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The Relationship between Cognitive Style and Problem-Oriented Recording: An Exploratory Study

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The Relationship Between Cognitive Style
And Problem-Oriented Recording:
An Exploratory Study

by

Barbara L. Mudloff

A Dissertation Submitted to the Faculty of the School of Education
of Loyola University of Chicago in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Education

May 1981

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THE RELATIONSHIP BETWEEN COGNITIVE STYLE AND
PROBLEM-ORIENTED RECORDING: AN EXPLORATORY STUDY

The overall purpose of this exploratory study was to examine the relationship between cognitive style and the implementation of a health recording approach, the problem-oriented recording method (POR). The author examined the general problem-solving approaches of 50 registered pediatric nurses, working in a large urban medical center. The Group Embedded Figures Test (GEFT) was administered to all volunteers to categorize their general approach to problem-solving. Only nurses who scored in the lowest or highest quartiles of the GEFT were asked to continue in the study. These demarcations were done to avoid ambiguity with respect to the placement of the middle two quartile subjects.

All subjects were females, and norms utilized for female adult subjects. Thirty-six subjects completed the entire study. Following administration of the GEFT, random assignment to one of two instructional methods, lecture or self-instruction, occurred. Each participant was then administered a pretest relating to POR to assess prior

knowledge level of POR.

Following pretest administration, each participant was given a lecture on POR or self-instructional material to learn POR. Subjects were then asked to practice the POR for a six-week period. A subsequent posttest was administered to all participants.

Data were analyzed by an unweighted means analysis, resulting in rejection of the null hypotheses. A significant interaction at the .05 level was found between cognitive style and instructional method. Nurses described as field-dependent had higher average scores by the lecture method; nurses described as field-independent demonstrated high average scores by the self-instruction method. Tukey's test was also employed to determine significant differences among the means of the difference scores. One set of means was found to be significant at the .05 level.

Discussion of results centered upon the findings of this study being consistent with previous research dealing with cognitive style and learning of a conceptually based task. Field-dependent subjects generally do less well when formulating correct hypotheses for such tasks.

The investigator recommends that this exploratory study be replicated in several similar clinical settings with more elaborate controls, to corroborate the results, and that additional studies extend this design to include verbal analysis of strategies utilized to formulate the POR information.

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VITA

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CHAPTER I

INTRODUCTION

Interest in cognitive style has generated much educational research, especially research associated with the field-dependence-independence dimension (FDI) (Witkin, 1977). Extensive evidence has accumulated over many years that the styles identified with perception are also manifested when a person deals with symbolic representations, such as thinking and problem-solving. Individuals who have difficulty separating a perceived item from its environment also have difficulty with the class of problems whose solution depends on taking a critical element out of the context in which it appears and restructuring the problem material so that the item is now used in a different context.

Relatively field-independent persons (FI) are more likely to impose structure on stimuli that lack it or to overcome the organization of a predominant field. The propensity to impose structure upon a field is not limited to perceptual material but extends to verbal material as well. Field-independent persons develop and utilize mediators especially with tasks that require the learning of concepts to solve problems. Hence analysis and structuring are complimentary to articulation of the field. On the other hand, field-dependent persons are more likely to perceive the prevailing

field of stimuli in a global fashion and use far less intervention of mediators such as analysis and restructuring in problem-solving situations.

Studies examining the interaction between cognitive style and instructional method reveal that field-independent persons take an active role in the learning process while field-dependent persons more readily accept the structure of the material. Evidence is available that the method of instruction influences the learning process for field-dependent and field-independent persons.

This study focuses upon the learning of a procedure to restructure a set of data concerned with health problems and to determine the effects of cognitive style upon the learning of this procedure.

Statement of the Problem

During the last two decades, there has been a great need to learn vast amounts of information, sometimes resulting in stressful learning situations. Since most human learning is not solely a process of natural growth and development, but a phenomenon occurring in a specific context, we need to describe and to predict optimal learning methodologies for many different styles.

One area of vast knowledge and skill expansion in the last decade has been in the American health care system. This expansion has resulted in the development of sophisticated technologies and the need to educate numerous health care personnel to analyze and interpret the data obtained from use of these technologies. Until recent

years, most health care personnel were not required to demonstrate a high degree of analytic thought about data, but simply to carry out the physician's orders.

Examples of such assessment are numerous. One example within nursing is the nurse who works in the intensive care unit. She is expected not only to maintain bodily comfort, but also to interpret electrocardiogram readouts from the monitor and take appropriate actions based on the analysis of the data. If her analysis reveals a life threatening condition, she must give potent cardiac drugs intravenously and might need to start emergency resuscitation procedures before the physician arrives. A second example is found among nurses working in the community health care setting. The nurse may be making an analysis of data based upon physical exams, formerly thought the sole province of the physician. In some instances the nurses are functioning as independent practitioners and receiving fees for their services. A third example is the nurse who needs to present preparatory birthing instructions to a family or assist the mother at the birth of her baby. For nurses who have been educationally prepared by the lecture method, a more independent approach requiring self-study and learner participation may be quite stressful. Because of the quick advances in knowledge and roles, different approaches to learning have been evolving in the nursing profession. Among the newer approaches to study in nursing are self-study, programmed instruction, films, and workshops.

All of the procedures or tasks require written documentation of the analysis of the problem and an evaluation of the actions taken. Documentation provides a record of the activities performed and at least an implicit analysis of the reason for certain actions. Ideally documentation should provide a consistent approach to management of health care problems, and an explicit analysis of the approaches to management of these problems. One method of documentation providing this approach is the problem-oriented method of recording (POMR).

The reader should note that references to problem-orientation and problem-solving in this text refer to a particular pragmatic technique within nursing education and are not continuous with problem-solving research of the type done by Werthermer, Polya, etc.

The POMR is based upon the scientific problem-solving approach and was introduced into the American health care system by Dr. Lawrence Weed. The sequence of actions include (1) obtaining a data base-health history and present problems, (2) formulating an initial plan for health care, (3) writing progress notes based on the plan, and (4) evaluating the plan of action. The progress notes are written in a specific format called SOAP charting. This form of charting is based upon statements of the patients, the objective findings of the health team, the assessment of these data, and the plan of action. Each health team member contributes to this process at his/her level of sophistication. Although a medical diagnosis lies with-

in the province of the physician, the nurse can add to or present a problem at his/her level of knowledge.

Since many institutions and agencies have or want to initiate the POMR in an attempt to provide a more consistent approach to delivery of health care, its documentation, and evaluation, and since most nurses do not presently utilize this approach in their work setting; the investigator has decided to study factors relating to the implementation of problem-oriented recording in a large urban medical center. Following a review of the literature in the areas of cognitive style and staff development the investigator determined that cognitive style as described by Witkin (1977) and instructional approaches of the teacher were key factors in nursing personnel's mastery of POMR.

Hypotheses

Since the overall purpose of this study is to determine the relationship between cognitive style and the ability to utilize a problem-solving approach, the POR, in a clinical setting, the following null hypotheses were developed for testing and are:

Hypothesis One: There will be no significant differences in the ability to utilize problem-oriented recording (POR) among nurses with different cognitive styles as assessed by the Group Embedded Figures Test (GEFT) following instruction by the lecture method.

Hypothesis Two: There will be no significant differences in the ability to utilize problem-oriented recording (POR) among nurses

with different cognitive styles as assessed by the Group Embedded Figures Test (GEFT) following instruction by the self-instructional method.

Hypothesis Three: No correlation exists between cognitive style and the instructional method for the learning of a problem-oriented recording (POR).

Scope and Limitations of the Study

This study is limited to one urban medical center and to three clinical pediatric nursing areas within that medical center. All participants are registered nurses or licensed practical nurses who have completed a basic pediatric nursing course and who have passed the state licensing exam in pediatrics. All participants presently chart on the medical record.

No attempt has been made to control for intelligence or grade point averages. In addition number of years in pediatric nursing has not been controlled. It is the intent of the investigator to pilot this project as an in situ project.

Definition of Terms

For the purposes of this study, the dependent variable of cognitive style and the independent variable of instructional method are defined as follows:

Nurse is a professional health member who is qualified by education and certification to practice nursing as a registered professional nurse or a licensed practical nurse.

Cognitive style is defined as a characteristic approach to many situations encompassing perceptual and intellectual activities (Witkin, 1977).

Field-independent person is one who tends toward the perception of an entity as discreet from the background, utilizing the process of articulation.

Field-dependent person is one who tends toward the perception of their environment as a whole, utilizing this field as their primary source of evidence.

Embedded Figures Test is defined as the instrument developed by Witkin and associates to determine an individual's approach or style to environmental problems. Two major classifications are defined field independence and field dependence.

Lecture method is a didactic approach where an instructor presents the method of problem-oriented recording.

Self-instruction is a method of teaching the problem-oriented recording through use of a written question and answer format with examples for the subject to study on his/her own.

CHAPTER II

REVIEW OF THE RESEARCH

This chapter selectively reviews psychological studies related to the general concept of cognitive style, relevant educational research utilizing Witkin's approach to cognitive style, and the trends and research developments in the area of staff development.

This review strategy was utilized to provide a historical and conceptual development of the concept of cognitive style within the general field of psychology, and to assist the reader in making distinctions in the use of the term cognitive style by providing an appreciation for the sometimes subtle differences of the use of the construct of cognitive style.

The second focus of this chapter, educational research utilizing Witkin's approach to cognitive style, was formulated to provide a review of the use of the construct of cognitive style within an educational setting. The investigator thought a separate review of educationally related studies of cognitive style was particularly relevant because of the nature of this study, which focuses upon the learning of new material for staff personnel and the relationship between the learning method and cognitive style.

This literature review would not be complete without reference to the studies conducted in the area of staff development. Although

staff development is emphasized and encouraged, especially in educational and health care settings, research evaluating program effectiveness is usually perfunctory in nature. Frequently evaluation data are not kept or do not provide teachers with information which will be helpful for planning future programs or furnishing estimates of program effectiveness. Hence, the author included the topic of staff development to provide a perspective of the issues and problems and to assist in the development of the design of this study.

The need for efficient learning methods will reportedly become a central issue in the decade of the Eighties. This factor was recognized, at least implicitly, at the 1980 convention of the American Educational Research Association in Boston where selected papers dealing with efficiency of learning and attitudes of participants in training programs providing knowledge and skills for future use in a work setting were presented.

Cognitive Style

Witkin developed several instruments to measure cognitive style. One test was the Room-Adjustment Test (RAT). In this test the room is tilted 56 degrees and the chair 22 degrees. While the chair remains in a tilted position, the subject is asked to instruct the examiner to reorient the room to an upright position. The subject is given eight trials. In four trials the room and chair are tilted in the same direction, and in four trials the room and chair are tilted in opposite directions.

The Body-Adjustment Test (BAT) consists of six trials. In half the trials the room and chair are tilted in the same direction, and in half the trials they are tilted in the opposite direction. The subject is required to direct the experimenter to bring him (the subject) to the upright position. The BAT and RAT are scored similarly to the Rod-and-Frame Test (RFT).

The RFT consists of three series of eight trials each. On the first series, the frame and the subject's body are both tilted 28 degrees in the same direction. The rod is tilted 28 degrees in the same or opposite direction. The subject is required to bring the rod to a vertical position. In the second series, the body of the subject and the frame are both tilted 28 degrees to opposite sides. In the third series, the subject remains erect while the frame is tilted 28 degrees to the left or right. The total score is obtained by converting the subject's score on each series into a standard score on the basis of age and sex group to which the subjects belong. Witkin (1962) suggested using only the third series of the RFT instead of the complete test.

Variations of the original RFT were cited by Handle (1972) which do not require a light-proof room or a tilting chair and are portable. Performance with these modified instruments generally correlates well with performance on the original instrument. Some studies of testing variations have affected performance on the RFT (Long, 1973).

One of the most widely used modifications is Oltman's (1968) portable RFT. In a standardization study with 163 college students, Oltman reported a correlation of .89 between performance on his portable measure and performance on the standard RFT. Stuart and Murgatroyd (1971) reported a correlation of .86 between scores derived from their version of the RFT and Oltman's version.

Busch and Simon (1972) reported on a method for instructing five to seven year olds in the use of a portable RFT. Fiebert (1967) developed a system for administering the RFT to deaf children. Keogh and Tardo (1975) compared the performance of 63 third-graders on two versions of the RFT. They found that Nickel's version (1971) was more reliable and yielded scores with greater variability.

Hurley (1972) reported an unsuccessful attempt to develop a group administered RFT.

The Embedded Figures Test (EFT) requires the subject to locate a simple figure within a complex content. Witkin selected 24 figures from a set originally developed by Gottschaldt (1926) and superimposed colored patterns to make the test more difficult. The subject was originally given a maximum of five minutes for each figure. The score was the mean amount of time taken to find all 24 figures. The raw score was converted into a standard score. Witkin and associates (1971) prepared a manual giving detailed instructions on the administration and scoring of the EFT.

Witkin, based on his work (1962) and the work of Jackson

(1956), recommended the use of the first 12 items of the EFT, with a three-minute limit for each item, for research purposes.

Jackson, Messick, and Myers (1962, 1964) compared performance on five group-administered versions of the EFT with performance on an individually administered short form of the EFT derived from Jackson (1956). The subjects were 112 undergraduates. They found all five group administered forms to correlate significantly with the individually administered form, the correlation coefficients ranging from .62 to .84. For economy of administration they recommended that the Form V be used because it required only ten minutes for administration and could be printed at a lower cost than the chromatic version.

Spotts and Mackler (1967) also presented data on the relationship between individual and group administered versions of the EFT. Their subjects were 40 male undergraduates. They administered the Jackson short form of the EFT individually and a Jackson, Messick and Meyers (1964) group administered Hidden Figures Test. Spotts and Mackler obtained a statistically significant correlation of .55 between the two measures.

A Group Embedded Figures Test (GEFT) is also available for group administration (Witkin, 1971). Zenhausen and Renna (1976) studied the results of a sample of 337 undergraduates who took the GEFT. The results indicated a greater proportion of field dependent subjects than Witkin's earlier norms predicted. Evans (1969) showed

that correlations between the EFT and an early version of the GEFT were higher when subjects had prior opportunity to practice the group task. For 62 inexperienced college student subjects, the correlation was .43; for 43 experienced subjects, the correlation increased to .73.

The EFT is suitable for subjects 10 years of age and older. Goodenough and Eagle (1963) developed a children's version of the EFT, the CHEFT. They administered the CHEFT along with the RFT, BAT, and EFT to 30 ten-year old boys. The correlations between CHEFT scores and other three test scores were all statistically significant .70, .46 and .63, respectively. The intercorrelations among the other three tests were also significant and ranged from .59 to .68. The CHEFT was modified for easier administration by Karp and Konstadt (1963) and became known as The Children's Embedded Figures Test (CHEFT). Witkin (1971) recommended using the CHEFT for children five to nine years old. Coates (1972) developed a preschool form of the EFT.

Banta (1970) also developed a version of the EFT for use with very young children, the Early Childhood EFT. The task requires the identification of cut-out figures from a context. Herkowitz (1972) developed the Moving Embedded Figures Test (MEFT) for use with elementary school children. The subjects view a 20 minute film and are required to discriminate figures moving against stationary backgrounds. Herkowitz does not present data relating the MEFT to per-

formance on the CHEFT. The data relating to several of these pre-school instruments were reviewed by Kogan.

A number of foreign language forms of the Witkin tests have been used including a translation of the instructions of the CHEFT into Ibo (Okonji, 1969). To administer CHEFT to a group of Mexican children, Mebone and Johnsen (1970) translated the directions into Spanish. Vajtisek and Magara (1974) developed a short form of the EFT suitable for use with psychiatric patients. Pizzamiglio and Pizzamiglio (1974) presented norms for an Italian version of the CHEFT. Axelrod and Cohen (1961) employed a tactile version of the CHEFT in their research on the elderly.

Comrey, Bacher and Glaser (1973) cited a convention presentation by Evans (1969) reporting the development of a questionnaire measure of field dependence. Evan's 50 item Psychological Differentiation Inventory was designed for use with undergraduates and was developed to correlate with the EFT. Evans reported significant correlations between his measure and the EFT of .76, .64, and .46 for samples of 73, 60, and 154 undergraduates, respectively.

In 1965 Rosenblum, Witkin, Kaufman, and Brosgole reported on a version of the EFT designed for administration to monkeys. The initial data indicated that monkeys also differ from one another in perceptual disembedding.

Reliability. Witkin and associates (1962) reported the results of their research and that of others on the reliability of the RFT, BAT, and EFT. In all the studies reported, the reliabilities were

high, clustering in the high .80's to low .90's when tests were re-administered at one week intervals. Test-retest reliabilities over a three-year period are lower for the RFT and BAT, but remain satisfactory.

Adevai and McGough (1968) compared RFT scores in a sample of 36 undergraduate male freshmen and again four years later. There were no statistically significant differences between the mean error scores of the two testings. The correlation between the two sets of scores was .86. Bauman (1951) found a similar correlation of .84 for a sample of 32 males tested three years apart.

Dreyer, Nebelkopf, and Dreyer (1969) administered the CHEFT to a sample of 46 kindergarten and first-grade children. The test-retest correlation was a significant .87. They also noted a one-month test-retest reliability of .96 for portable RFT scores for a sample of 90 kindergarten children. Bowd (1974) administered the CHEFT to 53 kindergarten children and readministered the test to 47 children ten months later. He obtained a significant correlation of .80.

Busch and Simon (1972) reported very high split-half reliability coefficients for five-to-seven-year old children on their RFT. The test-retest reliability over periods ranging from about one month to more than two months was .57 for 70 subjects. Rusch and Lis (1977) found test-retest correlations ranging between .26 and .90 for a sample of 113 children retested after a three-year interval.

These results and other studies indicate that tests for the

construct of cognitive style as defined by Witkin have satisfactory reliability.

Parametric Factors. Small (1973) provided an excellent brief summary of studies reporting attempts to modify RFT performance. Generally, RFT performance is not modified by drugs or alcohol, but it can be improved by psychotherapy, supplying feedback, and practice. Goodenough and Witkin (1977) noted that EFT and RFT performance shows greater field independence with practice or training. Small showed that the RFT performance of normal college students could be improved through the administration of verbal reinforcement; it is unclear from Small's data whether verbal reinforcement can worsen RFT performance. Pelletier (1974) showed that training in transcendental meditation increases EFT and RFT measured field independence. These results suggest that the experimenter should use naive subjects to avoid bias in subjects' scores.

Intercorrelations Among Measures of Cognitive Style. Two factors are involved with regard to intercorrelations among measures of cognitive style. The first involves the degree of the relationship between different versions of the same measure, for example, the RFT and Portable RFT, and the EFT and Group EFT. Handel (1972) found that scores derived from various versions of the RFT were highly related. The same is true for correlations between versions of the EFT (Witkin and associates, 1971).

The second issue involves the degree of relationship between

different measures of field dependence, for example, the RFT and EFT. Witkin and associates in 1962 proposed that a perceptual index be derived by taking the mean score on the RFT, BAT, and EFT. The RAT was excluded because it proved to be a poor measure of field dependence. Intercorrelations among the three tests indicated that significant relationships existed among them. The correlations were generally in the range of .30 - .60. The authors concluded that these results indicate a consistent relationship in the perceptual functionings of individuals. The correlations between the RAT and other tests were lower; this fact was particularly true for younger subjects, ages 8-12 years.

Karp (1963) administered the RFT, EFT and BAT along with a variety of other measures to 150 male undergraduates in an attempt to determine whether the ability to overcome embeddedness is a specific aspect of a more general ability to overcome distraction. A factor analysis was performed on the intercorrelations among the 18 measures and showed three measures of field dependence to load on a common factor, and to have the highest loadings of any of the items on both four and eight factor rotations. Karp concluded that the ability to overcome embeddedness is distinct from distractibility.

In 1977, Witkin and Goddenough responded to suggestions that the RFT and EFT did not always overlap and when used interchangeably often generated contradictory findings. They indicated that some overlap exists between measures of perception of the upright and

measures of cognitive restructuring, but the overlap is not complete. They maintain that critical to performance on tests as the RFT is the extent to which subjects rely on body or visual fields as primary referents, and suggests that the processes involved in performance on the RFT are separate and distinct, though related to, those involved in the solutions of an embedded figures problem. These later problems are examples of a cognitive restructuring task. Preston and King (1979) support the fact that some common variance exists for the GEFT and RFT.

Witkin, Goodenough, and Karp (1967) studied developmental differences with respect to cognitive style. They found statistically significant correlations between the EFT and both the RFT and BAT at various ages from eight years to college level. Some significant correlations existed between the BAT and RFT. Arbuthart (1972) reviewed 40 studies in which more than one measure of field-dependence was used. He concluded that the Draw-a-Person Test and the Koh's Block Design should not be used as substitutes for the RFT and EFT in measurements of field-dependence. Weissenberg (1973) reviewed 12 studies from which he concluded that a medium correlation of .51 between the Hidden Figures Test (HFT) and the RFT, EFT, and the figure-drawing scale.

Correlations with other tests such as the Rorschach and the EFT were studied by Siegel (1977). Siegel thought that a logical relationship would exist between these tests. He tested 20 under-

graduates administering the EFT and Rorschach. He did not find a significant relationship existed, and concluded that there is a need for further clarification and refinement in the concepts of penetration and barrier scores for body image.

Preston (1979) examined the correlation between the GEFT and the Nickel Rod and Frame Test. She found that some common variance exists for the scores on the GEFT and RFT by Nickel.

Lockheed (1977) validated the CHEFT with 34 girls and 39 boys in the fourth grade, and 35 girls and 39 boys in the fifth grade. Significant correlations were found between the test and the articulation of body concept for the fourth grade boys and girls and fifth grade boys and girls. The EFT also correlated with scores on the Portable Rod and Frame Test for the fourth grade boys and girls.

Having reviewed several areas basic to the development of the EFT, the investigator will not review several areas of research related to the EFT and psychological concepts. These areas include social desirability, sex differences, intelligence and development.

Social Desirability. Pearson (1972) used the lie scale of the Eysenck Personality Inventory as a measure of social desirability. He used a sample of 30 neurotic young adults and obtained a statistically significant correlation of .48 between the personality test and the EFT as developed by Jackson in 1956, indicating that greater need for social approval is related to field dependence at least among young neurotic subjects.

Loo (1976) investigated Witkin's suggestion that low manifest anxiety is associated with relatively high perceptual articulation, whereas high anxiety is associated with relatively low perceptual articulation. IQ was controlled for 60 female undergraduates. Half of each group was assigned to either high or low ego involving conditions, and then completed three perceptual tests. Contrary to Witkin, the study yielded no significant relationship between anxiety and perceptual articulation. Loo (1976) also reported that a significant correlation was found between the Eysenck Personality Inventory measure of extraversion, and the GEFT for 35 female university students, indicating that field-dependent persons are more extraverted than field-independent persons. Correlations between measures of Eysenck's test were not significant.

Gormanous (1976) examined the effect of consequence between locus of control and cognitive style on the personality traits of anxiety and neuroticism in college subjects tested on Rotter's Intra-version-Extraversion Scale, the GEFT, the State Trait Anxiety Inventory, and the Eysenck Personality Questionnaire. Four relatively equal groups resulted by combining the locus of control and cognitive style scores. Subjects were classified into one of four groups: internal field-independents, external field-dependents, internal field-dependents, or external field-independents. The first two groups were combined to form the congruent group, and the last two groups formed the incongruent group. The two groups

that formed the congruent group significantly differed from each other in both dependent measures. The main effects of locus of control and cognitive style tended to cancel out each other when theoretical opposite extremes were combined. On both dependent measures, the internal field-independent group exhibited the lowest scores while the external field-dependent group exhibited the highest scores. Ghuman (1977) explored the relationship between scores on Piagetian tests of conservation, Raven's Standard Progressive Matrices, and the CHEFT with 60 eleven-twelve-year old children. The Children's Personality Questionnaire (CPQ) was also administered and special class data were obtained. There were significant correlations between CHEFT scores and the cognitive variables, including Factor B of the CPQ. Two significant relationships were found between the personality factors and the CHEFT. A significant difference was found between the social classes. The middle class children performed better than working class children; sex differences were not significant.

In 1977 Loo examined the relationship between field dependence and extraversion. The subjects were female university students who were given components of the Eysenck's Extraversion Scale and the GEFT. In two of three samples of students, field independence was associated with low impulsivity and plan decision times.

Loo (1978) conducted two experiments to investigate the hypothesis of an antagonistic and unhealthy relationship between extra-

version and field-dependence such that field-dependent subjects have a greater incidence of neuroticism than any other combination of the two dimensions. In the first experiment, 66 normal undergraduates completed the GEFT and Eysenck Personality Inventory. In experiment two, the case report data were analyzed for 24 male and 37 female hospitalized psychiatric patients who had been given the WAIS and the MMPI. The hypothesis was supported in both studies. Sex differences were found in extraversion, field-dependence, and their relationship to neuroticism.

In 1978, Hughes studied the relationship between the Eysenck's test for personality and the EFT. Subjects were 35 male and 34 female students of psychology ranging in age from 17 to 31 years. He found a small but significant sex difference in the EFT with males having higher field independence scores. No significant difference was found between the sexes on Eysenck measure.

Patsiokas, Clum and Luscomb (1979) contrasted cognitive characteristics of rigidity, impulsivity, and field-dependence in a group of 49 19-59 year old suicide attemptees and a group of 48 19-64 year old nonsuicidal psychiatric controls. All subjects were administered the EFT, the Alternate Uses Test, and the Matching Familiar Figures Test. The suicide group was characterized by greater rigidity in a divergent thinking task. Field-dependence was more characteristic of the suicide attempters. Impulsivity did not differentiate the two groups. The results are interpreted as sup-

porting a hypothesis of a cognitive predisposition to attempting suicide.

Sex Differences. In the early work of Witkin and associates (1954), there was found that females were more field-dependent than males, the differences being largest among adults. A close examination of the literature will bring forth a question about this fact. A number of studies have found no statistically significant differences in field dependence between males and females for both children (Bieglow, 1971; Bowd, 1974b, 1976a; Busch & Simon 1972; Coates, Lard and Jakabonics, 1975; Crandall & Sinkeldom, 1964; Domesch & Balter, 1976; Dreyer, Neblekoph, & Dreyer, 1969; Keogh & Lards, 1975; Massari, 1975) and undergraduates (Bieri, 1960; Eisner & Williams, 1973; Jackson, Messick & Myers, 1964; Willoughby, 1967). Coates (1974) and Constantinople (1974) found female children to be significantly more field-independent than male children.

During the last five years researchers have continued to study sex differences with respect to the EFT.

Allen (1978) examined the strength of association between sex and field dependence on RFT and EFT. She concluded, after studying 38 results from these tests, that gender accounts for less than 15 percent of the variance in field-dependence scores. Connor (1977) found no significant sex differences for visual-spatial abilities of 133 children in grades 1, 3, and 5 following a visual procedure designed to improve performance on the EFT.

Lynn Liben (1978) explored the relationship between performance on Piagetian spatial tasks, as a function of sex, field dependence, and training with 33 female and 33 male high school students. Liben utilized the EFT and the Guilford-Zimmerman Test of Spatial Orientations. Significantly more girls than boys made errors in horizontality tasks. Performance on the Piagetian spatial tasks was significantly correlated with performance on the EFT in both sexes. These findings emphasize the importance of studying performance on Piagetian tasks throughout the life span and particularly for interpreting cross-sectional research in elderly populations to recognize that the various concepts studied by Piaget are not universally achieved by adolescence.

In 1979 Martin compared twins for degree of closeness and field dependency. Sixteen pairs of male adolescent monozygotic twins and 16 pairs of dizygotic same-sexed male twins were administered a zygosity questionnaire, a semantic differential measure of closeness, and a short form of the EFT. No significant differences were found between the two sets of twins with regard to their closeness to their twin sibling or between the two groups with respect to field dependency. Intelligence differences were found between the monozygotic and dizygotic twins.

Morrell (1976) studied the effects of age and sex on a person's susceptibility to field dependence training and whether field dependence is a function of cognitive style or a person's inability

to make correct judgements in the face of too much and confusing and inaccurate information. Results from 11-, 14-, and 18-year old subjects indicated that RFT results are not a function of cognitive style. This seems particularly true of two aspects of the field-dependence phenomenon, the sex difference effect and the correlation between the RFT and EFT results.

Maria Revas (1978) studied the cultural differences between Mexican-American and Anglo-American boys and girls aged 5, 8, or 10 years old in an urban community with respect to field-dependence-independence. She found that there are no differences between the two cultural groups in either dimension of cognitive style. Mexican-Americans may be in the process of acculturation to the majority culture norms with respect to these two dimensions. Age, not ethnicity, was the best predictor of cognitive style. The results support a developmental trend from field-dependence to field-independence.

Schratz (1978) investigated sex differences in mathematical abilities and spatial relations among three ethnic groups prior to and during adolescence. Subjects, 244 in number, were second, third, fourth, fifth, and ninth graders. Instruments included the CHEFT and the Iowa Tests of Basic Skills. Significant interaction effects were demonstrated between ethnic group membership and sex for mathematical and spatial skills. In Hispanic adolescent groups, significant sex differences were found in scores in both skills in favor

of the female. No other study has reported the observed pattern of sex differences in Hispanic subjects, one that differs from that usually found in white subjects.

Signorella and Jamison (1978) found significant sex differences on measures of spatial ability, water-level performance, and sex role orientation. No significant differences were found for boys on field-dependence as measured by the GEFT. Correlations among field-dependence, spatial ability and water-level performance were significant while for girls they were not.

Intelligence. A number of studies have shown a positive relationship between field-independence and intelligence. In a factor analytic study involving a small number of children, Goodenough and Karp (1961) found some indication that performance on measures of field dependence is related to performance on WISC subtests of block design, picture completion, and object assembly. This finding was interpreted as providing evidence that these intellectual tests share with the measures of field dependence the requirement of overcoming embeddedness. In 1963 Karp studied 163 male undergraduates and obtained similar results. Witkin (1971) summarized the results of several studies on the relationship of EFT performance and intelligence in the test manual. Evidence was presented that moderate correlations between the EFT and the Weschler IQ scales were due to the relation between EFT performance and an analytical factor of the Weschler, i.e., block design, object assembly, and picture completion.

Coates (1975) found similar results for performance on the preschool EFT with respect to the block design and geometric scales of the WPPSI.

Many studies indicate that various measures of field-dependence are related to various measures of verbal and performance intelligence. These studies involve children (Bigelow, 1971; Busch & Simon, 1972; Canavan, 1969; Crandall & Lacey, 1972; Dreyer, Hulac & Rigler, 1971; Riley and Denmark, 1974; Satterly, 1976; Stuart, 1967) and undergraduates (Bieri, Bradhuen, & Galensky, 1958; Dubois & Cohen, 1970; Elliott, 1961; Gough and Alton, 1972; Houston, 1969; Spotts & Mackler, 1967; Wochtel, 1971). The correlations between field-dependence and intelligence are mostly in the .40-.60 range; correlations between field-independence and academic achievement and aptitude tests are lower.

Few later studies could be traced through computerized searches of psychological literature which specifically dealt with the constructs of IQ and EFT. One study conducted by Hoffman (1978) investigated the relationship between intelligence, field-dependence, leadership, and self-concept. Hoffman's sample was 88 sixth grade boys who were given the Piers-Harris Children Self-Concept Scale and the GEFT, and a measurement of IQ obtained by the Short Form Test of Academic Aptitude. Ten groups of four were formed consisting of subjects with different academic aptitude. Ten groups of four were formed consisting of subjects with different combinations of

high and low scores on the IQ and cognitive style measures. The groups were given an unstructured construction task. Following each session, the members of the group rated each other on leadership, and the percentage of speech time for each subject was obtained from tape recordings. Field-independence was related to intelligence and self-concept, and analytic subjects exhibited more leadership than global subjects. IQ did not differentiate subjects on any variable.

Development. The first major report of field-dependence research was completed by Witkin and associates in 1954. The data presented showed a relationship between age and field-dependence. One important point was the finding that field-independence increased sharply between the ages of 10 and 13 years. Between the ages of 13 and 17 years, slight increases in field-independence occurred. There was no significant difference in field-independence between the 17-year olds and a group of adults with a mean age of 20 years.

Witkin, Goodenough, and Karp (1967) reported an important study of developmental differences in field-dependence. Cross-sectional and longitudinal studies were conducted with subjects varying in age from 8 to 24 years. In the longitudinal study, the RFT performance was measured for subjects who were 10, 14, and 17 years old. A second group of subjects was tested at 8 and again at 13 years. The RFT, BAT, and EFT were administered cross-sectionally to approximately 25 boys and 25 girls at the following ages: 8, 10, 11, 12, 13, 15, 17 and 20 years. The data indicated an increase in field-

independence with increasing age, until 17 years of age. At that time a leveling-off occurred. Evidence was also present that showed individuals kept their relative positions among the field-dependence-independence dimensions with increasing age.

Crandall and Sinkeldom (1964) obtained a significant correlation of .74 between performance in a modified EFT and age for a sample of 50 grade school children ranging in age from 6 years to 12 years. When three measures of EFT performance were correlated with age for both males and females, correlations were obtained in the range of .50 to .83 (Crandall & Lacey, 1972).

In 1972 Handel used a portable RFT device to study changes in field-dependence as a function of age among 563 Israeli boys in grades 7 through 11. He found a statistically significant correlation between age and total error scores, indicating that older boys were more field independent than either six or seven-year old boys.

Alan Bowd (1977) conducted a study with 35 Canadian Indians and 33 white 7 and 8-year olds to examine the relationship between field-dependence and conservation in children from different cultural environments. Results support the proposition that the ability to ignore misleading perceptual cues as addressed by measures of field-dependence (e.g. CHEFT and Draw-a-Person Technique) is important on performance of Piagetian tasks.

Claeys and Dobreck (1976) administered the CHEFT and measures of verbal ability, perceptual speed, quantitative ability, and spatial

ability to 5 and 7-year old Belgian children (33 males and 36 females) adopted early in life. Parents were administered a parental attitude scale and a life goal inventory. The parents' experiences were unrelated to the children's test performance. Reinforcement of competition and independence, and the interview variable were significantly related to several ability measures and the CHEFT, especially in females. The females' primary abilities are interpreted in terms of the influence on the development of children's abilities of a future oriented attitude toward learning and memory and of a warm parent-child interaction.

Irwin, Eagle, Klein, and Yarbrough (1976) investigated the relationship between preschool children's field-dependence-independence and their mothers' traditionalism and intellectual stimulation provided in the home in rural Guatemala. The EFT and the Inkeler Overall Modernity Scale were utilized. EFT scores were not related to traditionalism; EFT scores were related to maternal sources of stimulation as well as to the presence of better educated older siblings in the home. In other studies, traditionalism has been confounded with other variables such as availability of intellectual stimulation.

Laosa and Deanila (1979) examined the development of cognitive styles among 182 Chicago children growing up in two communities, one traditional and one dualistic. The CHEFT was employed as the measure of field-independence. In the traditional community Chicano children

in grades one and five were found to have a relatively field-dependent cognitive style whereas those in the dualistic community had a relatively field-independent cognitive style. In both communities a progressive increase in field-dependence was found with increasing age. No significant sex differences in cognitive styles were found.

Waber (1976) examined sex differences in cognition with 80 10-13 year old females and 13-16 year old males. Subjects who matured early performed better on tests of verbal than spatial ability. The EFT was one of the tests utilized to determine spatial ability. Late maturers were more lateralized for speech than those maturing early. Sex differences, these authors argued, reflect differences in the organization of cortical function that are related to different rates of physical maturation.

Studies conducted on older subjects, usually beyond sixty years of age, indicate they become more field-dependent (Axelrod & Cohen, 1961; Comalli, 1965; Markus, 1971; Markus & Nielsen, 1973). Eisner (1972) suggested that poor performance on the EFT is related to inaccuracies in perception.

Other Factors. Many associations, some unusual ones, have been studied with respect to the EFT. It is sufficient to note a few studies in this area. Adelson (1975) assessed the moral judgements of women as a function of field-independence, feminist attitudes, and subjective adult experiences. LaTorre, Gossman, and Piper (1976) tested 20 male transsexuals for cognitive style, hemispheric special-

ization and several abilities. Seeley (1976) studied the relationship between cognitive style as measured by the EFT, internal-external locus of control, and family planning goals.

Applied Educational Research Utilizing Witkin's Approach to Cognitive Style

Special material and the effects of environmental factors.

Research presented in the preceding section (Witkin, 1962, 1974) demonstrated that relatively field-dependent persons are particularly interested in, and attend to social aspects of the environment.

These people are generally better at learning materials with social content. Adcock & Webberby (1971) and Baker (1967) found field-dependent-persons were not superior in recognizing faces when the task is one of intentional learning of faces, suggesting the superiority for social information was a selective function of recalling faces of peers rather than the better ability to learn and to recall such material. Crutchfield (1958) found that relatively field-dependent officers did significantly better than field-independent officers in recognizing photographs of other officers who had spent several days with them.

Fitzgibbon (1966) noted that field-dependent persons were better at learning social material when the material was peripheral to the task on which they were concentrating. Ruble and Nakamura (1972) studied children who were attempting to solve concept-attainment problems, on each trial of each problem the task was to identify the

correct figure among the three shown to them. In the first problem, "large size" was the correct concept, but the experimenter provided an additional social cue, looking at the correct figure. In the second problem, the social cue was also relevant and in the third problem, size alone was the correct cue. Results indicated that field-dependent children showed better learning on the second problem, featuring the salient cue alone. Field-independent persons showed better learning on the third problem on without social cues.

Pellegrino and Stickle (1979) studied the relationship between field-dependence-independence and the ability to label correctly facial affect. Fifty-six high school students were administered the GEFT and the pictures of facial affect. A low Pearson product moment correlation was obtained between the two measures. Data indicated significant differences did not exist between field-dependent and field-independent persons in their skills of labeling pictures of facial affect.

Other studies have also demonstrated a superiority of field-dependent persons in incidental learning of social cues (Eagle, 1969; Merrick & Damarus, 1964). In some studies the superiority of field-dependent persons was not evident (Beijk-Doctor & Elshaut, 1969; Fitz, 1971).

In contrast to the above named studies are studies showing a small but general superiority of field-independent subjects for the learning of nonsocial material (Beck, 1971; Iman, 1973; Klein, 1968;



Valinski, 1971; Witkin and associates, 1962, 1974).

Implications for the learning setting, especially the classroom, are that the social orientation of the relatively field-dependent persons make these individuals particularly adept at learning and remembering social content.

To the extent that the lower ranking of field-independent subjects on incidental learning of social cues is a function of lack of attention and not a lack of ability, these individuals can learn to do as well as field-dependent children when their attention is brought to focus on the social material.

Much evidence is now available from experimental situations on the relation between field-dependence-independence and the effects of various kinds of reinforcement. Field-independent persons under conditions of intrinsic motivation learn more than field-dependent persons (Fitz, 1971; Paclisanu, 1970; Steinfeld, 1973). These differences disappear when external rewards for learning are material in nature or in the form of praise (Ferrell, 1971; Paclisanu, 1970; Steinfeld, 1973).

Steinfeld's study illustrates these findings with children of 8 and 11 years of age who were playing an experimental game called marble in the hole. A baseline period was obtained to observe the children's preference for one hole or the other hole. The non-preferred hole was reinforced, and the effect of the reinforcement of the percentage of marbles dropped into this hole was determined.

The effects of three types of reinforcements were studied. It was found that in the abstract form of reinforcement, where a flashlight was turned on when the child dropped a marble in the non-preferred hole, field-independent children performed better than field-dependent children as expected. A second type of reinforcement material made use of token rewards; field-dependent children did better than field-independent children in this task. When praise was used as a reinforcer, field-dependent children did very well. Thus, field-independent children did better with intrinsic motivation; this difference disappeared when extrinsic rewards were used.

Much research on the effects of punishment has made use of the effects of social reinforcement in the form of verbal criticism. The results of these studies indicated that field-dependent persons are more affected by criticism than field-independent persons. The manner of administration of the criticism plays a major role on learning. This type of external reinforcement has a particularly strong effect upon field-dependent persons (Duvall, 1970; Ferrell, 1971; Fitz, 1971; Konstadt & Forman, 1965; Randolph, 1971).

One physical environmental factor affecting nonverbal free recall was studied by Miller, Cornett, and Wallen in 1978. These researchers examined the effect of marijuana on the free recall of 22 21-28 year old male volunteers. Each subject was used as his own control, and presented with line drawings of geometric figures for 10 acquisition trials. The recall varied with drug condition

and scores obtained on the EFT. Marijuana reduced recall in those subjects making two or more errors on the EFT, but had little effect on subjects making one or no errors. Intrusion errors were also evaluated following marijuana intoxication; this effect was unrelated to EFT performance.

Another environmental factor, anxiety, was studied by Loo (1977). Three hundred eighty-nine college students were administered a battery of tests for anxiety, locus of control, achievement, and field-dependence-independence. These researchers found that anxiety had a negative effect on test performances. As expected, high test anxiety tended to be associated with internality, self-esteem, and field-independence. The tendency to seek help was positively related to test anxiety.

Two other studies are of interest in determining the relationship between the perceptions of individuals and their environment. The first study was conducted by Knudsen and Kagen (1977). These researchers evaluated the ability of one person to take on the perspective of another person. The study was conducted with 97 five-to seven-year old subjects who were administered seven perceptual tasks and the CHEFT. Results indicated that no significant cultural differences were found among participants. The results of this study are contrary to other studies in three respects. Children were able to take the role of another at an earlier age than originally theorized by Piaget. Role-taking and field-independence

were not significantly related when age was controlled, and low inconsistent correlations among the visual perspective role-taking tasks indicated that visual perspective role-taking is not an established undimensional construct.

The second study of perception was conducted by Bone (1978). She studied the relationship between field-dependency as measured by the EFT and visual search, which was investigated on displays which differed in terms of the organization of the background element or differed in terms of organization background elements. A significant correlation between field-dependency was found on displays where elements were lumped but not on displays where the elements were placed in a regular or random display.

Mediators. Persons who tend toward an articulated cognitive style are more likely to analyze a field when the field is organized and to impose structure on a field which lacks it. Witkin described these individuals as relatively field-independent persons. Individuals who are more global in their approach to thinking will use considerably less analysis and structure when arriving at decisions about the environment. Several studies will be reviewed to illustrate this point.

Fleming (1968) showed a list of words to field-dependent and field-independent subjects, asking them to recall fully the words. A novel feature of the study was that the words belonged to a hierarchical structure and were presented to the subjects in either a

superordinate to subordinate sequence or vice versa. When the superordinate items came first, the word set was given an inherent organization. It might be expected that subordinate to superordinate structure, which lacked organization, would be more difficult for the field-dependent persons. Fleming found this fact to be true. In contrast, no significant relationship was found between field-dependence-independence and word recall with the structured, superordinate to subordinate sequence.

Koron, Snow and McDonald (1971) examined the acquisition of a teaching skill from written and video-modeling procedures. These two treatments were found to be differentially effective for field-dependent and field-independent intern teachers. Field-dependent teachers benefitted more from video-modeling than field-independent teachers who did as well with the written, as with the video modeling.

Schwen (1970) used programmed instruction sequences varying in the amount of structure provided by the programmed text. The first instructional approach, the large-step version, presented all of the generalizations of the subject first and then presented examples and discussions. The learner was then asked to answer questions and solve problems. In the second approach, the small-step version, each generalization was presented individually with examples and discussion. The learner was requested to answer questions after each section. In the small-step program, there was no relation between field-dependence-independence and retention three weeks later.

In the large-step program, greater field-independence was associated with greater retention.

Penzi (1974) studied the effects of the amount of feedback given to the learner in programmed instruction. Each subject was required to learn to read an exact ellipse. Some subjects were given feedback about their performance while drawing; other subjects were provided with a correctly drawn ellipse in the text. Results indicated that the performance of relatively field-independent university students were not influenced by whether or not they received feedback. Field-dependent students performed significantly better in the post-test when feedback was provided in the text.

Studies continue to be found in the recent literature with similar results as the above studies. Annis (1979) study the effect of cognitive style upon learning written material. Subjects were 129 undergraduate students who were assessed for their degree of field-dependence-independence. The written material was presented in a logically organized fashion and a scrambled 80-sentence article. Field-independent subjects scored better than field-dependent subjects on completion items of high structural importance to the meaning of the entire learning passage. The effect of cognitive style on material of low structural importance was not significant. An analysis of notes taken by subjects in the low structural importance treatment group indicated that notes taken on an organized learning passage were of higher structural importance.

Cofield (1979) investigated cue differentiation to psychological approaches in a junior college setting by classifying students as either field-dependent, field-neutral, or field-independent, as measured by the GEFT. One hundred twelve students participated, and were asked to listen to two eight-minute audiotaped sessions representing the respective approaches of client-centered and rational behavior therapy. No significant differences were found among the three groups with respect to preference for therapy. One significant finding was that 82 per cent of the subjects preferred rational behavioral approaches regardless of level of field-dependence.

Culbertson and Wille (1978) investigated the hypothesis that relaxation training would increase directed attention and decrease the distracting effects of an embedded context, which would result in increased reading performance and in greater levels of field-independence. In this study, subjects were four fifth-graders in a reading class at a level below the expected fifth-grade achievement level. The amount of relaxation was varied in length for each subject, ranging from two weeks to no therapy. Subjects were given the EFT before and after the research, and a reading achievement test. Teacher ratings of subjects' behaviors were also obtained. Off-behavior decreased between 11-13 per cent for all subjects receiving relaxation training and positive change occurred in two of four teacher rating areas. Only one subject showed positive results in the reading achievement test.

A study was conducted by DeBoeck and Claeys (1978), examining the hypothesis that field-dependent persons are superior in the learning of socially relevant material. They modified this hypothesis by placing distractors into a series of stimuli (trait names) for learning. Subjects were 154 high school male seniors. To assess recognition memory, a recognition list was used with the distractors differing in degrees of relatedness to the targets. The degree of field-dependence was assessed by the EFT. Results indicated that the relationship of field-dependence to false recognition of distractor traits is moderated by the target relatedness of the traits.

DeWitt and Ovarill (1976) reexamined the association between lateral eye movements and hemispheric activity in the brain. In this study, 48 right-handed female undergraduates who were described as left-gazers (right-hemispheric activity) were found to be field-dependent as measured by the EFT. These same subjects were more susceptible to hypnotic suggestions. The authors concluded that field-dependence and hypnotic susceptibility are mediated by processes associated with right-hemispheric activity.

Walker, O'Leary, Chaney, and Fauria (1979) studied the influence of cognitive style on an incidental memory task. Subjects were 38 males with a mean age of 49.9 years. The GEFT was used to measure cognitive style, and the Halstead-Reitan Battery as a measure of incidental tactual memory and mental imagery. The results indicated that cognitive style is related to an individuals ability to perform

a nonverbal, nonvisual memory task. Also, cognitive style may be an important mediating variable influencing intrapersonal behaviors such as nonverbal memory and mental imagery.

The use of mediators is generally more characteristic of field-independent persons than field-dependent individuals. However, effective learning can take place by field-independent individuals. It is the approach to learning that usually differs.

Cue Saliency and Learning. Bruner (1956) noted that, in the formation of hypotheses, about the nature of concepts to be learned, noticeable cues are generally more likely to be used than cues that are not noticeable. Generally researchers have found that field-dependent learners tend to ignore some nonsalient cues when formulating their hypotheses. In contrast, field-independent learners tend to sample the array of cues more completely (Dickstein, 1968; Kirschenbaum, 1969; Powers, 1977; Shapson, 1973, 1977). Goodenough (1976) found this expectation to be consistent in many studies. However, there is some evidence that field-dependent subjects may learn concepts more rapidly than field-independent subjects when relevant cues are salient (Ruble & Nakamura, 1972; Zawel, 1970).

More recent studies continue to explore the relationship between cognitive style and cue saliency. Some of these studies will be discussed in the succeeding paragraphs to demonstrate the approach presently being taken.

Bowd (1977) conducted a study with 35 Canadian Indian and 33

33 white 7-8-year olds to examine the relationship between field-dependence and conservation in children from different cultural backgrounds. His results showed that the ability to ignore misleading perceptual cues as assessed by measures of field-dependence, which was measured by the CHEFT, is important in performance on Piagetian invariance tasks. Finley, Salla, and Cowen (1977) administered a battery of tests relating to egocentrism and logical operations, to 26 field-independent and 26 field-dependent children who were so characterized by the CHEFT. Results supported previous work showing a positive relationship between field-independence and conservation in young school-age children.

Performance on Piagetian tasks was significantly correlated with cognitive style even in adolescent groups of students. Those students described as more field-independent generally performed better on tasks of spatiality and conservation (Guhman, 1977; Liben, 1978; Signorella, 1978).

Raymond Buriel (1978) examined the relationship between reading and achievement scores of Anglo-American and Mexican-American children. He measured the cognitive style of 40 Mexican-American and 40 Anglo-American children in the first to fourth grades by three tests, The WISC Block Design Subtest, the CHEFT, and the portable RFT. Results failed to support previous research that Mexican-American children are more field-dependent than Anglo-American children. Field-dependence is of substantial importance to the school achievement of

both groups.

Connor, Schackman, and Serbin (1978) studied sex-related differences in response to practice on a visual-spatial test for 93 first-grade children who had been given half the items of the CHEFT as a pretest and half the items of the CHEFT as a posttest. Subjects were randomly assigned to a treatment group that received a brief learning procedure or visual-spatial disembedding prior to taking the posttest. The control group received no training. Results showed positive gain for both sexes who had participated in the training session on the posttest.

Stasz, Shavelson, Cox, and Moore (1976) examined the effects of instruction on the correspondence between a model of the structure of concepts in a social studies unit and the representation of psychological structure of 98 high school students differing in field-independence and field-dependence. Cognitive style was assessed by the GEFT, a portable RFT, and the Human Figure Drawing Test. Teachers' cognitive styles were similarly assessed. Field-independent persons resembled each other more closely at posttest with respect to content structure than at pretest time. Differences between cognitive style were consistent for teachers and students.

Grippen and Ohnmacht (1977) studied the relationship between field-dependence and programmed instruction in a Russian vocabulary lesson with and without strong cues with 47 undergraduate students. They assessed the students' degree of field-dependence by the GEFT

and dogmatism. It was predicted that the cognitive style variables would produce interactive and main effects in an aptitude-treatment interaction situation. Predicted aptitude-treatment interactions were not demonstrated. Cognitive style was a significant predictor of performance.

In 1978 Lee studied the effect of age on perceptual cues in a community setting with 12 females in each of the following decades: 20's, 30's, 40's, 50's, 60's and 70's. All subjects were assessed on their visual acuity. Qualitative and quantitative data concerning perceptual problem-solving strategies were obtained. The EFT was utilized to determine cognitive style. Results indicated that with an increase in age a significant decline in the number of items solved occurs. Performance became relatively stable up through 49, and after 50 years implied a decline in field-independence rather than in higher-order cognitive processes.

Mihal and Barret (1976) examined individual differences in perceptual information processing in relation to the prevention of driving accidents. Seventy-five commercial drivers were assessed for field-dependence through testing with the EFT and portable RFT. A selective attention test was also administered. Field-dependence and selective attention were related to accident involvement in simulated settings. Visual measures of field-dependence and auditory measures of selective attention were related in the predicted direction, with the field-independent drivers making fewer errors in

selective perception.

An interesting research study was conducted by Primakoff and Goldberger (1976) examining the relationship between cardiac response to stressful imagery as a function of field-dependence. Forty female undergraduates were divided into five field-dependent groups as assessed by the EFT. Internal and external modes of presentation occurred which included a stimulus block followed by an image block. The internal stimulus block was an internally elicited thought, while the external stimulus block was a visually presented typewritten statement. Results indicated that the internal mode produced significantly greater heart rate responses than the external mode, and there was a trend toward field-independent subjects reacting with higher heart rate to both modes.

Zenhausen and Renna (1976) assessed 40 male and 40 female undergraduate students as field-independent or field-dependent on the GEFT. Each subject was then tested on two dynamic trapezoid illusions, and asked to make position judgements of static trapezoidal targets. Strong evidence was found for a differential use of perceptual cues for the two dependency groups.

This section has focused upon perceptual cues and their importance to problem-solving situations. Research cited in this section points to the fact that not only perception of the environment, but also the selection and attention to environmental factors which are critical to correct problem solving are essential. Field-independent

persons generally are found to select and to attend to appropriate cues, even though these cues may take them awhile longer to perceive than the field-dependent person who may well select irrelevant but salient cues.

Personality Factors and Style of Teaching. In this section personality factors such as creativity, leadership, and compliance will be reviewed with respect to cognitive style and learning. These factors and their effects on the learning process have been studied in a variety of learning environments.

Greene (1976) studied the effects of teaching 40 field-independent and 40 field-dependent females ranging in age from 19 to 67 years how to maintain themselves on a diet by accepting a counselor's suggestions. Subjects were measured for their degree of field-dependence-independence on the EFT and then interviewed by a male counselor. Interviews were systematically varied in terms of verbal feedback offered for subjects' self-disclosure statements and physical proximity of the interviewer to the subject. Field-dependent subjects were found to be less distancing during interview and more willing to comply to dieting recommendations. During a five-week period following the interview, these same subjects were less successful in losing weight. Field-dependent subjects were also found to be more sensitive to the emotional climate of the setting than field-independent subjects. Greene interpreted these findings in terms of interesting means of coping with dependency feelings.

David Hoffman (1978) investigated the relationship between field-dependence and leadership and self-concept of 88 sixth-grade boys. Ten groups of four members were formed consisting of subjects with different combinations of high and low scores in cognitive style measures. The groups worked on an unstructured construction task. Following each session, members of each group rated each on leadership. Field-independence was related to self-concept, and analytic subjects exhibited more leadership than global subjects.

Loo (1978) found that field-dependent subjects had longer reaction times to embedded contextual stimuli and more accidents in a simulated setting than field-independent subjects. Subjects classified as extraverts had longer reaction times and more convictions than introverts. No relationships were found for neuroticism.

Nappe and Gallagher (1977) explored several approaches to further understand the interrelationship of perception, personality, and cognition. Forty-five college students were administered the GEFT, the Remote Associates Text (RAT), and two self-report scales. Results indicated that advanced strategy levels and insightful responses were significantly related to high performance on the RAT. The authors suggest that the creative processes should be studied not as isolated structures, but with relational multifaceted emphasis.

A study of the effects of cognitive style matching in 32 teacher-student pairs was conducted by Packer and Bain (1978). Tests of cognitive style dimensions were given to participants, one of

which was the EFT. Participants were 54 final year trainee mathematics teachers and 58 first year psychology students. Thirty-two teacher-student pairs were formed so that teachers and students were matched or mismatched with respect to cognitive style. Teachers structured and taught to their partners a 30-40 minute lesson on the mathematical concept of network tracing. Students were then independently examined. Matching effects were obtained on objective test performance and on teachers' and students' subjective ratings of each other at the extremes of the field-dependence-independence dimension.

Evidence of teachers' style of teaching and its effects upon students has been studied by earlier researchers as Engelhardt (1973) who employed Hall's observation schedule, Instrument for Analysis of Science Teaching, to observe elementary school students in a mini-course setting. No relation was found between field-dependence-independence and intensity of teaching, style of teaching (student or teacher centered) or consistency of teaching style. Moore (1973) used a simulation game devised to investigate differences in teachers' use of rules, relations, and examples in explaining chemistry concepts. The results suggested that more field-independent teachers tended to use questions as instructional tools, and used questions to introduce topics and follow students' answers. In 1967 Ohnmacht also found no relation between field-dependence-independence and direct or indirect teaching as defined by Flanders Interaction Analysis summary scores. Wu (1968) found that student teachers described as field-

dependent, relied heavily upon discussion as the principle means of teaching. Field-independent teachers, however, favored lecture and discovery learning which reserved their rights to organize the learning situations either through facilitation of the learning process or by guiding the student learning.

In 1977 Witkin and associates published a longitudinal study involving college students. The study was conducted to assess hypotheses derived from field-dependence theory about the role of cognitive styles in students' academic development. A group of 1,548 students was followed from college entry into graduate school. The GEFT was administered at college entry. In their initial choices at college entry, final college majors, and graduate school specialties relatively field-independent students favored impersonal domains requiring cognitive restructuring skills and relatively field-dependent students favored interpersonal domains which do not emphasize these skills. Some tendency was found for students to do better in domains compatible with their cognitive styles.

Thus, differences in cognitive style are important for a chosen vocational area, but different cognitive styles do not necessarily imply less performance or competence in areas of study.

Staff Development

Instructional Settings. McKribben (1978) contends that the thought process of the teacher while teaching must be made conscious and altered, if needed, through in-service training. Such an ap-

proach was taken at Ohio Wesleyan University where an analysis of faculty reward structure as it relates to teaching, and an analysis of student and faculty perceptions of effective teaching and learning were conducted during the years of 1975-1977. During the first study year, faculty were interviewed to determine their perceptions of reward and incentive systems. Comparative data were obtained. Student learning styles using the Myers-Briggs Type Indicator, and information on faculty teaching styles were gathered using the Purdue Cafeteria Instrument. During the second year, additional consultation service was provided to faculty who were using the Purdue Instrument, and faculty interviews were continued. A videotape teaching laboratory, based on microteaching, was offered, and a teaching and a learning center was established to emphasize instructional support services. A questionnaire on liberal education, teaching and learning was developed and administered to students, faculty, administrators, teachers, parents, and alumni. Teaching improvement activities were summarized for this project and then distributed by the task force.

Other approaches have also been developed, which are larger in scope but similar in approach. Ahn (1973) discussed the approach utilized to develop a sequential program for the development of critical thinking skills which could be extended to all elementary schools in the school district. Major objectives of the study were: a) to enhance teachers' ability to think critically, practice in their classroom teaching strategies to develop pupils' thinking, and

develop and implement a critical thinking program, and b) to develop overt manifestations of critical thinking in pupils attending classes taught by teachers trained in the use of critical thinking.

In the pilot school, the teachers of grades K-5, the principal, and the staff development teacher received in-service training in procedures for developing children's critical thinking skills. The procedures included the Hilda Taba Training Strategies Program, the Building and Applying Strategies for Initial Cognitive Skills Program, the teaching of critical reading skills, analyzing levels of thinking, and organizing for instruction. An analysis of the data indicated that the children in the project school tended to make greater gains than the children in the comparison school. The teachers also asked more open questions and there was more classroom interaction.

The use of matching models as an instructional planning and staff development strategy was investigated by Gennari (1977). The study was conducted over an eight month period in a junior high school. It was found that teachers assume characteristics of roles that evoked positive responses from students. The data implied that matching models increases teacher flexibility and improves students' outcomes. Matching teacher and student role models is suggested as an effective decision-making strategy for instructional planning.

Oja (1979) described the design, implementation, and evaluation of a deliberate psychological education curriculum to promote the ego, moral, and conceptual development of in-service teachers en-

rolled in a five-week workshop, followed by a supervised practicum. Significant differences were found between experimental and control groups on all three dimensions of psychological growth as measured by the Lovinger Sentence Completion Test, the Rest Defining Issues Test, and the Hunt Paragraph Method Test. Experimental teachers' professional skill development showed significant gains. Corroboration was found when an analysis of journals, course evaluations, and teacher designed miniunits was conducted.

Paulsen (1967) examined the effectiveness and structure of slide tapes produced by the technique of rational analysis and self-sequencing. A posttest only design was employed. Differences approached significance favoring teachers who utilized the self-sequencing approach, but suggested variability of effects with variations of sequence rather than superiority of the self-sequencing technique.

Bose (1977) made a case for accountability on the part of teachers to bring about a limited range of outcomes. Suggestions for areas of research in order to affect the accountability included technical assistance, needs assessment, change strategies and staff development. Burkhalter (1978) studied a method for determining the administrator's role effectiveness as a manager. She developed her plan following visits and interviews within five school systems. She included five factors critical to managerial effectiveness which must be sequenced appropriately. These factors are specific management skills, organization, planning, controlling, and coordinating. Crucial to these

factors is continual improvement of management skills for administrators. Her analysis focused upon the need for a plan for staff development of managers. Dastur (1975) conducted a similar study in the area of social work.

Others as Esbensen (1977) studied how a state agency deals with the problem of providing needed inservice education to a diverse professional population in a large geographical area. He stresses the need for teachers of young children to develop an eclectic approach to teaching based on practical experiences as well as theoretical knowledge. The ability of teachers to respond to the demands placed upon them is linked to teacher-training experiences. It is necessary to design and organize need-responsive in-service education for educators teaching young children, and advises that a regional approach is vital to the advancement of quality education during early childhood.

Novak (1975) approached the need for in-service education by studying the differences in perceptions toward in-service faculty development programs among samples of administrators, division chairmen, and faculty. Data obtained revealed a broad image of perceptions. Consistent differences existed between the three groups, and the sample of administrators most often was responsible for causing the differences.

Generally, administrators viewed the components of in-service faculty development to be more desirable than did either the faculty

or division chairmen. Individuals with one to four years of experience and preservice training were more receptive to in-service faculty development; individuals in the same experience category without preservice training were less responsive to faculty in-service development.

Townsend (1968) studied the needs of selected vocational rehabilitation counselors employed in state or federal programs in five western states. He did his analysis by comparing the scores on the Graduate Examination of Rehabilitation Counseling, studying the total exam score. He found that significant differences existed between counselors with Master of Arts degrees in Vocational Rehabilitation Counseling and counselors with Master of Arts degrees in related fields, and counselors with Bachelor of Arts degrees in terms of their total scores on the exam. There were also significant differences between inexperienced and experienced counselors within these three groups.

Burns (1974) studied the effectiveness of the group process in staff development programs that were traditionally didactic in nature and were oriented toward changing attitudes and behaviors of psychiatric attendants toward psychiatric patients. Attitudes of attendants who had participated in the group process staff development sessions were more humanistic than those of attendants in didactically oriented sessions. The author concluded that group process interaction appears to offer a fruitful approach to staff development,

and may lead to therapeutic outcomes in terms of patient care.

Assessment of the benefits of the Staff Development Management Training Program for classified administrators was conducted by Otto (1979) in Los Angeles. Following the training program, a narrative questionnaire was given to participants, revealing significant and positive opinions of the changes resulting from participation in the program. It was found that task-oriented leadership directly related to the perceptual set existing in the work atmosphere.

In 1979 Paul developed, piloted, and field tested a proficiency module as part of an individual in-service plan. The module, a classroom management module for individual instruction in reading, was developed to assist beginning teachers and teachers new to the local system to apply a management system already in operation in the system. A designated time period was given in which the module needed to be completed. If large learning groups were present within a specific school, an additional workshop related to behavior modification strategies in the classroom was added. Paul recommended continuous emphasis upon individualized staff development utilizing the modular of this approach.

Webster and Mendro (1974) studied the effects of a videotape feedback system on classroom teacher behavior. These researchers videotaped 159 teachers in eight matched schools to examine the effects of a staff development program utilizing knowledge of objectives and immediate videotape feedback to modify the behavior of

classroom teachers; concomitants of teachers' success in the program were also investigated. Experimental subjects improved cognitive behavior but not affective behaviors more than essentials. Characteristics contributing to positive behavioral changes were dissatisfaction with perceived effectiveness, teacher experience, recency of latest degree, teacher attitude toward students, and student achievement.

In 1967 Zimmerman studied teachers' perceptions of a ten-week staff seminar which dealt with the teachers' perceptions of marginal students. It was found that teachers' perceptions lead to exclusion or isolation rather than focusing upon weakness of classroom and opening the classroom to the marginal student. An effectiveness intervention was in-staff training. Such intervention was considered necessary to develop the teaching staff to accept the role of the schooling system in student failure thereby increasing the awareness of the importance of classroom structure and process.

Very recent literature cites the need for the use of an appropriate model for the development of staff educational programs. Ashkenas and Schaffer (1979) stated that management training programs usually contribute little to organization results because they do not focus upon a training program designed to produce performance-improvement results but upon personality characteristics. Davis (1979) made a similar claim for staff development in the public sector, developing contextual framework for staff education, and recognizing

that variables external to the organization may have a significant effect upon staff improvement. Drummond (1979) and Miller and Wolf (1978) provided several inservice models including a provision of service model, personal development model, and three problem-solving models. Brethauer and Rummler (1979) extended the use of a model and included its use for examination of training methods through use of a central group, the procurement of multiple baseline data, and the use of before and after measures.

Timmel (1979) placed emphasis upon a staff development model for planned change that emphasizes the group process, and takes into account the values, attitudes, rules, and behaviors that adults bring to the work setting.

Reed and Riley (1979) suggested the use of a model focusing upon what is evaluated, who conducts the evaluation, and why it is conducted for nursing education.

Methodologies for implementing new educational programs suggest several similar approaches. Burch and Donley (1978) stated that the characteristics of those affected by the proposed changes be taken into consideration. Among the more important factors are: traditionalism, need for recognition and participation, fear of failure expectations, and pragmatism. Baxter (1978) saw staff development as met by staff taking supplemental courses and having membership in their professional organization.

Others have attempted to apply psychological techniques in an

attempt to promote staff development (Banks, 1976; Forman and Forman, 1980; Scholom, 1979).

More practical concerns for staff development maintenance were suggested by Frey (1979). He maintained that the basic principles of program survival include one person assuming responsibility for a new program, continuing staff development, and altering a new program to benefit and improve student achievement. Gable and Strain (1979) suggested a similar approach for treatment training for residential staff working with behavioral disordered children.

Hampton and Graham (1979) described the process of staff development in a high school advisement program as an interrelated and unified group of teachers and related personnel to promote an efficient process of curriculum change.

Ketchley (1978) recommended the development of training modules for a specific organization and staff in a clerical setting. The flexibility of the learner-centered approach was more effective than any standard course.

Kemerer (1980) encouraged promotion of retraining of staff members to maintain contemporary knowledge and skill levels and encouraged administrators and teachers to undertake new assignments.

Lawrie (1979) and Luehe (1979) recommended that personnel and their supervisors engage in systematic data gathering to indicate better their training needs.

Kirkpatrick (1978) included knowledge, skill, and attitudes as

essential components of supervisor training programs.

Schmuck (1979) recommended the use of three strategies for implementing staff development programs for urban school teachers. Technical assistance, content training, and process consultation between specialists and staff were cited. Shreyer (1979) stated a broader approach, contending that improvement in teaching is a continuous process, and suggesting a cycle of review, identify, analyze, and revise to stimulate greater self-confidence and success in teachers.

Wood and Thompson (1980) found that research on adult learning suggests that direct and concrete experiences where the learner applies what is being learned are an essential ingredient for in-service education. Abstract, word-oriented talk sessions are not adequate to change behavior.

Results of staff development programs vary. Champagne (1980) found evidence that staff development results in improved supervisor-teacher and teacher-student relations. Griffin (1978) maintained that it is difficult to evaluate staff development programs because of goals of staff development, the individual and contextual goals, and the structural properties inherent in the programs. Helliwell (1978) summarized the results of a study evaluating the effectiveness of training programs for Ontario's Civil Service Commission. Questionnaires completed by participants and supervisors indicated that courses are effective.

Johnsen (1976) studied 25 community-junior college instructors by the Delphi process, survey, and campus visitation. He found that teaching modalities and inservice training showed promise of increasing student learning and teacher effectiveness.

Mc Laughlin (1978) conducted a secondary analysis of the Rand Change Agent Study that describes four factors underlying the understanding of staff development: institutional motivation, implementation strategies, institutional leadership, and teacher characteristics. Each factor is considered to play a significant role in evaluation of staff programs and failure of any factor not to be considered seriously during the planning phase can result in negative effects. Lambert (1978) and Schiffer (1978) concurred with Mc Laughlin's findings, emphasizing the interrelatedness of staff, administration, and community support systems.

Evaluation tools of staff development programs are important for assessing and evaluating the effectiveness of programs.

Dillen (1979) suggested the use of question clusters related to staff development content delivery to be used to develop programs that will result in more productive professional development. The questions determine the focus of programs, analyze the target audience, discuss the selection of delivery modes, and identify future directions. Frantz (1979) described the use of a computer based system to alleviate problems that instructors at technical and community colleges face in developing and teaching courses.

Mancall (1978) suggested the use of Drucker's approach, management by objectives, to facilitate staff development and to avoid professionals and paraprofessionals from working at cross purposes.

Many authors cited the need for professional development, especially at the university and college level (Crowell, 1978; Kersh, 1979; Margolis, 1979). Dillen (1976) and Washington (1979) argued that the staff development process is a series of interrelated phases, and that these phases occur within a particular social organization. However, perceived needs of staff differ from the needs of administrators, resulting in the need for the delivery and packaging of different systems for each group (Hunter, 1979; Slezak, 1979).

In some instances support systems for staff development were regionally funded, allowing for variations and financing for activities (Costa, 1979; Ehr Gott, 1979).

From this review of the broad area of staff development, the reader can see that much work has been done in a variety of fields; all researchers found that staff development played a positive role in promoting competencies of personnel. Models for staff development closely resemble each other, consistently emphasizing the need for planning and organized central processes when implementing staff educational programs.

Health Care Settings. Giffel (1976) studied the effect of learner choice of instructional mode on the learner's attitude toward the instructional experience and his ability to apply information on

an exam. The population was 153 licensed practical nurses. The study was conducted as part of an in-service training program, and subjects were asked to indicate their preferred style of learning, lecture or discovery method. Results showed that learners did not necessarily choose a method on the basis of their preferred style. Nurses who expected high use of the information chose the lecture method while those nurses who had more experience with mediated self-instruction tended to choose self-instruction.

The process of the acquisition of empathy in a staff development program for registered nurses was examined by LaMonica (1978). She asked the question: "How does one learn to become a helper?" She obtained an objective measure of the level-of-empathy of a group of professional nurses practicing in an acute and chronic care hospital. Those nurses scoring low in empathy were given a short term human relations staff development course. Results indicated nurses tested were extremely low at the initial testing on the empathy dimension and that the training program significantly raised their empathy score levels. The examination of learning styles was not explored.

Marmol (1973) conducted an exploratory study of the application of operant conditioning in the geriatric center. He conducted and evaluated an in-service training program in operant conditioning for nursing personnel in a 168 bed convalescent hospital. Personnel who had taken this program had a lower turnover rate because they were better able to deal with patient and personal behaviors. However, no relationship to cognitive style or learning style were ex-

plored.

A study was conducted by Ritchie (1975) to determine the Jungian personality types of selected groups of nursing students and successful registered nurses to identify their preferred learning styles and to determine the relationship between preferred learning style and personality. Personality types were measured by the Myers-Briggs Type Indicator; learning styles were measured by the Media Effectiveness Chart. Results of the study indicated personality type differences among and between nursing students and registered nurses and a positive relationship between personality type and preferred learning style and that certain teaching methods were most productive for each personality type. It was recommended that educational programs restructure their curriculum to provide for these differences and that discussion seminars be regularly scheduled to permit students to learn how various personality types contribute to their own learning. Learning experiences should also be provided for instructors to promote knowledge.

Milde, Dowell, Ruther, Thomas, and Glick (1980) sent a survey questionnaire to emergency room nurses in Iowa hospitals. The respondents were mostly diploma graduates; 334 nurses replied. Most respondents had more than three years of nursing experience in emergency room nursing. These nurses obtained their in-service education from one of two sources, hospital in-service programs or physicians. Milde and associates recommended that self-instructional teaching

packets and/or closed circuit television be implemented in an effort to augment emergency room nurses' educational needs.

Welch (1980) suggested that the real issues behind providing continuing education in nursing were multifaceted. She claimed that four factors generally occurred, hindering the staff development. One factor is the attempt by many levels within the nursing profession to maintain the status quo. The second issue is the resistance of staff nurses to put new knowledge and skills into practice because of the lack of reward for clinical competence; and the third factor is the failure by nursing educators to instill in students the need for lifelong learning.

These studies are examples of staff development education within health care agencies. Other studies discuss the problems encountered when developing staff programs (Burch and Donley, 1980) or techniques for developing staff communication skills and observations (Hammeke, 1974; Laurence, 1977; McCarthy, 1978; Neill, 1979; Oliver, 1980; Parks, 1978; Slater, 1977).

Cognitive Style and Problem-Oriented Recording

Most studies were anecdotal in nature (Bonkowsky, 1972; Davis, 1974; Field, 1971; Hussey and Rossier, 1977).

Mitchell and Atwood (1975) utilized the POR approach as a learning tool for a group of beginning university nursing students and found that the group which utilized the POR approach identified a greater number of patient problems and had significantly higher

scores on tests of organization of written materials. Reider and Woods (1978) conducted a program for nurses in two veteran's hospitals to teach and to implement the POR approach. These authors analyzed their findings utilizing a pre-posttest design to measure the nursing staff's ability to increase their identification of patient problems. They found a higher level of identification of patient problems. Several studies in medical education provided a more organized method for clinical evaluation (Bashook, 1975; Fletcher, 1974; Liston, 1976; Margolis and associates, 1973; Savitz, 1973).

Recapitulation

The following generalizations may be drawn from the review of the literature on cognitive style. Cognitive style is a relatively enduring characteristic that affects how one approaches problem-solving situations. No definite consistent findings have been found relating cognitive style to specific personality characteristics such as social desirability.

Research has supported the fact that initial sex differences in EFT performance disappear with practice. There is also consistent evidence that field-dependence is related to various measures of both verbal and performance intelligence. This fact is true for children, adolescents, and adults.

Field-independence increases sharply till early adolescence with slight increases occurring between 13-17 years after which a relatively stable pattern is seen for the individual; advanced age is associ-

ated with greater field-dependence, although not necessarily with a diminution in cognitive processes.

Generally, field-dependent persons attend to social cues in the environment while field-independent persons demonstrate slight superiority in the learning of nonsocial material.

Field-independent persons usually attend to salient cues in a problem-solving situation, seeking to form an appropriate hypothesis; field-dependent persons utilize a trial-and-error method to problem-solving.

Vocational choices have been found to relate significantly to cognitive style. Particularly important is the fact that different cognitive styles do not imply less competence in the ability to perform satisfactorily in a given area.

Finally, cognitive style research within staff development is limited at the present time. However, applied research in institutional settings is steadily increasing in scope and complexity.

CHAPTER III

METHOD

Subjects

The subjects were 50 registered nurses employed in a large community urban medical center. The nurses ranged in age from 21-50 years old.

Each nurse was asked to volunteer for the study and written permission was obtained from each participant. The study was presented as a pilot project for the implementation of POR throughout all nursing units. Permission for the study was obtained from the Director of Nursing Service.

Participants were staff nurses and assistant head nurses who were either registered nurses or licensed practical nurses. No head nurses were included in the project. Fifty nurses began the study. Eleven nurses were eliminated because they did score within the extreme quartiles of the GEFT. Three nurses withdrew for personal reasons. Thirty-six nurses participated in the complete study.

Instrumentation

1. Group Embedded Figures Test (GEFT). Each staff nurse in the study was administered the GEFT. This is a group administered test of 18 complex figures that takes 12 minutes to administer. A reliability coefficient of .81 was obtained by calculating the correlation coefficient for two parallel forms of the test and correct-

ing by the Spearman-Brown prophecy formula for test length. This coefficient represented adult subjects of college age.

The correlation between the Embedded Figures Test (EFT) and the GEFT was .63, between the Portable Rod and Frame Test (PRFT) and GEFT was .34, and between the GEFT and the Articulation of Body Concept Test (ABC) was .55 for female adult subjects of college age.

2. Pediatric Nursing Tests. These tests had a total of four questions. The first two questions asked the subjects to place the given information in a POR format. The second two questions asked the subjects to prioritize the plan of care provided. The subjects responded in an essay format, and the test was untimed. The test was locally developed for the purpose of this dissertation. Reliability data for this instrument is reported in Chapter Four.

Procedure

Hypothesis One: There will be no significant differences in the ability to utilize problem-oriented recording (POR) among nurses with different cognitive styles as assessed by the GEFT following instruction by the lecture method. The procedure was as follows:

Administration of the GEFT to all 50 nurses.
Classification of nurses into field-dependent or field-independent groups. Subjects who did not fall into the extreme quartiles were dropped from the study.

Random assignment of each subject to the lecture or self-instructional method. (Field-dependent lecture = 9; field-dependent self-instruction = 12; field-independent lecture = 8; field-independent self-instruction = 7).

Administration of the pediatric nursing problem pretest to all subjects.

Administration of the appropriate method of instruction, lecture or self-instruction.

Provision of six weeks of practice sessions.

Administration of the pediatric nursing problem posttest.

Calculation of an analysis of variance on the pretest scores and the paired difference scores.

Hypothesis Two: There will be no significant differences in the ability to utilize problem-oriented recording (POR) among nurses with different cognitive styles as assessed by the GEFT following self-instruction.

The same procedure and data analysis were conducted for hypothesis two.

Hypothesis Three: No correlation between cognitive style and the instructional method for the learning of POR.

The point-biserial correlation was calculated from the data generated from the procedures described above.

Design and Statistical Analysis

Due to the attrition of subjects and random variation of the distribution of subjects into the two cognitive styles, an unweighted means analysis was used to determine if significant differences were present in the main effects and interaction between treatments. A 2 x 2 design with cognitive style as the dependent variable and method of instruction as the independent variable was employed.

The Point Biserial Correlation $r(r_b)$ was calculated to examine if a correlation existed between cognitive style and the instructional method.

CHAPTER IV

RESULTS

This research proposes to determine if a relationship exists between cognitive style and the learning of a new charting method that is based upon analysis and interpretation of a client's health history. To study this relationship the following hypotheses were developed.

Hypothesis One: There will be no significant differences in the ability to utilize problem-oriented recording (POR) among nurses with different cognitive styles as assessed by the Group Embedded Figures Test following instruction by the lecture method.

Hypothesis Two: There will be no significant differences in the ability to utilize problem-oriented recording among nurses with different cognitive styles as assessed by the Group Embedded Figures Test following self-instruction.

Hypothesis Three: No correlation exists between cognitive style and the instructional method for the learning of POR.

The following paragraphs will present the results of the statistical procedures utilized to test the null hypothesis of the study.

Pretest results revealed scores ranging from zero to 84 per

cent. Thirty-three nurses (91 per cent) scored lower than seventy per cent on the pretest, revealing lack of knowledge of POR. The subtotal scores were added together to obtain a total pretest percentage score for each participant. The maximum score equivalent to one hundred per cent was 115 points. Table One shows the means and standard deviations for the groups' pretest scores. Table Two shows the number of subjects for each group.

Following the clinical practice sessions, a posttest was administered to the 36 participants. The posttest format was the same as the pretest format and was scored in the same manner. Posttest results revealed three nurses (8 per cent) scored at seventy per cent or above. Table Three summarizes these results.

A review of the pretest scores showed extremely low scores for seventy per cent of the participants. To validate whether a significant relationship existed among the groups' pretest scores prior to instruction an analysis of variance was completed on the pretest scores. Results indicated significance at the .05 level for the interaction between cognitive style and instruction. Table Four summarizes the results.

Since a significant result was obtained from the analysis of variance of pretest scores, one could place some reliance on the gain scores for interpretation of the study's results. Figure One depicts the interaction between field and instructional method for the pretest scores.

TABLE 1

Pretest Means and Standard Deviations

Source of Variation	Number	Mean	Standard Deviation
Field Dependent:			
Lecture	9	9.2	11.1
Self-instruction	12	16.7	18.8
Field Independent:			
Lecture	8	47.6	27.9
Self-instruction	7	21.7	26.2

Note: Maximum score = 115.
Scores reported in percentages.

TABLE 2

Number of Subjects By
Field and Instructional Method

Method

		Lecture	Self-instruction
		Dependent	9
Independent	8	7	

Note: Number = 36

TABLE 3

Posttest Means and Standard Deviations

Source of Variation	Number	Mean	Standard Deviation
Field Dependent:			
Lecture:	9	41.1	12.1
Self-instruction:	12	33.8	18.8
Field Independent			
Lecture:	8	42.6	12.2
Self-instruction:	7	43.6	18.8

Note: Maximum Score = 115.
Scores reported in percentages.

TABLE 4

Analysis of Variance
of Pretest Scores

Source of Variation	DF	Mean Square	F
A ^a	1	4072.4	(1/4) 9.03*
B ^b	1	731.8	(2/4) 1.62
AB	1	2413.4	(3/4) 5.35*
WCell	32	451.1	

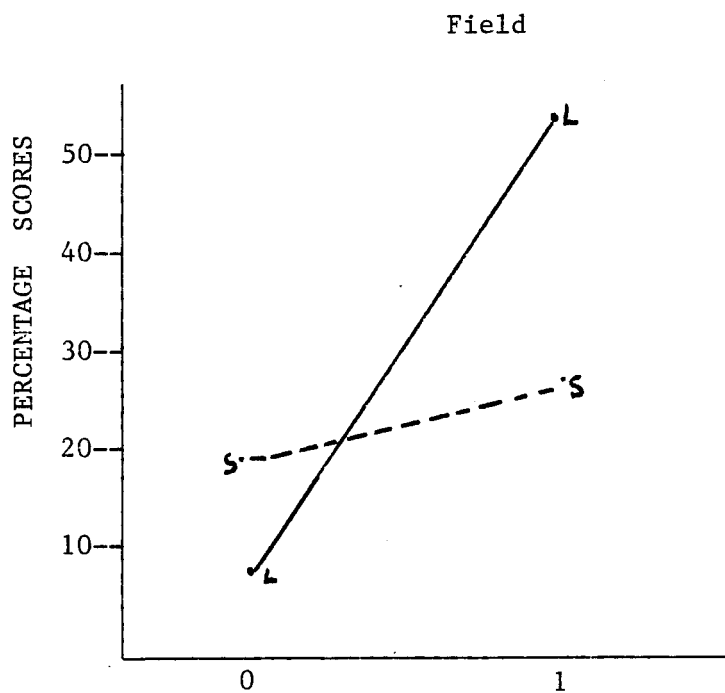
^aCognitive style

^bInstructional method

* $p < .05$

FIGURE 1

Interaction Between Cognitive Style and Instructional Method for Pretest Scores on Pediatric Nursing Test



Field-Dependent		0
Field-Independent		1
Lecture Method	—————	L
Self-Instructional Method	-----	S

Difference scores were obtained for each participant. The paired difference scores (D) were defined as $T_2 - T_1$ where T_2 is the posttest score and T_1 is the pretest score. Paired difference scores were assumed to be normally distributed on an interval scale. The means, standard deviations, and variances of the groups' paired difference scores are reported in Table five.

Since all cells of the completely randomized factorial design did not have the same size N's, an unweighted means analysis was utilized instead of an analysis of the variance.

Several reasons existed for unequal sample sizes:

1. The number of field-dependent and field-independent people in the same was unequal because of random variation.
2. Two subjects in the sample refused to complete the study.
3. One subject left the study due to health reasons.

Results of the unweighted means analysis indicated that a significant interaction existed between nurses with different cognitive styles and the instructional method for the learning of POR. Nurses who were classified as field-independent on the GEFT scored significantly higher on a pediatric nursing posttest following self-instruction. Nurses who were classified as field-dependent on the GEFT scored significantly higher on a pediatric nursing posttest following instruction by the lecture method. Thus, the first and second null hypotheses of the study were rejected. Table six summarizes these

results. Figure two depicts the interaction between cognitive style and instructional method for the difference scores.

Tukey's test was also applied to the mean difference scores for each group. The comparison between the means for the field-dependent and field-independent lecture groups was significant at the .05 level of significance.

To test the third null hypothesis the Point Biserial Correlation $r(r_b)$ was utilized. This correlational technique is utilized with variables, one of which is dichotomous and the other continuous in nature. A negative correlation existed between cognitive style and the lecture method. It was calculated to be $-.51$. A low positive correlation existed between cognitive style and self-instruction. It was calculated to be $+22$. Cognitive style included the factors of field-independence and field-dependence. This coefficient is a product-moment correlation coefficient and is used and interpreted just as the Pearson r is interpreted.

Six non-study participants took both forms of the pediatric nursing test. The mean, variance, kurtosis, and skewness of each distribution were calculated for each form of the test. No significant differences were found. Thus the test forms were considered to be equivalent.

The split-half technique was utilized to determine the reliability coefficient for the 36 pretests and 36 posttests. This technique was used because of the nature of the S.O.A.P. questions which were

TABLE 5
Means, Standard Deviations, and Variances of
Paired Difference Scores For Each
Category of Cognitive Style

<u>Cognitive Style</u>	<u>Instructional Method</u>	
Category	Lecture	Self-Instruction
Field Dependent:		
n ^a	9	12
Mean percentage scores of group	33.4	17.2
Standard deviation in percentage units	20.1	23.5
Variance in percentage units	402.1	552.7
Field Independent:		
n ^a	8	7
Mean percentage scores of group	5.5	21.9
Standard deviation in percentage units	30.3	30.9
Variance in percentage units	803.1	437.3

^aNumber of subjects in group

TABLE 6

Analysis of Variance of Paired
Difference Scores

Source of Variation	DF	Mean Square	F
A ^a	1	1235.2	(1/4) 2.14
B ^b	1	1.7	(2/4) .003
AB	1	2398.6	(3/4) 4.15*
WCell	32	578.2	

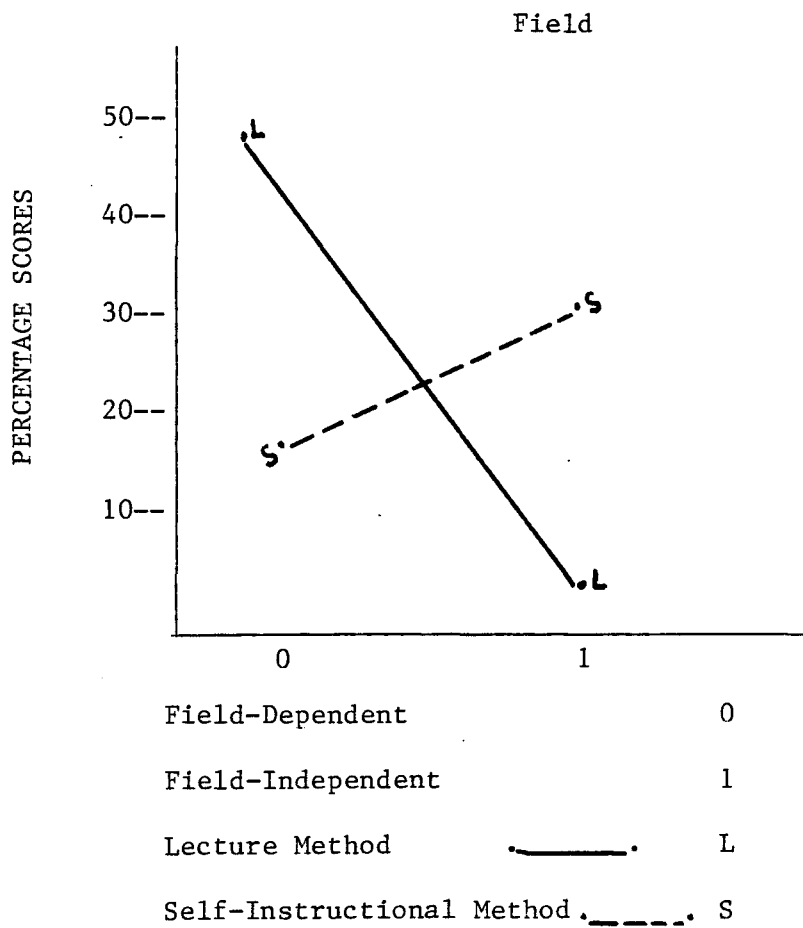
^aCognitive style

^bInstructional method

* p=.05

FIGURE 2

Interaction Between Difference Scores of Instructional
Method and Cognitive Style



essay in format. This approach is recommended by Ebel and Magnussen for essay type questions when calculating reliability. The total reliability coefficient was .88 using the Spearman-Brown prophecy formula to correct for test length for the pretest. This correlation was high because of the near zero scores for most participants. The total reliability coefficient was .51 using the Spearman-Brown prophecy formula to correct for test length for the posttest. This correlation was lower because of the generally poor performance by many participants on question two of Test B, the posttest. An analysis of the responses to the second question revealed lack of a detailed plan of care, mistaking subjective and objective data, and including data not provided in the question. The investigator concluded that insufficient time was spent when answering this question. Perhaps participants were not motivated to make a more careful analysis of their responses.

Summary of Results

The following were found during the analysis of data.

1. Pretest scores were significant at the .05 level for the interaction of cognitive style and instructional methodology.
2. An unweighted means analysis showed a significant interaction between cognitive style and instructional method at the .05 level of significance.
3. A moderate negative correlation was calculated between the field of the participants and the lecture method.

4. A low positive correlation was calculated between the field and self-instruction method.

CHAPTER V

DISCUSSION

Reviewing the results of this study, the investigator concluded that persons described as field-independent tended to analyze and to restructure the given nursing problems, utilizing the procedure established for the learning of POR. Generally, the field-independent subjects' responses were well stated, and a complete approach to nursing care was provided. Clear distinctions were made among the four categories, and a nursing assessment was usually clearly defined. In contrast, field-dependent nurses made more errors when distinguishing between subjective and objective data. Assessments were frequently not clearly defined, and a plan of care was not comprehensive.

Although questions were encouraged, and reinforcement of correct responses was given during practice sessions, the investigator observed that the field-independent nurses asked fewer questions, and were generally more interested in doing the task. Frequent questions arose from many of the field-dependent nurses with respect to clarification between subjective and objective data. One significant recurring question related to assessment of the problem. Most field-dependent nurses had a great deal of difficulty succinctly stating a nursing problem once a medical diagnosis was provided. In most instances, this group of nurses equated the medical diagnosis with

the nursing assessment, even after repeated clarification.

Although a model of POR was provided for all participants during the instructional sequence, the frequency of referral to it occurred more often among field-dependent nurses. This group adopted the obvious features of the protocol to their charting, but ignored the distinction of the nursing assessment. The attempt to utilize salient cues when problem solving for field-dependent persons is consistent with previously reviewed studies.

Validity

Internal validity asks the question: Did the experimental treatments make a difference in this experimental instance? Eight different classes of extraneous variables may confound the effect of the experimental variable. These variables are maturation, history, testing effects, instrumentation, statistical regression, selection of subjects, experimental mortality, and selection-maturation interaction.

Maturation, testing effects, and selection were controlled to the extent that randomization provided equality among the participating groups. The small and unequal size of the groups, however, may have provided uncontrolled variation with regard to these issues.

Instrumentation was controlled by having the pretest and post-test reviewed by two nursing experts in pediatric nursing prior to the study's implementation. A possible source of bias involved the experimenter designing the study, developing the assessment instrument, scoring it, and providing the treatments.

Although subjects were selected for participation in the study because of their extreme scores on the GEFT, regression was controlled by randomization of the subjects to each instructional method.

General historical events that might produce differences between groups were reduced as much as possible. That is, the procedure for instruction and testing was performed in a similar fashion for all groups. However, specific intrasession historical factors were not controlled since all groups could not be instructed and tested simultaneously for it was not possible to free all personnel at one time.

Experimental mortality was controlled by use of a weighted analysis of variance, a recommended statistical procedure for this problem.

Finally the interactive effect of selection and maturation was controlled by randomization of the participants to instructional methods.

External validity refers to factors which might hinder the results of a study being generalized to similar populations. The most important threats to generalizability are four: the interaction of testing and the independent variable, the interaction of selection and the independent variable, reactive arrangements, and multiple interferences.

For purposes of this type of study the effect of pretesting participants is not a serious one since one is interested in generalizing to a setting in which testing would be done. At present re-

sults of this study can not be generalized to similar populations because of the small number of participants, and because of the exploratory nature of the study.

Since the participants of this study were limited to pediatric nurses, comparisons with nurses in other areas did not occur. Only three participants withdrew. Two of these subjects apparently refused to complete the study because of fear of failure; one subject withdrew for health reasons.

Participants were aware that a study was being conducted which might conceivably alter their attitudes and responses.

Limitations of the Study

First of all, the number of subjects studied was small. Second, no control group as traditionally recommended in the literature was utilized. Third, the pediatric tests contained a small number of questions, thereby affecting the total reliability.

Snow and Cronbach recommend looking at the reasonableness of the results when large sample sizes are not available to the researcher. Kerlinger (1973) comments that, when two or more experimental groups are present, control is present in the sense of comparison between (among) groups. Thus the concept of control is generalized. Reliability was estimated through the use of the Spearman-Brown prophecy formula; correct responses were determined by review of standard pediatric nursing texts.

In summary, the generalizability of the results of this study

are limited to this sample of nurses for the reasons given above. However the learning results were positive for the population studied.

Recommendations for Future Study

Future studies might add to the existing research design an analysis of the structure of the problem strategy employed by the subject. This analysis would be conducted by asking each participant to state what she did to arrive at her answer to each section of the POR. Pretest and posttest analyses would be compared. Weights would be assigned to the various strategies. An analysis of the assigned weights would provide information as to the overall type of strategy employed by the subject. This analysis would then be analyzed with respect to the GEFT scores of the participants.

A second approach for future studies would be to provide a different instructional set to four groups of subjects. Two groups would be field-independent, and two groups field-dependent as measured by the GEFT. Group one (field-dependent) would be provided with a lecture on POR; group two (field-dependent) would be given a lecture on POR and written examples; group three (field-independent) would be given a study guide for learning POR emphasizing the concepts and general approach for use; and group four (field-independent) would be presented a study guide for learning POR which presents the material in small steps. That is, a statement is made, and several examples are provided. An analysis between instructional methods and cognitive style would be conducted through use of analysis of variance.

A third approach to the extension of this study would be to determine the cognitive style of participating subjects by GEFT, and then attempt to instruct subjects in a field-independent cognitive style. The implications of this training for subsequent success in various instructional formats could be assessed.

SUMMARY

The overall purpose of this exploratory study was to examine the relationship between cognitive style and the implementation of a health recording approach, the problem-oriented recording method (POR). The author examined the general problem-solving approaches of 50 registered pediatric nurses, working in a large urban medical center. The Group Embedded Figures Test (GEFT) was administered to all volunteers to categorize their general approach to problem-solving. Only nurses who scored in the lowest or highest quartiles of the GEFT were asked to continue in the study. These demarcations were done so as to avoid ambiguity with respect to the placement of the middle two quartile subjects.

All subjects were females, and norms utilized for female adult subjects. Thirty-six subjects completed the entire study. Following administration of the GEFT, random assignment to one of two instructional methods, lecture or self-instruction occurred. Each participant was then administered a pretest relating to POR to assess prior knowledge level of POR.

Following a pretest administration, each participant was given a lecture on POR or self-instructional material to learn POR. Subjects were then asked to practice the POR for a six-week period. A

subsequent posttest was administered to all participants.

Data were analyzed by an unweighted means analysis, resulting in rejection of the null hypotheses. A significant interaction at the .05 level was found between cognitive style and instructional method. Nurses described as field-dependent had higher average scores by the lecture method; nurses described as field-independent demonstrated higher average scores by the self-instruction method. Tukey's test was also employed to determine significant differences among the means of the difference scores. One set of means was found to be significant at the .05 level.

Discussion of results centered upon the findings of this study being consistent with previous research dealing with cognitive style and learning of a conceptually based task. Field-dependent subjects generally do less well when formulating correct hypotheses for such tasks.

The investigator recommends that this exploratory study be replicated in several similar clinical settings with more elaborate controls, to corroborate the results, and that additional studies extend this design to include verbal analysis of strategies utilized to formulate the POR information. A second extension of this study would be the learning of a nonrelated conceptual task prior to instruction in POR in an attempt to develop hypothesis strategies for field-dependent participants.

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APPENDIX A

Consent Form (Adult) For Project Participation

Project Title: Relationship Between Cognitive Style and Problem-Oriented Charting

I, _____, state that I am over 18 years of age and that I wish to participate in a program of research being conducted by Barbara Mudloff, who has fully explained to me the procedures, benefits, and alternatives involved and the need for the research; has informed me that I may withdraw from participation at any time without prejudice; has offered to answer any inquiries which I may make concerning the procedures to be followed; and has informed me that I will be given a copy of this consent form. I freely and voluntarily consent to my participation in the research project.

(Signature of Staff Member)

(Signature of Volunteer)

Date

(Signature of Witness to written explanation and signature of volunteer)

APPENDIX B

NURSING PROBLEM TEST A S.O.A.P. FORMAT

DIRECTIONS: Place The Nursing Problems in S.O.A.P. Format

1. Three month old Maria Sanchez is admitted to the general pediatric unit with a fever of 102° rectally. Her skin turgor appears poor, and she has no tears. Maria's mother states that Maria has had twelve watery green stools during the last 24 hours and that Maria is irritable and refusing food. She has not vomited. Her mother does not recall Maria's exposure to any infectious diseases. Medical diagnosis is probable viral gastroenteritis.
2. Baby girl Donnetti was born at 37 weeks gestation of a diabetic mother, Class A. This is Mrs. Donnetti's first pregnancy and it has been uncomplicated. The baby was born normally with Apgar scores of 7-8 and 8-9. Mrs. Donnetti had mild hypertension during the last two months of pregnancy. Medical evaluation: normal newborn, maternal diabetes.

DIRECTIONS: Place In Order of Importance The Nursing Care Provided:

3. Baby Zuk was born at 36 weeks of gestation. The delivery was uncomplicated, and there was no prenatal care provided. Apgar scores were 6-7 and 7-8. The baby's birth weight was 5 pounds. Some mild respiratory distress was noted, and the baby was placed in the neonatal I.C.U. for observation. Several hours

post-delivery the baby developed tremors, hyperirritability and sweating. After feedings were started, vomiting and diarrhea ensued. Upon further questioning of the mother, it was determined that she was on methadone.

Medical diagnosis was neonatal withdrawal.

- Note baby's actions such as tremors, irritability, twitching, convulsions, and sleeping patterns.
 - Observe cry and describe.
 - Observe gastrointestinal function: vomiting, diarrhea, and regurgitation.
 - Observe for dehydration.
 - Observe respiratory status: tachypnea, yawning, sneezing, excessive mucus.
 - Observe for pyrexia.
 - Evaluate mother's ability to assist infant.
 - Obtain social service assistance.
 - Record all observations.
4. Baby Boy Justin is two days old. His parents signed the consent for a circumcision. The circumcision was performed the third day of birth. Prioritize the significant nursing problems for mother and nurse following this procedure.

- Check the penis for bleeding every hour for 12 hours.
- Wash area gently and dry by patting.
- Pin diapers loosely.
- Tell mother yellowish discharge on second day is normal.
- Teach mother above care.
- Record all events.

APPENDIX C

NURSING PROBLEM TEST B S.O.A.P. FORMAT

DIRECTIONS: Place The Nursing Problems In S.O.A.P Format

1. Baby Justin was born at 32 weeks of gestation weighing 1300 grams and placed in Neonatal I.C.U. for observation. Within several hours following delivery, Justin's respiratory rate began increasing into the 80's, grunting was noted and mild-to-moderate substernal retractions and nasal flaring appeared. Medical diagnosis was respiratory distress syndrome.

2. Anna, age six, is admitted to pediatrics for removal of her tonsils. She has an unremarkable medical history and is in good health. Her immunizations are up-to-date. However, during the last year she has had persistent sore throats and some difficulty breathing on occasion. It has been mutually agreed upon by Anna's parents and the doctor to plan for surgery over Easter vacation. Anna has not been in a hospital before. However, her parents have explained to her the reason for hospitalization. Medical diagnosis was chronic tonsillitis.

DIRECTIONS: Prioritize The Nursing Problems:

3. Baby girl Smith was born at 35 weeks of gestation following a normal spontaneous delivery. Her birth weight was 5⁹. She was the second child of a 25 year old married woman whose last child

was also born prematurely.

The second day postnatally, baby girl Smith's bilirubin was 11.0 mgm/100ml. Medical treatment was phototherapy and adequate feedings for dehydration. Medical diagnosis was hyperbilirubinemia, secondary to prematurity.

- Unclothe the infant.
- Protect infant's eyes with eye patches.
- Check for eye drainage every eight hours.
- Cover head with stockinette.
- Monitor skin temperatures.
- Discontinue therapy periodically and remove eye patches.
- Observe infant's behavior.
- Protect skin and provide appropriate fluids.
- Record all observations.

4. John, age three years, was admitted to the general pediatric unit following an upper respiratory infection. He had a harsh barking cough, inspiratory stridor and moderate substernal retractions. His fever was 102°F. He appeared restless and his respirations were becoming more labored. Medical diagnosis was acute laryngeal tracheobronchitis.

- Observe for signs of respiratory distress: stridor, restlessness, cyanosis, retractions.
- Provide adequate fluid intake.

- Provide emotional support to child keeping him her in a calm; quiet environment.
- Provide support to parents and keep informed.
- Record all observations.

APPENDIX D

LEARNING BASE FOR PROBLEM-ORIENTED CHARTING

- I. What Is Problem-Oriented Charting?
 - A. The problem-oriented record is a record-keeping system which has four components.
 1. Data Book.
 2. Problem List.
 3. A Plan.
 4. Progress Notes.
 - B. Data Base is basic information obtained on every patient.
 1. Patient profile.
 2. History and physical.
 3. Laboratory reports.
 - C. Problem List.
 1. A problem is any condition or need of the patient or any question that needs a solution.
 2. Problems are identified from the data base.
 - D. The Plan.
 1. Initially the plan tells what will be done to resolve the problem(s).
 - E. The Progress Notes.
 1. The written events communicating patient progress.
 2. Progress notes include flow sheets, progress notes, and discharge summary.

II. DATA BASE:

A. Data base is essence of problem list.

1. Consists of patient facts.
2. Consists of laboratory values.

B. Problem List.

1. Collaborative tool for all health team members.
2. Formulated by physicians, nurses, and other health team members.
3. Includes facts found in data base, that need intervention or contribute to health status.
4. Numbered and dated.
5. Resolved problems are placed on inactive problems.
6. Temporary problems simply written in progress notes and placed on problem list.

C. The Plan.

1. A systematic arrangement of details to accomplish a goal.
2. Components: data, treatments, patient education.
3. Each problem will involve obtaining more data as needed.
4. Each problem has own plan.
5. Plan written by any health team member.
6. Initial plan revised at regular intervals.

D. Progress Notes:

1. Documentation of developments concerning patient problems.
2. Form: narrative, flow sheet, discharge summary.

3. Narrative includes: subjective or symptomatic list, objective data, assessment and plan.
4. Assess: interpret facts.
5. Plan: sequence of action.

E. Flow Sheet.

1. Shows progress of variables.
2. Data relating to one or more problems.
3. Anything measured at regular intervals and recorded on flow sheet.
4. Should reflect quality of care.

F. Discharge Summary.

1. Done in S.O.A.P. format.
2. Written notes for each patient problem.
3. Example:

Date	Problem #1
	S Summarize findings.
	O
	A Decision or diagnosis.
	P What was done and what remains to be done.

III. Examples:

A. PROGRESS NOTES

DATE	PROBLEM #1
4/25/77	

S: Mother states child has had eight liquid green stools in 24 hours.

- O: Child appears dehydrated: poor skin turgor, slightly depressed anterior fontanel.
- A: Probable moderate dehydration.
- P: Maintain NPO.
Place on I.V. therapy - D5/.2NS with 5 meq KCL at 20cc/hr.
Record accurately intake and output.
Clinitest, hematest stools.
Labstix urines.
Stools for culture.

B. DISCHARGE SUMMARY

DATE 5/1/79

PROBLEM #1 Diarrhea

- S: Child's diarrhea subsided.
- O: Child's diarrhea subsided 36 hours post-admission. He was advanced to clear liquids gradually. They were tolerated.
- A: Presently the child is well hydrated.
Diagnosis: viral gastroenteritis with moderate dehydration.
- P: Instruct mother to return to doctor if diarrhea ensues. Give return Clinic appointment.

APPENDIX E

Pretest, Posttest, and Paired Difference
Scores for Field-Dependent Lecture Group

Subject Number	Pretest Score	Posttest Score	Difference Score
5	5.2	54.8	49.6
6	2.6	38.3	35.7
8	6.1	50.4	44.3
11	7.0	31.3	29.3
12	3.5	33.9	30.4
13	4.3	37.4	33.1
14	6.1	58.3	52.2
15	9.6	54.8	45.2
21	38.3	24.3	-14.0

Note: Scores are expressed in percentages.
 Maximum raw score = 115.
 Mean of differences scores = 33.4
 Standard deviation of difference scores = 20.1
 Number = 9

Pretest, Posttest, and Paired Difference Scores
for Field-Dependent Self-Instruction Group

Subject Number	Pretest Score	Posttest Score	Difference Score
1	47.8	39.1	-8.7
3	51.3	43.5	-7.8
4	33.9	33.9	0
7	2.6	26.1	23.5
9	8.7	1.7	-7.0
16	7.8	23.5	15.7
18	4.3	19.1	14.8
19	5.2	20.9	15.7
22	30.4	53.9	23.5
23	0	73	73
24	4.3	24.3	20
25	3.5	47	43.5

Note: Scores are expressed in percentages.
 Maximum raw score = 115.
 Mean of paired difference score = 17.2
 Standard deviation of difference scores = 23.5
 Number = 12

Pretest, Posttest, and Paired Difference Scores
for Field-Independent Lecture Group

Subject Number	Pretest Score	Posttest Score	Difference Score
4	53	47.5	5.5
5	83.5	51.3	-32.2
6	62.6	65.2	2.6
7	80.9	54.8	-26.1
8	43.5	34.8	-8.7
9	33.9	70.4	36.5
13	7.8	30.4	22.6
14	15.7	70.4	54.7

Note: Scores are expressed in percentages.
 Maximum raw score = 115.
 Mean of difference scores = 4.8
 Standard deviation of difference scores = 30.3
 Number = 8

Pretest, Posttest, and Paired Difference Scores
for Field-Independent Self-Instruction Group

Subject Number	Pretest Score	Posttest Score	Difference Score
1	4.3	40.0	35.7
2	73.0	80.0	7.0
3	41.7	23.5	-18.2
10	6.1	39.1	33.0
11	3.5	27.8	24.3
12	11.3	53.9	42.6
15	12.2	40.9	28.7

Note: Scores are expressed in percentages.
Maximum raw scores = 115.
Mean of difference scores = 21.9
Standard deviation of difference scores = 20.9
Number = 7

APPROVAL SHEET

The dissertation submitted by Barbara Mudloff has been read and approved by the following committee:

Dr. Joy Rogers, Director
Associate Professor, Education, Loyola

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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Education.

April 21, 1981
Date

Joy Rogers
Director's Signature