theoretical framework for this study. The nonevaluative nature of the descriptions of the four elementary learning styles and the notion of the possibility of the ultimate integration of styles with experience and maturity were also considered valuable attributes of Experiential Learning Theory. The emphasis in Experiential Learning Theory on the importance of learning in adapting to change seems appropriate for study of a profession which is currently undergoing major changes which will require adaptation by members of the discipline. In addition, the professional nursing educational system includes students at various levels of development and with varying amounts of experience. Hence, the assumptions and concepts described in Experiential Learning Theory seem particularly appropriate for the study of this population.

In the upcoming section, a detailed description of Experiential Learning Theory is presented.

2. Review of Experiential Learning Theory

In his theory of experiential learning, Kolb (1984) views learning as a major human adaptation process, a life-long process of person-environment interaction. Kolb integrates concepts from behavioral and cognitive learning theories attributing equal importance to the intellectual and emotional components of the learning process. Learning results from the resolution of conflicts among modes of relating to the world, i.e. thinking, feeling, perceiving and behaving. For Kolb, all learning is grounded in experience. Learning is

defined as 'the process whereby knowledge is created through the transformation of experience' (Kolb, 1984, p. 37). Kolb's theory can be categorized as a 'strong interactionist' view of learning. Kolb acknowledges the influence of the interactionist theories of Lewin, Dewey and Piaget in the development of his theory. Like these theorists, Kolb sees learning as an active process whereby knowledge is created through transactions between personal internal factors and objective environmental factors. Both person and environment are changed as a result of these transactions. Thus, knowledge is constantly being created and recreated as newly created knowledge becomes the basis for new experiences. Knowledge is not considered an independent entity to be acquired or transmitted.

Kolb's view of learning is based on the existentialist approach which emphasizes personal growth and change through a dialectical resolution of conflict between opposing ways of dealing with the world. Supporters of this position seek to overcome the separation of sensation and concept imposed by proponents of empiricism and idealism (Greene, 1984). A dynamic relationship exists between experience and conceptualization. Experience, when reflected upon, is the basis for conceptualization (knowledge) and subsequently these conceptualizations mediate experience. Learning is the mechanism by which experience is transformed into knowledge.

Kolb's definition of experience has a dual meaning: personal subjective experience which refers to a person's internal state and objective environmental experience which refers to external conditions in which experiences occur. These two forms of experience interact in complex ways and are transformed by the learning process to create new knowledge. Consequently, knowledge for the individual consists of objective social knowledge and subjective personal knowledge. Social knowledge is the objective, socially and culturally transmitted account of previous human cultural experience while personal knowledge is the accumulation of an individual's subjective life experiences (Kolb, 1983). Social

knowledge cannot be separated from the knower since the knower must transform this knowledge to create personal meaning: This transformation is accomplished by the learning process. Thus, individuals have unique perspectives or understandings of objective social knowledge as a result of the impact of their personal knowledge systems on this knowledge.

Since all social knowledge is learned, Kolb (1984) suggests that the structure of social knowledge is similar to the structure of the learning process. These structures will now be described in detail. Kolb describes the learning process as a four stage cycle involving four adaptive learning modes: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC) and active experimentation (AE). To learn, individuals must be able to involve themselves directly in a situation (CE), to reflect upon an experience and place it in perspective (RO), to create concepts that integrate these observations into theories or explanations (AC) and, finally, to use these theories to solve problems (AE). However, individuals must continually make choices concerning which learning modes are most appropriate in given situations. Over time, people develop preferences for particular learning modes as these modes are repeatedly chosen to effectively deal with their world.

Two distinct dimensions of learning can be identified within this cycle, each representing dialectically opposed adaptive orientations. The concrete experience/abstract conceptualization dimension represents opposing ways of grasping or representing experience (prehension). Representation of experience may be accomplished by symbolic or conceptual means (comprehension) or by a more holistic, here and now involvement in an immediate experience (apprehension). For example, a painting may be represented in the comprehension mode as an example of a particular form of art or in the apprehension mode as a holistic, aesthetic, emotional response to a visual stimulus. The second dimension, active experimentation/reflective observation, reflects opposing modes of transforming representa-

tions of experience. Reflective observation of experience is transformation via intention while active environmental manipulation of the representation is transformation by extension. An example of transformation by intention would be reflecting upon the meaning of an experience whereas actively testing out an idea in a practical situation would be an example of transformation by extension. The dialectic resolutions among these modes of responding to the world provide the basis for Kolb's proposed structure of the learning process.

Four ways of knowing emerge from this structure depending upon how experience is represented and transformed. Kolb (1984) refers to these ways of knowing as elementary forms of learning. These elementary ways of knowing correspond to the basic learning styles described in Experiential Learning Theory and are discussed in detail later in this paper. Since learning is defined by Kolb (1984) as the process whereby knowledge is created by the transformation of experience, different forms of knowledge are created depending upon the way experience is represented and transformed. The relationship between the structure of the learning process and the structure of knowledge is illustrated in Figure 1.

Representation of experience by apprehension and transformation by intention is divergent learning and results in divergent knowledge. Representation of experience by apprehension and transformation by extension is accommodative learning and results in accommodative knowledge. Experience grasped or represented by comprehension and transformed by extension is convergent learning and results in convergent knowledge. Finally, experience grasped or represented by comprehension and transformed by intention is assimilative learning and results in assimilative knowledge. The four types of knowledge are basic forms of knowledge which serve as a foundation for developing higher levels of knowing and learning (Kolb, 1984). It is important to point out that Kolb places equal value on each of the components of the learning process suggesting that neither is more superior nor

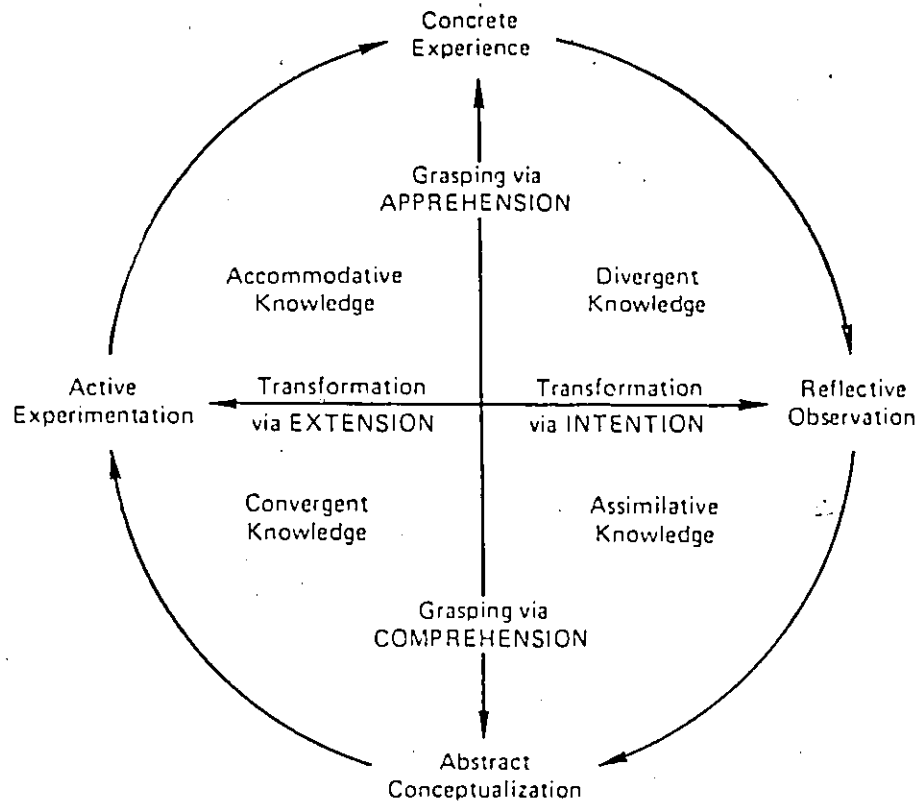


Figure 1: The Structure of Knowledge and the Learning Process (Kolb, 1984)

more advanced than the other. In this respect, he differs from Piaget who maintained that reflective symbolic thinking represented a higher level of cognitive functioning (Kolb, 1984). For Kolb, higher level learning occurs with the integration of all four elementary forms of learning. This integration is the goal of human development.

Kolb (1984) links his view of knowledge structure to Pepper's work on 'world hypotheses'. Pepper (1942) suggests that world hypotheses are philosophical systems

which define assumptions and rules for development of knowledge from common sense or experience. Different forms of social knowledge are created which reflect the underlying assumptions made about the nature of truth or reality and the methods advocated to validate phenomena of interest. Each 'world hypothesis' is derived from a 'root metaphor' or view of the nature of reality which shapes development of knowledge within this perspective. Pepper maintains that all viable forms of social knowledge are derived from one of four world hypotheses. Pepper's world hypotheses are labelled formism, mechanism, organicism and contextualism. Kolb draws comparisons between the knowledge resulting from these world hypotheses and the four forms of knowledge described above, i.e. assimilative, convergent, divergent and accommodative knowledge (see Figure 1).

The first two world hypotheses (formism and mechanism) are based on the representation of experience by comprehension. Truth from the formist (realist) perspective lies in correspondence between description and reality. From this perspective, methods of inquiry are analyses of precise measurements of observed data. Kolb suggests that formism is the root metaphor of convergent knowledge. Since convergent knowledge results from active transformation of symbolically represented experience, this comparison to formism seems logical. Empirical validation of abstract concepts as a method of creating knowledge in formism is consistent with Kolb's description of the creation of convergent knowledge. The root metaphor of the second world hypothesis (mechanism) is the machine. Inquiry focusses on finding structure in reality and building explanatory models. Kolb suggests that mechanism is the root metaphor of assimilative knowledge. Assimilative knowledge is created by internal reflection on symbolically represented experience. Concepts are organized into theoretical explanations of experience. This process appears consistent with Pepper's description of the nature of mechanistic knowledge.

The remaining world hypotheses are based on the representation of experience by apprehension. The root metaphor of organicism (idealism) is 'harmonious unity' or the self-actualization of the human being. Inquiry is focussed on understanding the processes by which the organism proceeds towards self-actualization. Kolb (1984) compares organismic knowledge to divergent knowledge. Divergent knowledge results from internal reflection on experience represented through apprehension. Experience is viewed holistically in an attempt to place all aspects of experience in perspective to see the relationships among parts of the 'whole'. Descriptions of reality emphasize images and the feeling aspects of lived experiences. The basis of the organismic world hypothesis is the assumption that individuals ultimately strive to gain a final absolute understanding of the nature of reality with all relationships understood in a clearly organized 'whole'. Thus, Kolb's comparison of organismic knowledge to divergent knowledge appears to be plausible. The fourth world hypothesis is contextualism in which reality consists of the immediate changing event. Inquiry emphasizes description of contextual here-and-now experiences. Kolb sees this world hypothesis as the basis of accommodative knowledge. Accommodative knowledge is created by actively transforming experience grasped or represented by apprehension. The focus is on the immediate event as it happens without an a priori theoretical framework determining its interpretation. The basis of the contextual world hypothesis is the assumption that reality exists only in the immediate event and is constantly being created and recreated. Actions are true if they are workable or lead to a desired state of experience (Kolb, 1984). This description of the creation of knowledge by acting upon immediately experienced events appears congruent with Kolb's description of the nature of accommodative knowledge.

In summary, Kolb (1984) suggests that experience, knowledge and learning are intricately related in the human adaptation process. Knowledge is created from experience via the learning process. Forms of learning and knowledge are the result of how experiences

are represented and transformed by learners. Four elementary forms of learning and knowledge are derived from Kolb's proposed learning cycle. These four elementary forms of learning represent the basic learning styles described in Kolb's theory. Descriptions of these styles and the forces thought to influence their development are now presented.

Kolb's description of the learning cycle represents an ideal model of learning in his view. Kolb (1984) maintains that few individuals actually make equal use of all learning modes described in the model in a given learning situation. As a result of genetic dispositions, family and educational experiences and their choices of lived experiences, individuals develop relatively stable patterns of person-environment interactions. Kolb suggests that these patterns tend to emphasize one or the other modes of representation and transformation of experience resulting in four general patterns or styles of learning which correspond to the elementary forms of learning and knowledge described earlier.

Divergers excel in concrete experience and reflective abilities. They tend to grasp or represent experience by apprehension and transform experience intentionally. As a result, their strengths are imagination and the ability to view situations from many perspectives. They have a personal, people-oriented learning orientation. Accommodators excel in concrete experience and active experimentation skills. They also tend to represent experience by apprehension but transform experience extensionally. Experience is represented in a concrete manner and transformed through active manipulation. They are good at carrying out plans and getting things done. They are people-oriented, active learners. Convergers excel in abstract conceptualization and active experimentation skills. They tend to grasp or represent experience by comprehension and transform it through extension. Experience is represented symbolically and actively applied in actual situations. They are less people-oriented and are good at applying theory to practical situations. Assimilators excel in abstract conceptualization and reflective observation skills. They tend to represent experi-

ence by comprehension and transform experience by intention. Experience is represented symbolically and transformed through internal reflection. These learners are good at theory building through inductive reasoning. They are less people-oriented and less practical than other learners (Kolb, 1978).

Kolb identifies five forces responsible for shaping these basic learning styles or patterns of person-environment transactions. These forces range from past, more general influences such as personality dispositions and habits of thought and action to more current specific environmental demands such as career and current job demands.

The first force identified by Kolb (1984) as shaping learning style is personality disposition. Kolb acknowledges the influence of Jung's theory of psychological types on his conception of learning or adaptive style. Jung theorized that people vary in their preferred ways of transacting with the world. Those who are oriented towards the inner world of the self (introverts) and those who are externally oriented (extroverts) develop preferred adaptive styles of decision making, perceiving and judgement. Kolb (1984) claims that there is an empirical relationship between Jung's personality types (adaptive styles) and his learning style types (Kolb, 1984). Jung's personality types as measured by the Myers-Briggs Type Indicator (Myers, 1972) were found to be related to learning styles as measured by Kolb's Learning Style Inventory (LSI), (Kolb, 1984). Extraverted-sensing type was related to accommodative learning style, introverted-sensing type was related to divergent learning style, introverted-intuitive type was related to assimilative learning style and extroverted-thinking type was related to convergent learning style (Kolb, 1984). Descriptions of the Jungian personality types appear consistent with Kolb's descriptions of learning style type with the exception of the comparison of the introverted-intuitive type to Kolb's assimilative learning style. Kolb (1984) suggests that individuals with introverted-intuitive personality types are more practical than those with assimilator learning styles. He suggests that the particular manner in which various personality types

tend to view the world influences the development of particular learning styles. In this respect he suggests learning style is partially shaped by personality structure.

The second source of influence in shaping learning style is educational specialization. Educational experiences expose learners to a particular form of social knowledge with specific modes of inquiry which interact with the learners' personal knowledge systems. These transactions result in changes in personal knowledge structures and accentuation of a particular learning style. Kolb (1978) has identified disciplinary differences in learning style in studies of university students in various academic departments. Kolb suggests that learners select learning environments which are congruent with their preferred learning styles and these styles are further accentuated within these learning environments. If learning style and environmental learning demands are incongruent, then learners will either change their styles or leave the field.

Thirdly, professional career experience is a force which shapes learning style. Professional groups are committed to a common problem and have a set of accepted expectations concerning values, beliefs and behavior patterns. These normative pressures exert a press for certain ways of responding to the world. Kolb et al. (1981) have found in their research that various professional groups have distinctive learning orientations, e.g. engineers are predominantly convergent learners while social workers are predominantly accommodative learners.

Fourthly, current job role is hypothesized to shape learning style through the task demands and job requirements which necessitate the use of specific learning abilities on a day to day basis. Kolb et al. (1981) report research which demonstrated learning style differences in individuals holding different types of jobs, e.g. social work administrators were found to have accommodative learning styles while social workers in the field had divergent learning styles.

Finally, the most specific influence which shapes learning style is the immediate task performed by the individual. Each task demands a specific set of skills for effective performance. When personal skills match task demands, 'adaptive competence' results. Kolb (1984) conceptualizes learning styles as 'higher level learning heuristics that facilitate the development of a generic class of more specific skills that are required for effective performance on different tasks' (Kolb, 1984, p.93). Based on a methodology which is intended to measure personal and environmental variables in commensurate terms, Kolb identified sets of performance competencies which are associated with each of the four learning styles. The relationships of these competencies to the four learning styles are described below.

Competencies associated with the accommodative learning style are 'active' skills such as committing oneself to objectives, seeking and exploiting opportunities, influencing and leading others, being personally involved and dealing with people. Divergent competencies are 'valuing' skills such as being sensitive to people's feelings and values, listening with an open mind, gathering information and imagining implications of ambiguous situations. Assimilative competencies include 'thinking' skills such as organizing information, building conceptual models, testing theories and ideas, designing experiments and analyzing quantitative data. Finally, convergent competencies, labelled 'deciding' skills, include skills such as creating new ways of thinking and doing, experimenting with new ideas, choosing the best solution to problems and making decisions.

The five forces described above (personality disposition, educational experiences, career choice, job role and specific adaptive tasks) all impact on the development of a preferred learning style. An individual's learning style is the result of the cumulative effects of these forces. However, as will be discussed later in this paper, individuals ultimately move toward integration of the different modes of learning resulting in more complex, highly developed patterns of responding to the world.

This integration of the different modes of learning is described in the developmental component of Kolb's theory which will now be presented. Kolb's concept of development and a description of the developmental stages of learning will be followed by an explanation of the process by which learning structures increase in complexity and hierarchical integration. Finally, the structures of consciousness which govern the level of processing of experience will be described.

In Experiential Learning Theory, learning is the process whereby development occurs (Kolb, 1984). Development is conceptualized as the product of personal knowledge and social knowledge or as the cumulative result of an individual's subjective experiences with social knowledge systems. Development is characterized by increasing complexity in the four elementary modes of learning in addition to higher level integration among these modes. With experience and maturity, individuals develop along each adaptive mode through the creation of increasingly complex structures for differentiating experiences which, in turn, are governed by a hierarchical structure of rules for organizing and interpreting experience. At lower levels, these rules are simplistic 'either-or' rules for interpreting experience. For example, an experience may be classified as either good or bad. At higher levels, more complex rules allow for a variety of interpretations of experience. With increasing complexity in each learning mode, individuals gain more control over their responses to the world around them with higher levels of consciousness making broader interpretations of experience possible. Development in one mode tends to precipitate development in other modes. Thus, with development there is increasing integration among the four modes. Similar to Jung's theory of individuation, integration of all modes of relating to the world marks the highest level of adaptation. Nondominant modes of relating to the world re-emerge and demand re-expression in mid-life (Kolb, 1978).

Kolb (1984) divides the human development process into three stages. The first stage, acquisition, occurs from birth to adolescence and involves the acquisition of cognitive structures and basic learning competencies. The second stage, specialization, occurs from adolescence through career preparation or experience. In this stage, accentuating forces act to reinforce a certain learning style, a style which best suits adaptation to a particular career path. The third stage, integration, is thought to begin in mid-career and mid-life once the individual has become established in the world. Nondominant modes which have been less used emerge and demand expression resulting in changes in career activities and life style (Kolb, 1978).

Development in all stages results in increasing complexity along each adaptive mode with increasing integration among modes. Development in the concrete experience (CE) mode results in affective complexity; development in the reflective observation (RO) mode results in perceptual complexity; development in the abstract conceptualization (AC) mode results in increased symbolic complexity and development in the active experimentation (AE) mode results in behavioral complexity. Figure 2 is a graphical representation of the developmental aspect of the theory.

The base of the cone represents the lower stages of development in each of the four modes while the apex of the cone depicts the ultimate integration of the four adaptive or learning modes. The four vertical dimensions rising to the apex of the cone represent increasing complexity in each mode as related to each of the developmental stages.

An individual's learning style can be represented on the cone by four points (one on each learning mode rising to the apex). A diverger in the specialization stage would be represented by points higher on the vertical lines representing affective and perceptual complexity. As this learner moved to the integration stage, the less dominant modes as well as the dominant modes would rise on the vertical dimensions (Kolb, 1978).

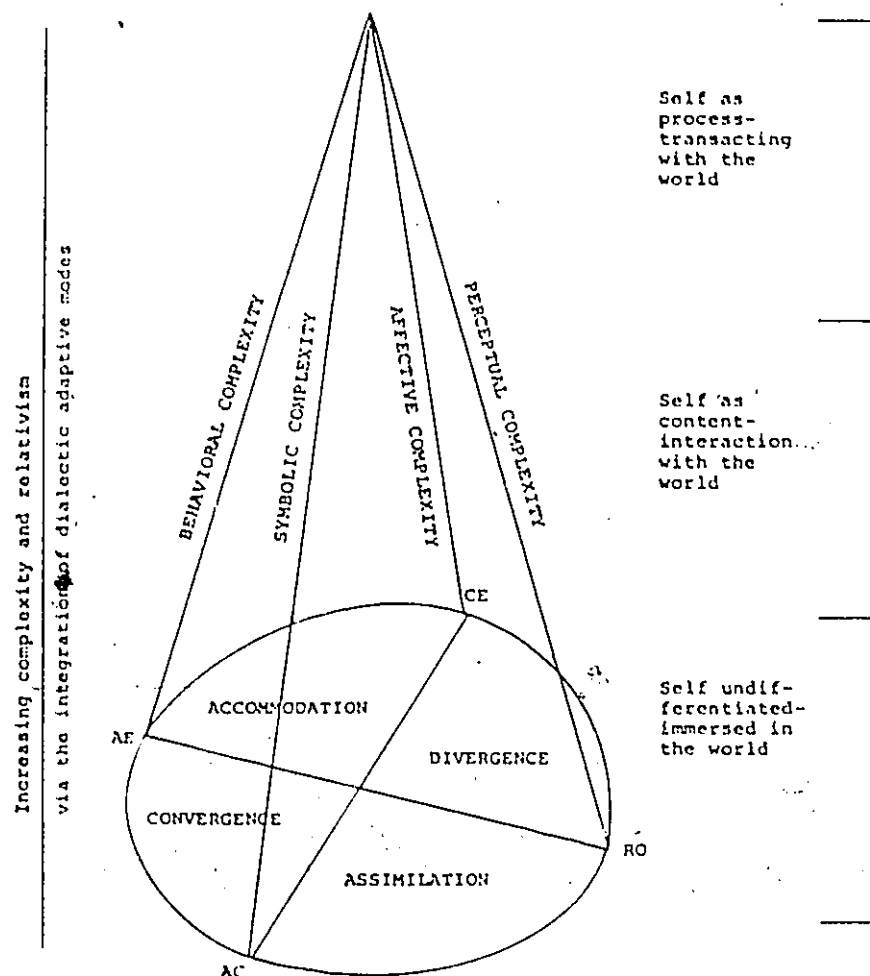


Figure 2: Experiential Learning Theory of Development (Kolb, 1978)

Kolb (1984) suggests that increases in modal complexity result from the combination of pairs of elementary forms of learning sharing a common adaptive mode producing higher levels of learning. For instance, an experience may be grasped or represented by com-

prehension and transformed first by intention and then by extension, e.g. reflecting upon the meaning of an idea and then testing it out in a practical situation. The feedback from this action broadens the original concept (idea). The learning mode shared by the combined pair of elementary forms of learning (in this case, the comprehension mode), increases in hierarchical integration or complexity. Any combination of pairs of elementary learning styles sharing a common adaptive mode is possible and results in increased complexity of the shared learning mode. Increases in affective (CE) complexity result in a system of higher order sentiments and values to view the world. Increases in perceptual (RO) complexity result in a broader perspective in viewing the world. Increases in symbolic (AC) complexity result in higher levels of conceptual organization. Finally, increases in behavioral (AE) complexity result in a broader system of goal/action strategies. The highest level of learning results from the holistic integration of all four elementary forms of learning. Kolb suggests that few individuals reach this level of learning and adaptation in their lifetime but maintains that there is a natural adaptive striving towards this level of integration (Kolb, 1984).

Kolb (1984) maintains that these developmental levels of learning or adaptation are controlled by three different forms or levels of consciousness. Each developmental phase is characterized by a more complex structure of consciousness than the previous phase. Individuals at the highest level of development can display all three levels of consciousness. Levels of consciousness vary in their extension in time and space and in the complexity of their information processing structures. The meaning of an experience depends on the level of consciousness applied to it. These structures of consciousness determine what experiences are attended to and how they are defined (Kolb, 1984).

In the acquisition phase of development, adaptation is primarily short term, goal directed performance. The individual's focus of experience is elaborated upon by representing and transforming it using one of the elementary forms of learning. This 'registrative'

form of consciousness results in accumulation of instances of a type of experience. At this level of consciousness, individuals respond automatically to an experience in terms of a structure which defines goals and feedback concerning whether or not these goals have been met. Hierarchic integration of the learning modes is low and experiences are handled in each mode at an immediate, situational, goal-directed level (Kolb, 1984).

In the specialization phase of development, pairs of elementary forms of learning sharing a common adaptive mode are combined resulting in an actual change in the focal experience due to the increased modal complexity resulting from the combination. This combination of elementary forms of learning is governed by an 'interpretive' consciousness which selectively alters the experience giving it new meaning and structure in terms of the hierarchically integrated learning mode (the common learning mode). In the specialization phase of development, there tends to be accentuation of two learning modes as experience is consciously interpreted from a particular orientation (Kolb, 1984). As a result of this increased complexity in learning modes, future experiences are subsequently channeled into higher levels of processing along these more highly developed modes. The way in which individuals interpret experience is related to the degree of complexity of these structures. With interpretative consciousness, individuals are more deliberative in their representations of experience recognizing that they control the choice of lived experiences and their interpretation. Experiences are viewed from a longer term wider perspective and from that of the more highly developed modes. Thus, it can be seen that in the specialization stage, experiences will tend to be interpreted selectively in terms of the more highly developed learning modes.

In the integration stage of development, experience is viewed from a more holistic, 'integrative' form of consciousness requiring integration among all four learning modes. Experience is viewed from a broader long term perspective and requires the release of one-

self from earlier specialized interpretive ways of viewing the world. Kolb (1984) maintains that few individuals ever achieve this level of consciousness possibly because of the psychological safety associated with the specialized form of interpretive consciousness. Integrative consciousness resembles Jung's process of individuation or Maslow's self-actualization.

In this presentation of Experiential Learning Theory, the psychological and philosophical bases of the theory were identified followed by a description of the relationships among experience, learning and knowledge as posited in Experiential Learning Theory. A description of the structure of the learning process and its relationship to the structure of knowledge was presented leading to a discussion of the concept of learning styles and forces influencing the development of these styles. Finally, the developmental component of the theory was presented. The developmental stages of learning were described and the process by which learning structures increase in complexity and hierarchical integration with development was summarized. The structures of consciousness governing the level of processing of experiences were then described. An explanation of the relationship among the developmental stages of adaptation, structures of consciousness and levels of learning concluded the overview of the theory.

In the next section, an extensive review of the research relating to Experiential Learning Theory is presented. Studies conducted by Kolb and his associates as well as those of other researchers are reviewed.

3. Review of Related Research

Early research on Experiential Learning Theory conducted by Kolb and his associates focussed on describing characteristics of individuals with different learning styles and describing learning environments thought to be influential in shaping particular learning styles. Using samples of graduate students at the Massachusetts Institute of Technology

(MIT), Kolb explored relationships between learning style and various aspects of learning in specialized professional education programs. His research focussed on the concept of accentuation of a particular learning style during the specialization stage of development. Several of these studies are reported in the following paragraphs.

Several studies were done to investigate learning characteristics of individuals with different learning styles. Torrealba (1972) found that graduate business students with convergent learning styles performed better than those with divergent learning styles on conventional intelligence tests which required one correct answer to a question. In his study, specialists in computer systems and finance were found to have convergent learning styles as predicted by the theory. However, contrary to theoretical predictions, the proportion of marketing and human relations specialists with accommodative learning styles was not significantly greater than that of other styles, although in the hypothesized direction.

Growchow (1974) found that market managers classified as accommodators by the LSI tended to solve problems encountered with an interactive computer program in an intuitive, trial and error manner. Assimilators were found in the same study to be good at inductive reasoning. Stabel (1973) found that managers with accommodative learning styles tended to rely on information from others rather than their own analytical ability.

Kolb (1973) found learning styles of graduate business students to be related to their undergraduate major. Engineers tended to have convergent learning styles; English, history and psychology majors were divergers; mathematics and economics majors were assimilators and business graduates were accommodators. Kolb concluded that these results suggest the influence of undergraduate education on learning style. However, he noted that since his sample had been selected from graduate students in business, these findings had limited generalizability. An alternate interpretation of these results might be that the learning styles of these students may have influenced their choice of undergraduate educational specialty.

Kolb (1978) suggests that individuals whose learning styles match environmental demands are more satisfied with their career choices than those whose styles do not match learning demands. Plovnick (1975) found support for the hypothesis that physics students with convergent learning styles would be more satisfied with their program than those with divergent learning styles since convergent learning skills are emphasized in physics learning environments. Physics students who were divergers were found to take more courses outside the field than those with convergent learning styles which Plovnick interpreted as indicating a lesser degree of satisfaction with their program. In a study of four university departments, Kolb and Goldman (1974) found a positive relationship between plans for graduate school and match between learning style and learning demands of a particular field suggesting that students whose learning styles are congruent with environmental demands of a field are more committed to their chosen field. This concept was supported in another study (Kolb, 1973) in which students whose styles matched learning demands of the field rated the importance of pursuing a career in their field higher than those whose styles were not matched. In the same study, Kolb (1973) found that students whose style matched disciplinary learning demands had higher cumulative grade point averages and perceived the academic work load to be lighter than those whose style did not match disciplinary demands.

To further explore the relationship between learning environment and learning style, Kolb (1978) developed a typology of four learning environments which corresponded in emphasis to the four learning styles. In a study of over one hundred students in an experientially based graduate human relations course, Kolb (1973) found a relationship between learning style and satisfaction with the course. Consistent with the theory, divergers and accommodators were more satisfied with the experiential teaching method than convergers and assimilators taking the course. Convergers and assimilators found assigned readings and expert summaries most valuable to their learning. In another study

of graduate business students, Kolb (1972) found that more students with concrete-reflective styles chose an optional T-group course than those with abstract-active styles. Kolb considers these results further support for his contention that individuals are attracted to learning environments where demands match their personal learning orientations.

In summary, Kolb suggests that the results of these studies support the notion that individuals choose careers congruent with their learning orientations. When learning style and learning demands are matched, individuals are more satisfied with their career choice and demonstrate a stronger commitment to the field. Individuals whose styles are not congruent with the demands of the learning environment tend to choose other environments and leave the field. The results of these studies served as the basis for Kolb's later contention that the structure of knowledge of a discipline fosters the development of a particular learning style.

In a series of studies at Case Western Reserve University (CWRU), Kolb and his associates developed an applied theory of experiential learning in relation to learning in professional education and work settings. Working with students and alumni of CWRU schools of engineering and social work, Kolb developed a methodology for defining and assessing learning competencies acquired in professional education and demonstrated in professional work settings within the experiential learning framework (Kolb et al., 1981). The theoretical bases of these instruments are described in the upcoming paragraphs.

Expanding on his earlier theory, Kolb now described learning as adaptation and introduced the concept of adaptive competence to reflect an individual's ability to adapt to environmental demands through the strategic employment of personal adaptive competencies. Kolb then proposed a hierarchical system of adaptive competencies composed of three levels of adaptation to the environment varying from discrete, short term responses to specific situations to general, long term, integrative adaptive processes. The lowest level of adap-

tive competencies (performance competencies) represent adaptation in short periods of time to specific situations in a goal directed manner. The middle level competencies are more generic and thus more extensive in terms of time and space. Kolb views these middle level competencies as 'learning heuristics which facilitate learning generic clusters of performance competencies' (Kolb, 1984, p. 35). These generic competencies correspond to Kolb's earlier descriptions of the four learning modes in his learning cycle. The highest levels of adaptive competencies are developmental competencies which result from the integration of lower learning competencies with development and contribute to the development of integrity and guiding life purpose (Kolb, 1984).

Kolb (1984) contends that development from lower to higher levels of adaptive competence is the result of a learning process and thus follows the same stages of development as learning which were described earlier as acquisition, specialization and integration. As individuals develop along each adaptive mode, 'greater complexity in structures and behaviors are demonstrated at each level of development' (Kolb et al., 1981, p. 35).

Kolb and his associates (Kolb et al., 1981) then used the concept of adaptive competence to design a methodology for measuring personal and environmental factors in commensurate terms. A self assessment list of performance competencies relating to the four learning styles was developed, labelled the Adaptive Competence Profile (ACP). Prior to these studies, measurement of personal learning style was obtained from Kolb's Learning Style Inventory (Kolb, 1978), a forced choice inventory consisting of words which are ranked by respondents as most characteristic to least characteristic of their learning style. Scores on the LSI are used to classify individuals into one of four learning styles described in Experiential Learning Theory. The ipsative format of the LSI places limitations on the type of analyses possible. Therefore, Kolb and his associates wished to develop a measure of learning style which resulted in independent scores. The self-assessment instrument of learning competencies, the ACP, had these qualities.

At the same time, a similar instrument, the Environmental Press Questionnaire (EPQ), was developed to measure perception of environmental learning demands for the same performance competencies. The desired result was to obtain measures of personal learning orientations and environmental learning demands in commensurate terms providing a more accurate means of comparison of person-environment fit (Kolb et al., 1981). Details on the measurement properties of these instruments are discussed in the methodology section of this paper. The results of several related studies carried out by Kolb and his associates are described below.

Kolb et al. (1981) asked a total of 89 students in social work and engineering courses to indicate their perceptions of environmental learning demands of these courses as measured by instruments designed to reflect experiential learning constructs. The EPQ and another instrument, the Environmental Press Paragraph Ranking Scale (EPPRQ) were used. Students also completed Kolb's original Learning Style Inventory (LSI). In addition, a panel of trained observers observed classes in each course a minimum of four times using an instrument designed to measure learning press or orientation in Experiential Learning Theory terms (Environmental Press Observational Scale (EPOS)). The EPQ and the EPOS are based on Fry's (1978) earlier work in which he described a four-category typology of learning environments which correspond in emphasis to the four learning modes of Kolb's learning cycle. Consistent with the theory, engineering courses were perceived to have an abstract/active orientation or press, while social work courses were found to have an active/concrete orientation. Observer ratings on the EPOS were in agreement with student perceptions of environmental press as measured by the EPQ and EPPRQ. Kolb et al. (1981) concluded that these results provided support for the validity of these measures of environmental press and for the suggestion that environmental learning demands influence the development of particular learning styles. In an earlier study (Kolb et al., 1981), engineers and social work alumni were found to have convergent and accommodative

learning styles respectively suggesting a relationship between predominant learning style of alumni and the learning environmental press of their educational programs.

In another study, Kolb et al. (1981) correlated scores on the ACP with those of the LSI. Since the adaptive competencies thought to be measured by the ACP were theoretically representative of the four learning modes measured by the LSI, certain competencies were expected to correlate with each of the four learning modes measured by the LSI. Scores on the ACP were correlated with the combination scores of the LSI. Certain performance competencies were found to correlate significantly with the LSI scores in a pattern congruent with expectations derived from the theory. The researchers noted that competencies relating to different aspects of problem solving and decision making clustered around different modes. They expressed concern that environments which emphasized certain competencies over others might result in learners skilled in some aspects of these processes at the expense of others. This phenomenon was further supported by the results of a factor analysis of a commensurate measure of environmental press perception. Engineering courses were found to be highest on conceptual problem solving and data analysis and lowest on interpersonal flexibility and personal engagement which Kolb interpreted as an indication of an unbalanced educational focus. Kolb et al. (1981) suggest that these results indicate the need to consider the creation of a more balanced environmental press to enable the development of competencies needed in all phases of problem solving and decision making.

In a study of 91 engineers and managers, Griggs (1981) found support for the notion of describing learning environments in engineering according to the typology of learning environments previously proposed by Fry (1978). The Environmental Press Index (EPI) was used. The EPI is based on Fry's (1978) typology and respondents were asked to indicate the degree to which each of the four types of learning competencies were required for

success in their learning environments. Engineers working in the field perceived their environment to be more abstract and active than those in managerial positions who perceived their environments to require concrete/active skills. He concludes that personal learning characteristics and environmental learning demands can be effectively described using Experiential Learning Theory constructs (Griggs, 1981).

Manring (1981) studied the impact of match between personal and job characteristics on job satisfaction of 84 engineers in two engineering firms. Subjects with high scores on the AC-CE scale of the LSI (highly abstract) who perceived their environment to have a high symbolic (abstract) press were significantly more satisfied with their jobs than those with low AC-CE scores (highly concrete) who perceived their environments as highly abstract. However, the researcher noted that subjects whose competencies were slightly less than perceived demands experienced the job as challenging and satisfying while those whose competencies greatly exceeded job demands were less satisfied and bored. She concluded that the notion of person-environment match as a function of job satisfaction is overly simplistic since satisfaction in this study seemed to be related to whether or not subjects were overqualified or underqualified vis a vis their work environments.

In a similar study of 270 engineers and 111 social workers, Kolb and his associates concluded that while match between personal competencies and environmental demands is desirable, mismatch is not necessarily undesirable in that it might motivate the subject to develop (Kolb et al., 1981)

In the same study, the researchers were interested in determining what environmental demands were important in shaping the 'professional mentality' of engineering and social work alumni and how well professional education programs prepared graduates for different career roles. They found that engineers in five 5-year cohort groups had a greater proportion of convergent learning styles than other styles suggesting an enduring learning

style regardless of job role upon graduation. Based on reports by alumni who considered themselves underqualified for managerial roles in their profession, Kolb et al. (1981) concluded that professional undergraduate programs currently prepare their graduates for core professional roles which emphasize specific groups of competencies at the expense of others. They labelled this phenomenon 'professional deformation' and suggested that professional schools should design learning experiences which encourage the development of all competencies to better prepare graduates for later career adaptations. The researchers also concluded that the level of maturity of a profession is related to the degree of professional deformation. The researchers considered the existence of a unified paradigm in knowledge creation an indication of the level of maturity of a profession. Learning styles of social work alumni were more dispersed than those of engineering alumni which they suggest is an indication of the lack of an unified paradigm in social work as compared to engineering.

In summary, in this series of studies, support was demonstrated for the notion of describing demands of learning environments in professional education and work settings of engineering and social work in terms commensurate with descriptions of personal learning styles. Engineering learning environments were found to have a convergent press which is consistent with the dominant learning style found among engineering students and alumni. Social work learning environments were found to have an accommodative press which is also consistent with the dominant learning style found in this group. Job satisfaction was found to be related to match between learning press and learning style except when subjects were either extremely overqualified or underqualified in relation to environmental demands. Kolb and his associates concluded from their studies of engineering and social work alumni that professional education programs may be preparing their graduates for the core professional role but may be neglecting to develop those competencies needed to facilitate adjustment to changing job roles in later careers. A major contri-

bution of these studies was the development and testing of instrumentation for measuring personal learning characteristics and environmental learning demands in commensurate terms.

In the preceding paragraphs, studies by Kolb and his associates were reviewed. In the upcoming paragraphs, studies by researchers in other fields including general education and medical and nursing education are discussed.

A number of researchers have reported results which are consistent with Kolb's theory. Learning style has been found to be related to learning methods resulting in higher levels of achievement. Katz (1981) hypothesized that occupational therapy students with active learning styles (accommodator and converger) would score higher on outcome measures when content was learned through student group discussion methods and that students with reflective learning styles would do better when the lecture method was used to learn content. Katz compared groups with active and reflective learning styles and compared outcome scores resulting from exposure to each teaching method. Active learners scored higher following group discussion methods while reflective students scored higher following lecture methods. These findings are consistent with theory.

The matching of counsellor-client learning styles to improve counselling effectiveness has been investigated. Skaggs (1982) asked subjects classified as either accommodators or assimilators (n=128) to evaluate counsellor performance in videotaped therapy sessions in which counsellor and client learning styles were matched and unmatched. Subjects rated counsellors with learning styles similar to their own higher than counselors with opposing learning styles. Skaggs concludes that these findings suggest that subjects would be more satisfied with counselling styles consistent with their learning style. However, Marshall (1981) did not find support for her hypothesis that learning style is related to the type of counselling approach preferred by 205 counselling students. Marshall attributes her lack of results to weaknesses in the LSI.

Similarly, matching student-teacher learning styles has been found to influence learning situations. Grand Maison (1981) found that medical students whose styles differed from their clinical teachers gave lower ratings of teaching abilities to these teachers than to those whose styles matched their own. He suggests that this phenomenon may be an indication of the importance of matching learning styles to maximize learning.

The relationship between learning style and scores on achievement tests has been studied. Kevin and Liberty (1975) found a positive relationship between grades and abstract conceptualization (AC) scores on the LSI. Students receiving high scores on a computer based chemistry course exam had high scores on the AC scale. Davis (1984) suggested that computer programming requires abstract-active learning competencies and hypothesized that convergent learners with their abstract-active learning orientation would score higher on tests which emphasized use of these competencies. He found that students with convergent learning styles scored higher on a post-test of content from a computer programming course. However, Barrie (1984) did not find a relationship between learning style and performance in an introductory course in computer programming for adult learners.

Kolb (1984) suggests that learners with different styles differ on their preferred methods of learning. Grand Maison (1981) found a relationship between learning style and preferred types of learning activities. Concrete learners were found to prefer people-oriented learning activities in his study. Koch (1984) also found a relationship between preferred type of teaching method and learning style. These results are not consistent with those of Marshall (1981) reported above. Scott (1984) found that abstract type advance organizers resulted in increased learning retention of abstract learners but had no effect on learning retention of concrete learners following a lecture on the subject of interest. However, Fox and Walter (1985) found no relationship between learning style and preferred learning method nor did Robinson (1981)...

Several researchers have found support for Kolb's contention of disciplinary differences in learning style. Abbey and Weisner (1977), Marshall (1981), and Skaggs (1982) found counselling students and practioners to have predominantly concrete learning styles. Teachers have been found to have accommodative learning styles (Dunn, 1982; Ateni, 1982). Abstract styles have been found to predominate in groups interested in computer science, engineering and science. (Barrie, 1984; Davies, 1984; Emerson, 1976; Kevin & Liberty, 1975) while concrete styles have been found to be common in human service fields such as nursing and occupational therapy (Huch, 1981; Christensen, Lee & Bugg, 1979; Laschinger & Boss, 1983; Kirchoff & Holzemer, 1979; Morin, 1982; Seidman, 1983; Stafford, 1986). Learning styles of medical students and physicians appear to vary with their medical specialty (Plovnick, 1975; Gjerde & Wunderlich, 1978; Grand Maison, 1981).

Since the focus of this study is on nurses and nursing students, studies of nursing populations are of particular interest. Several studies were found. The most consistent finding in these studies is the predominance of concrete learning styles in groups of nurses studied. Greater proportions of diverger and accommodator styles were found than converger and assimilator styles; this reflects a more concrete, people-oriented learning orientation within this group (Christensen, Lee & Bugg, 1979; Huch, 1981; Laschinger & Boss, 1983). These findings are consistent with theoretical expectations since nursing is a human service profession.

Several researchers have investigated learning style differences among nurses in various roles and with different types of educational preparation. Neither Marcinek (1983) nor Seidman (1983) found learning style differences between undergraduate baccalaureate nursing students and Post-RN students (Registered Nurses enrolled in a baccalaureate program) although Huch (1981) found Post-RN students to have higher AE scores than undergraduates, a finding consistent with the theory. Marcineck (1983) found nursing

faculty to be significantly more abstract than nursing students studied which she suggests reflects the influence of job role demands on learning orientation. Mentkowski and Strait (1983) followed nursing students from freshman to senior year and found an increase in learning orientation towards active experimentation.

The relationship between learning style and achievement or attitude towards computer-assisted instruction has also been investigated. Morin (1982) found no relationship between nursing students' learning style and attitude towards computer assisted learning nor did Kirchoff and Holzemer (1979) find a relationship between student learning style and achievement following computer assisted instruction.

Evidence of a relationship between learning style and ~~type of nursing specialty~~ preferred by students and nurses has not been shown. Neither Dougan (1982) nor Laschinger and Boss (1983) found a relationship between learning style and preferred nursing specialty unlike Plovnick (1975) who found learning styles of medical students to be related to their preferred medical specialties.

Several investigators have studied the relationship between learning style and factors influencing aspects of nursing education. Huch (1981) found that nursing students with accommodative learning styles were more satisfied with their nursing program than those with other styles suggesting that the people-oriented active learning environment of nursing appeals to learners with concrete active styles. Laschinger and Boss (1983) found that personal factors had a greater influence on students with concrete styles in their choice of nursing as a career than those with abstract styles. Students with abstract styles were more likely to be influenced by readings or interest in the subject matter of nursing than those with concrete styles who tended to be influenced more by role models in the field or advice from others. These findings are consistent with theory.

No studies were found in which the environmental press of nursing learning environments has been investigated from the perspective of Experiential Learning Theory. Researchers have focussed on measuring personal learning styles of nurses and nursing students; therefore, investigations of nurses and students' perceptions of learning demands in nursing environments are needed to add to existing knowledge about Experiential Learning Theory in nursing populations.

4. Criticisms of Experiential Learning Theory

Researchers have identified certain limitations of the theory which require attention. Many (Merrit, 1983; Freedman & Stumpf, 1978) have expressed doubt about the measurement properties of the Learning Style Inventory. This is discussed in the methodology section. Little support have been found for proposed relationship between learning styles and personality characteristics. West (1982), in a study comparing learning style type to responses on three personality tests by medical students found results inconsistent with theory. Subjects with convergent learning styles were found to score highly on personal sociability, a finding inconsistent with theoretical predictions. Another criticism of the theory is its apparent focus on professional individuals. Few studies were found in which the theory was tested with nonprofessional groups. Many respondents have reported difficulty in understanding the meanings of the words on the LSI. Emerson (1976) found the instrument unsatisfactory for use in a community college sample of engineering students and recommended using simpler words. Since this instrument was originally designed and tested with graduate students at MIT, this criticism may have merit. Finally, because of the nature of the LSI, testing the theory is limited to adult populations at the specialization stage of development.

In the most recent description of Experiential Learning Theory, Kolb (1983) has attempted to clarify several inconsistencies found in his earlier descriptions of his theory. He attempts to provide evidence of support for his conception of the nature of the learning process from physiological, philosophical and psychological research. Through his descriptions of the structures of consciousness controlling levels of processing, Kolb (1984) describes in more detail his conception of the process whereby individuals progress towards the development of all learning modes. This had not been explained in his earlier work. These additions have clarified some aspects of his earlier theoretical statements.

However, because of the dialectical nature of the theory, constructs are difficult to operationalize and therefore testing of aspects of the theory, such as integrative competence, is problematic. However, the theory is still at an early stage of development and Kolb and his associates are actively involved in research to test the theory. Kolb (1984) has made revisions to the theory as a result of the findings of other researchers suggesting his willingness to modify the original theory.

In summary, results of research on Experiential Learning Theory with various populations have been mixed with evidence of support for the theory as well as evidence of the need to further explore and redefine aspects of the theory. Many concerns have been raised about the measurement characteristics of the LSI. However, it appears that sufficient support for predictions from the theory has been demonstrated to warrant further investigations within this framework.

In the preceding section, research on Experiential Learning Theory with several target populations was reported. In the next section, an overview of the literature related to the nature of traditional nursing knowledge and the development and use of nursing theory as a basis for practice is presented. Kolb (1984) maintains that disciplinary differences in learning style are the result of interactions between individuals in a discipline with a par-

ticular type of social knowledge. It is important, therefore, to describe the traditional knowledge base of nursing and to trace the development of the current body of nursing knowledge to provide the bases for several hypotheses proposed in this study.

5. Theory-based Nursing

Preparation for nursing careers has evolved from the turn of the century hospital-based apprenticeship experiences. Today university and community college based nursing education programs emphasize both application of a body of knowledge and practical experience in clinical settings. Early nursing education programs emphasized mastery of standard nursing procedures with little emphasis on mastery of the scientific principles underlying these procedures. Nursing was a 'doing' activity. In the 1950's, nurse educators recognized the need for nurses to have an understanding of the scientific rationale for their actions and adopted a modification of the 'medical model' of disease as the basis for nursing curricula. Students studied biological science and the pathophysiology of disease to provide them with a better understanding of the basics of their care. Many nurse educators and scholars, however, were concerned that the medical model, although useful, was inadequate to describe the phenomena of interest in that it focussed on disease processes and minimized the psychological aspects of health and illness. If nurse educators and practitioners were to accept the American Nurses Association's (A.N.A.) 1980 definition of nursing as 'the diagnosis and treatment of human responses to actual or potential health problems', (A.N.A., 1980, p. 9), then a more holistic view of the patient was required than was offered by the medical model. As a result of this concern, several nursing scholars developed and proposed theoretical descriptions of patients and the nurse-patient relationship. Nursing scholars maintained that these theoretical models of nursing should serve as the basis for the development of a body of knowledge unique to nursing.

Several nursing authors have commented on the nature of traditional nursing knowledge as the profession has developed. Murphy (1971) states that traditional nursing knowledge is based on a nonsystematic accumulation of unrationalized experiences. MacFarlane (1977) suggests that currently, many nursing curricula are based on the conventional wisdom of generations of nurses which has not been tested. This conventional wisdom she suggests is 'an euphemism for ritual, superstition and speculation about unrationalized experience' (MacFarlane, 1977, p. 269). Jacobs and Heuther (1978) and Orr (1979) concluded that, traditionally, nursing has had an 'intuitive, a-theoretical base'. Fawcett (1984) and Stevens (1984) argue that through the development, testing and application of explicit nursing theories as a basis for practice, nursing practice will become less task-oriented and nursing care will be planned and executed from a more holistic view of patients and their situations. These authors imply that when patient situations are viewed from a systematic holistic framework, then more relevant data can be collected and considered in designing comprehensive care for these patients, thus raising the quality of care.

Nursing scholars differ on the desired goal of theory development. Many feel that an unitary theory useful in any nursing situation is desirable. This view led to the development of 'grand theories of nursing' such as those of Orem, Roy and Rogers, which attempt to account for all nursing phenomena. A more recent view is that of 'theoretical pluralism'. Proponents of this view suggest that certain nursing theories are more appropriately used in particular situations (McGee, 1983; Meleis, 1985; Fawcett, 1984) and that a unitary nursing theory is not realistic at this stage of theory development in nursing.

Nursing theories have been classified on an abstract-concrete continuum (Chinn, 1984; Meleis, 1985). Orem's theory of nursing is classified at the "low abstractness" end of the

continuum while others, such as those of Rogers or Neuman are classified at the "high abstractness" end. In the following paragraphs, brief descriptions of Orem and Neuman's theories are provided to illustrate this classification.

In Orem's theory of nursing, the patient is viewed as an individual whose goal is to maintain health through the execution of deliberate 'self care' practices. All individuals have basic human needs which must be met if the healthy state is to be maintained. Individuals learn the required actions necessary for the maintenance of good health which includes physiological, psychological and developmental dimensions as well as actions requiring implementation when a health deviation is either present or imminent. Nursing is required when the patient is unable to execute the necessary 'self-care' actions to maintain health. It is the nurse's role to assess the patient's level of functioning (self-care ability) and, if deficiencies are found, to implement a plan of care (nursing system) which will facilitate the achievement of optimal functioning of the patient. The nurse may either totally replace the patient as a self care giver, assist patients in meeting their needs or act as a supporting or educating helper to enable patients to meet their health needs. When patients regain their ability to manage their self care needs, nursing is no longer necessary (Orem, 1984).

This theory of nursing is considered relatively concrete by nursing scholars (Meleis, 1985; Fawcett, 1984). The notion of a patient as a person with physiological, psychological, developmental and health deviation needs is easy to understand and is a familiar way of viewing patients for most nurses. The concept of the nurse as a helper of patients to meet these needs is not difficult to conceptualize as this view of nursing is consistent with the image many people have of the nursing profession. In contrast to less familiar conceptualizations of the patient and his world, Orem's view of nursing seems relatively concrete and more readily understood by nurses and nursing students.

Neuman (1982) has proposed a theory of nursing based on general systems theory. Nursing is seen as an important element in a larger health care system. The nursing system includes the client and the nurse interacting with the environment with the goal of maintaining an optimal level of wellness. The individual is seen as one who is 'subjected to the impact of stressors' from his environment and who has developed certain responses (lines of defense) to stressors which tend to maintain 'system stability' (Neuman, 1982). When the client is unable to maintain system stability, the nurse must act to either reduce encounters with stressors or to manage the effects of stressors by strengthening the client's line of defense. The individual is diagrammatically represented by a series of concentric circles surrounding a central core or 'basic structure'. These concentric circles represent 'lines of defense and resistance' which are client resources for resisting stressors from the environment. If stressors are able to penetrate these lines of defense and resistance, the individual must either cope with these stressors and ultimately regain system stability or remain in a state of 'unwellness'. Nursing interventions are geared to restoring system stability at one of three 'levels of prevention'. Primary level interventions are designed to strengthen an individual's flexible line of defense', e.g. prevent exposure to potential stressors by teaching clients about risk factors of disease. Secondary level interventions are geared to 'protecting the basic structure' when stressors have successfully penetrated the client's lines of defense and resistance, e.g. administration of prescribed medical treatment during acute illness. Tertiary level interventions are designed to attain or maintain maximum wellness levels following an episode of ill health, e.g. rehabilitation following a stroke. Neuman (1982) states that nursing is unique from other health professions in that it is concerned with all the variables (physiological, psychological, sociocultural and developmental) affecting an individual's ability to maintain system stability, i.e. nursing is holistic in nature.

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Fawcett (1982) feels Neuman's theory is highly abstract as does Hoffman (1982). It seems reasonable to conclude that Neuman's theory is relatively more abstract than that of Orem. Conceptualizing individuals as those whose goals are to maintain self-care of their physiological, psychological, developmental and health deviation needs seems to be a more concrete process than conceptualizing individuals as central cores surrounded by layers of lines of defense designed to protect or alleviate the effects of environmental stressors. The complexity of the diagram used to explain the nurse-client situation adds to the level of abstraction of the theory.

In summary, Orem's theory of self care and Neuman's theory of nursing were outlined briefly. Orem's theory of self-care was described as being less abstract than that of Neuman. In the following paragraphs, the current status of nursing theories in contemporary nursing practice and education will be discussed.

Acceptance of the notion of theory-based nursing among nurses has been slow. Meleis (1984) suggests that since most nursing theories were developed for the purpose of designing nursing curricula, they 'reflect an ideal view of nursing' rather than a description of the real world of nursing. Consequently, nurses in practice settings have been slow to adopt these theories as a basis of practice (Stevens, 1984). In attempting to understand this resistance to theory-based practice, Meleis (1984) suggests causes such as the type of student choosing nursing as a career and the 'functional orientation' of early nursing education programs. Service-oriented students and procedure-oriented training programs did not encourage the development of reflective, critical thinking necessary for theory development. Meleis (1984) contends that the isolation of nursing theorists from nursing practitioners is another source of resistance towards the use of theory-based nursing as well as the lack of doctoral programs in nursing. However, she states that these sources of resistance are changing and suggests that the type of students now choosing nursing careers

and the current changes in nursing education programs will result in a more positive attitude towards theory-based nursing. Recently, there has been a strong effort to promote the use of nursing theories in practice settings and most educational programs are based on either one or several theoretical views of nursing. It seems reasonable to expect that these changes would result in greater emphasis in nursing learning environments of competencies requiring the application of abstract ideas to practical situations.

Numerous reports were found in the literature of clinical applications of nursing theories (Marten, 1978; Walhorn, 1980) and of curricula based on explicit nursing theory (Baker, 1982; Lebold & Baker, 1976). However, no systematic studies were found which explored attitudes of nurses or nursing students towards theory-based nursing.

6. Problem Statement and Purpose of the Study

In his theory of experiential learning, Kolb (1984) suggests that the structure of knowledge of a discipline exerts a characteristic learning press or set of learning demands on the learner which reflects a particular view of reality and the methods of inquiry used to create knowledge. He speculates that individuals are attracted to particular disciplines because they perceive similarities between the learning press of these environments and their personal learning orientations. Members of a discipline develop particular ways of dealing with the world and come to emphasize learning competencies most effective for acquiring knowledge of the discipline. These competencies tend to cluster around the different modes of learning proposed in Experiential Learning Theory and result in what Kolb refers to as a preferred learning style. Kolb suggests that repeated person-environment transactions in the specialized learning environments of professional educational programs and actual job roles result in the accentuation of personal learning styles of learners. Thus, learners become more highly developed in competencies required to

meet learning demands of these environments. Kolb maintains that when personal learning orientations are not congruent with environmental learning demands, learners either change their orientation or leave the field.

Several researchers have reported studies in which a greater proportion of nurses and nursing students were found to have concrete learning styles than abstract styles (Laschinger & Boss, 1983; Christiansen, Lee & Bugg, 1979; Marcineck, 1984; Seideman, 1984). Learners with concrete styles have a feeling-based, atheoretical approach to dealing with the world. Kolb (1984) found that this style is predominant in humanistic people-oriented professions such as social work and nursing.

Several nursing authors have described traditional nursing knowledge as atheoretical and pragmatic (Meleis, 1984; Murphy, 1971; MacFarlane, 1977). Recently, there is a movement to encourage the adoption of nursing theories as a basis for practice. This approach will require more emphasis on the development of competencies of an abstract type in undergraduate nursing education and inservice programs. Learning environments in nursing must emphasize these competencies if nurses are to perceive these abilities as important to their professional development. In the past, nurses have been resistant to the notion of theory-based practice. It is important then to study personal and environmental factors which influence learning in current professional educational programs and attitudes of nurses and nursing students towards theory-based nursing. In this study, learning styles, perceptions of environmental learning demands and attitudes towards theory-based nursing of students in a nursing students who have participated in a theory-based nursing curriculum are explored within the Experiential Learning Theory framework. In addition, the relationship between person-environment match and degree of satisfaction with nursing is investigated.

7. Statement of Research Hypotheses

The following hypotheses are derived from the above review of the theory and the reported research related to Experiential Learning Theory:

1. Learning style is related to attitude towards the use of theory as a basis of nursing practice: concrete learners are less positive towards theory-based practice than abstract learners.

Individuals with concrete learning styles have been found to be people-oriented learners who tend to respond to situations in an intuitive manner (Kolb, 1978). These learners are less likely than abstract learners to base their actions on an a priori theoretical framework. Kolb states that concrete learners do not find theoretical approaches helpful and prefer to treat each situation as an unique case (Kolb, 1978). On the other hand, abstract learners have an analytical, conceptual approach to dealing with the world.

The notion of theory-based nursing implies the use of an explicit nursing theory as a basis of practice. The client is viewed from a particular theoretical view and data collection and planning of care are conducted according to a particular view of the client-nurse situation. Therefore, it is logical to hypothesize that subjects with concrete learning styles would see less utility in the use of an explicit nursing theory as a basis for practice and would therefore have a less positive attitude towards theory-based practice than would subjects with abstract learning styles.

2. Perceived environmental press is related to attitude towards theory-based nursing: subjects who perceive nursing environments to be more concrete than abstract are less positive towards theory-based nursing than those who perceive nursing environments to be more abstract than concrete.

Kolb (1984) states that learning environments can be classified according to relative emphasis on competencies related to the four learning modes in the learning cycle. Competencies emphasized in concrete learning environments include being sensitive to peoples' feelings and responding to the emotional aspects of a situation while competencies emphasized in relatively abstract environments include building conceptual models and testing theories and ideas.

Since the notion of theory-based nursing implies the application of a particular nursing theory in a practical situation, it is logical to predict that subjects who rate nursing environments as more concrete than abstract have a less positive attitude towards theory-based nursing than those who perceive nursing environments as more abstract than concrete.

3. Learning style is related to preferred method of learning nursing theory: subjects with concrete learning styles prefer methods of learning which require interpersonal involvement, such as group discussions and 'hands on' clinical experiences, more than those with abstract learning styles. Conversely, those with abstract learning styles prefer methods such as readings on the subject matter or lectures from experts more than those with concrete learning styles.

Individuals with concrete learning styles have been found to prefer learning by methods which involve personal interaction and involvement (Kolb, 1984).

Learning in situations which require actual personal involvement such as in a clinical nursing setting or in small group discussions are instances of the type of learning experiences preferred by these learners. On the other hand, learners with abstract styles have been found to prefer learning new material through lectures by experts or by reading about the subject matter. Therefore, it is logical to hypothesize that nursing students with concrete learning styles prefer learning about nursing theories in situations which require personal involvement and interpersonal interaction more than those with abstract learning styles. Conversely, those with abstract learning styles prefer learning about nursing theories through lectures from experts and readings about the subject matter of these theories.

4. Learning style is related to nursing theory preferred as a basis of practice; individuals with concrete learning styles prefer Orem's theory of nursing more than learners with abstract learning styles. Conversely, learners with abstract learning styles prefer Neuman's theory of nursing more than learners with concrete learning styles.

Nursing theories have been classified on an abstract-concrete continuum. Fawcett (1984) and Stevens (1984) have situated Orem's theory of nursing at the 'low abstractness' end of the continuum. They have also described Neuman's theory of nursing as highly abstract.

Learners with concrete learning styles prefer to learn through immediate personal experience in actual situations while those with abstract styles prefer to learn through symbolic representation of experiences (Kolb, 1978). It is logical

that learners with concrete learning styles would prefer a less abstract theory, such as Orem's, which relates more directly to their perceptions of actual nursing experiences, than a more abstract theory such as that of Neuman. Conversely, learners with abstract learning styles would be expected to have a stronger preference for a relatively abstract theory such as Neuman's than would learners with concrete learning styles.

5. Post-RN students perceive nursing learning environments to be more concrete than undergraduates in nursing.

Current nursing practice has been described as being a-theoretical and task oriented by many authors (MacFarlane, 1977; Murphy, 1971). The notion of the use of explicit nursing theory as a basis of practice is new and the adoption of this concept is limited in actual nursing settings. In view of the fact that theory-based nursing is at an early stage of development, it is unlikely that current nursing environments will reflect the importance of competencies necessary for this approach when measures of environmental press are administered. Therefore, it would be expected that current nursing environments would be perceived as predominantly concrete in learning press. Therefore, nurses actively involved in nursing are likely to perceive nursing environments as more concrete than would generic nursing students who have had less experience in actual nursing roles.

6. Post-RN students have a less positive attitude towards theory-based nursing than generic nursing students.

Kolb (1978) suggests that with education and experience in disciplinary learning environments, learning styles of individuals are further accentuated as a result of repeated person-environment transactions.

As discussed above, the concept of theory-based nursing is at an early stage of development and currently few nursing agencies have adopted this approach to nursing practice. Therefore, it is unlikely that current nursing environments will reflect the importance of competencies necessary for this approach. Therefore, it is logical to hypothesize that nurses who have had more experience in actual nursing situations and therefore are more likely to have concrete learning orientations, are less positive towards theory-based nursing practice than are undergraduate nursing students.

7. Person-environment match in learning orientation is related to satisfaction with nursing as a career: subjects whose learning style matches perceived learning demands of nursing environments are more satisfied with nursing as a career than those whose style does not match perceived learning demands of nursing environments.

Kolb (1978) has suggested that when personal learning orientations of individuals match environmental learning demands higher levels of satisfaction with job role results. Therefore, it is hypothesized that nursing students and practitioners whose learning orientations match their perceptions of learning press in nursing environments are more satisfied with nursing than those whose style and environmental perceptions of press are unmatched.

In this chapter, an overview of Kolb's theory of experiential learning was presented. Recent studies based on Experiential Learning Theory were then reviewed followed by a critique of the theory. An overview of the development and current status of nursing theory in nursing education and practice was then discussed. Two nursing theories relevant to this study were briefly described. The chapter concluded with the statement of the problem and the research hypotheses. In the next chapter, the study design and research methodology are described.

CHAPTER II

METHODOLOGY

In this chapter, the research subjects are described and instruments used in the study discussed. Studies assessing the reliability and validity of these instruments are also presented. Finally, the method of data collection and procedures for data analysis are discussed.

1. Research Subjects

Research subjects in this study were nursing students enrolled in a baccalaureate nursing program in a large eastern Canadian university. One hundred and twenty-one students in their third or fourth year of a generic baccalaureate nursing program (an entry level 4-year program) and 76 students enrolled in a 3-year baccalaureate nursing program for graduate nurses (Post-RN program) were invited to participate in the study.

Third and fourth year students in the generic program were selected as they had completed most clinical nursing rotations and had had the opportunity to apply the theories of Orem and Neuman in actual nursing settings. It was felt that these students had been exposed to sufficient experience in actual nursing settings to have a reasonable conception of the environmental demands of typical nursing situations. Students in the Post-RN program are experienced nurses who have returned to school to upgrade their academic qualifications. These students have varying amounts of nursing experience and were selected as representative of students with graduate experience in nursing who had had the opportunity to apply the theories of Orem and Neuman in actual nursing settings as part of their nursing studies. Students selected for this study are unique in that they have had the

opportunity to use several theories of nursing as a basis for practice in different clinical nursing settings. This program is the only program which could be identified in North America which has the concept of 'theoretical pluralism' as the basis for the nursing curriculum. In other undergraduate baccalaureate nursing programs, a single nursing theory is used as the curricular base. Thus, students in this study are familiar with several nursing theories and are appropriate subjects with which to explore the research questions. The investigator was interested in comparing the less experienced students in the generic nursing program with the more experienced post-RN students on certain questions of interest of this study.

All students who participated in the study were female. Students in the generic program were between the ages of 20 and 47 with 90% between the ages of 20 and 30. The Post-RN students were between 21 and 48 years of age with 75% between the ages of 25 and 38. Subjects in the study were those students present during regular class time on the days of data collection who agreed to participate in the study.

In the next section, the measuring instruments used in the study are presented and discussed together with reliability and validity studies associated with these instruments.

2. Measuring Instruments

Five measuring instruments were used in this study. Three of the instruments were developed by Kolb and his associates (Kolb et al., 1981) to measure experiential learning constructs: the Learning Style Inventory (LSI), the Adaptive Competence Profile (ACP) and the Environmental Press Questionnaire (EPQ). The Nursing Theories Opinionnaire (NTO) was designed by the researcher to measure preferred theory for nursing practice, preferred method of learning nursing theories and attitude towards theory-based nursing. Finally, the Nursing Career Choice Questionnaire (NCCQ) was used as a measure of rela-

tive satisfaction with nursing. Demographic data were also gathered. Details concerning the measurement properties of these instruments and reliability and validity studies relating to them are described below.

The Learning Style Inventory (LSI)

The LSI (see Appendix A) was developed by Kolb to measure the learning style construct. The LSI is a brief, forced choice, self-descriptive inventory which measures a learner's relative emphasis on the four learning modes: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC) and Active Experimentation (AE) (Kolb, 1978). For each of nine sets of four words describing learning competencies, subjects are asked to rank the words from most characteristic to least characteristic of their personal learning style. The nine sets of words on the LSI are presented to respondents in four columns, each of which represents a learning mode. Six of the nine words in each column are used to measure the corresponding learning mode. The thirty-six words selected for the LSI came from a list proposed by several behavioral scientists familiar with Experiential Learning Theory (Kolb, 1978). A longer inventory was shortened to nine sets of four words following pilot testing. Finally, an item analysis was done to determine the six words chosen to measure each learning mode in the finalized version of the LSI. Kolb tested the instrument on 287 management students and calculated correlations among the six words within each of the four learning modes. Kolb was satisfied with correlations between .5 and .6 shown by most pairs of words. Further analysis demonstrated negative correlations between scores representing opposite learning orientations (CE and AC, $r = -.57$), (AE and RO, $r = -.50$). As expected, other intercorrelations were low (CE with RO .13, RO with AC -.19, AC with AE -.12 and AE with CE -.02). Kolb (1978) suggests that these correlations justify his creation of the two combination scores (AC-CE and AE-RO).

In choosing the words to be ranked in each set, Kolb controlled for social desirability responses by assuring that each choice was equally positive in this respect. Respondents are told that there are no right or wrong answers in the instructions on the instrument (Kolb, 1978).

Six scores are computed from the LSI. Individual scores for each of four learning competencies (modes) are obtained by summing the ranks assigned to each of the six words representing each learning mode (CE, RO, AC, AE). The possible score range is from six to twenty-four. These scores measure the relative emphasis placed on each learning mode by the respondent. It is interesting to note that being a forced choice instrument, it is impossible to obtain high scores for each of four competencies. The same, of course is true for low scores. Kolb (1978) defends his use of the forced choice ranking format by suggesting that this format is in accordance with construct validity criteria. He argues that since learning involves situational resolution of conflicts among the four learning modes, then an instrument measuring styles should be constructed to create a similar conflict among choices (Kolb, 1984).

Two combination scores are computed by subtracting the scores for learning modes on opposite ends of each learning dimension. Concrete Experience scores are subtracted from the Abstract Conceptualization scores (AC-CE) to reflect the emphasis on abstractness as compared to concreteness. Reflective Observation scores are subtracted from Active Experimentation scores (AE-RO) to reflect the degree of action as compared to degree of reflection preferred by the learner. Scores may have positive or negative values.

The two combination scores are plotted on a grid which allows for comparison to a normative group studied by Kolb. Learners can be classified into one of four learning styles: Diverger, Converger, Assimilator or Accommodator. The plotted point represents which of Kolb's four learning styles best describes the respondent's learning style. The

data used to construct the Learning Style Grid were obtained from Kolb's initial sample of 287 management students as well as from an additional 1600 adult subjects from a variety of disciplines and occupations. The axes are placed on the median values of the LSI combination scores. LSI results are plotted on this grid and compared to this normative group. Kolb notes that two thirds of this normative group are college educated males (Kolb, 1978).

In the following paragraphs, results of reliability and validity studies conducted by Kolb on the LSI are reported. Reports of studies by other researchers concerning the reliability and validity of the LSI follow.

Kolb (1978) acknowledges certain difficulties in establishing reliability of the LSI using conventional reliability measures (test-retest, split-half reliability). He suggests that due to the interdependent nature of the learning modes and the situational variability of learning, reliability co-efficients would be less than 1.0 even if no error in measurement occurred (Kolb, 1978). Kolb suggests that consistent support for the construct validity of the LSI is an indication that the LSI is measuring the learning modes accurately.

Kolb (1978) maintains that the LSI is useful for groups since group scores cancel out random situational and personal variability. He cautions against using the LSI for assessment and selection of individuals (Kolb, 1978).

Kolb (1978) reports split-half reliability results for each mode, using two sets of three words for each modal score, e.g. ACx and ACy, and applying the Spearman-Brown prophecy formula for five groups (n's=47, 50, 90, 442, 48, $r = .37$ to $.81$). The split half reliability coefficients for the combination scores (using correlations between the two sets of scores, eg. ACx-CEx and ACy-CEy, AEx-ROx and AEy-ROy) were between $.75$ and $.86$ which Kolb suggests is acceptable and similar to other self report instruments, particularly the Myers-Briggs Type Indicator (Kolb, 1978).

Kolb (1978) reports a number of validity studies on the LSI. He reports correlations between LSI results and various aptitude and personality tests. Kolb reports correlations of each of the four LSI modal scores (CE, AC, AE, RO) and each of the scores on the Wunderlich Aptitude Test ($r = .18$ to $.24$, $n=311$) and the Myers-Briggs Type Indicator ($r = .27$ to $.42$, $n=46$). Kolb suggests that these relationships lend support to the validity of the LSI.

Other validity studies reported by Kolb include significant relationships between learning style and occupation. Kolb obtained support for the hypothesis that students and alumni of an engineering school would be predominantly convergent in learning style while students and alumni of a school of social work would be predominantly accommodative (Kolb et al., 1981). These results are consistent with earlier results of studies on learning styles with professional groups (Kolb, 1978).

Kolb (1978) also reports significant relationships between learning styles of students and those of teachers who most influenced them in their studies as well as between learning style of students and preferred learning situations.

Results from other reliability studies of the LSI have been inconsistent. Allen (1976) reports acceptable test-retest coefficients for LSI scores for three test intervals (immediate, one week, four weeks) in her study of 97 graduate education students. Geller (1979) reports acceptable test-retest reliability coefficients (1 month) for the combination scores (AC-CE, .78) and (AE-RO, .84) ($n= 50$). Gjerde and Wunderlich (1978) also report satisfactory test-retest reliability coefficients (.44 to .72, $n=24$) in a study with medical students. Plovnick (1975) obtained similar results in his study of medical students. Freedman and Strumpf (1978) report lower split half reliability coefficients for the LSI ($r = .35$ to $.49$, $n=1179$). Geller (1979) suggests that lengthening the instrument and substitution of different words might improve the reliability of the instrument.

Results from validity studies of the LSI have also been inconsistent. A number of researchers using the LSI have found support for the theory (Katz, 1981; Plovnick, 1975; Christiansen, Lee & Bugg, 1979; Grand Maison, 1981). These studies were discussed briefly in the review of the literature. Farrell (1981) conducted a factor analysis of the LSI using data from 417 high school seniors and found evidence of construct validity.

Other researchers using the LSI failed to obtain results consistent with the theory. Marshall (1981) attributes her lack of predicted results to weaknesses in the LSI and suggests the need for improvements. Grand Maison (1981) although obtaining results supporting the underlying theory also suggests the need for improvements in the LSI. West (1982) utilizing a small sample of medical students correlated results of three personality tests with learning styles of subjects tested. Results were inconsistent with theory. West questions the validity of the LSI.

The LSI appears to be best suited to measuring individuals in the specialization stage of development. The instrument is not intended to measure the degree of integration of learning styles which theoretically occurs with maturity (Kolb et al., 1981). The difficulty level of the words in the LSI may limit its utilization with other than post-secondary level subjects.

In conclusion, the LSI appears to be a relatively reliable and valid research instrument when used with groups. Reports of reliability and validity studies are mixed in support and criticism of the instrument. Since the LSI is the primary instrument used to measure learning style by Kolb, it was decided to use this instrument as one measure of personal learning style in this study.

In the following paragraphs, two instruments developed by Kolb and his associates (Kolb et al., 1981) to measure personal learning style and environmental press perception

in commensurate terms are described. The Adaptive Competence Profile (ACP) is a measure of subjects' perceived ability levels on personal learning competencies (learning style) and the Environmental Press Questionnaire (EPQ) is intended to measure perceptions of environmental press based on subjects' ratings of these same competencies with regard to their relative importance to successful functioning in particular environments.

The Adaptive Competence Profile (ACP)

The ACP was designed to measure individuals' perceptions of their levels of skill on competencies thought to be related to each of the four learning styles. These personal learning competencies were derived from the taxonomy of adaptive competencies developed by Fry (1978).

The ACP is a self assessment list of 27 competencies in which subjects are asked to rate their personal levels of skill on each competency on a 7-point Likert scale. Twenty competencies from the scale are used to calculate a personal profile of learning competencies. The scores on the five competencies relating to each learning style posited in the theory are summed and may be averaged to produce a mean item score for each learning style. Possible scores range from 1-7. Recently, Kolb (1984) classifies the competencies of listening with an open mind, being sensitive to values, imagining implications of ambiguous situations, gathering information and being sensitive to feelings as divergent competencies. Convergent competencies include making decisions, generating alternative ways of thinking and doing, setting goals, trying new ideas and choosing the best solution to a problem. Building conceptual models, designing experiments, organizing information, analyzing quantitative data and testing theories and ideas are labelled assimilative competencies. Finally, accommodative competencies include committing yourself to objectives, influencing and leading others, dealing with people, seeking and exploiting opportunities and being per-

sonally involved. The scores on these items considered by Kolb to be representative of the four learning styles were used to calculate the mean item scores for the four learning styles in the manner described above.

In this study, two additional scores were computed as indicators of abstract and concrete learning styles. The items representing the two abstract learning styles (ACCON (converger) and ACASS (assimilator)) were summed and averaged to produce an abstract style score (ACABSTRA). Similarly, the items representing the two concrete learning styles (ACDIV (diverger) and ACACC (accommodator)) were summed and averaged to produce a concrete learning style score (ACONCRET).

In developing the ACP, Kolb et al. (1981) designed a self-assessment list of learning competencies which they considered representative of the learning demands required in engineering and social work jobs. In addition, the researchers hypothesized that certain performance competencies would be empirically related to learning competencies described in Experiential Learning Theory. Kolb and his associates maintained that if personal learning competencies and job demands could be validly described according to this taxonomy, the resulting measures of person-environment fit would serve as powerful diagnostic tools for identifying person-environment match or mismatch. They suggest that such measures could provide a meaningful basis for planning individualized training programs designed to facilitate the development of underdeveloped personal competencies necessary for job performance. Although the ACP was designed with competencies felt to be important to social work and engineering jobs, the goal of the researchers was to generalize the use of the instrument across learning situations.

The original instrument was called the Work Abilities Index (WAI) and consisted of a list of 24 competencies thought to describe important aspects of social work and engineering jobs. Respondents were asked to indicate their level of skill on each competency

on a 7-point Likert scale ranging from unskilled to highly skilled. Fifty-nine social work and engineering graduating seniors completed the WAI and the LSI.

To assess construct validity, scores on each of the 24 competencies measured by the WAI were correlated with the LSI abstract-concrete (AC-CE) and active-reflective (AE-RO) scales. These correlations were then plotted on the four quadrant learning style map formed by the intersection of Kolb's two dimensions of learning (AC-CE and AE-RO) in the manner illustrated for the competency 'being personally involved' in Figure 3.

As illustrated in the figure, the performance competency of 'being personally involved' correlated $-.25$ with AC-CE and $+.10$ with AE-RO; hence, it falls in the accommodator quadrant of the learning space. In this study, the correlations of four competencies placed them in the diverger quadrant: being personally involved, dealing with people, being sensitive to people's feelings and being sensitive to values. Making decisions, committing oneself to objectives and seeking and exploiting opportunities were situated in the accommodator quadrant. Experimenting with new ideas, creating new ways of thinking, analyzing quantitative data, designing experiments, testing theories and building conceptual models were placed in the converger quadrant. In this study, no competencies were situated in the assimilator quadrant when this method was used (Kolb et al., 1981).

The researchers then performed a factor analysis and cluster analysis on the 24 competencies and found clusters which appeared to represent the four learning styles described in Experiential Learning Theory. In this analysis, the competencies of gathering information and organizing information formed a cluster which designated the assimilator style based on the researchers' conceptual interpretation of these items.

The researchers acknowledge the limitations of these results in view of their small sample but suggest that the trends in the data warranted further investigation. In a

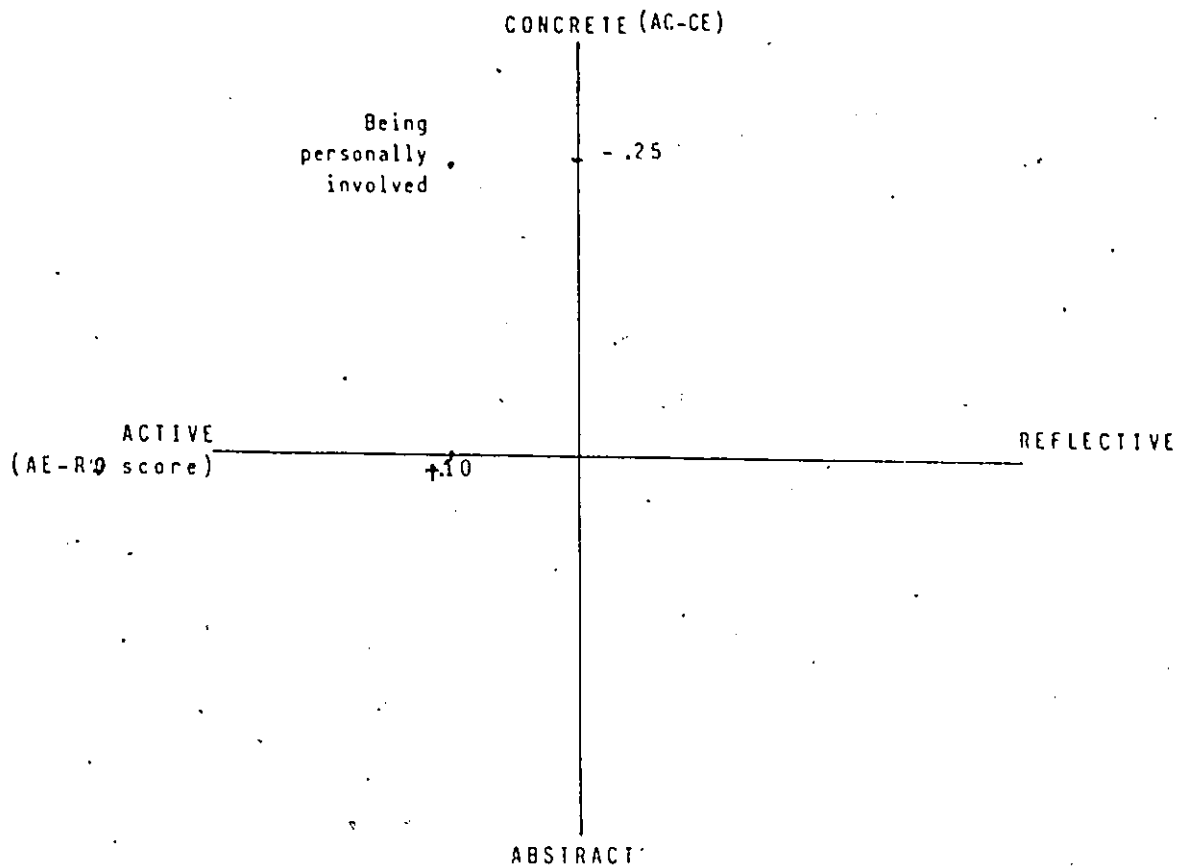


Figure 3: Plot of Competency on Learning Style Grid

follow-up study, they surveyed engineering and social work alumni (n=240) and found similar patterns of relationships among the competencies and learning styles as measured by the LSI (Kolb et al., 1981). In this study, five new competencies were added to the self-assessment list. The performance competencies such as working in groups, listening with an open mind, imagining implications of ambiguous situations and seeing how things fit in the big picture were added to the divergent quadrant and influencing and leading others was added to the accommodator quadrant in this study. The researchers note the similarity in patterning of performance competencies with learning styles for both student and alumni samples suggesting support for the construct validity of the ACP.

From a measurement perspective, the ACP consists of independently scaled items as measures of personal learning style. In contrast to the ipsative format of the LSI, scores from the ACP can be subjected to more powerful statistical analyses. This results in independent scores for each of the four learning styles. In this respect, more accurate assessment of individuals who have developed skills in more than one learning style should be possible. Kolb (1984) maintains that with maturity individuals develop skills in all phases of the learning cycle. Because of the ipsative format of the LSI, it is impossible to obtain high scores on all learning modes. Hence, it is not possible to measure accurately learning styles of mature individuals. The scores on the ACP are potentially useful measures of maturity. In addition, scores on the ACP can be compared to scores on the EPQ (a commensurate measure of perceived environmental learning demands) to determine the extent of person-environment fit of individuals measured. Although Kolb et al. (1981) did not use ACP mean item scores as indicators of learning orientation, it seems that this is plausible based on his description of the relationships between the four learning styles and certain competencies measured by the ACP.

No reports of reliability estimates of the ACP were found. Kolb et al. (1981) focussed on construct validity and describe their work as encouraging preliminary results which merit further study. No reports of the use of the ACP with other populations were found.

The decision to use the ACP in this study was based on the desire to increase the precision of data analysis procedures using a measure of personal learning style with independent scores. In view of the initial encouraging support for the construct validity of the ACP, it was decided to use this instrument as well as the LSI as a measure of personal learning style. In addition, since the investigator was interested in determining the degree of person-environment match and its relationship to satisfaction with nursing, the ACP is



appropriate to use for comparison with a commensurate instrument of environmental press (EPQ). The EPQ is described below.

The Environmental Press Questionnaire (EPQ)

The Environmental Press Questionnaire (EPQ) (see Appendix C) was also developed by Kolb et al. (1981) to measure perceptions of learning demands in different learning environments in experiential learning terms. It was developed from the ACP and is described as a commensurate measure of environmental press since it consists of the same list of 27 performance competencies. Respondents are asked to indicate to what extent each of the 27 competencies are needed to do well in a designated learning environment. Items are scored on a 7-point Likert scale from 'not important at all' to 'high level needed'. The items theoretically representative of each of the four types of learning environments are summed and may be averaged to produce mean item scores of the four types of environmental press: accommodative, divergent, convergent and assimilative. Scores range from 1-7. As was done for the ACP, two additional scores were calculated as measures of abstract and concrete environmental press. The items representing the two abstract types of environmental press (EPCON and EPASS) were summed and averaged to produce an abstract environmental press score (EABSTRAC). Similarly, the items representing the two concrete types of environmental press (EPDIV and EPACC) were summed and averaged to produce a concrete environmental press score (ECONCRET).

In a construct validity study, Kolb et al. (1981) analyzed intercorrelations among the EPQ items and noted similar patterns of interrelationships among performance competencies and learning styles as was found with the ACP. In addition, factor analyses and cluster analyses were conducted on the EPQ. Factor scores were created for students in two engineering courses and the researchers hypothesized that the factors would be scored rela-

tive to the strength of the perceived press of these courses. Factors receiving the highest scores were conceptual problem solving and data analysis while the personal engagement factor received the lowest score. These results were consistent with environmental press ratings of engineering environments as measured by another environmental press measure, the Environmental Press Paragraph Ranking Questionnaire (EPPRQ). In these studies, engineering environments were perceived as having a highly convergent press with an emphasis on the practical application of theories; thus, the high scores on conceptual problem solving and data analysis and low scores on personal engagement were consistent with theoretical expectations. Kolb et al. (1981) conclude that these results provide encouraging support for the construct validity of the EPQ but recommend further research with larger samples and different populations.

The measurement properties of the EPQ are equivalent to those of the ACP since the instruments are identical except for the wording of the stimulus question. Rather than being asked to rank their level of skill on each competency as they were in the ACP, subjects are asked to indicate how important each competency would be for successful functioning in a designated learning environment. While Kolb and his associates (Kolb et al., 1981) did not create mean item scores to measure levels of the four types of environmental press outlined in the theory, such scores seem to be logical ways of measuring levels of each of the four possible types of environmental press present in a particular learning environment. Similar to the ACP, four scores are obtained, representative of the four types of environmental press. As a result, learning environments can be measured according to their relative emphasis on each of the four types of press. In this manner, it is possible to assess whether or not the environmental press of a learning environment is balanced or biased towards one or more learning emphases.

As was the case with the ACP, no reports of reliability studies were found on the EPQ. Researchers focussed on construct validity and did not report reliability data. No studies were found in which the EPQ was used with other populations by other researchers.

The decision to use the EPQ in this study was based on reports of the construct validity of the EPQ as well as the commensurability aspect of the EPQ in relation to the ACP as a means of determining person-environment match or mismatch.

In this study, the ACP and the EPQ scores were used to determine person-environment match or mismatch. For each type of environmental press and corresponding learning style, difference scores were computed as indicators of person-environment fit. For instance, subjects' self-ratings of their divergent competencies were subtracted from their divergent environmental press score on the EPQ to produce a divergent difference score. Similarly, difference scores for accommodative, convergent and assimilative competencies were computed. In addition, two combined difference scores (abstract and concrete) were calculated. The abstract difference score (ABSDIFF) was calculated by subtracting ACP items representative of abstract learning competencies from their corresponding EPQ items and summing and averaging these differences. The concrete difference score (CONCDIFF) was calculated in a similar manner using the items representative of concrete competencies and press.

In summary, it was decided that the three measures of experiential learning theory constructs designed to measure personal learning style and environmental press perceptions had sufficient support for use in this study.

The Nursing Theory Opinionnaire (NTO)

The Nursing Theory Opinionnaire (NTO) (see Appendix D) was designed by the investigator to measure attitude towards theory-based nursing, preferred theory for nursing practice and preferred method of learning nursing theories. The NTO consists of three parts: (1) a semantic differential scale intended to measure attitude towards the concept of theory-based nursing practice (negative or positive) (2) a question in which subjects are asked to indicate their preference for one of two nursing theories and (3) an item in which subjects are asked to rate each of four learning methods on their usefulness for learning nursing theories.

In the semantic differential scale, subjects were asked to rate on a 7-point scale the concept 'Nursing Practice Based on Explicit Nursing Theory' for each of 11 bipolar adjective pairs. Eight of the eleven adjective pairs were selected as appropriate evaluative items based on the factor analyses of these items by Osgood and Tannenbaum (1957). The evaluative items selected for this instrument have been found to have high test-retest reliabilities (between .85 and .93) when attitudes are measured (Snider & Osgood, 1969). The factor loadings of the adjective pairs selected were between .59 and .88 on the evaluative factor (Osgood & Tannenbaum, 1957). Two adjective pairs classified by Osgood and Tannenbaum (1957) as indicators of potency and one adjective pair reflecting activity were included in the questionnaire. However, these items were not used in the calculation of the attitude towards theory-based nursing score. The positive and negative ordering of adjective pairs was varied throughout the scale.

A score on attitude towards the concept of theory-based nursing was calculated by summing and averaging the scores on the eight evaluative adjective pairs (after reversing the scoring of negatively ordered items to assure that all items were scored in the same direction). Possible scores range from one, a poor attitude towards theory-based nursing to

seven, a positive attitude towards theory-based nursing. The researcher felt that this scale would provide an appropriate measure of the degree to which subjects had negative or positive attitudes towards theory-based nursing.

The second part of the NTO was used to determine which of two nursing theories used in the nursing program was preferred by each respondent. The two theories were selected because in the researcher's view, of the many theories the subjects had been exposed to in their program, these theories represented examples of a relatively concrete nursing theory (Orem) and a more abstract nursing theory (Neuman). Subjects were asked to choose only one of the two theories.

The third part of the NTO was used to determine the relative usefulness of four types of learning methods for learning nursing theory. Subjects were asked to rate each of four methods on a scale from one (not helpful at all) to four (very helpful). The four methods were formal lectures from experts, textbook reading with a study guide, small group discussion of a case study and 'hands on' experience in the clinical area. The four learning methods included were based on Kolb's (1978) findings. He found that learners with concrete learning styles preferred learning methods which required personal and interpersonal involvement such as small group discussions and 'hands on' experiences and individuals with abstract learning styles found readings and lectures from experts helpful but group exercises and simulations not as helpful. In this questionnaire, a combined score for abstract type learning methods was calculated by summing scores for the first two stimuli on the scale (lectures and readings). A combined score for concrete-type learning methods was calculated by summing the scores on the third and fourth stimuli (small group discussions and 'hands on' clinical experiences). The possible scores range from 2-8 for each combined score.

In summary, the NTO was designed to measure attitude towards theory-based nursing, preferred theory for nursing practice and preferred learning method for learning nursing theories.

The Nursing Career Choice Questionnaire (NCCQ)

The Nursing Career Choice Questionnaire (NCCQ) (see Appendix E) is a seven item questionnaire intended to determine the degree of satisfaction with nursing. The NCCQ was adapted from Hackman and Oldham's (1974) Job Diagnostic Survey (JDS) which had been used to measure affective responses to work. Respondents are asked to indicate their level of agreement (on a 7-point Likert scale) with each of seven statements related to satisfaction with their job. Scores on three of the seven statements are summed and averaged to yield a possible range of scores from 1-7 for general satisfaction. The other four statements are filler items. The JDS was subjected to reliability testing using a sample of 658 employees for 62 jobs in seven organizations. Hackman and Oldham (1974) report an internal consistency reliability coefficient of .76 for the three items selected for scoring. The form requires less than five minutes to complete.

In the NCCQ, the word 'nursing' was substituted for 'job' which appeared in the JDS. The term 'satisfaction' was not included in the title of the questionnaire in an attempt to avoid response set in the subjects. The three statements used to calculate the satisfaction with nursing score were (1) "Generally speaking, I am satisfied with nursing", (2) "I frequently think of quitting nursing" (reversed scoring required for calculation) and (3) "I am generally satisfied with the kind of work I do in nursing".

It was decided that this scale was appropriate for use in this study as a general measure of satisfaction with nursing based on the instrument's acceptable published reliability results, clarity and short time requirement for completion.

Demographic data relevant to the study were also collected. These included number of years and type of nursing experience in addition to their program of study, age and enrollment status (full-time or part-time) of the respondents.

In summary, the three instruments derived from experiential learning theory, the LSI, the ACP and the EPQ were presented and discussed. Reliability and validity data of these measures were presented. The development of the NTO and the NCCQ were then presented and discussed. In the next section, the data collection procedures are described.

3. Data Collection Procedures

The five instruments described above were administered during class time to third and fourth year students in the generic baccalaureate program and to students in the first, second and third year of the Post-RN program. Testing was completed in a two week period in February-March of the 1986 school year. Prior to completing the questionnaires, subjects were assured that their participation was voluntary and that no personal identification was required. Subjects were told that the study was being performed to determine nursing students' opinions of important learning demands in nursing learning environments, their learning styles and their feelings towards theory-based nursing. They were told that as students in a curriculum based on the concept of theoretical pluralism in nursing their input would be valuable and would be of use in curriculum revision. All subjects completed a consent form indicating their willingness to participate in the study. (see Appendix F)

The investigator obtained permission from the teachers in the generic program to personally administer the questionnaires during class time. The instruments required 15-20 minutes for completion. Ninety-six per cent (n=62) of the third year generic class and 89% (n=55) of the fourth year class completed questionnaires.

Due to scheduling problems and the manner in which the Post-RN classes are organized, teachers in the Post-RN program requested that they be permitted to distribute the questionnaires at a time convenient with their scheduled class activities. The investigator held briefing sessions to clarify what was required to complete the instruments. In addition, the investigator drafted a covering letter inviting the students to participate in the study and explaining the overall purpose of the study in terms similar to the explanation given to the generic students. Feedback on the results of the study was offered as well.

Seventy-seven per cent ($n=31$) of the first year full time Post-RN students and 82% ($n=29$) of the third year Post-RN students completed the instruments. Because of problems in scheduling of data collection and classroom activities, sufficient numbers of responses were not obtained from the second year Post-RN student group to be included in the analysis. The data obtained from this group was not felt to be representative of this group since the number of responses represented only 32 per cent. However, the data obtained from the 16 subjects in this group who did respond were used in estimating reliability of the instruments used in this study.

In this section, data collection procedures were presented. In the next section, the statistical procedures are discussed.

4. Statistical Procedures

Seven hypotheses were proposed in this study. Statistical procedures appropriate for testing these hypotheses in the null form include testing differences between means as well as correlation analyses. The level of significance was set at .05. In addition, reliability data were obtained on all five instruments used in the study.

In summary, in this chapter, the study design was outlined. The research subjects were described and instruments used in the study described. Studies assessing the reliability and validity of these instruments were also presented. Finally, the method of data collection and procedures for data analysis were discussed. In the next chapter, the results of the data analyses are reported and discussed in detail.

CHAPTER III

PRESENTATION AND DISCUSSION OF THE RESULTS

In this chapter, the results of the study are presented and discussed. First, reliability data and the means and standard deviations of variables of interest in this study are reported and discussed. Second, the results of the hypothesis tests are presented and discussed. Third, recommendations for future research are proposed. The chapter concludes with a summary and conclusions.

1. Descriptive Statistics

In this section, alpha reliability estimates, means, standard deviations and other descriptive data on the five measuring instruments are presented. As described above, responses of all subjects who completed questionnaires (including second year Post-RN students) were used in calculating reliability estimates.

Alpha reliability coefficients were computed for each of the four LSI modal scores (CE, RO, AC, AE). The coefficients for the modal scores were between .32 and .56 which are lower than those reported by Kolb (1978). The CE scale had the lowest reliability coefficient (.32). Kolb (1978) also found this and suggests that this may be due to a bias in the LSI against obtaining an accurate score on the CE scale since, in his view, completing the instrument is an abstract task. Split half reliability coefficients were obtained for the AC-CE and AE-RO scores in the manner reported by Kolb (1978). The split half coefficient for AC-CE was .65 and for AE-RO, .79. These results are similar to those reported by Kolb (1978).

Alpha reliability coefficients of the ACP scores were computed. The accommodator variable (ACACC) had an alpha reliability of .67, diverger (ACDIV) .64, the assimilator (ACASS) .74 and converger (ACCON) .82. The combined abstract style (ACABSTRA) had an alpha reliability coefficient of .82 and the combined concrete style (ACONCRET) had an alpha reliability of .72.

Alpha reliability coefficients of the EPQ press scores were also computed. The alpha coefficients for the EPQ scores were similar to those of the ACP. The alpha coefficient of accommodative press (EPACC) was .64, divergent press (EPDIV) .64, assimilative press (EPASS) .75 and convergent press (EPCON) .75. Since the EPQ and the ACP are theoretically commensurate measures of the same phenomena, the similarities in the internal consistencies of their corresponding combination scores were expected. The overall combined abstract press (EABSTRAC) had an alpha coefficient of .84 and the overall concrete press (ECONCRET) was .76. These reliability coefficients appear to be acceptable evidence of the internal consistency of the EPQ measures.

Alpha reliability coefficients were also computed for the press-competency difference scores. Difference scores were obtained by subtracting scores on each ACP item from its corresponding EPQ item measuring perceived environmental press. These newly created variables were summed and averaged to create difference scores for each type of press-style difference. In addition, overall combined abstract and concrete press-competency difference variables were created. The alpha coefficient for accommodative difference (ACCDIFF) was .47, divergent difference (DIVDIFF) .53, assimilative difference (ASSDIFF) .65 and convergent difference (CONDIFF) .68. The alpha coefficient for the overall abstract difference score (ABSDIFF) was .78 and the overall concrete difference score (CONCDIFF) .68. These coefficients are similar although somewhat lower than those of the EPQ and the ACP combination scores. The lower reliability coefficients are most likely related to the fact that difference scores are less reliable.

The semantic differential scale for attitudes towards theory-based nursing had an alpha reliability coefficient of .90. This is consistent with the reliability estimates for the evaluative adjectives reported by Osgood and Tannenbaum (1957). Thus, this scale has excellent reliability.

The learning method combination variables (abstract and concrete) were also subjected to reliability analyses. Both were found to have low alpha reliability coefficients. The combined ratings of readings and lectures (abstract learning methods (ABSMETH)) had an alpha reliability coefficient of .37. The combined ratings on small group discussions and hands on clinical experiences (concrete learning methods (CONMETH)) had an alpha reliability of .13. A possible explanation for these low reliability coefficients may be that some subjects may have ranked the four learning methods rather than rated each item independently. This was checked and cases eliminated where it appeared to happen. This resulted in little improvement in the reliabilities. The small number of items contributing to the score for each method would also tend to lower reliability estimates.

The NCCQ which is an indication of level of satisfaction with nursing had an alpha reliability coefficient of .57. This is lower than reliability estimates reported for the Job Diagnostic Survey (Hackman & Oldham, 1974) from which the NCCQ was developed. Since there are only three items contributing to the satisfaction score, this coefficient was not expected to be large.

In summary, the reliability studies of the instruments used in this study resulted in varying levels of internal consistency estimates. Alpha reliability coefficients were computed for all variables of interest and were reported in this section. Of particular concern were the low reliability estimates for the abstract learning score (ABSMETH) and the concrete learning score (CONMETH). In the next section, means and standard deviations obtained from subjects on the five instruments used in the study are presented.

The means, standard deviations and other data for the variables of interest in this study are presented in Tables 1 to 5. It should be noted that the number of subjects for analysis varies in these tables because data on some variables were not complete for some subtests. Incomplete data consisted of missing responses to different items on different instruments used in the study. No systematic pattern of missing data could be established. The means and standard deviations of the LSI scores are presented in Table 1.

The scores for subjects in this study differ from the normative sample of graduate management students used by Kolb (1978). Subjects in this study scored higher on the CE, RO, AE, and AE-RO scales and lower on the AC and AC-CE scales than those in Kolb's sample of graduate management students. Since Kolb's sample consisted of graduate students, it is reasonable to expect that these learners would score higher on abstract skills than would learners in this study who are undergraduate students. These scores are theoretically consistent with those expected of members of an active, people-oriented profession such as nursing. The LSI scores in this study are similar to those found by Laschinger and Boss (1983) for a sample of undergraduate university nursing students. Students in the generic and Post-RN program did not differ significantly on their CE, RO, AC and AC-CE LSI scores, but generic students had significantly higher AE and AE-RO scores than the Post-RN students. These latter results were not expected. Theoretically, one would expect individuals with experience in an activity oriented profession such as nursing to have higher AE scores than individuals with less experience.

The percent of subjects found to have each of the four learning styles is presented in Table 2. In this study, there was a significantly greater proportion of subjects with concrete learning styles (63%) than with abstract learning styles (27%) which is consistent with theoretical expectations ($\chi^2 = 26.9$, $df=1$). This finding is also consistent with those from other studies reported in the literature in which nurses and nursing stu-

Table 1: Means and Standard Deviations of LSI Scores by Program and Total Sample

Variable	GENERIC n=117		POST RN n=60		TOTAL n=177	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
CE	15.55	2.86	15.80	3.2	15.65	2.98
RO	13.06	3.20	13.70	3.1	13.32	3.20
AC	15.67	3.30	16.50	3.1	15.95	3.20
AE	17.61	3.10	15.90	3.2	17.10	3.20
AC-CE	.13	5.32	.64	5.3	.30	5.32
AE-RO	4.57	5.37	2.08	4.9	3.74	5.35

dents were found to have predominantly concrete learning styles (Christensen, Lee & Bugg, 1979; Huch, 1981). In this sample, the most frequently observed learning style was accommodator (39.2%) and the least frequently observed style was assimilator (12.2%). These findings are consistent with those of other researchers (Dougan, 1982; Marcineck, 1983; Seideman, 1983).

The means and standard deviations of the ACP and EPQ scores are presented in Table 3 and those of the EPQ-ACP difference scores in Table 4.

As can be seen in Table 3, assimilative competencies (ACASS) received the lowest ratings and divergent competencies (ACDIV) received the highest ratings by both groups of students. The mean score of the ACASS variable was significantly lower than each of the other ACP variables and the ACDIV mean score was significantly higher than each of the other ACP variables. It should be noted that since multiple t-tests were used in analyzing these data, the significance level was set at .01 to control Type I error. Subjects in the study rated themselves significantly higher on concrete competencies (ACONCRET) than abstract competencies (ACABSTRA) as measured by the ACP ($t=21.37$, $df=164$). Post-RN students scored significantly higher on each of the ACP variables than the generic stu-

Table 2: Per centages of Subjects with each Learning Style by Program and Total Sample

Style	GENERIC		POST RN		TOTAL	
	n	%	n	%	n	%
Accommodator	57	47.1	14	23.3	71	39.2
Diverger	21	17.4	22	36.7	43	23.8
Assimilator	11	9.1	11	18.3	22	12.2
Converger	20	16.6	6	10.0	26	14.4
Unclassifiable*	12	9.9	7	11.7	19	10.5
Total	121	100.0	60	100.0	181	100.0
Abstract**	31	25.6	17	28.3	48	26.6
Concrete**	78	64.5	36	60.0	114	63.0

*Subjects whose AC-CE and/or AE-RO fall on the classification cut-off point of the learning grid.

**Abstract style is combined total of convergers and assimilators

**Concrete style is combined total of accommodators and divergers.

dents. This finding is reasonable since the more experienced Post-RN students would be expected to have higher skill levels than the less experienced generic students.

Both generic and Post-RN students rated nursing environments highest on divergent press (EPDIV). It is interesting to note that assimilative skills (EPASS) are rated least important to effective functioning in nursing environments by both generic and Post-RN students. Assimilative competencies were rated significantly lower than each of the other three types of competencies by both groups. The subjects in this sample rated concrete learning competencies (ECONCRET) as significantly more important to effective functioning in nursing environments than abstract competencies (EABSTRAC) ($t=12.56$, $df=164$). It is also interesting to note that as for the ACP, the Post-RN students had significantly

Table 3: Means and Standard Deviations of EPQ and ACP Scores by Program and Total Sample

Variable	GENERIC n=117		POST RN n=60		TOTAL n=177	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Adaptive Competence Profile Scores (ACP)						
ACACC	5.01	.69	5.31	.85	5.11	.76
ACDIV	5.42	.55	5.64	.67	5.49	.60
ACASS	3.85	.74	4.14	.89	3.95	.80
ACCON	4.81	.75	5.28	.77	4.97	.79
ACONCRET	5.21	.55	5.47	.70	5.30	.61
ACABSTRA	4.34	.67	4.72	.76	4.46	.72
Environmental Press Scores (EPQ)						
EPACC	5.32	.74	5.78	.85	5.48	.74
EPDIV	5.96	.59	6.19	.55	6.04	.58
EPASS	4.62	.82	4.92	.88	4.72	.66
EPCON	5.82	.67	6.09	.59	5.91	.85
ECONCRET	5.65	.58	5.99	.34	5.71	.58
EABSTRAC	5.22	.69	5.48	.66	5.31	.69

higher scores than the generic students on all EPQ variables. This finding may reflect the greater understanding of the nature of actual nursing environments by the more experienced students.

Table 4: Means and Standard Deviations of EPQ-ACP Difference Scores by Program and Total Sample

Variable	GENERIC n=109		POST RN n=55		TOTAL n=164*	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Difference scores (Press (EPQ) - competency (ACP))						
ACCDIFF	.32	.61	.48	.69	.37	.64
DIVDIFF	.54	.59	.58	.59	.55	.59
ASSDIFF	.80	.78	.80	.90	.80	.82
CONDIFF	.99	.74	.82	.69	.94	.73
CONCDIFF	.42	.52	.53	.57	.46	.54
ABSDIFF	.89	.68	.79	.68	.86	.69

* Number of subjects slightly lower due to missing data for certain items on ACP or EPQ

Subjects in this study had significantly greater difference scores for abstract competencies (ABSDIFF) than concrete competencies (CONCDIFF), ($t=9.93$, $df=150$). This suggests that there is a greater discrepancy between their abilities and perceived environmental demands for abstract competencies as compared to concrete competencies.

Pearson correlations were calculated among the ACP learning style scores and among the four EPQ press scores to examine relationships among these variables. These correlations are presented in Table 5.

Table 5: Correlations among ACP and EPQ Scores

	ACDIV	ACASS	ACCON	ACONCRET	ACABSTRA
ACAQC	.59	.58	.69	.92	.70
ACDIV		.47	.59	.87	.58
ACASS			.65	.59	.91
ACCON				.72	.91
ACONCRET					.73

	EPDIV	EPASS	EPCON	ECONCRET	EABSTRAC
EPACC	.57	.63	.65	.91	.68
EPDIV		.61	.72	.86	.70
EPASS			.71	.69	.94
EPCON				.76	.91
ECONCRET					.78

As can be seen, the four ACP scores are highly intercorrelated. These high intercorrelations may be indicative of problems with the instrument or it may reflect the level of maturity of subjects in this study. Kolb (1984) suggests that with maturity, individuals become more integrated in their learning styles. This could affect their ACP scores. It is possible that scores for subjects at a higher level of development would be more highly intercorrelated reflecting more integrated learning styles. Based on their age and experience, it is reasonable to expect that subjects in the Post-RN group are likely to be more mature than the generic students. When correlations among the ACP variables for each

group were examined, intercorrelations among ACP scores were higher in the Post-RN group (.62 to .78) than the generic group (.33 to .61) suggesting some support for this reasoning. In addition, the correlation of the combination abstract and concrete scores (ACABSTRA and ACONCRET) was higher for the Post-RN group (.84) than for the generic students (.62).

The four types of environmental press scores were also highly intercorrelated. Intercorrelations among EPQ variable scores for Post-RN students were generally higher (.60 to .72) than those for the generic students (.51 to .73) as was the case with the ACP variables. As for the ACP, the correlation between the abstract and concrete press scores (EABSTRAC and ECONCRET) was higher for the Post-RN group (.83) than for the generic students (.74). It is possible that these intercorrelations can be explained by the same reasoning as for the ACP intercorrelations. Pearson correlations among the four types of press/competency difference scores were also highly intercorrelated although lower than for the ACP and EPQ scores.

The means and standard deviations of scores on attitude towards theory-based nursing, preferred method of learning nursing theories and satisfaction with nursing scores are presented in Table 6.

As can be seen, subjects appeared to have a moderately positive attitude towards theory-based nursing ($M=4.75$ on a scale of 1-7). Contrary to expectations, the Post-RN group had a slightly higher score on the attitude variable than the generic students. Considering their greater experience in traditional nursing settings described in the literature as atheoretical and pragmatic, Post-RN students were not expected to have a more positive attitude towards theory-based nursing than undergraduates.

Table 6: Means and Standard Deviations of Attitude, Method of Learning and Satisfaction with Nursing by Program and Total Sample

Variable	GENERIC		POST RN		TOTAL	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Attitude	4.73	.971	4.78	1.88	4.75	1.02
Preferred learning method						
Abstract type						
Lectures	2.71	1.02	3.42	.67	2.95	.98
Readings	2.63	.89	2.70	.98	2.65	.92
Total(ABSMETH)	5.34	1.51	6.12	1.30	5.61	1.48
Concrete type						
Discussions	2.96	.89	3.18	.89	3.03	.90
Clinical experience	3.69	.63	3.07	.99	3.49	.82
Total(CONMETH)	6.65	1.11	6.25	1.89	6.25	1.26
Satisfaction	5.33	.94	4.95	2.33	5.02	1.21

Subjects in this study appeared to prefer learning methods classified as concrete (group discussions, clinical experiences) to those classified as abstract (readings and lectures). Clinical experiences received the highest rating by the generic students; however, the Post-RN students rated lectures highest. It is interesting to note that the Post-RN group found clinical experiences significantly less helpful than the generic students. This most likely reflects their greater experience and familiarity with actual nursing settings.

Subjects in this study appear to be moderately satisfied with nursing ($M=5.02$ on a scale of 1-7). It is interesting to note that the generic students had significantly higher mean satisfaction scores than Post-RN students. This finding may reflect a greater understanding of the actual nursing role by the Post-RN students as compared to a more idealistic view of nursing of the generic students. The constraints of the actual nursing role may be a factor affecting level of satisfaction of the Post-RN students. The generic nursing students, on the other hand, may be more satisfied with nursing since their nursing experiences have been more limited and well controlled.

Subjects in this study preferred Orem's theory of nursing as a basis for practice significantly more than that of Neuman, (Chi squared = 21.98, $df=1$). Sixty-seven percent of the subjects in this study preferred Orem's theory to that of Neuman which was preferred by thirty-three percent of the subjects.

In summary, in this section, reliability and other descriptive data on the variables of interest in this study were presented. In the next section, the results of the tests of the null hypotheses are presented and discussed.

2. Results and Discussions of the Tests of the Hypotheses

In this study, three of seven research hypotheses were supported. These results are discussed in the upcoming paragraphs.

In the first hypothesis, it was predicted that subjects with abstract learning styles (convergers and assimilators) have a more positive attitude towards theory-based nursing than those with concrete styles (divergers and accommodators). This hypothesis was supported in this study using the LSI. Subjects with abstract learning styles had a signifi-

cantly more positive attitude ($M=5.08$) towards theory-based nursing than those with concrete learning styles ($M=4.65$), ($t=2.41$, $df=152$).

This hypothesis was also tested using the ACP measure of learning style. When subjects were grouped as those whose concrete competencies (ACONCRET) were greater than their abstract competencies (ACABSTRA) and those whose abstract competencies exceeded their concrete competencies, a significant difference was found in attitude towards theory-based nursing score. Subjects whose abstract competencies exceeded their concrete competencies had a significantly more positive attitude towards theory-based nursing than those whose concrete competencies exceeded their abstract competencies ($t=2.18$, $df=153$).

These results are consistent with Kolb's theory when he suggests that concrete learners do not find theoretical approaches helpful and prefer to treat each situation as a unique case (Kolb, 1984). Abstract learners, on the other hand, are more likely to use an abstract model or theory as a basis for action rather than rely on a global intuitive feel of the situation (Kolb, 1984). If this is true, then the results of this study are supportive of this aspect of the theory.

In a post hoc analysis, correlations between each of the ACP variables and the attitude variable were examined. The correlation between ACABSTRA and attitude was higher ($r=.23$, $p<.05$) than that of ACONCRET and attitude, ($r=.11$, $p>.05$). Theoretically, it would be expected that ACABSTRA would have a positive correlation with attitude towards a theoretically based approach to nursing. Hence, these results are consistent with theoretical expectations. However, if subjects are at the specialization stage of development, it would be expected that ACONCRET would be negatively related to attitude. This was not the case, however, and it is possible that these results were found because subjects in this study were at a higher developmental level and, thus, had more integrated learning styles. If the positive intercorrelations of the ACP variables are a reflection of maturity,

then it is not surprising that these variables are all positively related to attitude since at this developmental level, the four modes are theoretically integrated. Although these correlations were not all significantly related to attitude, the trend appeared to warrant further investigation. Consequently, this phenomenon was explored in another post hoc analysis in which data from the two student groups were analyzed separately.

When the correlations between ACP variables and attitude were analyzed for the Post-RN and generic nursing students separately, different patterns were observed. For the generic students, ACABSTRA had a higher correlation with attitude ($r=.26$, $p < .05$) than the concrete variable (ACONCRET), ($r=.03$, $p > .05$). In the Post-RN group, both ACP variables had positive correlations with attitude (ACABSTRA, $r=.32$ and ACONCRET, $r=.26$). In addition, the correlation between ACABSTRA and ACONCRET was higher (.84) for the Post-RN group than that of the generic student group (.62). This may be a reflection of a higher maturity level in the Post-RN students as compared to the generic students.

To summarize, the first hypothesis appears to be supported in this study suggesting support for this aspect of Kolb's theory. Learners with abstract styles had more positive attitudes towards theory-based nursing than those with concrete styles. The post hoc results indicating differences in patterns of correlations between the ACP variables and attitude for the two levels of students are of interest. Since the Post-RN group would seem to be more mature than the generic students, there appears to be support for Kolb's notion of increasing integration of learning style with maturity. These results should be explored in future research.

In second hypothesis, it was predicted that subjects who perceive the environmental press of nursing to be more concrete than abstract have a less positive attitude towards theory-based nursing than those who perceive the environmental press to be more abstract than concrete. This hypothesis was supported.

Subjects who perceived abstract competencies to be more important to effective functioning in nursing learning environments than concrete competencies (EABSTRAC>ECONCRET) had a significantly more positive attitude ($M=5.14$) than those who perceived concrete competencies to be more important than abstract competencies (ECONCRET>EABSTRAC), ($M=4.61$), ($t=-2.08$, $df=140$). These results are consistent with Kolb's theory when he states that environmental press perception reflects the individual's interpretation of the type of learning demands emphasized in the discipline (Kolb, 1984). Kolb maintains that these learning demands are indicative of the nature of knowledge of the discipline. If subjects perceive learning demands of their environments as more concrete than abstract, it is logical that they would see less value in the use of an abstract approach to practice than those who consider abstract competencies to be more important than concrete competencies for effective functioning in nursing environments. Learners who perceive their environments as more concrete than abstract are more likely to consider a holistic response to individual situations preferable to application of an a priori theoretical framework. Thus, these results were expected and represent additional support for Kolb's theory.

In a post hoc analysis, the Pearson correlation between EABSTRAC and attitude was found to be higher ($r=.29$, $p < .05$) than that of ECONCRET and attitude ($r=.22$, $p < .05$). It is consistent with theoretical expectations that there would be a higher correlation between abstract environmental press perception and attitude towards a theoretical approach to nursing than between concrete environmental perception. However, a positive correlation between concrete press score and attitude would not be expected for individuals at the specialization level of development.

When the correlations of the EPQ variables and attitude for the two groups of students were inspected, different patterns were observed. As might be expected of individuals at the specialized level of development, the abstract press score (EABSTRAC) for the

generic students was more highly correlated with attitude ($r=.32$, $p < .05$) than was the concrete press score (ECONCRET), ($r=.12$, $p > .05$). In the Post-RN group, the correlation between attitude and EABSTRAC was .24 and between attitude and ECONCRET, .41. No explanation from the theory could be found to explain this result. The correlation between EABSTRAC and ECONCRET was found to be higher for the Post-RN students (.83) than for the generic students (.74). This may reflect a higher level of development in the older, more experienced Post-RN subjects who, theoretically, would be expected to have more integrated learning styles.

The post hoc findings of differences between the Post-RN students and generic are interesting. The EPQ variables of the Post-RN students had considerably higher intercorrelations than those of the generic students. The pattern of correlations among EPQ variables and attitude for the two groups seems to suggest support for the notion of the effect of maturity on learning style. It seems theoretically consistent that if EPQ variables are more intercorrelated and thus, theoretically more integrated, then the correlations between each of the EPQ variables with attitude would be similar. On the other hand, for subjects at the specialization stage of development, less integration is present and different patterns of correlations of EPQ variables with attitude would be expected. The pattern of correlations observed for generic students appears consistent with theoretical expectations. These post hoc findings suggest some support for the usefulness of the ACP and EPQ as measures of relative maturity. Further exploration of these findings seems worthwhile.

In summary, the second hypothesis was supported in this study. Learners who perceive nursing environments to have a more abstract press than concrete press have more positive attitudes towards theory-based nursing than those who perceive nursing environments to have a more concrete than abstract press.

It was predicted in the third hypothesis that abstract learners (convergers and assimilators) prefer abstract learning methods such as readings and lectures more than concrete learners (divergers and accommodators) and concrete learners prefer concrete learning methods such as group discussions and 'hands on' clinical experiences more than abstract learners. Using the LSI, this hypothesis was not supported in this study. Although abstract learners show a greater preference for abstract learning methods (ABSMETH) ($M=5.69$) than concrete learners ($M=5.55$), the difference is not significant ($t=.55$, $df=175$). Similarly, concrete learners show a greater preference for concrete methods of learning (CONMETH) ($M=6.66$) than abstract learners ($M=6.27$), however, the difference is not significant ($t=-1.86$, $df=175$).

This hypothesis was also tested by using the ACP scores as indicators of learning styles. When subjects were grouped as was done in testing Hypothesis I (those whose abstract skills exceeded their concrete skills and those whose concrete skills exceeded their abstract skills), no significant differences were found between group means for either ABSMETH or CONMETH.

These results are not supportive of Kolb's theory when he suggests that learning style is related to preferred method of learning. While abstract learners had a greater preference for abstract learning methods than concrete learners and concrete learners had a greater preference for concrete learning methods than abstract learners, neither of the differences was significant. These results were not expected.

A number of explanations for these results are possible. First of all, the method scores were not reliable measures of preferred methods of learning nursing theory. Since each score consisted of only two items, it is possible that subjects interpreted each item quite differently. Secondly, it is possible that some subjects may have misinterpreted the instructions for scoring the method items. Some subjects may not have rated the four

items independently. This would result in greater measurement error in the combination scores and would reduce the possibility of detecting significant differences. This possibility ~~was checked~~, however, and no differences in results were found when suspected cases were eliminated from the analysis.

In a post hoc analysis, this hypothesis was explored using the LSI modal scores (CE, RO, AC, AE) as was done by Kolb (1978) and Pigg et al. (1980). Kolb (1978) reports significant correlations between these scores and preferences for different learning activities. Pigg et al. (1980) conducted a similar analysis and found similar correlations. Correlations in this study are similar although higher in several instances than those of Kolb (1978) and Pigg et al. (1980). In this study, the lecture method had a significant positive correlation ($r=.17$) with the AC score, the group discussion method was correlated positively with the CE score ($r=.21$) and clinical experience as a learning method had a significant positive correlation with the CE score ($r=.16$) and a significant negative correlation with the AC score ($r= -.14$). These correlations are consistent with theoretical expectations. These findings suggest some support for the notion of a relationship between learning style and preferred method of learning. However, due to the small size of the correlations, these results should be treated cautiously.

In further post hoc analyses of the data on learning method preferences, subjects in this study rated clinical experience as most helpful and readings on the subject the lowest. However, the generic students found clinical experience significantly more helpful than the Post-RN students and the Post-RN students found lectures by experts significantly more helpful than the generic students. These results are not unexpected since one would expect that the relatively inexperienced generic students would consider practical experiences in actual nursing settings very helpful for their learning about the profession. On the other hand, the Post-RN students with their familiarity with actual nursing situations most likely considered lectures by experts a more efficient method of learning nursing theory.

The Post-RN students would be able to relate their past nursing experiences to the content of the lectures unlike the undergraduate students. Thus, it may be that learning style is less of a factor in learning about nursing theory than extent of nursing experience.

In the fourth hypothesis, it was predicted that abstract learners prefer Neuman's theory of nursing (a relatively more abstract theory) more than do concrete learners and concrete learners prefer Orem's theory (a relatively more concrete theory) more than do abstract learners. The result of the test of this hypothesis is presented in Table 7. This hypothesis was not supported ($\chi^2=.30$, $df=1$). Both abstract and concrete learners prefer Orem's theory of nursing to that of Neuman as a basis of practice. A significant proportion of subjects in this study preferred Orem's theory of nursing to that of Neuman ($\chi^2=21.928$, $df=1$).

This hypothesis was also tested using the ACP scores as a measure of learning style. Point biserial correlations of the ACP variables with preferred theory were low ($r=.07$ to $.12$) suggesting a lack of relationship between learning style and preferred nursing theory.

A number of explanations for these results are plausible. All subjects in this study had had an opportunity to use Orem's theory as the framework for practice in actual hospital settings. Orem's theory is particularly easy to use in active treatment settings and fits easily with current nursing approaches to practice. Students had been required to submit written weekly assignments documenting their use of this theory with their patients. Thus, they were very familiar with the use of this theory.

On the other hand, students in this study had used Neuman's theory in community nursing settings and had not been required to submit formal written accounts of their use of the theory. It is possible that these students were less familiar with Neuman's theory and thus, when asked to choose between Orem's and Neuman's theory, chose the one with

Table 7: Test of Hypothesis IV

LSI	Preferred Nursing theory	
	OREM	NEUMAN
Abstract style	34	14
Concrete style	74	40

CHI=.299, $p < .234$

which they were most familiar. It is possible that type of clinical nursing experience influences the type of theory preferred as a basis for practice. Teacher effects also may have influenced students' preferences for one theory or the other. It is interesting to note that all groups except the third year Post-RN students preferred Orem's theory to that of Neuman. The fact that the second year Post-RN group data are missing may have influenced the results since this year is centered entirely around Orem's theory of nursing. Finally, if Orem's theory is correctly classified as a more concrete theory than that of Neuman, it is not unreasonable to find that a group of subjects who have predominantly concrete learning styles prefer a theory which is relatively more concrete. However, support for the hypothesized relationship between learning style and preferred nursing theory was not found in this study.

In hypothesis five, it was predicted that the Post-RN students perceive nursing learning environments to be more concrete than do generic students. This hypothesis is supported in this study. Post-RN students perceived nursing environments to have a higher concrete learning press ($M=5.99$) than did the generic students ($M=5.65$, $t=-3.71$, $df=172$). This result is consistent with Kolb's theory. Kolb (1984) maintains that with experience in a discipline, individuals' interactions with the learning demands of the environment

result in the accentuation of particular learning competencies important to success in that discipline. Nursing environments have been described in the literature as active and practical with a human service orientation (Jacobs & Heuther, 1978). These attributes fit Kolb's descriptions of concrete learning environments. If current nursing environments have this focus, it would be expected that experienced nurses would rate the importance of concrete learning competencies higher than would the undergraduate students. It can be argued that since the generic students' exposure to nursing practice has been balanced between classroom instruction and controlled clinical experiences, they would tend to rate the importance of concrete competencies slightly lower than the Post-RN students. This argument was supported in this study.

It must be noted that the Post-RN students also rated nursing environments significantly higher in abstract press ($M=5.49$) than did the generic students ($M=5.22$), ($t=-2.35$, $df=168$). This may be a reflection of their greater understanding of the need for abstract skills in nursing situations despite the predominance of a concrete, practical focus. While the emphasis may be on concrete press, it may be argued that nursing practice requires abstract competencies and with experience, practitioners come to perceive the need for such competencies. It is also possible that this is a reflection of the fact that they are nurses enrolled in a university level nursing program. It would be interesting to study responses of nurses in general practice who may be different from Post-RN students to see if differences exist on these variables.

However, both generic and Post-RN students perceived nursing environments to be significantly more concrete than abstract supporting Kolb's contention that nursing as a human service profession would have a predominantly concrete learning orientation. It is interesting to note that both generic and Post-RN students considered divergent competencies most important and that both rated convergent competencies second in importance.

This phenomenon may reflect the fact that nursing like medicine is concerned with both human service and the application of scientific knowledge in practice. Kolb (1978) cites medicine as an example of a discipline which includes considerable variation on the two dimensions of Experiential Learning Theory. The environmental press scores obtained in this study may be a reflection of these orientations in the nursing profession. Another finding of interest is that both groups of students rated assimilative competencies as least important. This is consistent with comments of some authors (Meleis, 1985; Fawcett, 1984) who suggest that traditionally, nurses and nursing students have not emphasized the importance of conceptualization in the development of the discipline. However, since the value of the assimilative press score mean is reasonably high ($M=4.72$), it appears that these competencies are considered of average importance for effective nursing performance. It is also possible, however, that this score is a reflection of the fact that all students are enrolled in an university level program of nursing. It would be interesting to measure this variable in other groups of nurses with different types of training to see if differences exist.

In hypothesis six, it was predicted that Post-RN students have a less positive attitude towards theory-based nursing than generic students. This hypothesis was not supported. In fact, Post-RN students have a slightly more positive attitude towards theory-based nursing ($M=4.78$) than the generic students ($M=4.73$) although the difference is not significant ($t=0.29$, $df=171$).

Several explanations for this result are possible. First, it is possible that as students enrolled in a theory-based nursing program, the Post-RN students have accepted the underlying assumptions of the curriculum. It is also possible that social desirability may have been a factor although subjects were assured that their responses were confidential. As students in a post diploma program, it is also possible that these subjects may not be repre-

sentative of the RN population. Another occurrence which may have influenced the results is the poor response rate of the second year Post-RN group. It is possible that this group did not respond to the invitation to participate in the study because of their attitude towards theory-based nursing. It is interesting to note that a trend of increasing scores on attitudes (more positive) with length in program was present in both the generic and Post-RN groups. Fourth year generic students had higher attitude scores than the third year generic students and the attitude scores increased over the two Post-RN student groups. However, these increases in attitude scores were not significant.

In summary, hypothesis six was not supported in this study. A number of explanations for this result were suggested. It seems advisable that this hypothesis be tested with a larger and more representative sample of the RN population before conclusions are drawn.

Finally, in hypothesis seven, it was predicted that degree of person-environment fit is related to satisfaction with nursing. Absolute difference scores (ABSDIFF and CONCDIFF) were used as indicators of person-environment match-mismatch. It was expected that as person-environment mismatch increased (higher difference scores), satisfaction would decrease. On the other hand, when subjects were more matched to their environment (lower difference scores), satisfaction was expected to be higher. This hypothesis was not supported. Pearson correlations between the difference scores (ABSDIFF and CONCDIFF) and satisfaction scores were found to be low ($r = .02$ and $-.0046$) and not significant suggesting a lack of relationship between difference scores and satisfaction with nursing. It is possible that this result is partially due to the relatively low reliability of the difference scores.

Another possibility is that person environment match and its relationship to satisfaction is a more complex phenomenon than Kolb suggests. Manring (1981) found in her

studies of engineers that when subjects rated their personal competencies lower than their perceptions of environmental demands, they had higher satisfaction with their jobs than when they rated their competency level higher than job demands. She concluded that subjects who are underqualified for their jobs were challenged to improve and were thus more satisfied with their work. Those who were overqualified were found to be bored and thus less satisfied with their work environment. This phenomenon was explored in a post hoc analysis.

ACP items were summed to create an overall competency score and similarly, EPQ items were summed to create an overall environmental press score. Subjects were classified as underqualified if their ACP total score was lower than their EPQ score and overqualified if their ACP score was higher than their EPQ score. Similar to the results of Manring (1981), when subjects were classified as underqualified (press greater than competency) and as overqualified (competency greater than press), the underqualified group were significantly more satisfied with nursing ($M=5.24$) than the overqualified group ($M=4.6$), ($t = -2.29$, $df=145$). This result suggests that person-environment match is not necessarily desirable for job satisfaction and that when personal learning competencies are perceived to be less than those required for the job, individuals are challenged to learn and improve. On the other hand, individuals who perceive themselves to be overqualified for job demands are bored and less satisfied.

It is interesting to note that difference scores for the subjects in this study were significantly higher for abstract competencies than concrete competencies suggesting that they perceived their environments to require a higher level of abstract competencies than their personal ability levels. Concrete difference scores were significantly lower suggesting that they felt more qualified on concrete competencies necessary for effective functioning in nursing environments. This is consistent with Kolb's theory when he suggests that nurs-

ing as a concrete active profession would promote the development of concrete competencies and thus, one would expect that nursing students would rate these competencies higher than abstract competencies.

In summarizing the results of the tests of the hypotheses, it can be said that some evidence of support for Kolb's theory was found. However, a number of concerns about the theory were raised. In this study, three of seven hypotheses deduced from the theory were supported. As hypothesized, learning style and perceptions of environmental press were found to be related to attitudes towards theory-based nursing. In addition, as predicted, Post-RN nursing students perceived nursing environments to be more concrete than did the generic students.

Some support for Experiential Learning Theory was obtained when learning style was measured by the LSI. Learning style was found to be related to attitude towards theory-based nursing which is supportive of theoretical predictions and thus, the underlying theory. In addition, subjects in this study were found to have similar proportions of learning styles as were found in other studies of nurses and nursing students. Consistent with theoretical expectations, there was a significantly greater proportion of subjects with concrete learning styles than with abstract learning styles. Hence, it would seem unwise to discount the usefulness of the LSI as a measure of learning style. There would seem to be enough evidence of support for theoretical predictions from the theory to warrant further research using the LSI.

Some support for theoretical predictions using the ACP as a measure of learning style was found. When subjects were grouped as more concrete than abstract using their ACP scores, subjects were found to have a more positive attitude towards theory-based nursing than those who were more abstract than concrete. This finding is supportive of the theory and provides some support for the construct validity of the ACP. In addition, consis-

tent with theoretical expectations, subjects in this study were found to be more concrete than abstract according to their ACP scores.

The pattern of scores on the EPQ seems to reflect an accurate description of the general orientation of nursing environments as described in the literature and in the researcher's experience. Some support for the construct validity of the EPQ was established when, as would be expected from the theory, nursing environments were perceived to be more concrete than abstract. Items on the EPQ could also be altered to be better descriptors of nursing learning environments.

In addition, differences found for the ACP and EPQ scores for the two groups of nursing subjects appear to reflect different levels of maturity consistent with theoretical expectations. These findings are consistent with theoretical expectations and should be investigated in future research.

The notion of comparing self-ratings of personal learning competencies (ACP scores) to perceptions of environmental demands (EPQ scores) could be helpful for planning individualized teaching-learning sessions. More work in refining the ACP and the EPQ seems worthwhile since some support for construct validity was obtained for both instruments. If further evidence of validity for these instruments can be established, they may be useful in diagnosing learning needs and planning learning experiences to develop all types of competencies.

It is possible that Kolb's theory, as a broad molar theory might best be used as a framework for curricular design. The value of the theory is the assumption that there are several ways of learning, none necessarily better than others. Kolb (1984) maintains that his concept of learning style is not meant to be 'reified' resulting in stereotyping, but rather to illustrate the fact that individuals differ in their preferred ways of learning.

The cycle of learning proposed in the theory seems particularly appropriate for an applied discipline such as nursing. Hence, it has value for curricular design. The notion of planning learning environments to promote the development of all types of learning competencies is useful. The EPQ and the ACP appear to be useful instruments which could be refined to better reflect environmental demands of nursing environments and competencies important to nursing practice. In this study, nursing students perceived themselves to be lower on abstract competencies than on concrete competencies. This finding is consistent with those of others who have studied conceptual development of nursing students from other theoretical perspectives as well as from the Experiential Learning Theory perspective. Given the current emphasis on the importance of development of theory as a basis for practice, the identification of perceived levels of competence of abstract learning skills is important and has implications for designing appropriate learning experiences for the development of these skills in addition to others. Donner (1985) has indicated the need to study aspects of teaching nursing theory to students and graduates to promote the adoption of a more research-based approach to nursing practice. Such an approach will require development of competencies of an abstract type. The findings of this study were useful in the identification of self rated strengths and weaknesses of one sample of nursing students. It is possible that these instruments may be of value in other samples and may be useful for curricular planning.

One of the problems raised in this study is related to the difficulty encountered in measurement of Experiential Learning Theory constructs. Since the LSI had been criticized by other researchers (Merritt, 1983; Freedman & Stumpf, 1978), the ACP was used in this study as an alternate measure of learning style. Using the ACP, it was hoped that independent measures of the four learning styles described in Kolb's theory would be obtained from this instrument. When used in the manner described in this study, scores on the ACP were highly intercorrelated. This may reflect the choice of items on the scale. On

the other hand, Kolb (1984) maintains that in his learning cycle, all modes are somewhat related, especially for mature individuals at a higher level of integration. It was suggested that the high intercorrelations among the ACP variables may be a reflection of maturity. However, the high intercorrelations found in this study among ACP variables may limit its usefulness as a measure of learning styles of individuals at the specialization stage of development.

The LSI was not found to be useful in differentiating subjects by preferred method of learning nursing theory. Several reasons for these results were suggested and it would appear that the measure of preferred method may have been partly responsible for the failure to support this hypothesis due to its poor reliability. Support was not established for a relationship between learning style and preferred theory for nursing practice nor for preferred method for learning nursing theory. Also contrary to theoretical predictions, Post-RN students were not found to have a less positive attitude towards theory-based nursing than undergraduates nor was there evidence of a relationship between person-environment match/mismatch and satisfaction with nursing. However, the results of the tests of hypotheses and several interesting post hoc results are indicative of the potential usefulness of further research using Experiential Learning Theory.

In summary, in this section the results of the tests of the hypotheses were reported and discussed in detail. Possible explanations for the failure to obtain support for certain hypotheses were proposed followed by a summary statement about the usefulness of the theory for future research. In the next section, recommendations for future research are made.

3. Recommendations for Future Research

In this section, recommendations for future research arising from this study are proposed. First, a similar study including a larger sample with a broader representation of the nursing population is desirable. Nurses in general practice, nurse educators and administrators and students in different types of training programs would give a more comprehensive picture of nurses' perceptions of environmental stress in nursing environments. Also, there may be a considerable difference in attitudes towards theory-based nursing and preferred method of learning about nursing theory among these groups. Subjects in the present study were all familiar with the concept of theory-based nursing and were aware of the importance given this concept by the staff. However, this notion is relatively recent and often misunderstood by members of the profession. It would be useful to conduct a study to determine attitudes and understandings of different groups within the profession.

Secondly, a study designed to further explore the notion of integration of learning style with maturity would be useful. Post hoc findings comparing Post-RN and generic students were suggestive of support for this phenomenon using the ACP and the EPQ. A study designed to explore relationships between ACP scores and other measures of developmental maturity for groups thought to be at different developmental levels would be useful. Loevinger's (1976) sentence completion instrument intended to measure ego developmental level could be used in such a study.

The study could be replicated using a more reliable measure of preferred learning method since the one used in the present study was found to be highly unreliable. The Adjective Rating Scale (ARS) developed by Kelly et al. (1976) could be used to determine subjects' attitudes towards different methods of learning nursing theory. Reliability and validity studies for this instrument are considered adequate for group description and com-



parison by Kelly et al. (1976). This instrument might be a better measure of preferred method for learning nursing theories.

It is possible that the items on the ACP and the EPQ are not wholly representative of competencies important in nursing settings. Efforts to refine these instruments to better reflect nursing competencies while adhering to theoretical constructs of Experiential Learning Theory might be useful. It is possible that rewording some of the items on the EPQ and the ACP may result in more meaningful responses by nursing subjects. For instance, the items 'designing experiments' and 'analyzing quantitative data' may illicit negative responses in subjects who interpret such items as representing laboratory type competencies and therefore not important to the nursing role. Changing these items to 'designing experiments comparing different nursing interventions' and 'analyzing patient's laboratory results' may illicit different responses since these items are more relevant to nursing environments. In addition, items from the revised instrument could be correlated with those of established measures of nursing competencies such as the Slater Nurse Competency Scale (Wandelt et al., 1975) to see if relationships exist.

Another study of interest would be one to determine subjects perceptions of which type of learning environments or experiences in nursing are most effective in the development of different competencies. The results of such a study may provide a better understanding of the sources of influence on the development or lack of development of competencies important to nursing. Kolb et al. (1981) found differences in perceptions of the impact of different types of learning environments on the development of particular competencies. These results may have important implications for planning teaching-learning experiences in nursing education.

Another study could be designed to determine differential contributions of professional education and actual work experiences after graduation to the development of competencies.

In a study of social work and engineering practitioners, Kolb et al. (1981) found differences in their perceptions of the influences of actual job roles as compared to professional education programs in the development of certain competencies. Information gained from such a study may be useful for nurse educators and administrators in understanding the learning needs of new graduates as they make the transition from student to practitioner.

A longitudinal study tracing responses to the ACP and EPQ from freshman to senior level of a nursing program for the same group of students would be of interest. Information gained from such a study may be useful in determining changes in perceived levels of competence and perceptions of the importance of different competencies with experience in a professional education program. Theoretically, certain competencies would be expected to increase with experience in professional education programs.

Another area for future research might be to investigate how nurses and nursing students perceive nursing theories using Jacobsen's (1983) Semantic Differential for External Comparison of Conceptual Models (SDCM). Using the SDCM, it is possible to determine subjects' perceptions of the relative abstractness of a theory. This score could then be correlated with learning style to see if a relationship exists between learning style and perception of the relative level of abstractness of different theories.

Finally, a study to determine preference for a particular theory as a basis for practice and its relationship to learning style could be conducted with nurses who used different theories in actual work settings. At this stage of theory development in nursing, such a study is not feasible since few nursing institutions are established in their use of theory as a basis for practice. Such a study would require a group of subjects who are familiar with several theories and were thus in a position to make a choice among them. Another assumption would be that the institution was supportive of the notion of 'theoretical pluralism', that is, that nurses are free to choose which nursing theory they feel is appropri-

ate to the nurse-patient situation at hand. This notion is not generally well accepted in nursing settings at this stage of development in the nursing profession. Hence, such a study is not feasible in the immediate future.

In this section, several recommendations for future research were proposed. In the next section, conclusions arising from the results of this study are presented.

SUMMARY AND CONCLUSIONS

In his theory of experiential learning, Kolb (1978) suggests that the structure of knowledge in a discipline exerts a characteristic learning press or set of learning demands on the learner. Through repeated person-environment interactions in such environments, learners develop particular ways of dealing with the world and come to emphasize learning competencies most effective in acquiring knowledge of the discipline. These competencies tend to cluster around different learning modes in a cycle of learning described in the theory and result in what Kolb (1978) describes as a preferred learning style.

Nurses and nursing students have been found to have predominantly concrete learning styles reflecting the people-oriented human service nature of the profession. Kolb and his associates have developed measures of environmental press to determine perceptions of important learning demands in learning environments.

In this study, the researcher explored the hypotheses that learning style and environmental press perceptions are related to attitude towards theory-based nursing. Theory-based nursing is a new approach to nursing practice and represents a change from traditional more task-oriented approaches. As hypothesized, subjects with abstract learning styles and those who perceived nursing environments to be more abstract than concrete had more positive attitudes towards theory-based nursing than those with concrete learning styles and those who perceived nursing environments to be more concrete than abstract. These results are consistent with theoretical predictions and suggest some support for the underlying theory.

Additional support for the theory was obtained when, as hypothesized, Post-RN students were found to perceive nursing environments to be more concrete than did the generic nursing students when the EPQ was used to measure environmental press. This is supportive of theoretical expectations that as experienced practitioners of nursing, Post-RN students would rate concrete, people-oriented competencies higher than would the less experienced undergraduates. However, Post-RN students also perceived nursing environments to have a more abstract press than did the undergraduate students. This finding may be related to the Post-RN students' greater understanding of the need for abstract skills in nursing based on their extensive experiences in nursing situations. Finally, all subjects in this study rated nursing environments higher in concrete press than abstract press which is supportive of Kolb's contention of disciplinary differences in learning press.

Contrary to predictions, no relationship was established between learning style and preferred theory for practice or preferred method of learning nursing theory. Possible design problems which may have resulted in inadequate tests of these hypotheses were discussed and suggestions for future research recommended. It is possible that the lack of support for the hypothesis that Post-RN students have a less positive attitude towards theory-based nursing than undergraduates may have been related to methodological problems. Data from a large group of Post-RN students could not be obtained due to scheduling difficulties. This hypothesis should be explored in a study with a more representative sample before conclusions are drawn.

Finally, the hypothesis of a relationship between degree of person-environment fit and satisfaction with nursing was not supported. Design problems were suggested and an alternate explanation of the notion of person-environment fit and its relationship to satisfaction offered. Subjects who were underqualified in their personal learning competencies as compared to their perceptions of environmental demands were more satisfied with nursing

than those whose perceived competencies exceeded environmental demands. These findings are consistent with those of others who concluded that when personal competencies are rated lower than perceptions of environmental demands, individuals are motivated to improve and learn. When competencies exceed environmental demands, individuals are bored and thus, less satisfied. It seems logical to conclude from the results of this study that person-environment fit is not a necessary condition for satisfaction with nursing.

The patterns of relationships among ACP measures of the four learning styles were different for the two groups of nurses in this study. The four ACP style variables of Post-RN students were intercorrelated to a higher degree than those of the generic students possibly suggesting a higher level of development in the older, more experienced Post-RN students.

In summary, the results of this study are suggestive of moderate support for Experiential Learning Theory. Possible problems with the measurement properties of the instruments used in the study were discussed and caution was advised in the interpretation and generalization of these results. However, it can be concluded that there is sufficient evidence of support for theoretical predictions to warrant further research from the Experiential Learning Theory perspective. Recommendations for further research were advanced.

Given the possible design problems encountered in this study, the interpretation and generalization of the results must be treated cautiously. However, taking these cautions into consideration, it appears that some support for Kolb's Experiential Learning Theory was obtained. It appears that learning style is related to attitude towards theory-based nursing as is environmental press perception. Individuals with abstract styles and those who perceive nursing environments to be more abstract than concrete have a more positive attitude towards theory-based nursing than those who perceive nursing environments to be more concrete than abstract. Nursing environments are perceived to be more concrete than

abstract by subjects in this study and the more experienced nurses perceived nursing environments to be more concrete and more abstract than did the less experienced generic students. There appears to be no relationship between learning style and preferred theory for practice and preferred method for learning nursing theory although measurement of the latter two variables may have been a problem in testing these hypotheses. Finally, the relationship between person-environment fit and satisfaction with nursing appears to have more to do with whether individuals are under-qualified in terms of their personal learning competencies as compared to perceived learning demands than with whether or not their personal competencies exceed perceived learning demands. Finally, post hoc findings are suggestive of some evidence of support for the theoretical notion of increasing integration of learning style with maturity. Further investigation of this construct was recommended. It is also suggested, however, that more work is needed to improve the ACP and the EPQ and to more effectively operationalize variables measuring preferred method for learning nursing theory and preferred theory for practice. In addition, replication of this study with a larger and more representative sample of the nursing population would be desirable.

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APPENDIX A
LEARNING STYLE INVENTORY (LSI)

LEARNING STYLE INVENTORY

Instructions:

There are nine sets of four words listed below. Rank-order the words in each set by assigning a 4 to the word that best characterizes your learning style, a 3 to the word that next best characterizes your learning style, a 2 to the next most characteristic word, and a 1 to the word that is least characteristic of you as a learner.

You may find it hard to choose the words that best characterize your learning style. Nevertheless, keep in mind that there are no right or wrong answers, all the choices are equally acceptable. The aim of the inventory is to describe how you learn, not to evaluate your learning ability.

Be sure to assign a different rank number to each of the four words in each set; do not make ties.

- | | | | |
|--------------------------|-------------------|-------------------------|-----------------------|
| 1 _____ discriminating | _____ tentative | _____ involved | _____ practical |
| 2 _____ receptive | _____ relevant | _____ analytical | _____ impartial |
| 3 _____ feeling | _____ watching | _____ thinking | _____ doing |
| 4 _____ accepting | _____ risk-taker | _____ evaluative | _____ aware |
| 5 _____ intuitive | _____ productive | _____ logical | _____ questioning |
| 6 _____ abstract | _____ observing | _____ concrete | _____ active |
| 7 _____ present-oriented | _____ reflecting | _____ future-oriented | _____ pragmatic |
| 8 _____ experience | _____ observation | _____ conceptualization | _____ experimentation |
| 9 _____ intense | _____ reserved | _____ rational | _____ responsible |

Scoring:

The four columns of words above correspond to the four learning style scales: CE, RO, AC, and AE. To compute your scale scores, write your rank numbers in the boxes below only for the designated items. For example, in the third column (AC), you would fill in the rank number you have assigned to items 2, 3, 4, 5, 8, and 9. Compute your scale scores by adding the rank numbers for each set of boxes.

Score items:

2 3 4 5 7 8

 CE _____

Score items:

1 3 6 7 8 9

 RO _____

Score items:

2 3 4 5 8 9

 AC _____

Score items:

1 3 6 7 8 9

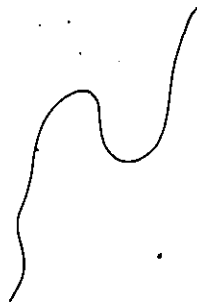
 AE _____

To compute the two combination scores, subtract CE from AC and subtract RO from AE. Preserve negative signs if they appear.

AC-CE: $\frac{AC}{\boxed{}} - \frac{CE}{\boxed{}} =$

AE-RO: $\frac{AE}{\boxed{}} - \frac{RO}{\boxed{}} =$

APPENDIX B
ADAPTIVE COMPETENCE PROFILE (ACP)

A handwritten signature or scribble, possibly the initials 'N' or a stylized 'W', located in the lower-left quadrant of the page.

ADAPTIVE COMPETENCY SCALE

Personal learning competencies: (Circle the appropriate number for each item).

How would you rate your level of skill on each competency?

	unskilled		average			highly skilled	
1. Listening with an open mind	1	2	3	4	5	6	7
2. Developing comprehensive plans	1	2	3	4	5	6	7
3. Building conceptual models	1	2	3	4	5	6	7
4. Committing yourself to objectives	1	2	3	4	5	6	7
5. Influencing and leading others	1	2	3	4	5	6	7
6. Making decisions	1	2	3	4	5	6	7
7. Designing experiments	1	2	3	4	5	6	7
8. Being sensitive to values	1	2	3	4	5	6	7
9. Being able to adapt to changing circumstances	1	2	3	4	5	6	7
10. Generating alternative ways to doing things	1	2	3	4	5	6	7
11. Organizing information	1	2	3	4	5	6	7
12. Setting goals	1	2	3	4	5	6	7
13. Experimenting with new ideas and approaches	1	2	3	4	5	6	7
14. Imagining implications of (ambiguous) situations	1	2	3	4	5	6	7
15. Identifying and defining problems	1	2	3	4	5	6	7
16. Dealing with people	1	2	3	4	5	6	7
17. Gathering information	1	2	3	4	5	6	7
18. Seeking and exploiting opportunities	1	2	3	4	5	6	7
19. Communicating with others	1	2	3	4	5	6	7
20. Analyzing quantitative data	1	2	3	4	5	6	7
21. Being sensitive to people's feelings	1	2	3	4	5	6	7
22. Being personally involved	1	2	3	4	5	6	7
23. Testing theories and ideas	1	2	3	4	5	6	7
24. Measuring and evaluating effective performance	1	2	3	4	5	6	7
25. Working in groups	1	2	3	4	5	6	7
26. Seeing how things fit in the big picture	1	2	3	4	5	6	7
27. Choosing the best solution to a defined problem	1	2	3	4	5	6	7

APPENDIX C
ENVIRONMENTAL PRESS QUESTIONNAIRE (EPQ)

ENVIRONMENTAL PRESS QUESTIONNAIRE

Work abilities: (Circle the appropriate number for each item).

To what extent do you need these competencies or work abilities to do well in nursing?

	not at all important					high level needed	
1. Listening with an open mind	1	2	3	4	5	6	7
2. Developing comprehensive plans	1	2	3	4	5	6	7
3. Building conceptual models	1	2	3	4	5	6	7
4. Committing yourself to objectives	1	2	3	4	5	6	7
5. Influencing and leading others	1	2	3	4	5	6	7
6. Making decisions	1	2	3	4	5	6	7
7. Designing experiments	1	2	3	4	5	6	7
8. Being sensitive to values	1	2	3	4	5	6	7
9. Being able to adapt to changing circumstances	1	2	3	4	5	6	7
10. Generating alternative ways to doing things	1	2	3	4	5	6	7
11. Organizing information	1	2	3	4	5	6	7
12. Setting goals	1	2	3	4	5	6	7
13. Experimenting with new ideas and approaches	1	2	3	4	5	6	7
14. Imagining implications of (ambiguous) situations	1	2	3	4	5	6	7
15. Identifying and defining problems	1	2	3	4	5	6	7
16. Dealing with people	1	2	3	4	5	6	7
17. Gathering information	1	2	3	4	5	6	7
18. Seeking and exploiting opportunities	1	2	3	4	5	6	7
19. Communicating with others	1	2	3	4	5	6	7
20. Analyzing quantitative data	1	2	3	4	5	6	7
21. Being sensitive to people's feelings	1	2	3	4	5	6	7
22. Being personally involved	1	2	3	4	5	6	7
23. Testing theories and ideas	1	2	3	4	5	6	7
24. Measuring and evaluating effective performance	1	2	3	4	5	6	7
25. Working in groups	1	2	3	4	5	6	7
26. Seeing how things fit in the big picture	1	2	3	4	5	6	7
27. Choosing the best solution to a defined problem	1	2	3	4	5	6	7

APPENDIX D
NURSING THEORIES OPINIONNAIRE (NTO)

NURSING THEORIES OPINIONNAIRE

DIRECTIONS: This is not a test and there are no right or wrong answers. It is important that your responses accurately reflect your own feelings. Below the concept is a series of eleven descriptive-adjective scales. Here is how you use the scales. An (X) placed toward the left of the scale indicates that you judge the concept to be more like the adjective on the left of the scale than the adjective on the right side of the scale.

Do not spend too much time deliberating on any one item, but try to give your first impression and work as quickly as possible. It would be appreciated if you would place your (X) in the middle of the spaces (: :X/), and not on the boundaries (: X :).

CONCEPT: NURSING PRACTICE BASED ON EXPLICIT NURSING THEORY

GOOD : ___ : ___ : ___ : ___ : ___ : ___ : ___ : BAD

UNPLEASANT : ___ : ___ : ___ : ___ : ___ : ___ : ___ : PLEASANT

DEEP : ___ : ___ : ___ : ___ : ___ : ___ : ___ : SHALLOW

VALUABLE : ___ : ___ : ___ : ___ : ___ : ___ : ___ : WORTHLESS

CLEAR : ___ : ___ : ___ : ___ : ___ : ___ : ___ : HAZY

MEANINGLESS : ___ : ___ : ___ : ___ : ___ : ___ : ___ : MEANINGFUL

NICE : ___ : ___ : ___ : ___ : ___ : ___ : ___ : AWFUL

NEGATIVE : ___ : ___ : ___ : ___ : ___ : ___ : ___ : POSITIVE

PASSIVE : ___ : ___ : ___ : ___ : ___ : ___ : ___ : ACTIVE

SWEET : ___ : ___ : ___ : ___ : ___ : ___ : ___ : SOUR

WEAK : ___ : ___ : ___ : ___ : ___ : ___ : ___ : STRONG

1. If given an opportunity to choose between 2 theories as your basis for nursing practice, which of the following would you choose? Circle one only.

1. Orem's Self care theory
2. Betty Neuman's health care systems model

2. For each method of learning listed below indicate how helpful it would be to you as a method for learning nursing theory by placing the appropriate number in the blank preceeding each method.

NOT HELPFUL, AT ALL	SOMEWHAT HELPFUL	HELPFUL	VERY HELPFUL
1	2	3	4



- ___ Formal lectures from an expert
- ___ Textbook readings using a study guide
- ___ Small group discussion of a case study
- ___ "Hands on" experience in the clinical area

APPENDIX E

NURSING CAREER CHOICE QUESTIONNAIRE (NCCQ)

NURSING CAREER CHOICE QUESTIONNAIRE

Each of the statements below is something that a person might say about nursing. You are to indicate your own, personal feelings about nursing by marking how much you agree with each of the statements.

Write a number in the blank for each statement, based on this scale:

HOW MUCH DO YOU AGREE WITH THIS STATEMENT?

DISAGREE STRONGLY 1 DISAGREE 2 DISAGREE SLIGHTLY 3 NEUTRAL 4 AGREE SLIGHTLY 5 AGREE 6 AGREE STRONGLY 7

- ___ 1. My opinion of myself goes up when I do this job well
- ___ 2. Generally speaking I am satisfied with nursing
- ___ 3. I feel a great sense of personal satisfaction when I do this job well
- ___ 4. I frequently think of quitting nursing
- ___ 5. I feel bad and unhappy when I discover that I have performed poorly on this job
- ___ 6. I am generally satisfied with the kind of work I do in nursing
- ___ 7. My own feelings generally are not affected much one way or the other by how well I do this job

Apart from your nursing education program(s), what experiences have you had in nursing?

How many years experience in nursing have you had?

What is your current age?

What is your current student status?

- ___ full time
- ___ part time
- ___ year in program

APPENDIX F

CONSENT FORM FOR SUBJECT PARTICIPATION IN STUDY

Research Subject Consent for Research Study

I _____ consent to participate in this study on student learning styles directed by Heather Laschinger at the University of Ottawa School of Nursing.

My participation involves:

1) completion of the Learning Style Inventory, Environmental Press Questionnaire, Adaptive Competence Scale, Nursing Theories Questionnaire and the Nursing Career Choice Questionnaire in the winter of 1986.

I understand that my participation is voluntary and I may withdraw from this study at any time without consequences. I understand that this data will be used for research purposes only with the researcher having exclusive access to the data which will remain in a locked file for four years.

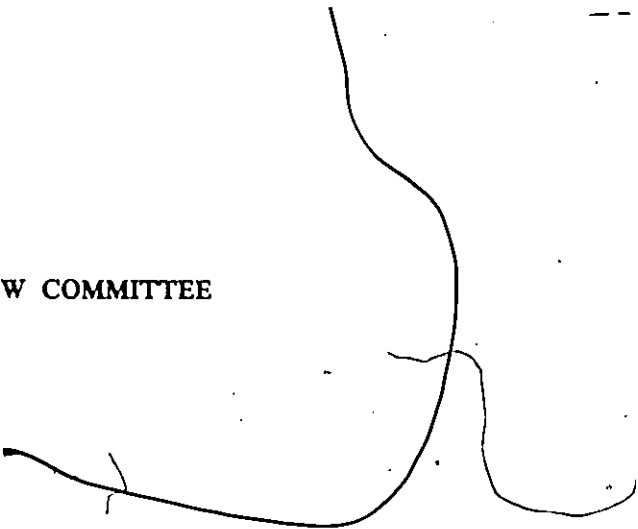
I understand that the study findings may be published but that any information that would identify me will not be revealed in any publication about the study.

I understand that any questions I may have relating to the study may be answered by contacting Heather Laschinger, at University of Ottawa School of Nursing.

Date: _____

Signature: _____

APPENDIX G
APPROVAL OF ETHICAL REVIEW COMMITTEE



UNIVERSITÉ D'OTTAWA



UNIVERSITY OF OTTAWA

January 14, 1986

Mrs. Heather Laschinger
School of Nursing
University of Ottawa
451 Smyth Road
Ottawa, Ontario
K1H 8M5

Dear Mrs. Laschinger:

Following a serious ethical review, the research committee at the University of Ottawa has approved your project entitled: Learning Styles and Attitudes towards Theory-based Nursing of Nurse Clinicians and Nursing Students.

We hope that you will be successful in the completion of this most interesting and needed study.

Sincerely,

Marie A. Loyer, PhD
Chairperson Pro-tem
Nursing Research Committee

MAL/gg

APPENDIX H

ABSTRACT



2

ABSTRACT

APPENDIX I

LEARNING STYLES OF BACCALAUREATE NURSING STUDENTS AND ATTITUDES TOWARDS THEORY-BASED NURSING PRACTICE

The purpose of this study is to investigate personal and environmental factors which could impact on attitudes towards theory-based nursing from the experiential learning perspective. Kolb has suggested that the structure of knowledge of a discipline is a major force which shapes learning styles of members of the discipline. Nurses and nursing students have been found to have predominantly concrete learning styles suggesting a practical, people-oriented manner of dealing with the world (Laschinger & Boss, 1983; Huch, 1981). Kolb reports that concrete learners find theoretical approaches unhelpful and prefer to treat each situation as an unique case.

In the past decade, nurse educators have emphasized the need to base nursing practice on explicit nursing theory (Fawcett, 1984; Meleis, 1985). A theory-based approach will require the further development of abstract competencies in nurses and nursing students. In view of the past research findings in which nursing students were found to be predominantly concrete learners, it would seem important for nurse educators to develop strategies to supplement nursing students' concrete learning competencies with those of an abstract type. Experiential Learning Theory may provide a means of assessing an individual's level of skill on these competencies and a means for determining the degree of emphasis on different competencies in nursing environments.

ABSTRACT

One hundred and twenty-one third and fourth year generic baccalaureate nursing students and 76 Post-RN students enrolled in a theory-based nursing curriculum were invited to participate in the study. Subjects completed two measures of personal learning style (the LSI and the ACP) and a measure of environmental press, the (EPQ) (Kolb et al., 1981). In addition, subjects completed an instrument constructed by the researcher, the Nursing Theories Opinionnaire (NTO). Correlational analyses as well as t-tests for differences between means were used in the analysis of data.

The results of this study suggest that as hypothesized, learning style and perceptions of environmental press of nursing learning environments are significantly related to attitudes towards theory-based nursing. Subjects with concrete learning styles and subjects who perceived nursing environments to be predominantly concrete were less positive towards the concept of theory-based nursing than those with abstract learning styles. Contrary to expectations, learning style was not found to be significantly related to preferred method of learning nursing theories nor to nursing theory preferred as a basis for practice.

The results of this study have potential usefulness for nurse educators in developing strategies for teaching theory-based nursing to both incoming members to the profession and to experienced nursing professionals.