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**AN INVESTIGATION OF THE EFFECTS OF STUDENT  
AWARENESS AND UNDERSTANDING OF COGNITIVE  
STYLE ON ACADEMIC ACHIEVEMENT**

**by**

**Jeanne V. Panuncialman**

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

**September**

**1985**

**Copyright, 1985**

**Jeanne V. Panuncialman**

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## VITA

The author, Jeanne V. Panuncialman, obtained her elementary and secondary education in Shelby, Ohio. She received a diploma in Nursing from St. Vincent's Charity School of Nursing in Cleveland, Ohio in 1951.

In February, 1974, she received a Bachelor of Science degree in Nursing from North Park College and in June, 1978 was awarded a Master of Science degree in Nursing from De Paul University in Chicago, Illinois.

In September, 1979, she began teaching at De Paul University in the Department of Nursing where she is presently employed.

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## CHAPTER ONE

### INTRODUCTION

This researcher began to study variables related to student achievement several years ago. A retrospective descriptive study was done by the researcher in which the problem was identifying student characteristics that related to the state board nursing examination scores. The nursing literature concerning this problem was sparse. Variables studied were: entrance test composites, subscores in reading, science, math, rank in high school, number of college courses completed, number of below average grades in major courses, National League of Nursing test scores and state board examination scores. Data were collected from a sample population of thirty-eight students who had failed the state board examination in a ten-year period. Thirty-eight students from the general population of students who had successfully passed the state board nursing examination were randomly selected as a control group. Data was collected from a control group. It was concluded that there was a profile for an experimental group that differed from the profile of the control group. The profile of those students who had failed the state board examination, the experimental group, included at least one course grade of D, and below average reading, math and science subscores on the college entrance examination.

Based on these findings, successful predictions of student state board failures at this school occurred during the subsequent two years. As a result of this study, a remedial program for freshman and junior students having characteristics of this profile was offered. The program consisted of remedial English and

reading skills. Several students improved course achievement and did pass the state board. Others tried and made little progress. Those students who did not progress had the negative experience that attrition from failure produces. This experience has been a primary influence in sustaining my interest in studying variables related to academic achievement.

It was noted that the literature about research concerning college students' achievement points toward a growing tendency to design methods and consider factors that facilitate promotion of effective student study processes.

In addition, educational research from the sixties to the present contains many studies focusing on the investigation of the effect of mediational variables on achievement. One such variable investigated by researchers is the student's approach or cognitive style and its relationship to their academic achievement. One conclusion from these studies supports the idea that instruction, along with cognitive style, influences the learning process for field independent, dependent persons.

As a result of these and other studies, focusing on cognitive style, evidence has shown that because knowledge is developed through processing information, an individual's typical approach or cognitive style is basic to his/her achievement. A contemporary general definition for cognitive style has been formulated by Harris and Hodges (1981), *Cognitive Style*: the theoretical assumption that individuals have a consistent approach to problem-solving or to general learning activities as for example, an analytic or holistic approach.

Interest in the mediational variable of cognitive style has generated much educational research, especially that associated with the dimensions of field dependence, field independence, Witkin. (1977). According to Witkin, et al., field

independence can be distinguished from field dependence by the extent to which a person can experience items (as discrete) from their surrounding field and thus overcome the influence of an embedding context. In addition, persons with an articulated cognitive style are likely to analyze a field when the field is organized, and to impose structure on a field when the field lacks organization of its own. Persons with a global style are more likely to go along with the field "as is" without using such mediational processes as analyzing and structuring (Witkin, et al., 1977, p 21).

This study investigates the effect awareness and understanding of the educational implication of one dimension of cognitive style has upon undergraduate student academic achievement. Witkin's theory of field dependence, field independence, will be utilized as a framework for this study because of the extensive research done on the subject and its broad application to learning.

### The Statement Of The Problem

The information explosion that has developed during the past several decades has complicated the undergraduate college students' quest for academic achievement. Their learning processes are not always facilitated by the learning activities made available for them. The plethora of texts, articles, audiovisual aids, programmed units, computer assisted learning packages, etc., do not always facilitate learning. In fact, some students experience a debilitation of academic achievement.

Students must also come to grips with the reality that although grades reflect only certain components of learning performance, the educational system is grade oriented. Even the public demands successful grades as evidence of accountability. Thus, academic achievement is a necessity for the student who wishes to continue to study in a college or university. National attrition rates of nursing schools average about thirty percent per annum. (N.L.N., 1981)

The undergraduate student is a young adult or adult learner whose developed repertoire of learning processes is a private affair. These individual learning processes can be facilitated by instruction, so that the students could be the designers of his/her learning process. Studies have shown that self esteem, attitudes and habits concerning student learning can improve when an individual is made aware of some of his/her cognitive style dimensions.

What effect would occur in an individual's achievement if he/she gained self-awareness and understanding of his/her cognitive style? Would the effect depend on the understanding the student had about the educational implications of his/her style? Would understanding promote adaptation of his/her cognitive style while learning, thus increasing academic achievement?

A review of the research done on cognitive style, field dependence, field independence, reveals a lack of studies that examine the effects of student awareness and understanding of this style dimension upon academic achievement.

Research is needed that will continue to identify factors relevant to optimal use of an individual's cognitive style so that individualized instructional designs can be developed that can help all students increase academic achievement.



## Purpose Of The Study

The purpose of this study is to investigate the effect that student awareness and understanding of the implications of cognitive style, has on his/her academic achievement in undergraduate nursing courses.

This study builds on the research in higher education that continues to investigate cognitive style effects on learning. This study differs from other studies in that the independent variable is awareness and understanding of the educational implications of an individual's cognitive style and the effect this factor has upon an individual's academic performance.

Support for the idea for this study could be found as far back as 1978 when Glasser (1979 p. 5) said, "The investigation of individual differences in the study of learning and the incorporation of individual difference parameters in learning is an unavoidable assignment for increasing relevance to instructional practice."

In The Scientific Basis of the Art of Teaching, Gage (1977) argues that process oriented research is necessary for adding to the scientific art of teaching. In addition, McKeachie (1980) makes a case for teaching college students how to identify their most effective learning strategy.

If baccalaureate nursing students are made aware of their cognitive style and given instruction about the educational implications relevant to their style, will nursing course test grades increase?

This study may provide information that will aid in the search for instructional design that could help students utilize their cognitive styles to improve their academic achievement. A study such as this may lead to the initial

formulation of a taxonomy of instruction based on cognitive style. Furthermore, information may be discovered that would be useful in the evaluation of learning. This study may discover factors that can be used to make learning conditions more favorable.

### Hypotheses

There will not be a difference in the course test #1 scores of the experimental subjects, who are aware of their GEFT score and have received instruction about the educational implications of the cognitive style, field dependence, field independence, as compared to the course test #1 scores of the subjects who are aware of their GEFT score and have received either the control treatment or no treatment.

There will not be a difference in the course test #2 scores of the experimental subjects, who are aware of their GEFT score and have received instruction about the educational implications of the cognitive style, field dependence, field independence, as compared to the course test #2 scores of the subjects who are aware of their GEFT score and have received either the control treatment or no treatment.

## Definition Of Terms

### Cognitive Style

An individual's way of processing information that is a pervasive part of an individual's psychological functioning.

### Cognitive Style/Field Dependence

Referring to perception in individuals who show relatively passive submission to the domination of the background and inability to keep an item separate from its surroundings. H. A. Witkin (1950)

### Cognitive Style/Field Independence

Referring to individuals who perceive with an ability to differentiate objects from their background. H. A. Witkin, (1950)

### Awareness

Notification of GEFT scores to subjects.

### Understanding

Subjects' knowledge after completion of instruction concerning the educational implication of field dependence, field independence.

### Achievement

Scores of Test I, Test II Nursing Courses

### Information Processing

Guidelines for designing educational activities oriented towards the information processing capability of students and

toward the systems that can improve their information processing capability.

#### Concept Formation

The process of, or stages in, the development and acquisition of understanding of an abstract idea: a cognitive system for integrating and organizing information based on common relationships. Harris and Hodges (1981)

#### Generic Student

A non R. N. Nursing undergraduate student

#### Basic Student

An R. N. student in the undergraduate Nursing Program.

### Subjects

This study was conducted at De Paul University within the Liberal Arts and Science College in the Department of Nursing. Standards must be maintained in colleges and universities accredited by the National League for Nursing. This implies some similarity of curriculum in accredited nursing schools.

The De Paul University nursing students are typically commuter students who graduated from a private high school or a junior college. Their ACT entry score is about 22 or above. The majority of students are of European descent and belong to a middle or upper socio-economic group.

The undergraduate nursing major enters the program with about 2 years of liberal arts and science courses and a GPA of 2.5. The nursing major must maintain a "C" in all nursing courses.

Subjects who volunteered for the study signed a letter of permission and were randomly assigned to experimental and control groups.

### Procedure

Students were asked to volunteer for this project during a class period. Advantages and expectancies of participation were discussed. Questions were answered and a handout about the participation was distributed. Signs inviting their participation in the project were also posted on bulletin boards.

Volunteers signed a letter of permission, completed an information sheet and took the SQ3R and cognitive style treatment verification test (see Appendix C) and the Group Embedded Figures Test. The pre-post test measured their prior knowledge about the instructional content and the GEFT measured their field dependence, field independence dimension. Volunteer subjects were randomly assigned to the experimental, control I (SQ3R - study technique) or control II (no RX) groups. The experimental subjects received an instructional booklet about the educational implications of field dependence, field independence. (Appendix E) They were asked to study the booklet within the next six weeks according to the directions contained in it. The control I subjects received an instructional booklet about the SQ3R study technique (see Appendix D). They were also asked to study the booklet within the next six weeks according to the directions contained in it. Control group II subjects received no booklet.

Follow-up group instruction (see Appendix G) was held with the experimental and control group I subjects after the six week period. The group in-

struction for the experimental subjects was to facilitate the understanding of the booklet, and help them apply their learning about the educational implications of field dependence, field independence to their present nursing course learning tasks. The group instruction for the Control I (SQ3R) subjects was to facilitate the understanding of the booklet they had studied about the SQ3R study technique, answer questions and help them apply their learning about the SQ3R study technique to their present nursing course learning tasks.

Following the group instruction the treatment verification test was again administered to all subjects. The GEFT score was also reported to all subjects. The experimental and control I (SQ3R) subjects were asked to complete a five minute evaluation form about the instructional booklet they had used.

### Scope And Limitations Of The Study

This study was limited to undergraduate nursing students during the academic year, 1983-1984.

The population for this study was volunteer Baccalaureate Nursing Students at De Paul University. De Paul University uses a quarter system.

Standards must be maintained in colleges and universities accredited by the National League for Nursing.

This study used only one of many cognitive and learning style tests that are available - the Group Embedded Figures Test (GEFT).

The results and implications from the data are restricted in that test grades are the only determining factors of achievement. This investigator piloted the program in Situ.

## CHAPTER TWO

### REVIEW OF THE LITERATURE

The present study sought to answer the question, could the achievement of undergraduate nursing students be effected if they understood the educational implications of the field dependent, field independent dimension of their cognitive style? The field dependence, field independence dimension of cognitive style was chosen as the conceptual framework for the present study. The first section of this review identifies and describes cognitive style and presents a broad overview of cognitive styles.

Psychological research concerning the characteristics, axioms and development of the theory of field dependence, field independence is included in the following section. This research is reviewed so that this dimension of cognitive style and its measurement can be understood.

The educational research section contains studies that helped expand this theory into the educational setting. These studies provided background and acted as a resource for this study. The next section reviews conflicting but related studies in higher education settings that used this theory for studies that analyzed achievement and cognitive style relationships. Finally, some studies done in higher education concerning other variables thought to be related to the achievement of college students are summarized in support of the contention that there is a need for factors of achievement research.

## Cognitive Style

### Overview of psychological research about cognitive style

Psychological research has shown that individual differences include an aptitude called cognitive style. Cognitive style is an aptitude, rich with many educational implications. Witkin, Dyk, Faterson, Goodenough, Karp, Lewis, MacHover, Meissner and Wapner concluded from many studies conducted from 1954 to 1962 that cognitive style has a significant holistic effect upon an individual's perceptions and thus is expressed in learning.

Witkin and others described cognitive style initially in perceptual terms, then expanded this construct to include intellectual tasks and also broader dimensions of personality functioning. In 1962, the characteristics of cognitive restructuring ability was added to field dependence, independence. Field independent people tend to rely on internal referents to structure what they perceive. This allows them to break up an organized field to identify discrete parts, to provide organization to a field otherwise without structure, or to impose a structure of their own creation upon an inherently structured field. Field dependent people on the other hand, tend to accept a field "as it is", adhering to the prevailing structure.

Messick (1976), described this bipolar style as follows:

Field-independence versus field-dependence refers to a consistent mode of approaching the environment in analytical, as opposed to global terms. It denotes a tendency to articulate figures as discrete from backgrounds and a facility in differentiating objects from embedding contexts, as opposed to a counter tendency to experience events globally in an undifferentiated



fashion. The field independent pole includes competence in analytical functioning combined with an impersonal orientation, while the field dependent pole reflected correspondingly less competence on analytical functioning combined with greater social orientation and social skills. (p. 14).

Messick (1976) also views cognitive style as a habitual mode of information processing. Information processing has been defined by him as a memory paradigm that includes the components of attention-rehearsal-chunking-working memory-operations-encoding and searching long term memory. In addition to this description of field dependence, independence, Messick also provides a glossary of other cognitive style dimensions. In Individuality in Learning (1976) he describes eighteen other approaches to cognitive style. In brief, eight styles describe variations in conceptualizing; two provide for measurement of cognitive interference management; two approaches identify perception of stimuli, the others describe speed of information processing, risk taking versus cautiousness in goal achieving, experience toleration, variations in thinking, memory and attention deployment. The reader may refer to this glossary for a detailed discussion of each cognitive dimension style.

Cognitive style researchers have developed instruments empirically based from studies they have conducted concerning a particular cognitive style approach. These tests identify style characteristics of individuals. For example, Witkin and others conducted approximately forty studies according to one author that contributed to the refinement and practical utilization of the original Rod and Frame test used to measure perception of the upright. These studies validated and extended Witkin's theory and additional instruments for measuring the

field dependence, field independence and as a result, the Group Embedded Figures Test (GEFT) evolved to accommodate group setting measurement of field dependence, field independence.

The cognitive style theory field dependence, field independence was selected as a framework for this study because of its broad application to the learner and because of the validity of the empirically based GEFT. This research explored the question of whether or not understanding one's cognitive style could have a significant effect on academic achievement. In addition, it continued to test the theory of field dependence, field independence.

### Psychological Research Concerning the Cognitive Style, Field Dependence, Field Independence

#### Development of Witkin's theory of field dependence, field independence (1916-1979)

The theory of field dependence, field independence has been used as a framework for psychological and educational research for about fifty years. Professor Herman Witkin, world renowned psychiatrist and psychologist, was an investigator of cognitive style as an interactive process in personality development. His classical studies of individual differences in perception on the upright in space began in 1940. These empirical studies formed the basis of field dependence theory. Witkin periodically redefined the theory and extended its conceptual framework to incorporate new data and insights.

Professor Witkin wrote the following about this theory before his death:

Though it has changed very much in its lifetime, field dependence theory is still very much in evolution. We can therefore be quite sure that, just as it has changed in the past, it will appear quite different in the future under the impetus of newly emerging evidence. An evolving theory is inevitably characterized by lacunae and uncertainties. This is surely true of field-dependence theory at this moment. These lacunae and uncertainties in themselves provided an impetus for research which can serve to advance the theory. Cognitive Style (1981), Page X.

### Intelligence

Researchers have identified cognitive style as different from intelligence. According to Witkin, Goodenough (1981) if intelligence is defined in terms of general cognitive abilities, the restructuring dimension may be considered the expression of the field dependence, field independence in intellectual functioning. The issues of intelligence may also be considered from the standpoint of conventional I. Q. measures.

Several correlational and factor analytic studies provide evidence that performance of the EFT (Embedded Figures Test), a cognitive style test, is indeed related to performance on a variety of other perceptual and intellectual tests involving the ability to overcome an embedding context. Some studies provide evidence that performance of the EFT does not relate, or relates at a much lower level to performance tests which do not require disembedding (e.g., tests of verbal ability). Fenchel (1958) found that field dependent subjects were slower in solving the extinction problem of the Einstellring Test. It was found that the EFT loaded on the analytical factors of the Wechsler tests but not on either the verbal comprehension or attention-concentration factors. (Goodenough & Karp, 1961). In

other words one cannot say that persons who are field independent according to their GEFT score are superior in general intelligence as reflected in the Wechsler since they may show wide variations in two out of three I. Q. factors measured by this test. Loeff (1965) indicated that the EFT correlated with other disembedding tasks, but not with tasks requiring sustained attention. Pascual (1969) found that the EFT along with the Wechsler analytic subtests and the Piagetian tasks involving disembedding (e.g., water level problems) correlate at a low level on Duncker problems of functional fixity, Guilford's Match Problems and insight problems representing the adaptive-flexibility factor.

One study investigated the relationship between intelligence, field dependence, leadership and self-concept.

Hoffman (1978) conducted this study with a sample of eighty-eight sixth grade boys who were given the Piers-Harris Children Self Concept Scale and the GEFT, a measurement of I. Q., a Short Form Test of Academic Aptitude and cognitive style test. Subjects with differing academic aptitude and cognitive styles were placed in ten leaderless groups of four subjects per group. The groups were given an unstructured construction task. Following each session the members of the group rated each other on leadership. Speech time for each subject was obtained from tape recordings. It was concluded that the I. Q. did not differentiate subjects on any variable. In other words, a high I. Q. score did not correlate with high leadership ratings. The researchers expected to find a positive leadership, I. Q. correlation. The results of this study provide some evidence that field dependence, field independence is a construct distinctly different from general intelligence.

## Development

There are clear age related changes in field dependence over the life span. The relationship between age and field dependence was first substantiated by Witkin in 1954. Further studies such as the following supported the general finding that field independence increases with age.

Witkin, Goodenough and Karp in 1967 studied the effect of age on field dependence, field independence. Twenty-five boys and twenty-five girls from eight to twenty-four years participated in a longitudinal study in which the RFT, BAT, and EFT were administered cross-sectionally. The conclusions were that field independence increased until seventeen years of age. At that time, a leveling off occurred. In addition, subjects kept their relative positions among field dependence, field independence dimensions with increasing age.

This study added support to the fact that in 1964 Crandall and Sinkeldam exhibited a significant correlation of .74 on performance scores of EFT and age for fifty children ranging in age from 6 to 12 years.

Handel (1972) studied changes in field dependence with age in a population of five-hundred and three Israeli boys in junior high school. He used a portable RFT device to obtain measures of field dependence. He found older boys to be more field independent.

In 1972, Crandall and Lacey correlated three measures of the EFT with the age and sex of fifty grade school children from 6 to 12 years of age. Correlations of .50 to .83 were obtained.

Axelrod and Cohen 1961; Comalli 1965; Markus 1971 and Markus and Nielsen 1973, conducted studies with elderly subjects. Their general conclusion was that field dependence increased with advancing years. A computer search

revealed no more recent studies about the development of field dependence, field independence with aging.

### Expansion of the theory of field dependence

The theory of field dependence, field independence began with the identification of differences in perceptual performance, however Witkin, Lewis, Hertzman, Machover, Meissner and Wapner (1954) conducted further studies, using the same laboratory tests for testing domains other than perception. They found the tests consistent across measures, and concluded that there is an articulated-global dimension which runs through the domains of intelligence, social behavior, body concept and body defense.

Because of the self consistency of field dependence, field independence differentiation recommended itself as a useful psychological construct for conceptualization of this dimension. The following reasons support the use of differentiation: the associated characteristics of field dependency were found to be ordered during ontogenetic development and characteristics were stable over time. Some of the characteristics possessed a degree of specialization of functions while others reflected a degree of separateness of the self from selves of others. All the listed features are distinguishing properties of a relatively more differentiated or less differentiated psychological system.

Witkin's theory (1981) of field dependence, field independence began with studies that added to the perspective of individual differences and concluded that there were a continuum of perceptual approaches. Then, in the 1962 version of differentiation theory, the enlarged picture of self-consistency was conceptualized. Within that conceptualization, an articulated vs global field approach was regarded as one manifestation of greater or less differentiation and field

dependence, independence referred to a component of that field approach dimension--greater or lesser disembedding ability in perceptual functioning.

The field dependence, field independence theory continues to be used for many multidisciplinary studies and it is an evolving theory. In Cognitive Styles (1981) Goodenough states that the theory of field dependence, field independence needs revision and expansion in light of new evidence. He sees the need for theoretical changes by testing new conceptualizations of field dependence that would include further study of the distinctiveness of the biological functions involved in perception of the upright and cognitive restructuring, the generality of the restructuring dimension, and the hierarchical ordering of all constructs in the theoretical model.

One critic of this theory, Seymour Wapner in Individuality and Learning (1976) acknowledges the contribution Witkin's theory of cognitive style has had on improving the quality of higher education, but he conceptualizes cognitive style as context dependent. In addition, he feels strongly that cognitive style is not a pervasive quality, because of this he believes mismatching, as well as matching cognitive style dimensions of students, teachers and context may promote optimum learning.

### Measurement

A premise of cognitive style theory is that cognitive style may be evaluated by controlled lab procedures. The early work on field-dependence theory was important for the issue of cognitive styles. It arose out of the broad stream of research of individual differences prevalent in the 1940's. The purpose of the early

studies was directed toward understanding the differences in how people perform tasks. Laboratory experiments of how people locate the upright in space were devised.

Field-dependence/independence - use of the body or field as referents for perception of the upright

Two phenomena determine our perception of the upright. First, the surrounding area about us (the field) serves as the character of a framework, the main axes of which are vertical and horizontal spatial directions. Second, the gravitational force apprehended through the vestibular, tactile and kinesthetic senses provide more definition of the vertical direction of space.

Witkin, et al., separated these standards to develop experimental research strategies to study perception of the upright. These experimental research situations later, after empirical studies, developed into standardized tests and were called Rod and Frame test (RFT), Body Adjustment Test (BAT), Rotating Room Test (RRT) and Embedded Figures Test (EFT).

The Rod and Frame test was conducted in a darkened room. A luminous square frame substituting for a visual framework can be rotated around its center. Pivoted at the same center is a luminous rod that can be tilted clockwise, independent of the luminous frame. The subject's task is to adjust the rod to an upright position even though the frame and body are tilted in a series of eight trials.

For some subjects (field dependent) in order for the rod to be apprehended as upright, it must be aligned with the frame, regardless of the frame's position: for example, if the frame is tilted 30 degrees, they will tilt the rod 30 degrees and say the rod is straight. At the other end of the continuous performance range are subjects who adjust the rod more or less straight regardless of



the frame position (field independent). The test score is obtained by arriving at a standard score by conversion of the subject's score on each test series. Age and sex modifications are included in the standard score.

The Body Adjustment Test (BAT) consists of several trials. The subject is seated in a chair in a small tilted room. Both the chair and room can be displaced by the experiments independently. In half the trials the room and chair are tilted in the same direction. The others are tilted in the opposite direction. When given the task of adjusting the chair (and therefore their own body) from an initially tilted position to the upright, with the room tilted, some (field dependent subjects) align their bodies with the tilted room and report they are sitting straight. At the opposite extreme of the performance range were subjects (field independent) who brought the body close to the true gravitational upright.

The Rotating Room Test (RRT) provided the subject with a similar task but tested the relationship of changing outward centrifugal force, the downward pull of gravity and body alignment. The subject seated in a chair that could be tilted was driven around a circular track in a small room, while the visual field remained upright. Subjects differed as in the BAT in the extent to which they aligned their bodies with the upright room.

The Embedded Figures Test (EFT) replaced the physical apparatus for determining field dependence, field independence. It requires the subject to locate a simple figure in a complex design which is so organized as to conceal the simple figure. Witkin selected twenty-four figures from a set originally developed by Gohschaldt (1926) and superimposed colored patterns to make the test more difficult. The score was the mean amount of time taken to find the twenty-four figures. The raw score was converted into a standard score. In 1971 Witkin et al.,

prepared a Group Embedded Figures Test administration guide and a scoring manual. This test is used to evaluate the field dependence, field independence dimension of college students in a group setting.

For some persons the simple figure almost "pops out" of the complex design, so their perception is field independence. For others the organization of the field as a whole dictates the manner in which its parts are experienced, hence recognizing the simple form takes longer. These people are field dependent. The common denominator underlying individual differences in task performance was the extent to which a person perceives an item from its surroundings; or, to put it another way, the extent to which a person analytically perceives. Based on empirical evidence, a continuum of these tendencies was proposed. One extreme of the performance range explained perception as dominated by the prevailing surroundings or field, that mode of perception was designated as "field dependent". At the other extreme of the continuum, subjects were experiencing items as more or less separate from the surrounding field. The designation "field independent" was used for these subjects. Because scores from any test of field dependence, field independence form a continuous distribution, these labels reflect a tendency of varying degrees of strength toward one mode of perception or the other. There is no implication that there exist two (2) distinct styles of human beings.

Additional labels were adopted to further clarify perceptual approaches. The person who tends to perceive an item as discrete from the background of an organized field and imposes structure on an unorganized field is said to be experiencing in an articulated fashion. Analysis and structuring are considered complementary aspects of articulation. In contrast, a person experiencing accord with the prevailing field and making less use of mediators such as structuring and analysis is experiencing a global approach.

### Reliability of measures of field dependence, field independence

Following the development of these cognitive style tests, it was necessary to insure their precision and accuracy. Error variance in research studies is controlled by increasing the reliability of measurement instruments such as tests. The reliability of the EFT, RFT, BAT and CHEFT was reported by Witkin and associates as clustered in the high eighties to low nineties when tests were readministered at one week intervals.

Witkin and others found that retest reliabilities for the RFT and BAT were satisfactory, however, those over a three year period were lower.

In addition to these results the studies listed below have satisfactory reliability, thus the measurement tests for the construct field dependence, field independence theoretically described by Witkin have satisfactory reliability.

<u>RESEARCHER</u>	<u>TEST</u>	<u>RELIABILITY MEASURE</u>	<u>SUBJECTS</u>	<u>CORRELA- TION WITH PREVIOUS SCORES</u>
Adevai & McGough, 1968	RFT	test-retest post 4 years	36 male Undergrads	.86
Bauman, 1951	RFT	test-retest post 3 years	32 males	.84

### Validity of measures of field dependence, field independence

There are several ways of accessing the validity of the various tests designed to measure field dependence, field independence. The most direct way is to examine the intercorrelations among the test versions of field dependence, field independence. Scores from the RFT, portable RFT and Group EFT were found to be highly related. (Handel, 1972), Witkin, et al., found high correlations

between versions of the EFT. Witkin et al., concluded that intercorrelations among the RFT, BAT and EFT ranged from .30 - .60. They felt these results indicated a consistent relationship in perceptual functioning of individuals.

The tables on the following pages outline significant studies that demonstrate intercorrelations of various test versions.

## RFT STUDIES

<u>RESEARCHER</u>	<u>YEAR</u>	<u>EXPERIMENT</u>	<u>SUBJECTS</u>
Oltman	1968	RFT Portable	163 college students
Results: .89 Correlation with RFT			

Stuart and Murgatroyd	1971	RFT Portable	
Results: .86 correlation with Oltman's Portable			

Fiebert	1967	System for deaf children	
Results: Successful			

Hurley	1972	Administration of Group RFT	
Results: Unsuccessful			

## EFT STUDIES

Jackson Messick, Myers	1964	Five Group administered EFT versions with short form of EFT	112 college students
Results: .62 to .84 correlation between measures			

Spotts and Mackler	1967	Group Administered & short form	40 male college students
Results: .55 correlation between measures			

Zenhausen and Renna 1976 Group Administered EFT Witkin's GEFT 1971 results analyzed 337 college students

Results: More field dependent subjects than predicted norms.

EFT STUDIES, CON'T

<u>RESEARCHER</u>	<u>YEAR</u>	<u>EXPERIMENT</u>	<u>SUBJECTS</u>
Evans	1969	EFT and GEFT with inexperienced subjects.	62 college students
Results: .43 correlation between measures.			
		EFT and GEFT with experienced subjects	43 college students
Results: .73 correlation between measures.			
Vojtisek and Magaro	1974	Short form EFT developed	Psychiatric clients
Evans	1969	Developed 150 question questionnaire	73 college students
Results: .76 correlation with EFT.			
			60 college students
Results: .64 correlation with EFT.			
			154 college students
Results: .46 correlation with EFT.			

Psychological research basic to the understanding of Witkin's theory of field dependence, field independence and the EFT has been reviewed as a foundation for a selective review of studies that employed Witkin's theory in studying field dependence, field independence and teacher-learning implications. This research review will also help in understanding the educational implications of field dependence, field independence for higher educational settings that will be discussed later.

### Review of Research in Education

The individual's perceptual tendencies we have been reviewing show themselves in congruent form in his/her cognitive activities (i.e., his/her dealings with symbolic representations). Witkin and others (1977) concluded from their empirical evidence that they were dealing with a broad dimension of individual differences that extended across both perceptual and intellectual activities. They used the word "style" to describe the characteristic approach the person uses in a wide range of situations; and, because the approach included both perceptual and intellectual activities, they spoke of it as "Cognitive Style".

They enumerated the essential characteristics of cognitive styles as follows:

1. They are individual differences in how we perceive, think, solve problems, learn, relate to others, etc., in other words, differences concerned with cognitive form and process.

2. They are pervasive dimensions, a feature of personality that can be assessed by nonverbal perceptual methods.

3. They are stable over time, but this does not mean they are unchangeable.

4. They are bipolar so they can be distinguished from intelligence and other abilities. Each pole has adaptive value under specified circumstances and so may be judged positively in relation to these circumstances; (i.e., they have neutral character).

According to Witkin, Lewis, Hertzman, Machover, Meissner and Wapner, 1954; Witkin, Dyk, Faterson, Goodenough and Karp, 1962; Witkin, 1976; the field dependence, field independence dimension of cognitive style has been extensively researched and has had the widest application to educational problems.

Research studies investigating relations between student learning and cognitive style have used cognitive and social characteristics included in the articulated-global dimension of field dependence, field independence. Some of these studies which analyze field dependence, field independence relationships and learning social information, cue saliency, cue perception effects, concept attainment and student, teacher interactions during learning will now be reviewed.

#### Learning Social Information

Ruble and Nakamura (1972) studied twenty-eight second and third grade boys and twenty-eight second and third grade girls in a west coast school while they solved concept-attainment problems. They were instructed to identify a correct figure from three shown to them in a trial for each problem. In one problem, the experimenter provided a social cue, looking at the correct figure.



Field dependent children demonstrated better learning on this problem. The researchers concluded that field dependent children are helped with concept-attainment when social cues and reinforcements are provided, but that the most effective style for a task would vary with the task demands. Witkin and others concluded from this and other studies with similar hypotheses that field dependent students learn information with social cues better than field independent students.

Field dependent individuals' superior memory for social information is illustrated by a study conducted by Crutchfield, et al., (1958). They found that relatively field dependent army officers were superior to field independent officers in recognizing photographs of other officers who had spent several days at an assessment center. A similar study conducted by Eagle, et al., (1969) supported these findings.

Relevant studies have shown that field dependent persons are better at learning social material when the material is peripheral to the task on which they are working. For example, Fitzgibbons, et al., (1978) gave thirty female college subjects a learning task to perform while a planted subject, separated by a curtain, called out thirty rater validated neutral and social words. All subjects had been informed their respirations would be measured while they took a digit symbol subtest of the WAIS. After this subjects were asked to recall words heard from the other side of the curtain. The relatively field dependent subjects recalled more social words than the field independent subjects, but for the neutral words there was no difference in recall. Correlations showed that the more field dependent a subject was, the more social words she recalled.

In contrast to these studies are numerous studies showing a small but general superiority of field independent subjects in non social learning tasks (Beck 1971; Iman 1973; Klein 1968; Valinski 1971; and Witkin and associates, 1962, 1974).

Implications of these findings for the student are that field dependent individuals, because of their social orientation, are adept at learning and remembering social information. Field independent students may learn social information as well when their attention is brought to focus on the social information.

#### Cue salience and cue perception

Many learning activities involve reading and some researchers have conducted studies investigating cue salience and cognitive style relationships with various aspects of the reading process.

Scott's (1976) study reported that field dependent children rely heavily on contextual cues while reading. This conclusion offers support for Witkin's earlier conclusions (1954) that field dependent readers were affected by the salience of cues in reading materials.

Bonhomme's (1980) study was designed to determine the relationship between two specific reading methods and materials of the English reading achievement of field dependent, independent children of differing levels of language proficiency. Three hundred disadvantaged Hispanic first graders of an elementary school in New York comprised the sample population. Half of these subjects were English dominant and half Spanish dominant. Four equal groups of subjects were made: field dependent, field independent, English dominant and Spanish dominant. The effectiveness of the basal or linguistic-phonenic approaches in reading was tested for three months. On the basis of this study, the following conclusions were drawn: the basal reader approach better prepares English dominant children while the linguistic-phonenic approach prepares Spanish dominant children better.

The basal reader approach is more effective for field independent children while the linguistic-phonenic approach is more effective for field dependent children. These results suggest reading approaches differ in the availability of salient cues.

Christiansen (1980) et al., initiated a pilot study to determine differences in information processing in oral and silent reading of field dependent subjects and field independent ninth grade readers at three difficulty levels of reading. In her paper, she reported only the results of the findings about silent readers. Cognitive style data were obtained from the GEFT and reading achievement was measured by the Progressive Achievement tests (ACER, 1973) Vocabulary and Comprehension. Intelligence Quotient was controlled for in this experiment. Fry's readability formula (Fry, 1977) was used to select appropriate reading material. The subjects were tested on their reading and were provided a procedure for measuring their self correction of errors. Analysis of the reading accuracy patterns indicated lower omission rates for field independent subjects at all reading difficulty levels. The percentage of omissions decreased for both cognitive styles as the reading difficulty level decreased. The researcher concluded upon analysis of error patterns for the three difficulty levels of reading, that there were noticeable differences between field dependent and field independent students at the frustration level; therefore it would seem important that the cognitive style of all students, but especially poor readers be known, since different instructional methods are required. The stress factor caused by frustration in reading appeared to magnify reading errors causing the field dependent reader to have difficulty with cue sampling and/or cue perception.

Gripen and Ohnmacht studied this phenomena of cue saliency in 1977 with field dependent and field independent students using a programmed language instruction. Programmed instruction with and without salient cues in a Russian vocabulary lesson was given to forty-seven undergraduate students. The GEFT was used for the measure of field dependence. Predicted interactions regarding

field dependence and cue salient relationships were not demonstrated but cognitive style was a significant predictor of performance. Field independent subjects obtained higher scores. The results of this study differ from those of similar cited studies whose sample population were children. This may add support to Witkin's contention that at the age of seventeen, a leveling off of field dependence occurs.

Loo (1978) studied various age groups of a female population for the relationship between age and cue perception. Seventy-two females were tested for visual acuity and cognitive style. Six groups of twelve subjects per group were formed according to the following decades: twenties, thirties, forties, fifties, sixties and seventies. Qualitative and quantitative data concerning perceptual problem solving methods were obtained. When the data were analyzed it revealed that, with an increase in age, there was a decline in item solving. Performance scores were relatively stable up to the age of forty-nine, after that a decline in performance and field independence resulted. This finding correlates with those of previous studies cited concerning the development of field dependency and development. In addition these results indicate item solving may be related to cue saliency.

#### Concept attainment factors

The relationship between field dependence, field independence and concept attainment is of special concern to educators. Nursing curricula are, for the most part, conceptual. The following studies have been done for the purpose of analyzing the effect of various aspects of concept attainment and cognitive style relationships.

Individuals with a field independent cognitive style are likely to analyze a field when the field lacks organization of its own. Mediational processes such as

analyzing and structuring are used in many situations. Field dependent individuals are more likely to go along with the field " as it is" and do not make as much use of mediational processes. Mediational processes are used in concept attainment. In addition, concept attainment involves organizing, using feedback and hypothesizing.

Fleming (1968) conducted a study in which word lists were shown to field dependent, field independent subjects and free recall of the words was subsequently measured. The word lists had two sets of word sequences, One was structured in an organizational format that featured superordinate sequencing. The other word list lacked the advance organizer feature that the superordinate list provided. The researchers concluded that field dependent subjects found the format without organizers difficult but that concept attainment is possible for both field dependent and field independent subjects.

Douglass (1978) designed a study to identify interaction between the independent variables, cognitive styles of 627 biology students and the instructional sequence of material, and their combined effect on student achievement. The students were ranked according to their intelligence quotient (I. Q.) scores and classified as field dependent or field independent students based on their results on the GEFT. They were then randomly assigned to one of three levels of instructional materials:

1. a deductively sequenced package
2. an inductively sequenced package of instruction
3. a control group pursuing three related units of high school biology.

Pre and post tests were used. The researchers concluded that instruction should be individualized in such a way that global field dependent students are

matched with deductive materials and analytic field independent students are matched with inductive materials.

Schwen (1979) examined the relationship of amount of structure in programmed texts with field dependence, independence and learning. The number of generalizations and examples given before an active response was required by the learner was varied. In one text version generalizations were followed by examples and discussions. The learner was then expected to answer questions. The second text version presented individual generalizations with examples and discussions, but the learner answered questions after each generalization. In the latter text version no relationship was found between field dependence, field independence and learning retention three weeks later. In the broader text version retention scores correlated with the degree of field independence.

An implication of these research studies suggests that attention to cognitive style difference learning under more structured and less structured conditions is important for concept attainment.

Witkin's expectation that field dependent individuals would attempt to use a spectator approach to concept attainment while, in contrast, field independent individuals use a hypothesis-testing approach is supported by the following study.

Nebelkopf and Dreyer (1973) studied the shape of learning curves of 30 field dependent and independent children in a concept attainment task. The children homogeneous as to age and verbal I. Q. were presented with a two choice simultaneous discrimination problem. The learning curves of field independent subjects were discontinuous suggesting they were using the hypothesis testing approach, while the learning curves for the field dependent students reflected the use of a spectator approach.

This study of concept attainment suggests that field independent individuals are more likely to use mediators of their own design i.e., hypothesis testing approach, while learning whereas field dependent individuals rely on the characteristics of the learning task itself (spectator approach).

It is important for teachers to analyze learning tasks with students to determine what learning behaviors are necessary to achieve the tasks. Since the hypothesis testing approach is often expected for concept attainment in nursing courses, this lesser use of structuring and feedback may handicap field dependent students. The present study teaches students this by helping them understand the educational implications of field dependence, field independence.

#### Mismatching/Matching Styles

The combined effects of teaching approaches, instructional materials, student learning methods and cognitive style have been the focus of recent research. Most of the following studies focus mainly on the progress and outcome of interactions when participants are mismatched or matched according to cognitive style.

Research on the role of teachers' cognitive styles in their approach to teaching has, for the most part, used the social versus impersonal orientation and sense of separate identity aspects of the articulated-global dimension for investigating classroom behavior of teachers with contrasting styles. Evidence on how teachers teach indicates, first of all, that whereas relatively field independent teachers favor teaching situations that are impersonal in nature and oriented toward the more cognitive aspect of teaching, field dependent teachers favor teaching situations that allow more interaction with students.

For example, Moore (1973) investigated differences in 20 teachers' use of rules, relations and examples in explaining chemistry principles and questioning students (n 12) about them. He developed a simulation game and observed the differences in teaching. Discovery techniques could not be employed in this game, so field independent teachers translated the discovery approach into the game by their questioning techniques. It was concluded that field independent teachers tended to use questioning as an instructional tool, whereas field dependent teachers used questioning primarily to evaluate student learning. This finding was consistent with an earlier study by Wu (1968) who found that more field dependent student teachers in social studies ranked discussion approach as more important to student learning than lecture or discovery approaches. Field independent teachers selected the latter approaches as more important.

Intensity or consistency of teaching styles has been investigated by Ohnmacht (1967). No relationship was found with field dependence, field independence. Witkin (1977) suggests the results could have been confounded by the use of Hall's Observation schedule and Flander's Interaction Analysis summary scores. More research in this area is needed but is probably difficult to design because of the closed door attitude many teachers appear to have concerning evaluation of their instruction.

DiStefano (1970) selected eleven male students from each of eleven teacher's classes and administered a survey to determine their relationship attitude toward each other. He used the GEFT to measure the field dependence, field independence dimension of each participant. The perception of subjects who scored similarly on the GEFT was positive. Mismatched students and teachers viewed each other negatively.



James (1973) replicated this study and obtained the same results. In addition to obtaining questionnaire data, the researcher asked each teacher to assign a predicted final course grade for each student. Field independent teachers assigned field independent students higher grades and field dependent teachers assigned field dependent students higher grades.

Research has also demonstrated that individuals have a different reliance on external and internal stimuli according to their cognitive style. This could mean that this difference might be reflected by automatic nervous system function. One behavior that researchers believe indicates certain automatic nervous system functions is that of attending. Attending precedes perception of cues or stimuli. An interesting and rather conclusive study concerning attending differences between field dependent and field independent subjects in relation to cardiac response and stressful imagery was conducted by Primakoff and Goldberger (1976). Forty females were divided into field dependent and field independent groups based on GEFT scores. Typewritten statements were presented to the subjects. These served as external stimulus blocks. Directions for imaging served as internal stimulus blocks. The heart rate count was used as criterion for anxiety level. The data indicated that field independent subjects demonstrated significantly greater heart rates after the external stimulus was presented while the field dependent subjects had an increase in heart rate after the internal stimulus was presented along with the external stimulus. This study may indicate that mismatching cognitive style produces discomfort or stress. A valid assumption is that when cognitive style is mismatched, cue sampling becomes difficult and confusing. Many individuals have been known to display signs of stress in these situations.

Stasz, Shavelson, Cox and Moore (1976) studied the correspondence degree between the structure of concepts in a social studies unit and the representation of them that high school students and teachers expressed after instruction and study of this unit. Ninety-eight students and twenty-four teachers differing in field dependence, field independence were assessed by the GEFT, a portable RFT, the Human Figure Drawing test and a post test of unit concepts. The data demonstrated upon analysis that field independent subjects had higher post test scores. Field dependent subjects had difficulty distinguishing concepts. Teachers and students of like cognitive style had similar post test scores. The researchers were surprised at this finding because of the fact that teachers were considered experts. It was expected that their post test scores would be different than that of the students.

Mahlis (1981) conducted a study to determine teacher approaches in regular classroom instruction and how the different approaches compared with the teacher's cognitive style. Furthermore, he then compared his data results with those of previous researchers who had used simulated classroom teaching approaches (Wu and Moore). Thirty homogeneous fifth and sixth grade teachers were observed for a total of ninety-six hours by six trained observers. The observation schedule Teacher-child Dyadic Interaction (Brophy and Good, 1969) was used. The GEFT was administered to the subjects to determine their cognitive style. The results supported the same finding Wu and Moore had obtained in their studies. It was concluded from analysis of the data that the actual classroom teaching behaviors in the classroom are related to the teachers' cognitive style. Field dependent and field independent teachers differed most dramatically in the overall frequency of interactions. They also differed in their conceptual level of instruc-

tional activity and the type of feedback they supplied to students. Future research is needed to determine how teachers vary their instructional behaviors to match or mismatch students' cognitive style during the teaching-learning process.

One hundred twenty one pre-service teachers from Stanford University participated in a study (Koran, Snow and McDonald, 1971) in which cognitive style and the acquisition of the teaching skill, analytical questioning was observed. The hidden figures test was used to evaluate cognitive style. Subjects were randomly assigned to both written and video-modeling instruction. These two teaching methods were found to be differentially effective for field dependent and field independent pre-service teachers. Field dependent teachers benefited most from the video-modeling method. This may have occurred because video modeling might have helped with perceptual processing. Field independent teachers apparently had no perceptual processing difficulties, as evidenced by the fact that they did as well with the written method as the video-modeling method. This study supports the premise that effectiveness of instructional methods varies from subject to subject with differences related to the subjects' cognitive style.

Research based on Witkin's suggestion that optimal learning results when the instructional style of the teacher capitalizes on the strengths of the learner's cognitive style has been supportive. For example, in a paper presented at the Annual Meeting of the American Educational Research Association (AERA) (1976) Elliot reported on a study designed to determine whether instructional treatments specifically designed to match identifiable learner characteristics can produce significantly better learning than mismatched instruction. Instructional treatments for geometry were developed to match learning patterns of individual students, using field dependence and field independence as the learner traits.

Eighty-nine suburban third graders were tested with the Children's Embedded Figures Tests and classified as either field dependent or field independent. They were then randomly assigned to one of three treatment groups: (1) instruction matched to field independent cognitive style, (2) instruction matched to field dependent cognitive style, or (3) no instruction. After the instruction had been completed, four criterion tests developed and validated by the researcher were administered to the students. Upon analysis, data were interpreted as providing partial support of the theory that matching learner traits and instructional treatments can produce learning gains.

An example of a study that produced conflicting evidence concerning the matching of cognitive styles is MacNeil's (1980) investigation of the relative effect of discovery and expository instructional style on subjects of contrasting cognitive styles, field dependence, and field independence. The content of instruction was basic principles of behavior modification. Treatment consisted of five one hour sessions for a two week period. The researcher's conclusions were that matching the learner's cognitive style with a similar instructional style did not enhance academic performance. MacNeil points out in his discussion that this study was the only one of this nature that used undergraduate level subjects and found no relationship among the variables. He recommended that further investigations be conducted using age or educational level as control variables. Perhaps imposing instructional methods upon college aged students confounded the results.

Some of the above the studies indicate that teacher student match in cognitive style creates greater interpersonal attraction than teacher student mismatch. The literature on field dependence, field independence suggests that

the basis for this phenomenon of interpersonal attraction effect of teacher and student matched cognitive style is shared interest, social orientation, similar personality characteristics and similarity of communication modes. Whether to match or mismatch instructional approach with cognitive style tendencies for increased achievement is still a question that lends itself to further research.

### Cognitive Style Awareness

Matching of cognitive style is neither practical nor cost effective. Can awareness on both the part of the teacher and student be a potent factor in student achievement?

Doebler (1977) studied the effects of teacher awareness of the educational implications of field dependent and field independent cognitive style on student attitudes and self concept. The sample population was two hundred ninety-five fifth grade students. Measures used were the GEFT, student and teacher surveys. Treatment consisted of giving the teachers and students their cognitive style test results. A seminar on educational implications was also given with follow-up sessions provided. The researcher concluded that attitudes and self-concepts of the students and teachers improved and that cognitive style matching between teacher and student was not necessary. This study did not measure achievement. Some support for the results of this study can be found in that cognitive style awareness and understanding is thought to relate to learning to learn.

Learning to learn according to Dai Hounsell (1979) is characterized by activities that help the learner search for purpose, meaning and understanding of context. These activities are differentiated from the technical skills of study. Learning to learn involves what Flavel and Wellman (1977) and Brown (1975) call

metacognition. The term metacognition according to these researchers means an awareness of one's own cognitive process. In this study awareness is considered basic to and part of understanding the educational implications of one's dimension of field dependence, field independence.

### Changing cognitive style

Some researchers have raised the question of whether or not cognitive style behaviors can be adapted. Witkin (1981) explains that ecological press provided an important early impetus and a continuing guiding force in the shaping of cultural forms through phenotypic transmission calculated to produce individuals capable of functioning in ways suited to their environment. Cognitive styles may be included among the adaptive ways of functioning.

Cognitive style is considered to be a process. Kirby (1979) believes along with Hagberg and Leider (1978) that the "Ultimate transfer skill" is knowledge of one's own cognitive or learning style and the ability to apply information about it in one's own life.

Although Witkin believes one characteristic of cognitive style is stableness over time, he points out this does not mean behaviors of the style cannot change (i.e., "many behaviors that emanate from cognitive styles are malleable"). He uses the words malleable and adaptive to indicate that the stableness can bend towards change. He has said that it seems possible to induce individuals to use different cognitive style behavior by providing direction. Because of this, Witkin believes that teachers adapting their style to their students' cognitive style would be a realistic goal when we can identify a particular teaching strategy that the teacher may use to achieve adaptation (1977). Generally speaking, the following psychological studies taken collectively appear to support Witkin's position about the malleability of field dependence, field independence.

Witkin (1948) reported that training designed to change field dependence to field independence included discussions of the problem of orientation and information given subjects regarding their performance scores in space orientation tasks. These subjects improved their ability to judge the true upright or become more field independent. He concluded that field dependent subjects perceive an objectively upright rod as being tilted in the opposite direction of the frame and adjust the rod to vertical by shifting it in the direction of the frame's tilt, while field independent subjects are able to use internal cues to determine the vertical. However, Witkin asserted that the basic perception of the upright itself was not affected. He claimed that the training led to development of "special intellectual techniques" by which subjects were able to make adjustments in their judgments on the specific tests on which they had been trained. Because he found no evidence of transfer effects on other perceptual tasks, he felt that the basic mode of perception had not changed in these subjects.

In 1970 McAllister conducted a two phase investigation using a sample of thirty hospitalized male patients in which the technique of successive shaping and fading (Behavioral Therapy) was combined with contingent positive reinforcement in the form of tokens in an attempt to modify rod and frame test (RFT) performance. A control group of thirty patients was subjected to the RFT without follow up treatment but instead with practice designed to improve the RFT performance. The results indicated that post treatment RFT scores for the experimental group had improved even when later (one month) another RFT was administered. These findings do not belie the evidence supporting field dependence, field independence in the personality structure. They do open the possibility that the aspects of individual functioning are a reflection of life experiences rather than internal factors composing the personality structure.

Jacobson (1966) determined whether brief sensory deprivation could act to decrease the perceptual field dependence of forty-one male and female college students. An experimental group was given the RFT followed by an hour of sensory deprivation. The control group was given the RFT and their activity was controlled during the practice interval. The experimental group showed on post test RFT a significant decrease in field dependence. The control group post RFT remained the same as their pretreatment RFT. It was concluded that the experimental group experienced a reduction in RFT scores because of increased body awareness caused from the treatment. The researcher concluded that artificial modification of the sensory environment so that external stimulation is reduced may increase cue saliency and the availability of internal cues.

Chess, Neuringer and Goldstein (1971) studied changes in field dependence in a study using 13 alcoholics and 13 non-alcoholics (control group). The experimental subjects had an average drinking history of 20 years. General objective arousal tests and the RFT were administered weekly for six weeks. Measures of the arousal procedures (i.e., skin resistance and heart rate) were collected along with serial RFT scores. The researcher's thesis that RFT changes would be caused from arousal was not substantiated, however results provided a reflection of previous studies that concluded alcoholics are more field dependent than non-alcoholics. In addition, this study's result cast doubt on the idea that field dependence in alcoholics is a stable phenomenon. The data demonstrated that the serial RFT measurement changed in the expected direction from field dependence toward field independence during the course of the subjects' treatment for alcoholism.



McWilliams, et al., (1975) conducted a study to determine the stability of field dependence and its relationship to the self actualization of fifty-four alcoholic subjects. The RFT and Personal Orientation Inventory (POI) were administered pre and post treatment. The treatments given to the subjects in three equal groups were psychedelic drug treatment, individual treatment and normal hospital care for six weeks. Field dependency scores and self actualization scores increased for the subjects given individual treatment. This study supported Chess, et al., and Goldstein, et al., findings that field dependence is not stable.

The impact of operant autonomic conditioning was examined by McCanne, et al., (1976). The portable RFT was administered to forty psychology students before and after operant autonomic conditioning training or control experience. Ten subjects were assigned to each of four groups: a heart rate conditioning group, a false heart rate feedback group, a galvanic skin response conditioning group and a control group. Half of the subjects in the three experimental groups were informed of the purpose of the study and half were not informed. Informed subjects in the conditioning groups exhibited significantly lower RFT scores after conditioning; the control group's scores remained stable. It was concluded that changes in RFT performance were related to internal body cues. The results suggest that awareness of individual control over autonomic functioning may be an important determinant of RFT performance.

Evidence from the majority of these psychological studies support Witkin's contention that cognitive style is malleable but not changeable. This research study differs from those above in that it is educational research. Instruction will be given to facilitate the understanding of the educational implications of field dependence, field independence so that undergraduate nursing stu-

dents may adapt their cognitive style to various learning activities. It is hypothesized that this treatment will result in an increase in the test achievement of the subjects. Some educational researchers would support this idea, for example, Rameriz etc. Ramirez (1982) believes that using sets different from one's own will increase transfer options. Thus, if the learner understands the opposite pole of his/her cognitive style dimension, he/she may be able to use it with practice.

Students must be recognized for their autonomy as adult learners. Receiving instruction about their cognitive style may assist them in learning. The teacher and curricular tasks most often make choices for the learning approach that really belongs to the learner.

Messick suggests that cognitive style information may be used to capitalize, compensate and correct learning approaches. Other researchers recommend mismatch of style for challenge. Who can do this better than the learner, provided the learner has instruction?

### Higher Education Research

#### Cognitive style and course achievement

One objective of American Education is to provide every person with an equal opportunity to receive an education of high quality. While not the total answer to this, judicious use of cognitive style holds a promise of helping the educator and student determine the most effective approach to learning.

The research focusing on cognitive style of field dependence, field independence in higher education has primarily examined its relationship to course work preferences, performance in different subject areas, instructional strategies, curriculum design and learning achievement.

The most comprehensive study to assess hypotheses derived from field dependence theory about the role of cognitive style in students' academic development and performance in different subject areas is a longitudinal study at the higher education level conducted by Witkin and others (1967-1977). In that study 1,548 first year students in a municipal college were assessed at admission. Some of these students transferred, but 1,422 subjects were followed throughout their college career. This study sought to answer the question of whether or not students' cognitive styles were related to their chosen major field, and if changes in students' majors resulted in better congruence between their major and cognitive style. In addition, student achievement as it related to cognitive style and expectations of the major was analyzed. The independent variables used were sex, cognitive style (GEFT), verbal competence (SAT), math competence (SAT), attrition pattern and choice of major. One dependent variable measured course achievement. Some conclusions were that verbal competence had little relationship with cognitive style, but that cognitive style did relate to the SAT math scores and vocational education interest. Additional findings were that more field independent students favor domains in which analytical skills are called for such as the physical and biological sciences; while field dependent students demonstrated strong preference for social science domains. Attrition occurred when chosen field was incompatible with cognitive style. Achievement did not show a significant relationship to GPA and cognitive style but, to cognitive style and some course grades. Performance in courses of mathematics and science measured by final course grades were higher for field independent male students. The raw and partial correlations for one of these courses was large and significant,  $.31(p<.01)$  and  $.33(p<.01)$  respectively. The raw correlations were similar in magnitude for woman subjects.

Support for Witkin's finding of a relationship between cognitive style and course achievement can be found in several of the following studies conducted with undergraduate college students.

Conger conducted a study in 1981, with a sample of sixty collegiate students who were enrolled in an elementary statistics course. Data analyzed included GRE, SAT, ACT and course test scores. The results suggested that style attributes and GRE and SAT scores did account for a significant proportion of the variable of achievement in the statistic course. Students with the highest ability and aptitude received the highest course test scores.

Hinton (1980) examined the role of cognitive style as it pertains to the learning of mathematics from six departments of a two-year college at Ohio State University. The relationship of 32 students' cognitive style and math course test scores were analyzed. GEFT scores showed that field independence was related to the achievement of higher mathematic scores, (i.e., field independent subjects scored highest).

Hansen (1980) investigated field dependency and foreign language proficiency in a sample population of two hundred ninety-three college students enrolled in an introductory Spanish course. American College Test (ACT), mathematics grade averages and GEFT results were correlated with a cloze test score representing final language performance. Higher scores were achieved by field independent students. The researcher recommends appropriate pedagogical modification to integrate all cognitive styles for successful learning for all students. These studies support the idea that information about how the learner gains knowledge does offer hope that we may be able to do a better job of helping students learn.

### Ability, achievement and cognitive style

Several studies were noted from the computerized literature search that examined aptitude and ability scores and cognitive style and their relationship to student achievement. These studies are important because they examine whether or not cognitive style is confounded with ability.

One of these studies designed to predict college level academic achievement with tests of cognitive style and cognitive aptitude was completed in 1979 by Schwen and Bednar. Two hundred forty subjects were drawn from an introductory geography course utilizing an audio-tutorial mastery design (15 weeks). A significant relationship between cognitive style test and the Scholastic Achievement Test (SAT) was found. The relationship between GEFT and course test scores was negative. Schwen and Bednar's findings partially support those of Witkin's (1977) conclusions from his longitudinal study that there is a positive correlation between SAT and GEFT scores.

Harden (1981) hypothesized that there was a relationship between undergraduate students' cognitive style and level of achievement in the business administration major. The sample population was the experimental group of forty-four management major students and forty-four non-management students (control Group). The measures used were questionnaire, math GPA, Vocation Preparation Inventory and the GEFT. The conclusions were that field dependent students found the business administration major difficult.

Ng Wai Kong (1982) conducted a study with freshmen geography students in which it was hypothesized that there is a positive relationship between achievement and the linear combination of general ability, field dependence, field independence, anxiety and treatment. Redundant and lean instructional treatment

in an audio-tutorial format were used. In the redundant treatment rules and concepts were stated twice as often as in the lean instructional treatment. The GEFT score was the measure of field dependence, field independence. The hypothesis was confirmed. Redundancy improved achievement of low general ability and field dependent students. This study supports Witkin's contention that cognitive style and instructional style matching is related to achievement.

Czarnecki (1980) examined 500 adults' performance on the GED as a function of field dependent, field independent cognitive style in a study of a sample population of five hundred. All subjects took the GED and the GEFT. The researcher found that the reading subtests of the GED related to cognitive style. Field dependent subjects had lower reading scores. Czarnecki recommended that a variety of questions appropriate for both cognitive styles be included in all GED test designs.

Wormack (1980) reported a study of the relationship between nonverbal analytical perception as measured by the SAT and performance on a standardized science achievement test among thirty-nine male and thirty-nine female minority premedical and pre dental students. The findings supported the primary hypothesis that students identified as field independent according to the GEFT would achieve higher test scores. No relationship was found between SAT and science scores.

Relationships of aptitude, previous achievement and cognitive style to academic achievement in nursing courses was studied ex post facto by Talatczyk (1981). The sample population was one hundred eighty-one seniors in the nursing major of a private urban university. The ACT, GPA scores and cognitive style test results were analyzed. The researcher concluded that cognitive style was not a predictor of academic success. This finding supports Witkin's conclusion that cognitive style in itself is not a predictor of general college success.

Walker (1981) conducted an ex post facto field study in a Midwestern community college. The sample population was one hundred sixty-two students who had successfully completed their first nursing course. The purpose of the study was to determine aptitude and ability relationships with achievement. The primary independent variables were the student's field dependence, field independence dimension as measured by the GEFT and SAT. One dependent variable was course achievement. Subjects were found to be more field dependent as a group than the liberal arts college students who comprised the norm group. The conclusions from this study were that field dependence, field independence and academic ability were moderately correlated with course achievement in the expected direction (i.e., field independent students had higher scores). These findings agree in part with the conclusions of Hinton (1980), Congero (1981), Hansen (1980) and Harden (1981).

Some of the studies reviewed above support the idea that achievement in the sciences is enhanced when the students' cognitive style is field independent. Although cognitive style is not the same as intelligence the SAT scores of field independent students are generally reported as higher than those of field dependent students. One possible explanation for this may be that the instructional design of many courses of study are oriented to the field independent dimension of cognitive style.

#### Instructional strategies and cognitive style

Several studies reported experiments with pacing and the use of different instructional methods and their relationships to cognitive style and achievement.

Wilson (1981) studied the effects of instructor versus student pacing and cognitive style on the achievement score of a standardized math test. The GEFT

was the measure used to identify the field dependency of sixty-eight students. It was concluded that field dependent students need instructor paced instruction and field independent students do well with self paced instruction.

Horak (1977) conducted a study which examined the effect of teaching methods and cognitive style on student achievement in college mathematics. The course was a two-week unit designed for pre-service elementary education teachers. The sample population of one hundred eighteen pre-service teaching students received the GEFT test and were randomly assigned to an inductive or deductive instructional group. No interaction between field dependency and mathematic achievement scores was found. The researcher concluded that field dependent students as well as field independent students profited from the inductive method of teaching.

Wallace (1980) conducted a study with sixty university students in two instructional groups. After administering a pre-test, thirty students were placed in a self-paced audio-tutorial instruction and thirty students received group instruction. The post test scores were correlated with the students' GEFT result. Field independent students scored higher regardless of study mode. The results of this study conflict with those of Ng Wai Kong (1982) cited above.

Rittner (1981) examined the effects of field dependence and spatial perception and their interaction with instructional treatment. Students in a floral design school were randomly assigned to one of four instructional treatments; simple or detailed drawings, demonstration and colored photographs. They took a cognitive test and constructed a floral design. Analysis of data demonstrated in all but one case field dependence was significantly related to both achievement and performance. No positive relationship was found between cognitive style and



instructional method. The results of the study suggested the importance of the individual's cognitive style in relation to course achievement rather than instructional design. The fact that random assignment of instructional treatment to individual students was used may account in part for Rittner's findings.

These studies suggest that there may be a relationship between instructional design, cognitive style and achievement but more research is needed to delineate cause and effect. Most studies of this nature do not control for a possible interactive effect from the cognitive style of the instructor.

#### Curriculum design and cognitive style

Other research studies using achievement as a dependent variable have reported the effects of curriculum packages containing specific content material, designed for various instructional methods and students' cognitive style interactions.

Danielson, et al., (1979) designed and carried out a study to determine the relationships between academic achievement, rote learning, learning for understanding, cognitive style and the medium of presentation (print versus television). The sample population was one hundred thirty-one adults in the experimental group and thirty adults in the control group. The treatment was a content learning package prepared for presentation in print and television. It was concluded that the subjects receiving the print treatment scored significantly higher on the rote level questions than they did on the understanding level questions. Following this instruction the subjects were tested for achievement, the dependent variable. It was also found that field independent subjects scored higher than field dependent subjects on rote questions.

Hoskins (1980) determined whether or not there is interaction between field dependent, field independent cognitive styles and learning achievement when the learner has behavioral objectives for a learning activity. Fifty-four (54) sophomore undergraduate nursing students participated in the study. The verbal learning activity was a text on nursing diagnosis developed by the researcher. The subjects were divided into two groups, group I received objectives, group II did not. The SAT, GEFT and a score of post test unit achievement were the criterion variables. A conclusion was made that there was an aptitude treatment interaction between cognitive style and achievement. Field independent subjects achieved higher post test scores. No differences were found between group I and group II scores. One recommendation for future study was to vary the specificity and diversity of objectives to aid disembedding.

It appears documented from educational research that relatively field dependent and field independent individuals favor different learning approaches. The applied research that has been done suggests that field dependent students prefer more interpersonal contact with teachers and peers, require more frequent feedback and greater externally imposed structure, and learn best when content is organized into smaller units, whereas field independent students prefer individual study, require less frequent feedback, provide their own structure when it is lacking and are able to handle larger units of context. Consequently, it follows that the effect of these approaches should appear in achievement. Teaching approaches, instructional materials, evaluation of learning and student learning methods, if not individualized to facilitate learning, may confound learning.

## Summary

1. Field dependence, field independence cannot be equated with general intelligence even though that dimension of field dependence, field independence must be considered.

2. Field independence increases until early adolescence when a period of stability occurs.

3. Applied educational research utilizing the field dependence, field independence dimension of cognitive style has included measuring achievement occurring with the learning of social information, use of mediators, the effect of varied curriculum packages and student teaching interactions.

4. The findings that have been reviewed suggest that field dependent persons are better at recalling social material and that this superiority is based on their selective attending to social material.

5. Evidence reviewed suggests that the lesser use of structuring and feedback as a mediator may handicap field dependent students in instructional learning situations. Field independent students appear to use a hypothesis testing approach to concept attainment while field dependent students favor a spectator approach.

6. In regard to matching or mismatching teacher-student, student-learning method and their relationships with field dependency, field independence; some questions are:

A. Does matching or mismatching teacher or instructional method with similar or dissimilar approaches to learning improve achievement?

B. What is going on in the interaction during matching or mismatching teacher or instructional method with students' cognitive style that produces an achievement effect?

C. How do situational variables moderate the effects of matching or mismatching instruction with cognitive style differences?

7. The results from research about cognitive style relationships of students in higher education show that achievement in different subject areas reflects relationships to cognitive style. Conclusions from studies revealed that field independent students achieve higher scores than field dependent students in tests that require analysis, math, science, verbal language, and reading. SAT scores are higher for field independent individuals.

8. Field dependence, field independence does not show a general consistent relationship to overall achievement measures such as college grade point average. In contrast, numerous studies have demonstrated a relation between cognitive style and achievement in specialized areas.

9. The results from studies reviewed concerning relationships between instructional strategies, and cognitive style in general were positive. Conclusions about curricular design and cognitive style are conflicting and inconclusive.

10. The computer search of the literature did not identify studies wherein subjects were made aware and taught the meaning of their dimension of field dependency in order to increase their academic achievement. Studies were reviewed that support Witkin's contention that cognitive style is malleable.

## Selective Review of Research in Higher Education Concerning Academic Achievement

Fifty years of research on effective college teaching has produced an enormous number of studies. In reviewing these, James and Chen Kulik, et al., (1977) note that some studies of alternative approaches to college teaching reported significant differences in student achievement outcomes.

During the 1960's and 1970's, individualized teaching methods became a research focus. In general, researchers concluded that individual study on the part of the learner had a greater influence on student achievement than did classroom instruction.

Dubin and Taveggia in Teaching Learning Paradox (1968) analyzed data from ninety-one comparative studies of college teaching technology conducted from 1925 to 1965. They concluded that there was no measurable difference among traditional methods of college instruction based on student's final exam grades. These findings could be due to the state of research during the first half of the 19th century.

Subsequent research has focused on the development of techniques for influencing how, when, how much and what the student studies on his/her own time. (Calhoun, 1976).

Three features of individualized instruction (i.e., instruction focusing on students' individual study time) appear to have effects on student study. These include frequent proficiency exams, immediate feed-back, and the degree of remediation requirement. Kulik further states that these components of college teaching increase course effectiveness.

This focus, along with improved research design and utilization of multidisciplinary approaches to education problems, is beginning to open new doors for learners.

## CHAPTER III

### METHODOLOGY

#### Design Of The Study

Three levels of instruction (instruction about the educational implications of cognitive style, control instruction and no instruction) and two measures of achievement (nursing course test I and test II) were combined to form a 3 x 2 factorial design. This design was chosen for the purpose of increasing control and generating data that could be examined for alternative explanations. Subjects were randomly assigned to one of three instructional conditions in an experiment to address questions concerning the effects of the understanding of cognitive style on nursing course tests. A pretest-posttest was used for verification of treatment.

The experimental group was given instruction about the educational implications of cognitive style. In order to control for instructional time, a second group (control group I) received an instructional treatment for the same duration as the experimental group. This group received instruction about a study technique called survey, question, read, recite and review (SQ3R) which is an active recitation and rehearsal study skill (Robinson, 1970). According to Bower, Hilgard (1981, p. 540) "a basic problem with self-prescribed study aids is that students find them hard work (more so than passive reading) and so they tend not to take them up nor to continue with them unless some strong incentives (rein-

forcers) can be built in. Apparently, the student's wish for a high grade is too remote or weak a reinforcer." The third group, control group II received no treatment.

Two nursing course test scores were collected as the data for the dependent measures, nursing course test I and nursing course test II. According to Ary, et al., (1979) it is desirable to include more than one effect measure in this design. When each subject is tested more than once, the variable of time is a within subject factor since the time comparison involves the same individual.

Learning cannot be directly measured, but can at least be estimated through such measures as test scores. The dependent measures, nursing course tests I and II, answer the question of whether the experimental conditions made any difference in nursing course test achievement over a period of time. In this study the experimental instructional condition is controlled by comparisons with Control group I (SQ3R control treatment) and Control group II (no treatment).

This design reduces the threat to internal validity such as the effects of history, maturation and pretesting. These phenomena are experienced in all groups, therefore any difference between the groups on test measures probably would not be attributable to these factors. Randomization should control for differential selection of the subjects and statistical regression (Cook and Campbell, 1978).

The primary concern of this design was the threat to external validity. Since volunteer undergraduate nursing students in a midwestern private school of nursing comprise the sample population, only limited generalizations can be made from the results of the study.



A variety of statistical procedures was employed in analyzing the data. Treatment verification data analysis included the use of t tests and analysis of variance. The hypotheses were tested by using Anova with replication and a two way Anova. The results of these analyses will be discussed in the following chapter.

### Hypotheses

Two comprehensive hypotheses were formulated for this study:

There will not be a difference in the course test #1 scores of the experimental subjects, who are aware of their GEFT score and have received instruction about the educational implications of the cognitive style, field dependence, field independence, as compared to the course test #1 scores of the subjects who are aware of their GEFT score and have received either the control treatment, or no treatment.

There will not be a greater difference in the course test #2 scores of the experimental subjects, who are aware of their GEFT score and have received instruction about the educational implications of the cognitive style, field dependence, field independence, as compared to the course test #2 scores of the subjects who are aware of their GEFT score and have received either the control treatment, or no treatment.

## Subjects

Thirty five undergraduate nursing students, approximately one third of the total nursing student population, participated in this experiment. These volunteers were randomly assigned to experimental and control groups. (See Table 1). Univariate statistics show the approximate equivalency of groups.

During one of the junior and senior classes in the fall of 1983, students were given an account of this research project and invited to participate. They were informed that the data concerning them would not be made available to the administration and would in no way be used in determining their academic progress. Anonymity was also assured. The students were told they did not have to participate and could leave the project at any time. Only two students who had been randomly assigned to the experimental group did not complete all phases of the study.

Table 1

Distribution of Total Population

Experimental Group	Control Groups	
	SQ3R	No RX
10	13	12

## Univariate Analysis

Univariate analyses of the major characteristics of the sample population who participated in the experiment indicated that:

1. sixty percent of the sample were junior students. (Table 2);
2. the average age of students in the experimental group was 24, while the average age for the SQ3R control group was 27 and the average age of the no treatment group was 26;
3. eighty percent of the student participants have had no nursing experience; and
4. fifty-four percent of the sample were field dependent. (Table 3.)

**TABLE 2**  
**Class Level of Students**

	EXPERIMENTAL		CONTROL I (SQ3R)		CONTROL II (No Rx)	
Juniors	7	70%	9	69.2%	5	41.7%
Seniors	3	30%	4	30.8%	7	58.3%
Total	10	100%	13	100%	12	100%

Table 2 shows that the class levels of education were equally representative for the experimental and control group I but not for control group II. Sixty

percent of the sample were juniors while forty percent were seniors. Subjects' ages ranged from 20 to 47 years. Twenty one was the most frequent age. Six of the participants were R.N. students who had from one to 21 years of nursing experience. The mean years of experience was 6.33 years while the median was 3 years. Twenty-nine participants were non-R.N. students and had no nursing experience.

Nineteen of the students were field dependent while sixteen were found to be field independent. Scores of the GEFT were used and scores below the mean of 10.8 were considered field dependent. (GEFT Manual).

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**Table 3**  
**GEFT Scores of All Groups**

	FD		FID	
	N	%	N	%
Experimental	6	32	4	25
Control (SQ3R)	6	32	7	44
Control (No Rx)	7	36	5	31

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### Instrumentation

#### Nursing Tests

Nursing course test scores of subjects after treatment constituted the dependent measure for this study. Theoretical nursing courses are required in the

nursing major. The content of these courses concerns the nursing care for individuals through out their life span in wellness and illness. An average unit of content includes several chapters of texts, audio-visual references and additional readings. The courses are team taught with six to eight faculty members on each junior and senior team. Course achievement is evaluated by testing, using multiple choice test questions. Current test evaluation policies and procedures have been in effect for several years. Tests are constructed and reviewed by the team members. A test bank of questions is used whenever possible to increase test reliability. The professor giving the unit instruction uses test bank questions which have demonstrated the desired test statistics. New questions may also be written. All team members review each of the test questions to be included in the unit tests. Evaluation of tests includes a team review of all test statistics and an analysis of the raw score distribution. Based on this evaluation, questions may be eliminated and scores adjusted. Three tests are given at intervals throughout the quarter, and scores are expressed in raw scores and percentages. Students must demonstrate at least average achievement (grade C) in these courses to continue in the nursing major. Unit test scores No. 1 and No. 2 represent cumulative use of the independent variable.

#### The Group Embedded Figures Test (GEFT).

The variable, awareness of cognitive style was identified by the Group Embedded Figures Test (GEFT). which identifies the cognitive style as field dependent or field independent.

The GEFT (Witkin, Oltman, Raskin and Karp, 1971) is a perceptual test adapted as closely as possible from the individually administered Embedded Figures Test (EFT). It contains eighteen (18) complex figures, 17 of which were

taken from the EFT. As in the EFT the subject is to locate a familiar figure that has been obscured or embedded in the complex figures. Individual differences in EFT performance, however, appear to relate to more than just differences in perceptual functioning, and the EFT Manual (Witkin, Oltman, Raskin and Karp, 1971) cites several studies showing that an ability to keep things separate in experience in the EFT (signify greater differentiation in perceptual functioning) is also evident in other activities as well.

Since the GEFT is intended as a group form of the EFT the most direct criterion measure is the EFT. In one particular study subjects were given the second and third sections as individually administered tests using the items in their original colored form. Another group was given the second section as a group test. The correlations, corrected for reduced test length and combined for the two (2) groups, were .83 for males and .63 for females.

Another means of evaluating the GEFT's validity is the Rod and Frame Test (RFT) (Witkin, 1948; Witkin and Asch, 1948) which is itself a criterion measure of field dependence, field independence. A group of subjects taking the GEFT was tested on the RFT administered with a portable apparatus. Each subject's score on the latter test was the absolute size of errors over eight trials. Correlation of the EFT with the portable RFT were ( $r=.39$ ) for fifty-five men and ( $r=.34$ ) with sixty-eight women.

Measures on a scale of articulation of body concept (ABC) (Witkin, Dyk, Faterson, Goodenough and Karp, 1962) have repeatedly been shown to relate significantly to measures of field dependence, field independence (Karp, Silberman and Winters, 1969; Witkin, et al., 1962). The subjects taking the GEFT and the portable RFT were asked to make human figure drawings in the same testing

session during which the portable RFT was administered. These drawings were rated on the ABC scale, with the most articulate drawings receiving a score of five and the least articulate a score of one. The correlation for female undergraduates was .55. This combined evidence suggests that the GEFT is a useful substitute for the EFT when individual testing is impractical.

Studies reported on the reliability of the EFT for the current 12 figure, 3 minute format are all based on data obtained by recomputing scores for tests given in the original 24 figure, 5 minute form. The reported reliability for 15 year olds was .92 (males, n=25) and .61 (females, n=25); for 17 year olds, .84 (males, n=23) and .79 (females, n=25).

In many studies, high odd-even reliabilities have been found in the original form of the test. For example, Linton (1952) obtained .95 reliability for college women, while Bauman (1951) reported a test-retest reliability of .89 after a three- year interval for groups of young men and women in their twenties.

An appropriate method of estimating reliability of the GEFT is to correlate scores derived from parallel forms with identical time limits. Correlation between the nine-figure first section scores and the nine-figure second section scores were computed and corrected by the Spearman Brown Prophecy Formula, producing a reliability estimate of .82 for both males (n=80) and females (n=97). These reliability estimates compare favorably with those of the EFT.

This test is well established in the research literature; thus a degree of confidence can be placed on its reliability as a result of having undergone intense investigation over the years. The tests were purchased by the researcher from "Consulting Psychological Press", Palo Alto, California.

### Instruction

The variable, understanding of cognitive style, was manipulated by providing the experimental group with an instructional booklet about the cognitive style, field dependence, field independence. The content of the booklet was designed from the research studies reviewed. It focused on the educational implications of the style. The instruction was designed using an information processing model of teaching as a framework (see Appendix E).

The Educational Implication of Field Dependence, Field Independence Booklet designed by the researcher contained self-test questions along with organizers, directions, illustrations and a checklist for recording time spent. Space for recording examples of application of the instruction to study techniques was provided.

The human subjects committee at De Paul approved the consent form and ethical considerations of the research project. The contents, materials, reading level of the instructional booklet and treatment verification test were judged to be appropriate for nursing students by four nursing instructors who juried the experimental materials, thus providing content validity for the booklet. Six non-study participants who were college students, but non-nursing students, took the tests and studied the instructional materials. As a result of this pilot test, some illustrations were relabeled and one illustration was changed. The item analysis showed that the difficulty level of the questions at post-test averaged 58%. According to Tuckman (1975), fifty to sixty per cent of the students should select the correct answer on a multiple choice test.

Control group I (SQ3R) received an instructional booklet that explained the study technique: Survey, Question, Read, Recite, Review (SQ3R). The SQ3R



booklet was informational and contained a reprint of an article from a nursing journal with directions to the student on how to practice the study technique. A blank sheet was provided for the written outline of the article. In addition, a sheet for recording time spent was included.

A follow-up group instruction session for the experimental and control I (SQ3R) subjects was provided. It was developed according to an information processing and concept formation model of instruction (Weil, 1978). This instructional model was chosen for its appropriateness for students in nursing programs. The third group received no treatment.

### Summary of Procedure

This research protocol was developed and followed in sequential order as indicated below:

1. Volunteer subjects were solicited by handouts, bulletin board notices and explanations during class periods.
2. Volunteers signed a consent form and filled out an information sheet.
3. Subjects were randomly assigned into one of three groups. Experimental, Control I, or Control II.
4. The GEFT timed test and a test to be used for treatment verification was administered to all subjects. The GEFT test took five minutes and the treatment verification test took 15 - 20 minutes.

5. The experimental group received a booklet about the educational implications of cognitive style. Control Group I received an instructional booklet about the study technique, SQ3R. All booklets were distributed during the latter part of November which was the end of the fall quarter. Control Group II received no booklets. The subjects who received the booklets were asked to study them and follow the directions given in their booklet. They were encouraged to call the researcher (phone number provided), for answers to any questions they might have.
6. A follow-up group instruction session was held for the Experimental and Control I groups at the beginning of the Winter Quarter, approximately six weeks after the initial contact. This instruction was carried out to clarify and reinforce the knowledge the subjects had derived from their booklets. (Appendix G.) All subjects attended. At this time, control group I (control treatment) and the experimental group were given their GEFT score.
7. The treatment verification test was administered to all subjects. Control group II (no treatment) subjects were given their GEFT score at this time.
8. The Experimental and Control Group I subjects completed a two part evaluation survey. They were asked to rate their booklet using a A,B,C,D or F grade on clarity and potential for use.
9. Nursing course tests I and II were administered at the sixth and ninth week of the winter quarter of 1984. This was five and eight weeks, respectively, after instruction had been completed.

## CHAPTER IV

### ANALYSIS AND RESULTS

This chapter presents treatment verification results and the various statistical analyses performed to determine the answers to the research questions.

#### Treatment Verification

Two assessments were performed to evaluate the success of the manipulation of the independent variable in this study. First, the analysis of the treatment verification test scores indicated whether or not there was an effect from instruction (i.e., whether or not the experimental subjects had an understanding of the educational implications of field dependence, field independence and whether or not the SQ3R study technique was learned by control group I). Secondly, the subjects were asked for their own evaluation of the clarity and usefulness of the instructional materials.

#### Treatment Verification Test

A multiple choice test for treatment verification was administered to all subjects. Approximately fifteen minutes were allowed for the completion of the test. Subjects took the test before and after treatment period. Test scores were expressed in raw scores for correct answers.

This test in addition to measuring the subject's pre and post treatment knowledge of the educational implications of the cognitive style field, dependence, field independence, also measured pre and post treatment knowledge of the study technique, SQ3R.

The treatment verification test was designed from the research about the educational implications of field dependence, field independence (Witkin et al, 1977). It had eighteen questions that were criterion referenced to the instructional objectives. This test was subscaled into six recognition/recall SQ3R questions and six recognition/recall questions and six application questions about the educational implications of field dependence, field independence.

Treatment verification data analysis included the use of the paired t test because the paired t test gives a precise comparison of sample means from group scores. It tests whether the mean of sample differences between pre and post tests are different from the null hypothesis of zero. The paired t test considers dependency factors (extraneous sources of variability i.e., individual ability, growth, guessing, size of N's, etc). Each individual acts as his/her own control. Also presented in this category were ANOVAs to determine whether the groups varied in regard to pretreatment verification test scores and GEFT scores.

## Results

The six SQ3R questions concerned recognition and recall. The item analysis showed that the control group given instruction about the study technique SQ3R made fewer errors upon post-testing than the other groups, and the paired T test was significant at the .001 level (Table 4). This indicates that the treatment for students in this group did take place.

Table 4  
Paired t Test Data  
Control Group (SQ3R) SQ3R Subscale

Subject	Pretest Score	Post Test Score	Difference Score	D Sq.
1	1	3	-2	4
2	4	5	-1	1
3	5	4	+1	1
4	2	3	-1	1
5	4	6	-2	4
6	1	6	-5	25
7	5	6	-1	1
8	0	5	+5	25
9	0	4	+4	16
10	2	6	-4	16
11	3	4	-1	1
12	2	4	-2	4
13	1	4	-3	9

t=4.63

p=.001, SD=1.79

According to item analysis, the experimental group who had not received instruction about SQ3R made fewer errors on the post-test than on the pre-test.

The paired t test value was at the .095 level of probability (Table 5). This suggests that there may have been some generalizations possible from the experimental treatment.

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**Table 5**  
**Paired t Test Data**  
**Experimental Group SQ3R Subscale**

Subject	Pretest Score	Post Test Score	Difference Score	D Sq.
1	4	2	+2	4
2	1	4	-3	9
3	3	5	-2	4
4	4	5	-1	1
5	2	4	-2	4
6	4	6	-2	4
7	3	4	-1	1
8	4	5	-1	1
9	1	0	+1	1
10	3	3	+0	0

t=1.87

p=.095, S.D.=1.52

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The control group (No RX) made the same amount of errors on the post-test as the pre-test. The paired t test was N. S. (Table 6). This strengthens the finding that the control (SQ3R) treatment did take place.

Table 6  
Paired t Test Date  
Control GROUP(No Treatment) SQ3R Subscale

Subject	Pretest Score	Post Test Score	Difference Score	D Sq.
1	2	2	+0	0
2	2	0	+2	4
3	3	1	+2	4
4	4	4	+0	0
5	2	2	+0	0
6	1	1	+0	0
7	6	6	+0	0
8	3	3	+0	0
9	0	0	+0	0
10	5	5	+0	0
11	1	3	-2	4
12	0	2	-2	4

t=0 (NS)  
p=1, SD=1.20

The paired t test for the subscale cognitive style recall indicates that this treatment also took place (Table 7). The experimental group made fewer errors on the six recall and recognition questions about the educational implications of cognitive style than the other groups. The paired t test was significant at the .014 level of probability.

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Table 7  
Paired t Test Date  
Experimental Group C. S. Recall Subscale

Subject	Pretest Score	Post Test Score	Difference Score	D Sq.
1	3	6	-3	9
2	3	3	+0	0
3	4	6	-2	4
4	2	5	-3	9
5	1	5	-4	16
6	3	4	-1	1
7	0	6	-6	36
8	1	5	-4	16
9	3	4	-1	1
10	2	0	+2	4

t=3.03

p=.014, SD =2.30

---

The control group, SQ3R, made fewer errors on the post test questions than on the pre-test. The paired t was significant at the .002 level of probability (Table 8). This suggests that there may have been some generalizations possible from the control treatment.



Table 8  
Paired t Test Data  
Control Group (SQ3R) C. S. Recall Subscale

Subject	Pretest Score	Post Test Score	Difference Score	D Sq.
1	1	1	+0	0
2	1	2	-1	1
3	2	4	-2	4
4	0	4	-4	16
5	0	2	-2	4
6	1	4	-3	9
7	2	3	-1	1
8	0	0	+0	0
9	0	0	+0	0
10	4	4	+0	0
11	1	3	+2	4
12	4	5	-1	1
13	1	4	-3	9

$t=3.96$

$p=.002$ , S.D.=1.33

A possible reason for this finding is that the study technique could also have helped them score higher on these questions.

The control group, with no treatment, showed little difference in their pre-post test errors and the paired t test was not significant (Table 9).

Table 9  
Paired t Test Data  
Control Group (No Treatment) C. S. Recall Subscale

Subject	Pretest Score	Post Test Score	Difference Score	D Sq.
1	2	2	+0	0
2	0	0	+0	0
3	0	0	+0	0
4	3	3	+0	0
5	3	6	-3	9
6	1	1	+0	0
7	2	4	-2	4
8	1	2	-1	1
9	0	0	+0	0
10	1	3	-2	4
11	0	2	-2	4
12	4	3	+1	1

t=2.14

p=.056, S.D.=1.21

The six application questions about cognitive style were difficult for the subjects as demonstrated by the results of the item analysis. The paired t test results were nonsignificant for all groups (Tables 10 11, and 12).

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Table 10  
Paired t Test Data  
Experimental Group C. S. Application Subscale

Subject	Pretest Score	Post Test Score	Difference Score	D Sq.
1	4	3	+1	1
2	3	2	+1	1
3	1	2	-2	4
4	1	4	-3	9
5	4	2	+2	4
6	3	3	+0	0
7	0	4	-4	16
8	1	5	-4	16
9	2	3	-1	1
10	3	0	+3	9

t=0.89

p=.398, S.D.=2.49

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Table 11  
Paired t Test Data  
Control Group (SQ3R) C. S. Application Subscale

Subject	Pretest Score	Post Test Score	Difference Score	D Sq.
1	1	1	+0	0
2	2	2	+0	0
3	2	3	-1	1
4	2	3	-1	1
5	1	3	-2	4
6	3	2	+1	1
7	3	1	+2	4
8	0	0	+0	0
9	0	0	+0	0
10	1	1	+0	0
11	3	3	+0	0
12	1	3	-2	4
13	2	2	+0	0

t=.76

p=.461, S.D.=1.09

---

Table 12  
Paired t Test Data  
Control Group (No Treatment) C. S. Application Subscale

Subject	Pretest Score	Post Test Score	Difference Score	D Sq.
1	2	1	+1	1
2	1	1	+0	0
3	0	0	+0	0
4	2	2	+0	1
5	4	5	-1	1
6	2	1	+1	1
7	4	3	+1	1
8	2	0	+2	4
9	1	0	+1	1
10	2	1	+1	1
11	0	1	-1	1
12	4	4	+0	0

$t=1.603(NS)$

$p=.137, S.D.=.90$

Application of the instruction about cognitive style and the study technique was done primarily by the subject through self study. The results show a need for more practice and facilitation by a teacher.

In summary, the average understanding level of cognitive style for the experimental group was higher than that of the control group, SQ3R, and the control group, no RX. However, the experimental group's post test percentile average score for test questions concerning cognitive style was only about 60%.

## Survey Results

Subjects evaluated the manipulation of the instruction with a rating scale of 4(A) to 1(D) for clarity and usability.

Results of the students' evaluation of the instructional tools showed that 70% of the experimental subjects rated usability of the booklet between good (3-B) and excellent (4-A), while 39% of the students thought it was average. Of the experimental group, 70% thought the booklet was clear, and 30 % gave it an average rating for clarity.

Over 80% of the control I SQ3R group rated usability of their instructional booklet good or excellent. About 77% felt the the booklet was clear, and the remainder rated clarity as average.

### Analyses of the Research Questions

Hypothesis I and II specifically addressed the question of the interdependence of the measure of understanding of the educational implications of cognitive style and its effect on the dependent variable, nursing course test I and test II scores.

### Anova for Pre Test Score Differences

An ANOVA of pre-test scores of all groups showed no significant differences between pre test scores of all groups (Table 13).

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Table 13  
ANOVA Pretest Scores all Groups

	DF	SS	MS	F
Among	8	004.11	0.513	.248
Within	96	198.55	2.068	
Total	104	202.66		

---

This finding showed that there were no significant differences in the level of knowledge concerning cognitive style before treatment.

An ANOVA of the distribution of field dependence, field independence showed no significant differences in the distribution of field independent, field dependent (See Table 14).

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Table 14  
ANOVA of GEFT Test Scores of all Groups

	DF	SS	MS	F
Among	2	126.38	63.19	2.09
Within	32	966.36	30.198	
Total	34	1092.74		

---

This analysis indicates that the groups were similar in terms of the distribution of field dependent, field independent characteristics.

A Two Way Anova with replication analyzed the repeated levels (test I and test II) of the dependent variable, nursing course test achievement. According to Ary (1979) statistical techniques that analyze all measures simultaneously should be employed to guard against misinterpretation of results.

In the analysis of variance a ratio of observed differences/error term is used to test the hypotheses. In this study test scores are the observations. An F-ratio uses the variance of group means as a measure of observed differences among groups. It analyzes two sources of variances between group variance and within group variance. A table of F-values is used to determine whether the obtained F-ratio is great enough to enable one to reject the null hypothesis at the predetermined level. An interaction sum of squares determines whether the obtained F-ratio represents a measure of the effect from the treatment or some other interfering factor not controlled for.



The assumptions of ANOVA are:

1. Random samples are selected from each of the groups.
2. A value of the dependent variable is recorded for each experimental unit.
3. The dependent variable is normally distributed in each population.
4. The variance of the dependent variable is the same in each population.

This experiment was conducted to test the hypotheses that subjects who understood the educational implications of field dependence, field independence would have higher test scores than subjects who did not receive instruction about the educational implications of field dependence, field independence.

#### Hypotheses

There will not be a difference in the course test #1 scores of the experimental subjects, who are aware of their GEFT score and have received instruction about the educational implications of the cognitive style, field dependence, field independence, as compared to the course test #1 scores of the subjects who are aware of their GEFT score and have received either the control treatment or no treatment.

There will not be a greater difference in the course test #2 scores of the experimental subjects, who are aware of their GEFT score and have received instruction about the educational implications of the cognitive style, field dependence, field independence, as compared to the course test #2 scores of the subjects who are aware of their GEFT score and have received either the control treatment or no treatment.

The course test scores for each group were employed as the dependent variable in the analysis of variance. The number of correct answers represented the raw score of each subject's test score.

### Results

The hypotheses were tested at the .05 alpha level of significance. The test I and test II scores for subjects were analyzed by an ANOVA with replication. The F-ratio between the groups was .457. The tabulated F with degrees of freedom (F,2,69) is 2.68. The calculated F-ratio was less than the tabulated and there is not a significant difference between the scores of all groups (Table 15) thus the null hypothesis was accepted for both hypotheses.

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Table 15  
ANOVA with Replication of Scores of Test I, Test II

	DF	SS	MS	F
Col	1	003.65	03.65	.239
Rows	2	021.86	10.93	.714
Inter- action	2	013.98	06.99	.457
Error	64	978.55	15.289	
Total	69	1017.94		

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In view of this finding an ANOVA was done to look for differences related to the distribution of the variable field dependence, field independence and test scores. The obtained F-ratio was found to be non-significant.

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Table 16  
ANOVA of Test I and Test II Scores of Field  
Field Dependent versus Field Independent Subjects

	DF	SS	MS	F
Among	11	141.381	12.85	.85
Within	58	876.559	15.11	
Total	69	1017.94		

---

Therefore, no statistically significant differences were demonstrated between the test scores of the students regardless of their GEFT score. The distribution of field dependence, field independence among the students was not markedly different.

The conclusions and implications of these findings will be discussed in Chapter Five.

## CHAPTER FIVE

### DISCUSSION

A review of the literature reveals several areas which bear on the present research. Witkin's research from 1948-1981 substantiated the perceptual differences of field dependence, field independence. In 1977, Witkin, Goodenough and others described the educational implications of this cognitive style. Doebler (1977) found that awareness of one's cognitive style enhanced the teaching-learning process of elementary school students. Others demonstrated that various experimental treatments could alter an individual's field dependence, field independence dimension (Jacobson (1966), McAllister (1970), Chess (1971) McWilliams (1975), McCanne (1976)). More recently researchers in higher education have been examining various variables (i.e., achievement and its possible relationship with cognitive style). Seventy-five percent of the researchers (cited in this study) who analyzed cognitive style and instructional treatment effects of subject's criterion referenced test scores found that field dependent subjects received lower scores. In spite of this, no generalizable knowledge for learning or teaching has resulted. In particular nursing research about this has been sparse and so research to address this problem formed the basis of the present investigation.

The fundamental research question explored in this study was whether or not the achievement of students who understood their cognitive style would be affected. For this research understanding of cognitive style meant students were aware of their GEFT score and of the instruction that had been given to them about the educational implications of field dependence, field independence which

individualized and potentiated the use of their cognitive style to increase their achievement.

The methods utilized in this research allowed college students to individually use their cognitive style for learning activities by promoting their understanding rather than assigning a set teaching approach for their learning.

### Hypotheses

The hypotheses were supported by the experimental findings. The idea that understanding one's cognitive style could be a potent factor of achievement was not substantiated by this study. Nor do these results agree with the conclusions of researchers who found that field dependence, field independence is malleable (Jacobson (1966), McAllister (1970), Chess (1971), McCabbe (1976), McWilliams (1978)). Their conclusions supported Witkin's (1977) theoretical contention that teachers could adjust their style when teaching students. They demonstrated that experimental treatments could alter the field dependence, field independence dimension of individuals. If their conclusions were valid then it could follow that students who received instruction so that they understood the educational implications of a dimension of their cognitive style would be better at using it advantageously to increase their learning. This was not demonstrated in this study.

The findings of this study also conflict with certain conclusions of Wilson (1981) and Ng Wai Kong (1982) who found that various instructional approaches did affect achievement. When these researchers used specially designed instruction while teaching students, it was demonstrated that field depen-

dent subjects received higher test grades. The instruction designed for this research did not significantly affect the course test scores of subjects.

However, the results of this study do agree in part with those of MacNeil's (1980). MacNeil matched different instructional approaches with field dependent, field independent, cognitive styles of undergraduate students studying educational psychology and found no differences in course test achievement. Although in the present study, the instruction was about the educational implications of cognitive style and was considered appropriate for all subjects regardless of their cognitive style, results indicated that this instruction caused no differences in course test scores.

One possible explanation for the lack of significant findings in this study is that the sample size was small.

Another factor that may have influenced the obtained results is that other variables relevant to information processing such as reading levels may have affected the results. Some studies support a possible relationship between cognitive style and reading ability (Scott, 1976; Bonhomme, 1980; Christiansen, 1980). In addition to these studies, Czarnecki (1980) found that the reading subscores of GED students were lower for field dependent subjects. In this study an assumption was made that the reading ability of the population would be evenly distributed because of admission requirements and randomization of subjects. Perhaps, this was not a valid assumption.

Another possible explanation for the results of this study may lie in the difficult areas of application of learning and motivation. The application of learning is a complex phenomena and has been studied in education since E.L. Thorndike's research on the transfer of training (Tyler, 1984). Since then Kirby

(1979) and others believe that one transfer skill is knowledge of one's own cognitive style and the ability to apply information about it in one's own life. This study tested this notion but did not find evidence that knowledge and the use of one's cognitive style while learning would increase achievement. However, if the subjects had more practice with this the results may have been different.

The treatment verification supports this because students did increase their knowledge but were unable to demonstrate application. Feedback, an essential component, was limited in this study's design because for practical reasons their teachers were not involved. Therefore, it was difficult for students to know whether or not they applied their knowledge correctly. In addition, the relationship of time to learning application is complex. For example, Karweit (1982), after reviewing the literature on time-on-task, found that the effects of learning time in achievement are small. However, she points out the fact that students need varying amounts of time to learn. In this study students all had the same amount of time for learning.

Motivation has long been considered a factor in achievement. Research including Dewey's studies of motivation has not solved the problem of how teachers could help students with this (Tyler, 1984). It is apparent from the data collected in this study that the amount of time the students spent in using the instructional materials was minimal and that high priority was not given to this (Appendix A). Reasons for this may be that the researcher could not obtain permission from the experimental site to use class time for the experiment and the students had crowded class schedules. Also some students stated that they wanted to spend more time on this and visit the researcher for more specific help but could not find time. Perhaps the level of student motivation would have been

greater if the faculty could have been included in the experiment as trained facilitators who would have reviewed the materials with the students and offered some feedback on their learning progress.

Even though the findings from this research were non significant, and therefore not open to interpretation, it is interesting to note that post hoc examination of the test scores of field dependent and field independent subjects showed no significant differences. In general, studies have supported field independence as being associated with higher test scores (Witkin (1977), Hinton (1980), Wormak (1980), Wallace (1980) and Walker (1981)). In view of the fact that nursing curricula are conceptual and focus on problem solving one would expect field independent students to achieve higher test scores. Yet upon analysis, in this study, test scores were not significantly different. One explanation for this may be that the treatment brought field dependent subjects up to the achievement level of field independent students. In addition, the students involved in this study were taught by team teaching. Both field dependent and field independent teaching strategies and materials are used and probably both field dependent and field independent styles are represented among the faculty. Although formal curricular design has not planned for this, perhaps, in this teaching situation the students were directly helped to utilize their cognitive style potential.

Other conclusions from this research were that baccalaureate nursing students do vary in their approaches to information processing as measured by the GEFT, and that field dependence, field independence was rather evenly distributed in the sample population. In addition, a level of understanding of the educational implications of field dependence, field independence was achieved by the instructional treatment, and subjects thought that instruction about cognitive style would



be helpful to them. Finally, the self instructional booklet with follow up instruction was found to be a good methodology for studying the academic achievement of nursing students.

In summary, the findings from this study indicate that for whatever reason, cognitive style even when understood by students as to its educational implications in helping them learn, when applied to a course testing situation was not found to be a strong enough factor of achievement to produce statistically significant results.

### Implications

This study demonstrates a need for continued research about individual variables (i.e., cognitive style) as they may be related to academic achievement. Improving the quality of education has been a concern of nurse educators throughout the history of nursing education. Considerable information attests to the fact that changes have occurred over the years. Major ones have been curriculum revisions, adoption of innovative teaching strategies and new patterns of school organization. In spite of this, however, the national attrition rate in schools of nursing is still about 30% and high state board failure rates prevail. The nursing school involved in this study demonstrates a similar attrition rate. The attrition rate in this school occurs mainly from inadequate nursing course test scores. No acceptable solution for this problem has been found. The consideration of cognitive style in planning for curriculum and instruction to improve achievement is nonexistent in schools of nursing. As a matter of fact, curriculum design has changed throughout the years based on trial and error. For example, in the 1970's,

curricular design changed radically from a medical model (system oriented) to an integrated conceptual model and no data have been collected and analyzed that demonstrate this change has improved the academic achievement of nursing students. It is obvious then that there is a need for quantitative and qualitative research in nursing education.

The review of the literature supports the idea that individual characteristics affect learning and that cognitive style is one of the characteristics. The assessment and use of one's cognitive style has emerged as a possible variable that can aid in the individualization of the learning process for better achievement. If this proves to be true, a revolutionary change would be mandated for curriculum and instruction. However, the results of this study suggest that the field dependent, field independent dimension of cognitive style may not be as fruitful an avenue for scientific investigation as some would suggest, but this conclusion must be viewed as tentative until additional studies corroborate it.

### Recommendations

This study sought to determine whether students who were aware of their cognitive style and given instruction about its educational implications would demonstrate higher test achievement than students who were taught a traditional study technique or given no treatment.

More research is needed to determine for certain the degree to which students can adapt their cognitive style to specific learning tasks. Perhaps this variable relates to transfer of learning as suggested by Kirby (1979). Transfer of theoretical learning to clinical practice has long been a dilemma in nursing educ-

ation. Since time may be an essential variable related to the application of learning, a longitudinal study would allow students to be followed for two years or the length of their nursing major. Faculty could be included to facilitate student attempts to potentiate the use of their cognitive style in order to determine further the effect this variable may have on academic achievement.

Future research might be qualitative and answer questions such as how does the learner cognitively organize content and how are the concepts and principles from content used in clinical practice. Measures such as student's self reports of studying methods and anecdotal notes about clinical practices might describe these processes. This type of study might also help explain the unanticipated finding of this study that field dependent and field independent students did equally well when research has shown the apparent academic superiority of field independent students.

Nursing educational research has been lax in studying ways to influence achievement. Nursing studies have focused primarily on the prediction of academic success from high school performance records of students (Holtzeimer, 1983). As a result, there is a need for research to examine the interaction between individual differences and learning.

### Summary

The purpose of this study was to investigate the effects that student awareness and understanding of the cognitive style, field dependence, field independence have on their academic achievement in undergraduate nursing courses. The population of the study consisted of volunteer junior and senior

nursing students at a university. This study tested Witkin's theoretical implication that it seems possible to induce individuals to adapt their cognitive style by the giving of information. It also tested the notion that the student can be the primary agent of his/her cognitive style adaptation.

The results showed no statistically significant score differences among an experimental group, a control group with control treatment and a control group with no treatment.

Discussion of this study centered around the idea that the student's understanding of the educational implications of his/her cognitive style may be a factor influencing transfer and application.

Recommendations were made to consider further questions about cognitive style by redesigning this study. More research studies are needed about academic achievement in nursing.

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## APPENDIX A

## Results from Booklet Check Lists

## Control SQ3R Group

Number of Students	Reading Time Spent	Practice Time Spent	Homework Completed
1	45mins.	45mins.	X
1	20mins.	15mins.	X
1	20mins.	40mins.	X
1	10mins.	20mins.	X
1	10mins.	?	X

## Experimental Group

1	90mins.
1	90mins.
1	60mins.
1	40mins.
1	20mins.



## APPENDIX B

## LETTER TO DE PAUL REQUESTING PERMISSION

2713 North Oak Park Avenue  
Chicago, Illinois 60635

November 4, 1983

Sr. Mary Jeremy Buckman, R.S.M., R.N., Ph.D.  
Chairperson, Department of Nursing  
DePaul University  
2323 North Seminary Avenue  
Chicago, Illinois 60614

Dear Dean Buckman,

I wish to conduct a research study concerning the awareness and understanding of cognitive style field dependence, field independence and its effect on undergraduate students' academic achievement. This study will be done as a partial fulfillment of the requirement for the Doctor of Philosophy degree. With your permission, I would like to ask junior and senior students in the Department of Nursing at DePaul University to participate in my study.

My plan is to conduct the study during the Winter Quarter, 1983. Student class time involved would be two fifteen minute periods at the end of the fall quarter. Enclosed please find a description of the study.

May I have your permission to conduct this study? I understand that I will also need to obtain clearance from the Human Subjects Committee of the Department of Nursing.

Sincerely yours,

Jeanne V. Panuncialman, R.N.  
Assistant Professor

## DESCRIPTION OF THE STUDY

### AN INVESTIGATION OF THE EFFECTS OF STUDENT AWARENESS AND UNDERSTANDING OF COGNITIVE STYLE ON ACADEMIC ACHIEVEMENT

The purpose of this study is to investigate the effects that student awareness and understanding of the cognitive style, field dependence, field independence has on his/her academic achievement in undergraduate nursing courses. The intended population of this study will be volunteer junior and senior nursing students. This study tests Witkin's theoretical implication that it seems possible to induce individuals to adapt their cognitive style by the giving of information. It also tests the notion that the student can be the primary agent of his/her cognitive style adaptation.

All subjects will be tested with the Group Embedded Figures Test to determine their field dependent, field independent score. Later their score and its interpretation will be given to them. All subjects will be given a pretest to determine their prior knowledge of field dependence, field independence and the study technique, SQ3R. The experimental group and control group will be randomly selected. An instructional booklet about the educational implications of field dependence, field independence will be give to the experimental group. One control group will receive an instructional booklet about the study technique, SQ3R. These two groups will receive a follow up group instructional discussion class. Another control group will receive no treatment. Later, all subjects will receive a post test on the content concerning educational implications of field dependence, field independence and the study technique, SQ3R. Data will be

analyzed to determine group differences/effectiveness of the instructional booklets, and the relationships of the independent variables awareness and understanding of the cognitive style field dependence, field independence to academic achievement.

This study will extend the knowledge base of instruction and curriculum and promote additional effective conditions under which individuals may achieve their maximum learning potential.

The only potential risk this study could engender would be the use of the subjects' personal information and test scores inappropriately. A coding method and standard research operating procedures will insure confidentiality. Participation or non participation in this study will have no effect on the student's academic standing. A consent procedure will include full explanation of participation in the study by the researcher to those subjects who volunteer. At this time a form will be presented for the subject to read and sign after any questions have been answered by the researcher. The researcher will be available on campus at designated times during the quarter to implement the research study and to continue answering questions relevant to the study. A coding method and proper placement of the data in a locked cabinet will insure confidentiality of subject responses.

Students will be encouraged to volunteer for this study as an adjunct to their learning methods. Students participating in the study who request test results (their own), will receive them upon the completion of the data collection.

This researcher is of the opinion that there is no risk for the subjects participating in this study. The subject may have access to his/her results of the two tests and will receive instruction which can improve his/her learning achievement.

## **APPENDIX C**

## STUDENT LETTER OF CONSENT

I, \_\_\_\_\_ agree to participate in this study on the effects of awareness and understanding of the cognitive style dependence, independence on achievement on bacalaureate nursing courses being conducted by Jeanne V. Panuncialman. R.N., M.S. I give the researcher permission to obtain my course tests grades and ACT scores from my permanent record. In addition, I give the researcher permission to obtain my course test grades and course grades from the team coordinator during the quarters that the research study is being conducted. I understand that the researcher will not give the instructor or team coordinator any kind of information about me and that all personal and academic information will remain confidential. My name will not appear in any of the reports of the data or results. I understand that the purpose of this study is as stated above. I understand that I will be given some tests to determine my cognitive style and may be given instruction. I understand that this study is not part of my undergraduate program or associated with professional organizations. I also understand that if I choose to withdraw or not to participate in this study, my standing in the adademic program in which I am enrolled will not be jeopardized. I understand that I agree to participate in this study freely and voluntarily but maintain the right to withdraw my consent at any time.

Investigator \_\_\_\_\_

Volunteer \_\_\_\_\_

Date \_\_\_\_\_

## INFORMATION SHEET

Name \_\_\_\_\_ Sex \_\_\_\_\_

1. Age \_\_\_\_\_
2. Ethnic Group \_\_\_\_\_ (Specify)
3. Religion \_\_\_\_\_ (Specify)
4. Marital Status \_\_\_\_\_ (Specify)
5. Student Classification  
Basic  
R.N. (Circle One)
6. Class Level  
Junior  
Senior (Circle One)

7. **ACT Score** \_\_\_\_\_

8. **Please specify courses you have taken in college that included information concerning the cognitive style, field dependence, field independence.**

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9. **If you are an R.N., how many years of staff experience do you have?**

**Months** \_\_\_\_ **Years** \_\_\_\_



## TREATMENT VERIFICATION TEST

## DIRECTIONS:

SELECT THE BEST ANSWER. PLEASE DO NOT GUESS THE ANSWER. IF YOU DO NOT KNOW THE ANSWER, SELECT NUMBER 4, THE 'I DO NOT KNOW' RESPONSE.

CIRCLE THE NUMBER OF THE BEST RESPONSE.

## SQ3R

SQ3R is a formula symbol that means;

1. surmise, question, read, recite and relate
2. survey, question, read, recite and review
3. survey, question, read, relate and review
4. I do not know.

Surveying written material is accomplished by:

1. rapidly scanning all pages of reading material
2. outlining subtitles and titles of chapters and paragraphs
3. reading subtitles and titles of paragraphs and chapters
4. I do not know.

Questioning while reading involves:

1. using any provided written questions about the material
2. reading titles and subtitles of chapters as questions
3. developing at least one reading question per page
4. I do not know.

The type of reading SQ3R demands is:

1. Active
2. Passive
3. Active and Passive
4. I do not know.

Reciting about the completed reading should:

1. follow the completed reading
2. occur at intervals during the reading of the content
3. be expressed orally rather than by writing
4. I do not know.

Review of written material should be completed:

1. one week after reading material
2. immediately after reading material
3. at frequent intervals
4. I do not know.

## COGNITIVE STYLE

The intelligence quotient (I.Q.) is an example of an individual's

1. working memory two cognitive style
2. cognitive style
3. ability
4. I do not know.

Cognitive style differs from ability in the following way;

1. cognitive style is limited to one personality feature
2. cognitive style is measured by grading
3. cognitive style is bi-polar
4. I do not know.

The main characteristic of field dependence is:

1. viewing the environment globally
2. paying attention to details
3. isolating self from environment
4. I do not know.

A field independent individual likes to:

1. participate in the situation
2. relate personally to the situation
3. analyze the situation
4. I do not know.

Field independence has the following educational implications for an individual;

1. This individual would prefer group study
2. This individual would prefer learning activities with social content.
3. This individual would prefer independent study
4. I do not know.

Select a preferred learning approach for an individual who is more or less field independent.

1. a media presentation
2. lecture
3. group discussion
4. I do not know.

A chapter in a textbook would be classified as having a field dependent structure if it included:

1. headings and outlines
2. charts and graphs
3. problems for solutions
4. I do not know.

Jane is field independent and is preparing for a test that focuses on case situation questions. She should:

1. stick to using only her field independent text
2. use some case study materials
3. chart and graph as much information as possible
4. I do not know.

Dick has reviewed his tests. He consistently concludes that he misses important phrases in test questions. He is probably:

1. field dependent
2. field independent
3. neither
4. I do not know.

Dick can adapt his cognitive style and improve test results by:

1. studying more
2. using memory aids
3. increase his attention to test question details
4. I do not know.

The best way to adapt your field dependence or field independence to learning experience is:

1. stick with your style
2. develop learning skills that will help you adapt to the learning experience
3. challenge yourself and ignore your style
4. I do not know.

A learning activity that helps individuals regardless of their cognitive style is:

1. a programmed review
2. a case study
3. an outline
4. I do not know.

## APPENDIX D

**SQ3R INSTRUCTION BOOK****AGREEMENT OF CONFIDENTIALITY**

**YOU HAVE AGREED TO MAINTAIN CONFIDENTIALITY. THIS MEANS THAT DISCUSSION OF ANY ASPECT OF THIS RESEARCH PROJECT IS PROHIBITED. ANY MATERIALS THAT MAY BE LOANED TO YOU BY THE RESEARCHER MAY NOT BE SHARED OR DUPLICATED. THE MATERIALS MUST BE RETURNED AT THE END OF THE PROJECT.**

## USING SQ3R FORMULA FOR STUDYING

The SQ3R study method is a technique designed to help you remember more of what you read.

**S** is for survey. Most textbooks are written with chapter heading, subheadings, sectional divisions and paragraph titles. Glance over all of them when you start a reading assignment. Try to select the major ideas in the chapter or chapters you plan to read. This should take about 2 to 4 minutes.

**Q** is for question. Instead of letting the words slide by, turn the chapter and paragraph headings into questions. For example, when you see, "The psychological causes of depression," ask yourself what are these causes? Then make the subsequent reading an active search for these causes.

The first "R" is for reading. Your reading should be an active search for the answer to the questions you have formulated.

The second "R" is for recite. Put the text aside and briefly recite the answers to your formulated questions. Jot down these answers in your notes. This is considered written recitation.

The final "R" is for review. Complete your studying by reviewing your questions and answers. You will retain more if you review what you have learned at frequent intervals. One is most apt to forget immediately after covering subject material, thus the reason for the review.

The above technique can be applied to any type of reading material (i.e., literature, graphs, tables, math or problem solving subjects).

S	-	SURVEY
Q	-	QUESTION
R	-	READ
R	-	RECITE
R	-	REVIEW

### SURVEY

Glance over the headings and subtitles of any chapter to note the main ideas that will be developed. If it has a final paragraph that summarizes these ideas, read it also. This will help you organize the chapter's main points before you read them.

Practice the survey technique, until you become comfortable with its application. Start with readings that you are familiar with. Glance over the headings and chapter summaries and see if you can identify the main ideas. Check then to see how well you have done.

By surveying material, you are creating for yourself a frame of reference that will make it easier for you to recall the material in a logical and meaningful way during your pre-exam study periods.

## QUESTION

Immediately after surveying material, turn the headings into questions. This will arouse your curiosity and will help your comprehension of the subject material.

The questioning technique makes the important ideas stand out. Your formulation of a question produces active learning. You then read to find the answer to the question. Psychologists have concluded that active learning leads to the greatest recall.

## READ

Actively searching for questions requires concentration. You must know what you are looking for, look for it, then relate what you have found to the other main ideas in the reading. One's reading rate will usually be slower when reading actively.

When reading you will not remember everything you have read. For example, at this moment try to remember a book you read last year. You probably can only recall small segments of it.

Surveying, questioning and reading for answers to questions you formulated will enable you to remember the main ideas of the material. You will also be able to give organized answers and recall them for test purposes at a later date.

Practice these three techniques as you read both for learning and pleasure. This practice will reap great rewards for you. It is important that you develop these three skills: survey, question, read before continuing to learn the SQ3R technique.

## RECITE

After you have mastered the previous three skills, you are ready to recite. This may be done orally or in a written format. Ask aloud the questions the surveying has prompted and answer these based on your active reading. If you would rather outline them in note form that is also acceptable. Reciting either orally or by writing will in fact improve recall.

## REVIEW

Reviewing means trying to recall from memory the main ideas of what you have learned. Try to reproduce orally or by writing the main ideas you have surveyed, questioned and answered by active reading and recitation. This should only take several minutes and should be done periodically throughout the assignment.

## ADDITIONAL APPLICATIONS OF SQ3R

The SQ3R Method may be modified to apply it to reading graphs, tables and problems.

### GRAPHS

In modern textbooks graphs are often used to illustrate main ideas. Many readers ignore them because they do not understand how to learn from them. In order to study graphs you should:

1. Survey the main points in the chapter and relate the appropriate idea to the legend of the graph and the slope of the trend.
2. Turn the legend of the graph into a question.
3. Read by looking at the graph to answer your question.
4. Recite the answer aloud.
5. Repeat steps one through four.

### TABLES

Tables are used to identify and clarify various parts of an idea or concept. In order to study tables you should:

1. Survey the chapter as before.
2. Formulate questions from the title of the table and the title or subtitle of the section of the material in which the table appears.
3. Read the table for answers to the questions you formulated.
4. Recite by reproducing the table.
5. Repeat steps one through four.

### PROBLEMS

In order to learn from problems presented in the reading material, you need to know, that the answer to this problem and the method by which the problem is solved, will be found within the material. It may be presented in the form of a graph, table or example. Apply the SQ3R technique to problems by:

1. Surveying the chapter.
2. Asking yourself questions the survey prompted. Other questions to be asked are:
  - a. What problems have I solved which were like this one?
  - b. What would be a good approach to solving this problem?
  - c. What idea goes with this problem?
3. Look for and think through the answer and method for solving the problem.
4. Verbalize and/or write a solution without using the material.
5. Review steps one through four.



SQ3R

The method of studying that has been presented is based on the method developed by Dr. Frances Robinson, entitled SQ3R-Survey, Question, Read, Recite and Review. If you're interested in finding out more about this method, read Dr. Robinson's book, Effective Study.

ASSIGNMENT FOR FOLLOW UP GROUP STUDY

Read the enclosed nursing article using the SQ3R method. Write your recitation on the page entitled, Written Recitation. Record your practice time on the space below.

Write down your observations and questions on the space below.

If you have any questions, you may call me (321-8150) or arrange to see me in my office.

READING TIME SPENT:

PRACTICE TIME SPENT:

QUESTIONS AND OBSERVATIONS FOR FOLLOW UP DISCUSSION:

**APPENDIX E**

**AGREEMENT OF CONFIDENTIALITY**

**YOU HAVE AGREED TO MAINTAIN CONFIDENTIALITY. THIS MEANS THAT DISCUSSION OF ANY ASPECT OF THIS RESEARCH PROJECT IS PROHIBITED. ANY MATERIALS THAT MAY BE LOANED TO YOU BY THE RESEARCHER MAY NOT BE SHARED OR DUPLICATED. THE MATERIALS MUST BE RETURNED AT THE END OF THE PROJECT.**

**STUDENT INSTRUCTION BOOKLET****DIRECTIONS**

1. **Read the learning objectives.**
2. **Continually refer to the objectives when learning the material in this booklet. This will enable you to evaluate your progress.**
3. **You may underline or high-light material in this booklet as you desire.**
4. **Write down the questions and observations for sharing with your peers and researcher at the follow-up group instructional period that will be announced on the bulletin board.**
5. **Think of your past learning experiences and relate these to the learning material in booklet.**
6. **Take all mini self-tests, and review the material as outlined.**
7. **Record your time spent in using this booklet on the learning time sheet.**  
**Include:**
  - A. **Time spent reading and re-reading this booklet**

- B. Time spent practicing learning techniques suggested in this booklet.
8. Visit the researcher or call her at 321-8150 if you have any questions concerning participation activities.

This instructional booklet focuses on helping you to understand one cognitive style: field dependence, field independence, and its related educational implications.

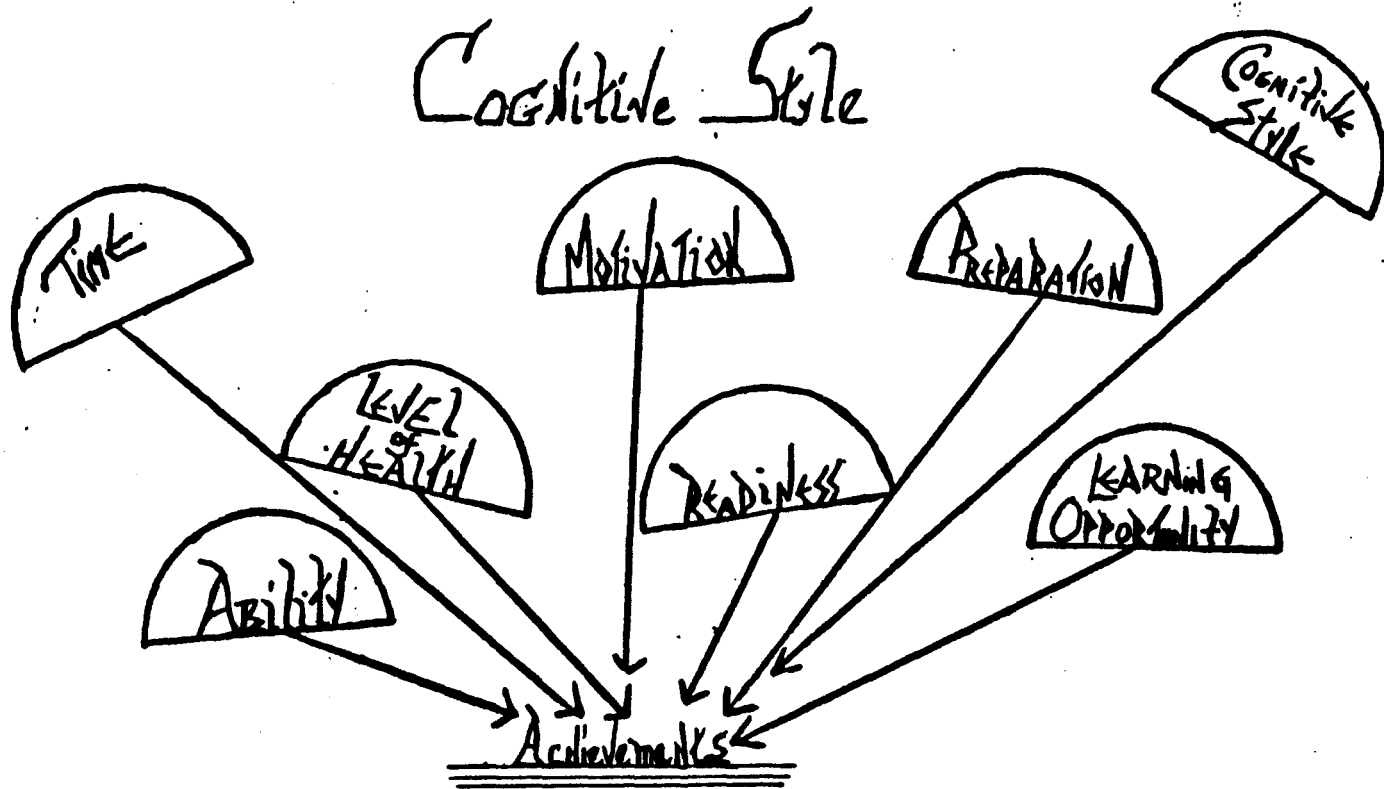
## OBJECTIVES

Upon completing this booklet as directed, you should be able to:

1. Define cognitive style.
2. Differentiate cognitive style from ability.
3. Demonstrate a knowledge of the characteristics of field dependence and field independence.
4. Select some educational implications of field dependence, field independence.
5. Choose aspects of learning experiences that would affect field dependent and field independent learners.
8. Analyze learning experiences as being either field dependent or field independent.
7. Distinguish between learning approaches that would be appropriate for field dependent learners from approaches that would be appropriate for field independent learners, and *vica versa*.
9. Identify examples on how to adapt field dependent to field independent learning experiences, and adapt field independent to field dependent learning experiences.

## INTRODUCTION

This instructional booklet concerns the concept of cognitive style. Within the last decade, researchers have determined that an individual's cognitive style can effect his/her learning achievement.



SOME FACTORS RELATED TO ACADEMIC ACHIEVEMENT



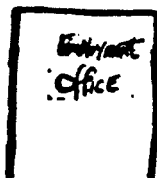
## COGNITIVE STYLE

Researchers have identified individual tendencies on perceiving, problem solving and thinking. These are known as cognitive styles. Several learning styles, identified lately as narrow dimensions of cognitive styles, have been applied to learning. If you are interested in learning more about "styles," the researcher can provide you with more information upon completion of this project.

### CHARACTERISTICS OF COGNITIVE STYLES

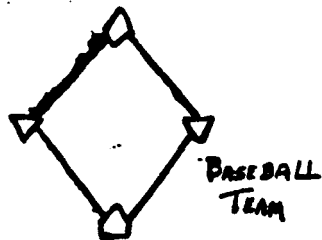
1. It is an individual's approach to perception, thinking and learning.

EX.



GETTING A  
JOB

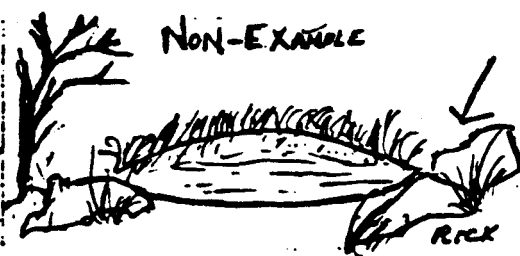
NON-EX.



2. It remains stable over time, but can be flexible.



POND WATER

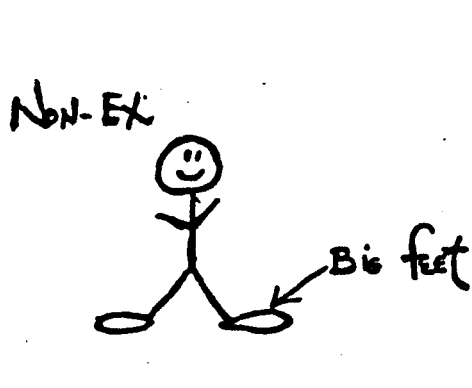
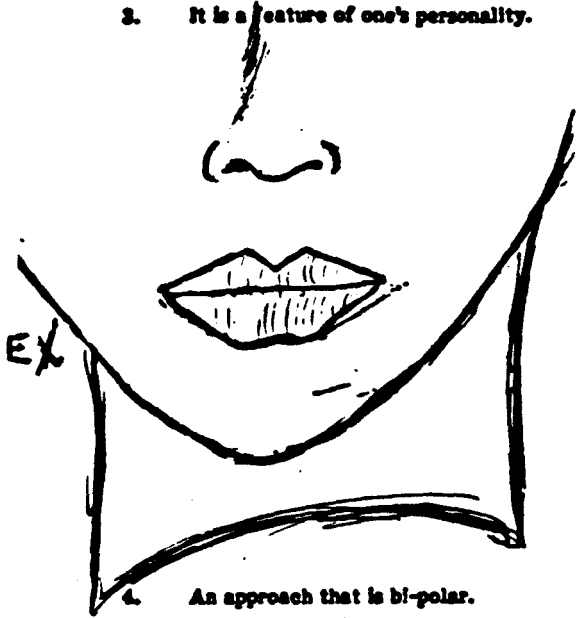


NON-EXAMPLE

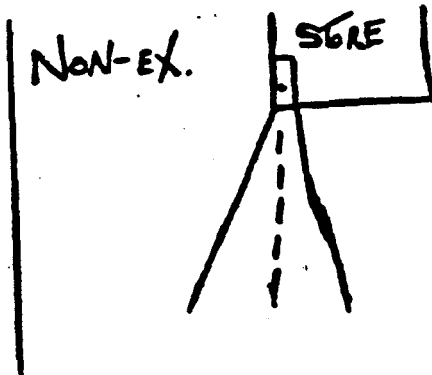
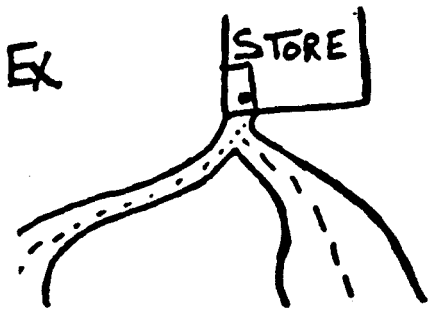
ROCK

CHARACTERISTICS OF COGNITIVE STYLES (cont.)

3. It is a feature of one's personality.



4. An approach that is bi-polar.



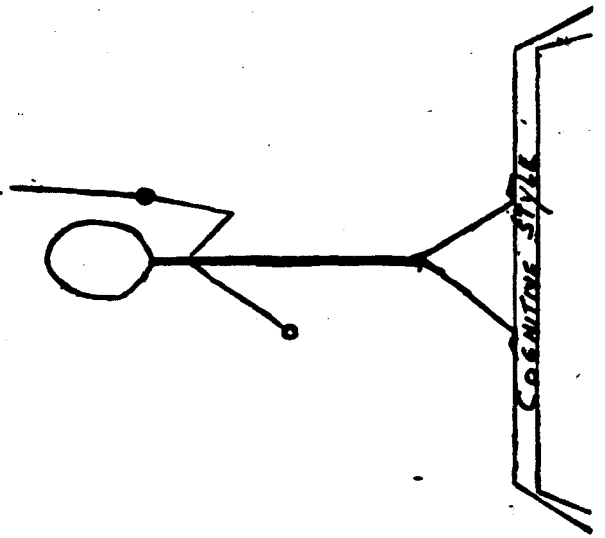
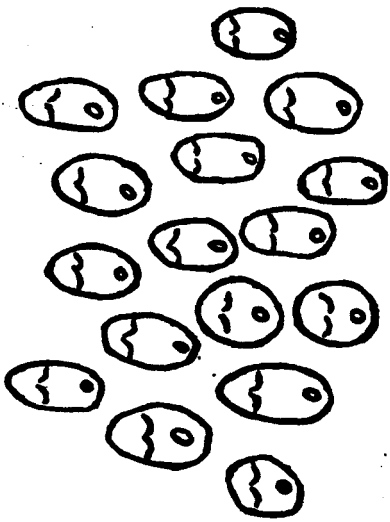
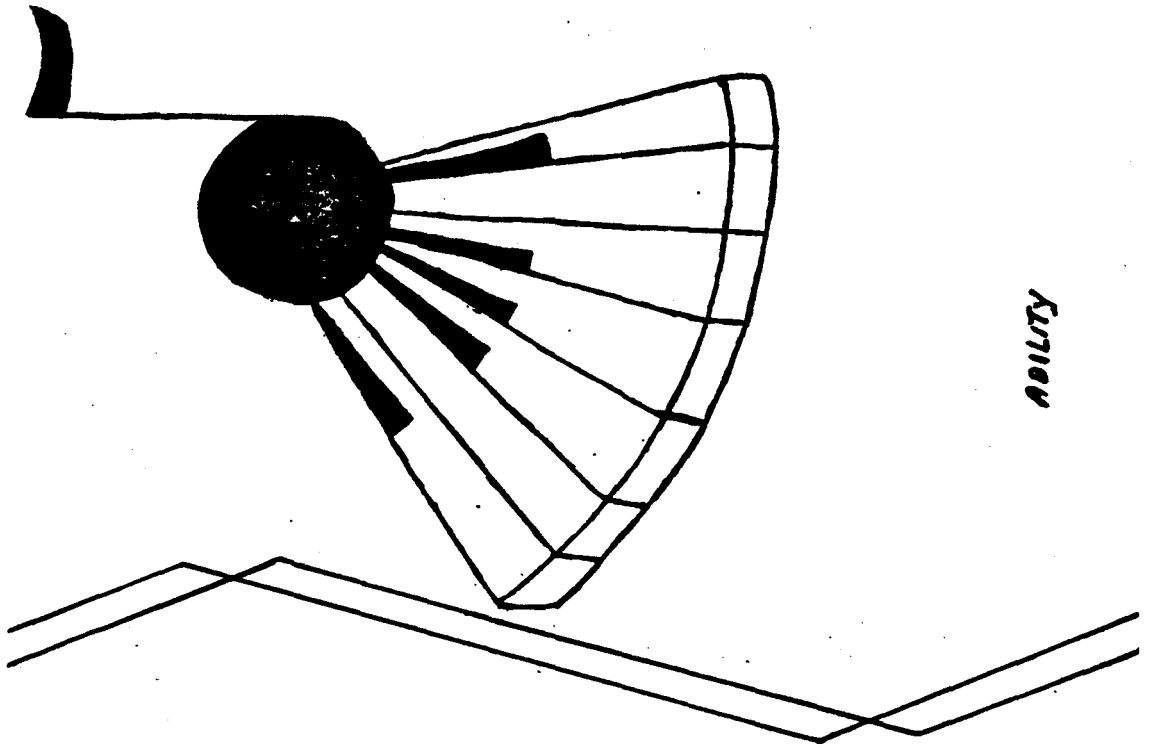
### CHARACTERISTICS OF COGNITIVE STYLES (cont.)

Cognitive style is an individual's approach to perceiving the environment and organizing and utilizing information about it. It includes the way one communicates and relates to others. Differences in cognitive style depend essentially on cultural differences and life experiences.

### DIFFERENCES BETWEEN STYLE AND ABILITY

STYLE		ABILITY	
A.	Manner or approach	A.	Skill
B.	Measured on continuum	B.	Measured by level of performance
C.	Value not attached to place on continuum	C.	Greater value placed on high level of performance
D.	Broad effect on performance	D.	Specific effect on performance

See some examples on next page.



## A COGNITIVE STYLE, FIELD DEPENDENCE, FIELD INDEPENDENCE

H. Witkin, a prominent psychologist and psychiatrist after about thirty years of research identified a cognitive style named field dependence, field independence. His theory involved perception and started when it was noticed years ago that pilots sometimes flew upside down during fog conditions while reporting that they were flying upright. Recently some astronaut experiments revealed similar findings. Based on Witkin's findings, the pilot flying upside down and reporting uprightness is field dependent, while the pilot who could maintain uprightness in a fog situation is field independent.

Witkin's research identified that individuals are somewhat field dependent or field independent. That is to say, an individual is closer to one pole of a continuum on which field dependence and independence are at opposite ends.

---

### FIELD DEPENDENT INDIVIDUALS

Accept environment as is

Like wholes, the big picture

Relate self to situations

Depend on others

Use models and imagination

Recall social information

### FIELD INDEPENDENT INDIVIDUALS

Structure the environment

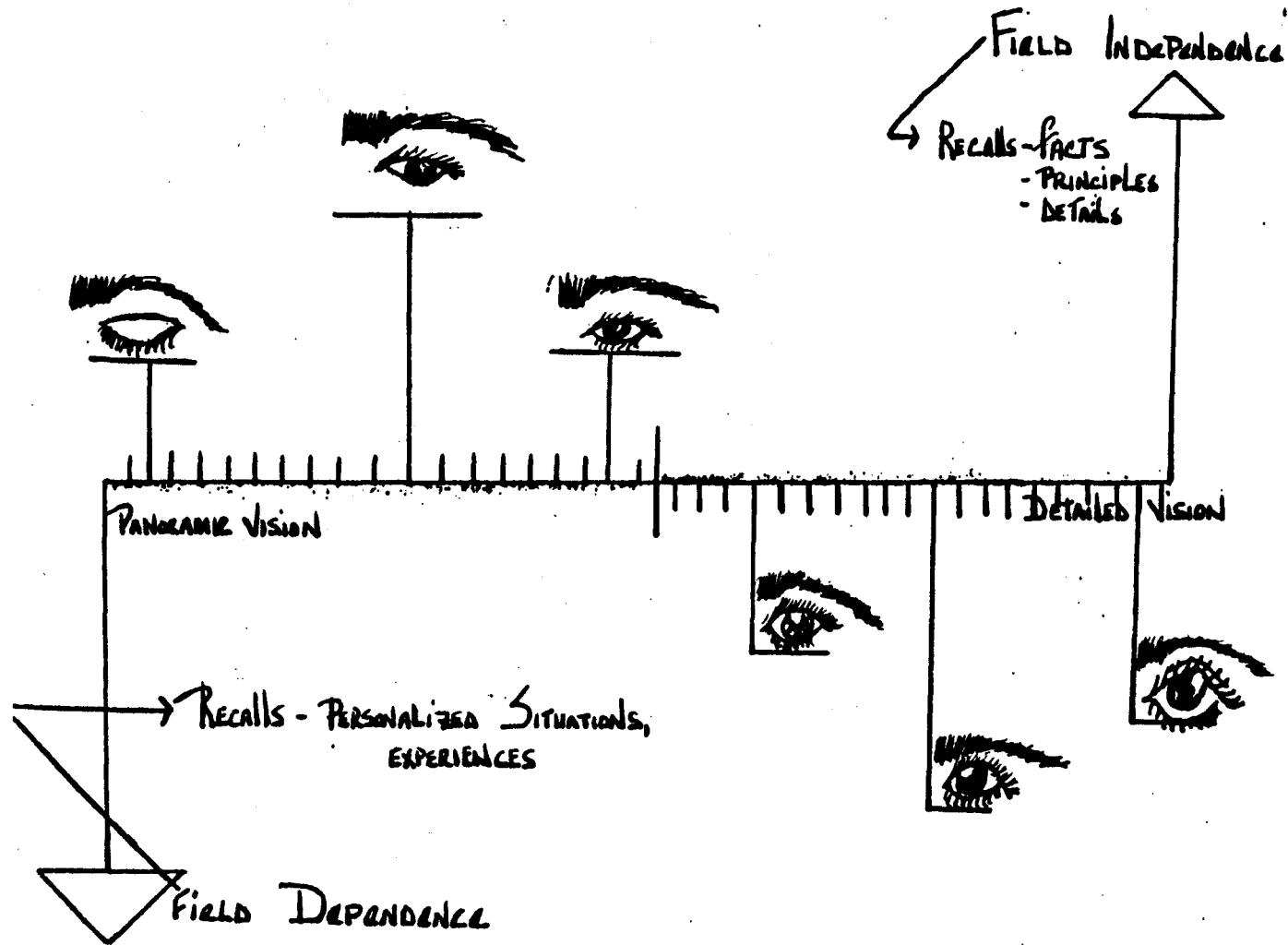
Like details, separate details

Isolate self from situation

Are independent

Classify and categorize

Recall facts and principles



**Mini Test**

**Select the distinguishing characteristic of cognitive style:**

1. skillful performance
2. valueless measurement
3. high I.Q.

**An example of an ability is:**

1. making a bed
2. writing a detailed outline
3. double jointedness

**Cognitive style is an unstable facet of an individual's physiology:**

1. true
2. false

**Answers appear on following page.**



Answers to mini-test.

2

1

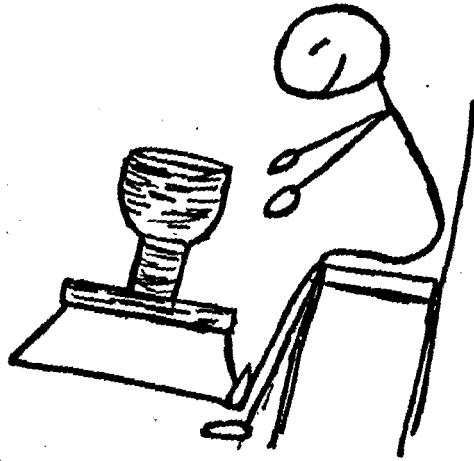
2

Field dependent individuals tend to organize their perceptions and experiences in terms of wholes or totalities. This sensitivity to the field or background of the environment influences their perception, information processing and utilization of information from the environment so that their focus generally is the total view.

By comparison, field independent persons respond to objects and events without including the background of their environment. Their perception and organization of information develops from attention to parts or details.

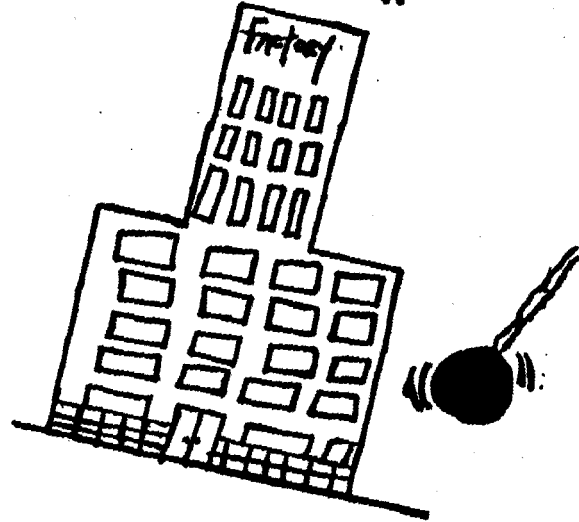
See the examples on the following pages.

POTTER AT WHEEL



FIELD DEPENDENCE

DEMOLITION



FIELD INDEPENDENCE

**THE EDUCATIONAL IMPLICATIONS OF BEING  
FIELD DEPENDENT OR FIELD INDEPENDENT**

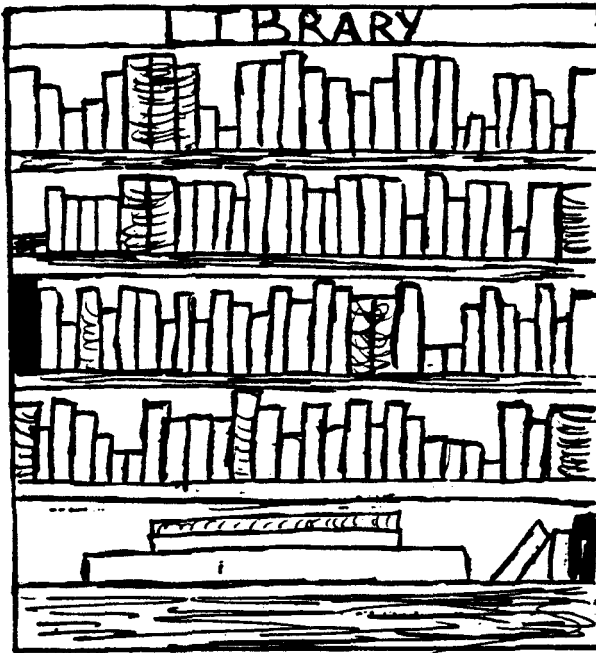
Your cognitive style, whether it be field dependence or field independence, can be used in learning. Do you think you are closer to being field dependent or field independent? At the end of this learning experience you will know because the psychological test you took will measure this. But for now, you need to realize that:

STUDENTS WHO	FIELD DEPENDENCE	FIELD INDEPENDENCE
1. Focus their attention	1. slowly, especially during stress	1. Fast
2. Prefer teachers to	2. guide and direct	2. Emphasize independent learning
3. Apply general principles	3. With effort as they miss cues	3. Separate parts from wholes
4. Analyze and structure learning experience	4. Use a global approach	4. Use hypotheses and theories
5. Use these learning approaches best	learning that includes feedback  models and personalized learning  like repetition  answer factual questions	feedback not necessary  learn by discovery  like to be challenged  answers all question types
6. Prefer learning activities that include:	6. Imposed external learning goals  Learning with external reinforcement	Self-defined learning goals  Learning with internal reinforcement
7. Remember	7. Learning experiences with social approaches and content	7. Learning experiences with math and science content

**THE EDUCATIONAL IMPLICATIONS OF BEING FIELD  
DEPENDENT OR FIELD INDEPENDENT (Cont)**

This information should help you identify and classify the field dependent and field independent characteristics in all of your learning experiences. All students and teachers have their own styles. Almost all materials from which you learn have more or less field dependent, field independent characteristics.

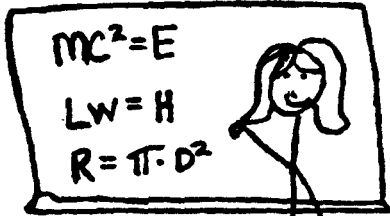
See examples on the following page.



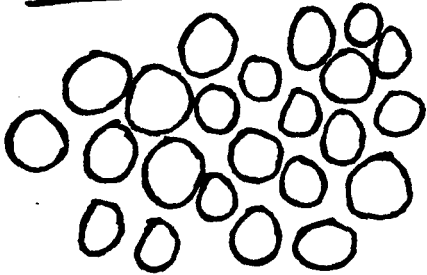
WHICH APPROACH BEST  
SUITS A FIELD DEPENDENT  
STUDENT?

OR

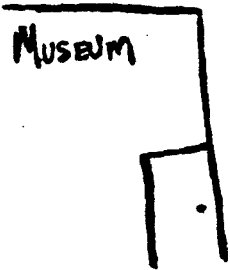




GROUP Lectures



FIELD INDEPENDENT  
STUDENTS PREFER  
WHICH TYPE OF  
LEARNING APPROACHES?



FIELD  
TRIPS



INDIVIDUAL READINGS

For example, courses N330, N332, N336 and N338 have external goals provided. Their content includes social, scientific and mathematical materials. Assigned learning materials offer a variety of field dependent and field independent activities. Various teaching styles will focus on the use of models, personalized and independent learning. Tests will also include both specific and evaluative questions. Grading is a form of external reinforcement.

Knowing and understanding a cognitive style, be it field dependence or field independence, can help you negotiate your own style with various learning activities. Finally, knowing your field dependence/field independence score can permit you to capitalize on your strengths and help you adapt your style to the learning activity at hand. If you are field independent, you can challenge yourself to develop field dependent characteristics and vice versa.

### Mini Test

Jane has high test anxiety. When she reviews her tests she notes phrases and words she did not notice when testing. Jane is probably more or less:

1. field dependent
2. field independent

Dick is upset with his clinical final test score. He said case situation questions confuse him. Dick is probably more or less:

1. field dependent
2. field independent

Answers appear on the next page

**Answers to mini test**

1. **Field Dependent**
2. **Field Independent**



## ADAPTING YOUR COGNITIVE STYLE

To reach your full learning potential you need to make use of both field dependent and field independent approaches to learning. When dealing with learning experiences, you will probably choose a method that appeals to your preferred cognitive style, but sometimes this is difficult because learning activities are created by individuals who may have different cognitive styles than yours. Also, the nature of some learning task activities may dictate the type of learning approach required. With knowledge about field dependent and field independent educational implications, you can develop a guide to identify noteworthy aspects of your learning experiences. Together with examples in this booklet of ways other students have adapted their cognitive style, you should be able to adapt or negotiate your own learning approach (style) as necessary to accomplish a task. Remember, your guide should include the type, structure, content and attention demand of the learning activity.

### HINTS TO HELP ADAPTATION

Can you rearrange the structure?

Can you find the same content with a different structure or format?

Have you arranged your environment to capitalize on your attention span?

Are you utilizing all media approaches to increase your sensory demand?

## EXAMPLES OF ADAPTING YOUR COGNITIVE STYLE

Jane is more or less field dependent. She is preparing for a test about the physiology of labor. Since this material is mostly scientific, she can probably enhance her recall by reading a case study covering this material, or by viewing a media presentation covering this content. Group study would help her. When she studies alone, she should arrange a quiet environment.

Dick is more or less field independent. He is preparing for a test on communication skills useful for the elderly client. Since this is mostly social information, he can probably increase his recall of the material if he practices each skill with an elderly person.

## MORE HINTS TO HELP ADAPTATION

Certain learning skills you have been using can be developed further to help your cognitive style adaptation. For depiction of these skills, turn to the following page. Page 27 has an index you may refer to for examples of each of these skills as used in this booklet. Page 25 has an example of a memorizing system that can be used to help recall.

COMPARE

ORGANIZE

ANALYZE

STATE REASONS - BASED ON TEXT

PARAPHRASE - STATE ANOTHER WAY

IDENTIFY DIFFERENCES

EXEMPLIFY

USE CHARTS AND DIAGRAMS TO EXPLAIN

VISUALIZE - MAKE MENTAL IMAGE

STATE MAIN IDEAS

THINK ABOUT A PROBLEM - INCUBATION

HYPOTHESIZE - GUESS









CRITIQUE - EVALUATE

USE MNEMONICS - SYSTEM OF RECALL

REVIEW - REHEARSE FOR RECALL

USE NUMBER PICTURES TO HELP RECALL

## EDUCATIONAL IMPLICATIONS OF FD, FID

NUMBER	PICTURE - NUMBER	KEY WORD TO BE RECALLED	KEY WORD CONNECTING
1		GROUP STUDY	CHAIRS IN CIRCLE PENCIL ON EACH CHAIR
2		MODEL	BLUE RIBBON FOR MODEL
3		SOCIAL INFORMATION	TELEPHONE RECEIVER FOR LIPS
4		REWARD	TROPHY FOR SAILBOAT
5		INDEPENDENT STUDY	CHAIR WITH BOOK ON SEAT
6		DISCOVERY LEARNING	TEETH BITING CHERRY
7		SCIENTIFIC INFORMATION	LAB WITH GALLOWES
8		CHALLENGES	DUELING HOUR GLASS

## SUMMARY : COGNITIVE STYLE APPROACH

### FIELD DEPENDENCE

### FIELD INDEPENDENCE

#### CHARACTERISTICS

RELATES SELF TO SITUATION	SEPARATES SELF FROM SITUATION
DEPENDS ON OTHERS	IS INDEPENDENT
ACCEPTS ENVIRONMENT	STRUCTURES ENVIRONMENT
GLOBAL	DETAILIST

#### EDUCATIONAL IMPLICATIONS

FIELD DEPENDENCE PREFERS :	FIELD INDEPENDENCE PREFERS :
FEEDBACK AND AWARDS	CHALLENGE AND SELF-CORRECTION
EXTERNAL OBJECTIVES	SELF-DEFINED OBJECTIVES
SPECIFIC FACTS	PROBLEMS
REPETITION AND MODELS	USES HYPOTHESIS
SOCIAL LEARNING ACTIVITIES	SCIENTIFIC LEARNING ACTIVITIES

## INDEX

1. Analyze, Discussion of Nursing Courses p. 20
2. Compare p. 9
3. Critique-Evaluate Mini-tests
4. Exemplify Examples
5. Hypothesize, Guess p. 18,19
6. Identify differences, differentiate p. 11
7. Organize p. 3
8. Paraphrase, state another way p. 13
9. Review, rehearse for recall p. 26
10. State main ideas p. 6
11. State reasons, rationalize p. 11
12. Use charts and diagrams to explain p. 12
13. Use a memory system of recall p. 25
14. Visualize-make mental images p. 25

**Assignment For Follow up Group Discussion**

You will notice that one learning skill, thinking about a problem--incubation is really not exemplified in this booklet. That is your assignment for the follow-up group discussion. Where and when the group discussion will take place will be announced on the bulletin board.

Think about all you have learned from this booklet and apply it to all your future learning activities. Record your observations and questions for sharing on this page.

**Record time spent:**

**Reading and reviewing booklet:**

**Applying your learning:**

**Questions and observations for sharing:**

**Circle the style you think you are:**

**Field Dependent**

**Field Independent**

**You will receive your style score after handing in the post-test.**

## **APPENDIX F**



Summary of Concept Attainment Lesson Plan

(Marsha and Bruce Joyce Weil)

Instructional Booklet

**Educational Implications of Field Dependence, Field Independence**

- I Objective**
- II Analysis of concept**
- III Exemplars**
- IV Related assignment for discussion period**

Discussion Period

- I Further application of concept**
- II Questioning - open process and evaluative questions that will further guide students in applying instruction**
- III Promote further understanding by sharing observations, answering questions and presenting more examples of concept application**
- IV State conclusions from discussion**

## **APPENDIX G**

**SQ3R Study Technique**  
**(Lesson Plan)**

**Instructional Booklet**

- I Introduction**
- II Presentation of technique**
- III Assignment for discussion period**

**Discussion Period**

- I Further Application of technique to individual's studying**
- II Questioning - recall and convergent questions**
- III Promote further understanding by sharing observations and answering questions.**
- IV Conclusion (Brief restatement of technique)**

APPROVAL SHEET

The dissertation submitted by Jeanne V. Panuncialman has been read and approved by the following committee:

Dr. Mary Jane Gray, Director  
Chairperson, Curriculum and Instruction, Loyola

Dr. Dianne Schiller, Director  
Assistant Professor, Curriculum and Instruction, Loyola

Dr. Anne Juhasz  
Professor, Educational Psychology, Loyola

The final copies have been examined by the directors of the dissertation and the signatures which appear 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 Philosophy.

November 6, 1985  
Date

Mary Jane Gray  
Director's Signature

Dianne Schiller  
Director's Signature